EnergyRite®
Pool & Spa Heater

Installation & Operation Manual

Models: ER152, ER202, ER252, ER302, and ER402
SERIES 100 - 101

2000627612 00

DESIGN CERTIFIED®

CERTIFIED®

Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

⚠ WARNING:

This manual supplies information for the installation, operation, and servicing of the appliance. It is strongly recommended that this manual and the EnergyRite Service Manual be reviewed completely before proceeding with an installation. Perform steps in the order given. Failure to comply could result in severe personal injury, death, or substantial property damage.

Save this manual for future reference.

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Hazard definitions

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels or to important information concerning the life of the product.

⚠ DANGER DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTICE NOTICE indicates special instructions on installation, operation, or maintenance that are important but not related to personal injury or property damage.

Please read before proceeding

NOTICE This is a gas appliance and should be installed by a licensed electrician and/or certified gas supplier. Service must be performed by a qualified service installer, service agency or the gas supplier.

⚠WARNING If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.

This pool heater MUST NOT be installed in any location where gasoline or flammable vapors are likely to be present, unless the installation is such to eliminate the probable ignition of gasoline or flammable vapors.

What to do if you smell gas –

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbors phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency, or the gas supplier.

Warranty –

Factory warranty (shipped with unit) does not apply to units improperly installed or improperly operated.

Experience has shown that improper installation or system design, rather than faulty equipment, is the cause of most operating problems.

1. Improper maintenance of pool water chemistry resulting in high water hardness and high alkalinity that results in a lime scale build up in the copper tube is not the fault of the equipment and is not covered under the manufacturer's warranty (see the *Facts About Water Chemistry* section of the EnergyRite Service Manual).
2. Excessive pitting and erosion on the inside of the copper tube may be caused by too much water velocity through the tubes and is not covered by the manufacturer's warranty (see *Water Connections, Table 7A - Minimum Water Flow Requirements*).

⚠WARNING Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual for assistance or additional information, consult a qualified installer, service agency or the gas supplier.

Checking equipment –

Upon receiving equipment, check for signs of shipping damage. Pay particular attention to parts accompanying the pool heater which may show signs of being hit or otherwise being mishandled. Verify total number of pieces shown on packing slip with those actually received. In case there is damage or a shortage, immediately notify the carrier.

Do not use this pool heater if any part has been under water. The possible damage to a flooded pool heater can be extensive and present numerous safety hazards. Any pool heater that has been under water must be replaced.

⚠ Owner warning –

The information contained in this manual is intended for use by qualified professional installers, service technicians, or gas suppliers. **Consult your local expert for proper installation or service procedures.**

NOTICE Consult and follow all local Building and Fire Regulations and other Safety Codes that apply to this installation. Consult a local gas utility company to authorize and inspect all gas and flue connections.

Your conventionally vented gas unit must have a supply of fresh air circulating around it during burner operation for proper gas combustion and proper venting.

⚠WARNING Should overheating occur or the gas supply fail to shut off, do not turn off or disconnect the electrical supply to the pump. Instead, turn off the manual gas control valve to the appliance at a location external to the appliance.

Prevention of freezing –

Heat exchangers and headers damaged by freezing are not covered by warranty.

See the *Winterizing* section of the EnergyRite Service Manual.

Please read before proceeding

Spa and hot tub safety –

The following safety rules must be observed while operating spa or hot tub.

1. Spa or hot tub water temperatures should never exceed 104°F (40°C). A temperature of 100°F (38°C) is considered safe for a healthy adult. Special caution is suggested for young children.

2. Drinking of alcoholic beverages before or during spa or hot tub use can cause drowsiness which could lead to unconsciousness and subsequently result in drowning.

3. Pregnant women beware! Soaking in water above 102°F (39°C) can cause fetal damage during the first three months of pregnancy (resulting in birth of a brain-damaged or deformed child). Pregnant women should observe the 100°F (38°C) maximum rule.

4. Before entering the spa or hot tub, users should check the water temperature with an accurate thermometer; spa or hot tub thermostats may err in regulating water temperatures by as much as 4°F (2°C).

5. Persons with a medical history of heart disease, circulatory problems, diabetes or blood pressure problems should obtain their physician's advice before using spas or hot tubs.

6. Persons taking medications which induce drowsiness, such as tranquilizers, antihistamine or anticoagulants, should not use spas or hot tubs.

⚠WARNING To minimize the possibility of serious personal injury, fire, or damage to your pool heater, never violate the following safety rules:

1. Pool heaters are heat producing appliances. To avoid damage or injury, do not store materials against the pool heater or the vent-air intake system. Use proper care to avoid unnecessary contact (especially children) with the pool heater and vent-air intake components.

2. Never cover your pool heater, lean anything against it, store trash or debris near it, stand on it or in any way block the flow of fresh air to your pool heater.

3. UNDER NO CIRCUMSTANCES must flammable materials such as gasoline or paint thinner be used or stored in the vicinity of this pool heater, vent-air intake system or any location from which fumes could reach the pool heater or vent-air intake system.

Codes –

This pool heater has been designed and certified under the latest edition of Z21.56/CSA 4.7 Gas Fired Pool Heater Standard, including applicable addenda.

The pool heater shall be installed in accordance with those installation regulations in force in the local area where the installation is to be made. These shall be carefully followed in all cases. Authorities having jurisdiction shall be consulted before installations are made. In the absence of such requirements, the installation shall conform to the latest edition of the National Fuel Gas Code, ANSI Z223.1 and/or CAN/CGA-B149 Installation Code.

As an option, all pool heaters may be ordered with heat exchanger construction that conforms to the latest edition of the ASME Boiler and Pressure Vessel Code, Section IV, Part HLW.

Ratings

HLW

Model Number Note: Change "N" to "L" for Propane gas models. Add suffix "-A" for ASME models.	Input Btu/hr	Pool Heater Water Content Gallons		Gas Connections	Vent/Air Size			Maximum Working Pressure (PSI)	
	(Note 3)	ASME	NON-ASME	(NPT)	Conventional	DirectAire (Note 2)	E-Rite (Note 2)	ASME	NON-ASME
ERN152	150,000	0.58	0.83	3/4"	5"	4"	4"	125	50
ERN202	199,000	0.58	0.84	3/4"	5"	4"	4"	125	50
ERN252	250,000	0.59	0.84	3/4"	6"	5"	5"	125	50
ERN302	300,000	0.59	0.85	3/4"	6"	5"	5"	125	50
ERN402	399,000	0.60	0.85	3/4"	6"	6"	6"	125	50

Notes:

1. The ratings are based on standard test procedures prescribed by the United States Department of Energy.
2. Use only the vent materials and methods specified in the Venting Section of the EnergyRite Installation and Operation Manual.
3. This appliance is equipped for operation up to 2000 feet, and including up to 4000 feet, with no field adjustments. The appliance output ratings up to 4000 feet shall be reduced by 4% for each 1000 feet above sea level. For operation above 4000 feet, consult the factory. For operation above 2000 feet in Canada, consult the factory.

The EnergyRite - How it works...

1. **Heat exchanger**
   Allows pool water to flow through specially designed tubes for maximum heat transfer, while providing protection against flue gas corrosion.

2. **Blower**
   The blower provides air to mix with gas in the burners.

3. **Gas valve**
   The gas valve is a single stage referencing valve. The valve senses the chamber pressure and regulates gas flow based on that signal.

4. **Outlet temperature sensor**
   This sensor monitors outlet water temperature and will shut down the unit if this temperature gets too high.

5. **Inlet temperature sensor**
   This sensor monitors the inlet water temperature and will be used by the integrated control to determine whether an ignition cycle should begin.

6. **Electronic display**
   The electronic display consists of 4 buttons and a dual line 32-character liquid crystal display.

7. **Burner**
   The burner is a stainless steel burner which accepts both gas and air and mixes them. The number of burners in the unit depends on the Btu input: 150,000 Btu/hr = 3; 199,000 Btu/hr = 4; 250,000 Btu/hr = 5; 300,000 Btu/hr = 6; and 399,000 Btu/hr = 8.

8. **Water outlet (pool supply)**
   For a standard unit this is a 2" slip fit connection with supplied union nuts and a starter pipe assembly. For an ASME unit, see the *ASME* section of this manual.

9. **Water inlet (pool return)**
   For a standard unit this is a 2" slip fit connection with supplied union nuts and a starter pipe assembly. For an ASME unit, see the *ASME* section of this manual.

10. **Water pressure switch boot**
    The water pressure switch boot provides protection for the water pressure switch.

11. **Control Module**
    The control responds to internal and external signals and controls the blower, and gas valve to meet the heating demand.

12. **High voltage junction box**
    The junction box contains the connection points for the line voltage power.

13. **Pool heater drain port (not shown)**
    Location from which the heat exchanger can be drained.

14. **Low voltage terminal strip**
    The terminal strip is used to connect proving switch contacts and a third party remote.

15. **Ignition electrode**
    Provides direct spark for igniting the burner.

16. **Flame inspection window**
    The quartz glass window provides a view of the burner surface and flame.

17. **High limit sensor**
    Device that monitors the outlet water temperature. If the temperature exceeds 175°, it will break the control circuit, shutting the pool heater down.

18. **Flame sensor**
    Used by the control module to detect the presence of burner flame.

19. **Top panel**
    Removable panel to gain access to the internal components.

20. **Power switch**
    Turns line power (120 or 240 VAC) ON/OFF to the pool heater.

21. **Outdoor vent cap**
    An outdoor vent cap is mounted on the pool heater as shipped from the factory.

22. **Water pressure switch**
    The water pressure switch is a safety device that ensures the heat exchanger is under pressure. If the water pressure in the heat exchanger goes too low, it will break the control circuit, shutting the pool heater down.

23. **Air pressure switch**
    The air pressure switch is a safety device that ensures proper blower performance through the heater before and during operation. This device also detects blockages in the vent or air piping.

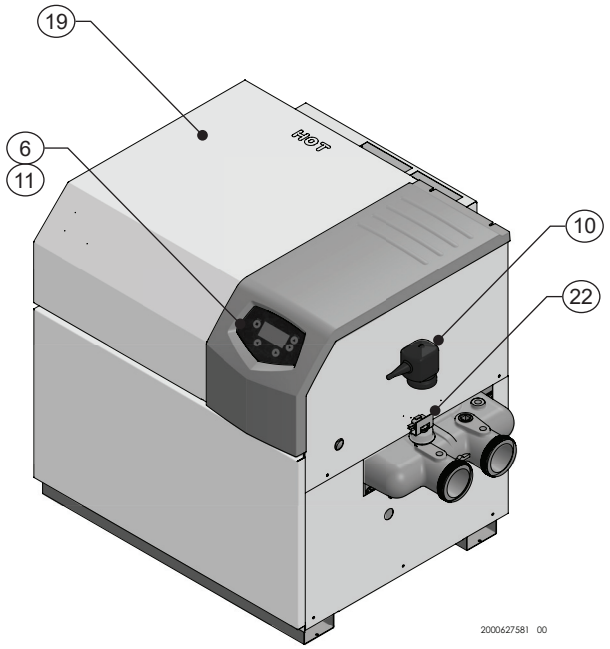
24. **240 VAC - 120 VAC conversion**
    This appliance is wired for 240 VAC service. The pool heater can be converted to 120 VAC by moving the jumper connector from the connector labeled 240 VAC to the connector labeled 120 VAC.

25. **Low gas pressure switch (ER252 - ER402 Models ONLY)**
    Ensures adequate gas pressure is provided to the pool heater.

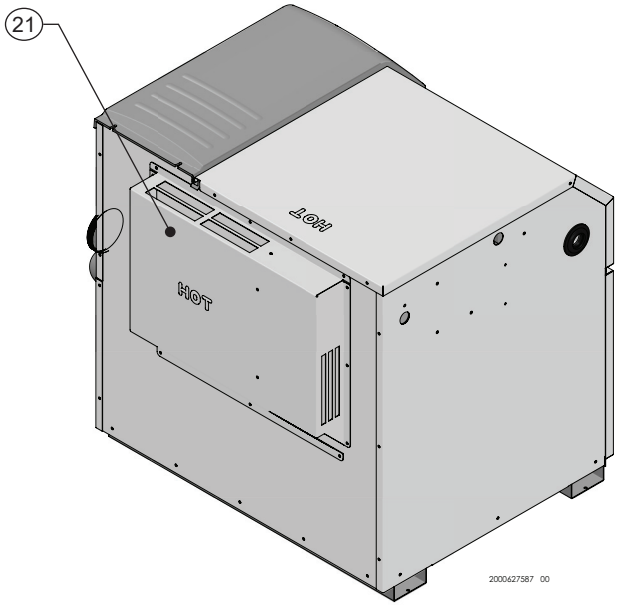
26. **Plenum Divider**
    Separates the plenum into two chambers to provide some isolation to the controls from the combustion air flow.

The EnergyRite - How it works... *(continued)*

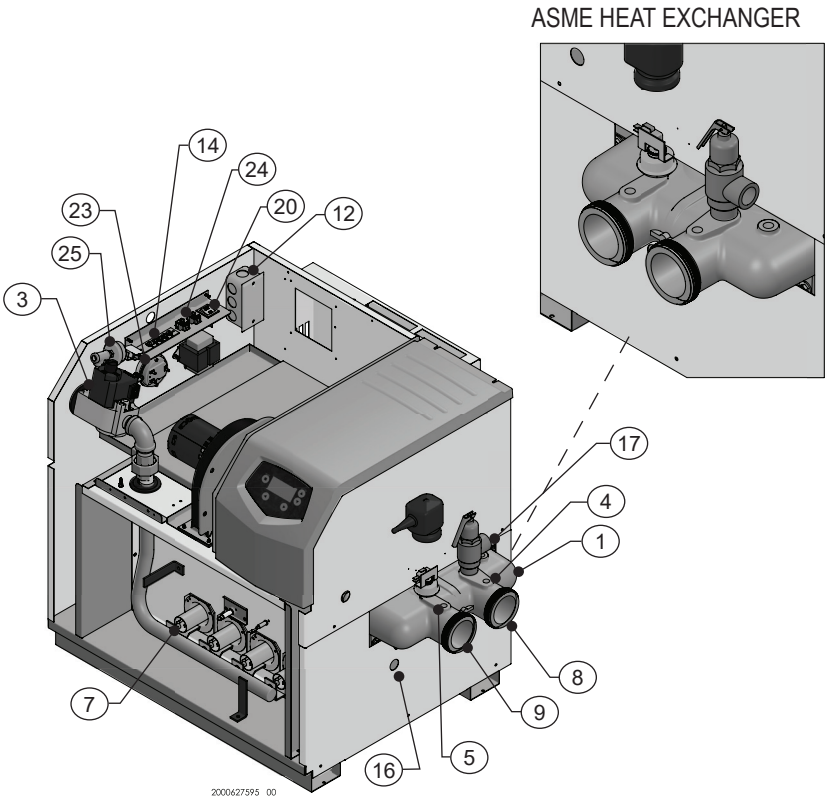
Models ER152 - ER402



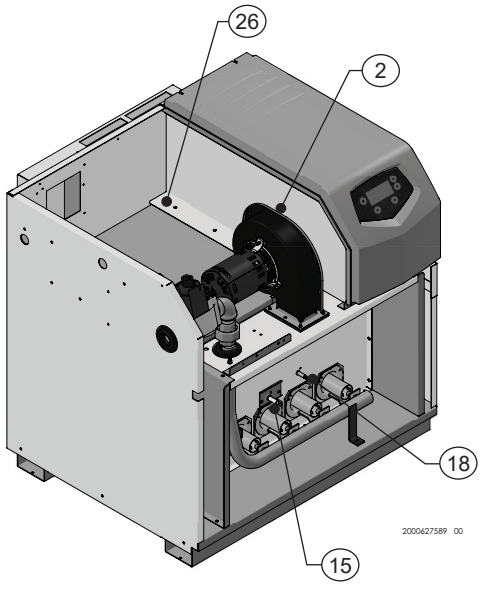
Front View



Rear View



Right Side (inside unit)



Left Side (inside unit)

1 Determine pool heater location

Location of pool heater

1. Locate the pool heater so that if water connections should leak, it will not result in damage to the area adjacent to the pool heater or to the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the pool heater. The pan must not restrict combustion air flow. Under no circumstances is the manufacturer to be held responsible for water damage in connection with this pool heater, or any of its components.

2. Pool heaters located in a residential garage and in adjacent spaces that open to the garage and are not part of the living space of a dwelling unit must be installed so that all burners and burner ignition devices have a minimum clearance of not less than 18" (46 cm) above the floor. The pool heater must be located or protected so that it is not subject to physical damage by a moving vehicle.

3. **DO NOT** install this pool heater in any location where gasoline or flammable vapors are likely to be present.

4. **DO NOT** install this pool heater on carpet.

5. This pool heater is approved for installation on combustible (wood) flooring.

6. Outdoor models are factory supplied with an outdoor vent cap assembly. Outdoor models must not be installed directly on the ground. A suitable rigid and level base such as concrete, brick, or other stable surface that will ensure stability of the pool heater. Outdoor models have additional special location and clearance requirements. These are specifically addressed in the Venting Section under *Outdoor Installation*. Do not install in locations where rain from building runoff drains or sprinkler systems will spill onto the pool heater. A windproof cabinet protects the pool heater from weather.

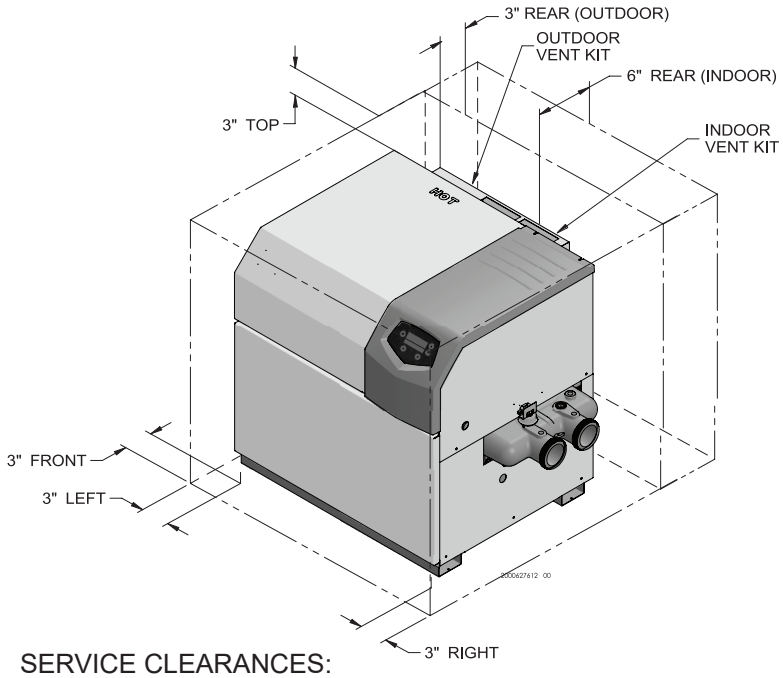
7. Indoor installations require that the factory installed outdoor vent cap be removed from the pool heater to allow the installation of a flue pipe. Specific instructions for the removal of the outdoor cap are addressed in the Venting section. Indoor installations require an adequate supply of clean combustion air for proper operation. Optional venting arrangements may allow direct pipe connection from the pool heater to the outside for combustion air. See the *Venting Options* section of this manual.

8. This pool heater must be installed at least five feet from the inside wall of a pool unless separated from the pool by a solid fence, wall or permanent barrier.

9. When a pool heater is installed within the pool structure, the structure shall be designed such that in the event of a fuel gas leak, the leaking gas is vented to the exterior of the pool structure.

1 Determine pool heater location *(continued)*

TABLE - 1A CLEARANCES FROM COMBUSTIBLE CONSTRUCTION	
Location	**Clearances**
Right Side	3" (24" suggested for service)
Rear (Outdoor)	3" (3" minimum from any surface)
Rear (Indoor)	6" (6" minimum from any surface)
Left Side	3"
Front - Alcove*	Open (24" suggested for service)
Top	3" (24" suggested for service)
Flue (Indoor)	6"
Hot Water Pipes	1"
*An Alcove is a closet without a door.	



SERVICE CLEARANCES:

FRONT = 24"
TOP = 24"
RIGHT SIDE = 24"

***Figure 1-1**_Clearances from Combustible Construction (Front and Rear)*

Combustion and ventilation air requirements for conventionally vented appliances and sidewall vented appliances

Provisions for combustion and ventilation air must be in accordance with the Air for Combustion and Ventilation Section of the latest edition of the National Fuel Gas Code, ANSI Z223.1, in Canada CAN/CGA-B149 Installation Code for Gas Burning Appliances and Equipment, or applicable provisions of the local building codes.

The equipment room MUST be provided with properly sized openings to assure adequate combustion air and proper ventilation when the pool heater is installed with conventional venting or sidewall venting and drawing combustion air from the room.

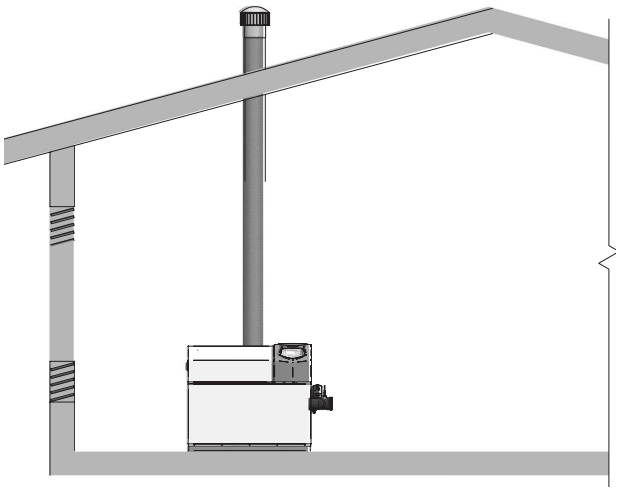


***Figure 1-2**_Combustion Air Direct from Outside*

1. If air is taken directly from outside the building with no duct, provide two permanent openings to the equipment room:

   (a) Combustion air opening, with a minimum free area of one square inch per 4000 Btu/hr input. This opening must be located within 12" of the bottom of the floor.

   (b) Ventilation air opening, with a minimum free area of one square inch per 4000 Btu/hr input. This opening must be located within 12" of the top of the ceiling.

1 Determine pool heater location

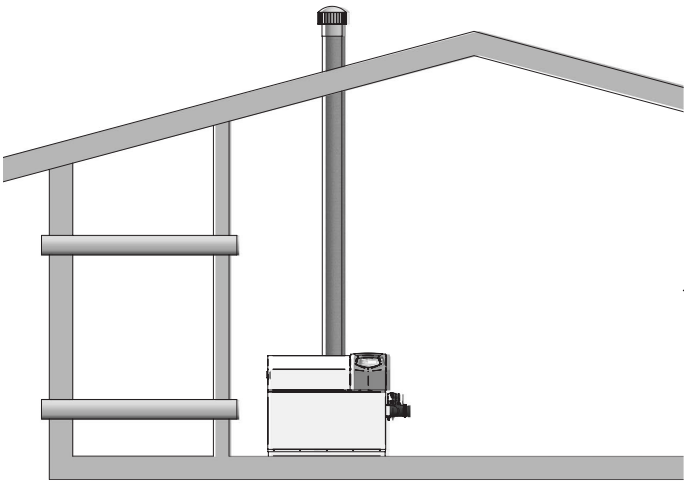


***Figure 1-3**_Combustion Air Through Ducts*

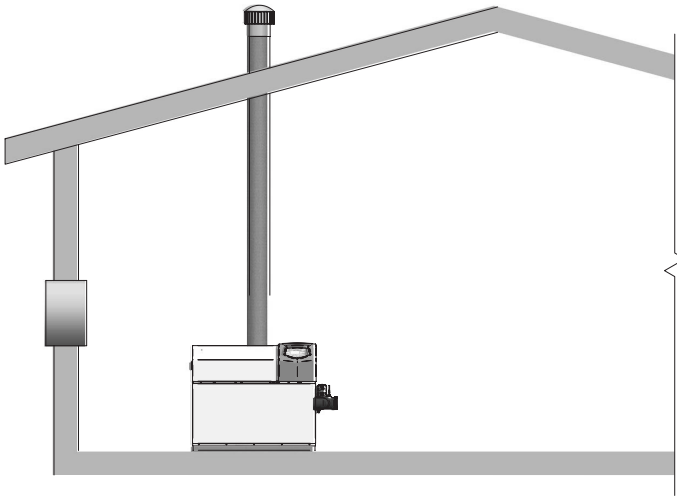


***Figure 1-5**_Combustion Air from Outside - Single Opening*

2. If combustion and ventilation air is taken from the outdoors using a duct to deliver the air to the equipment room, each of the two openings should be sized based on a minimum free area of one square inch per 2000 Btu/hr.

4. If a single combustion air opening is provided to bring combustion air in directly from the outdoors, the opening must be sized based on a minimum free area of one square inch per 3000 Btu/hr. This opening must be located within 12" of the top of the ceiling.

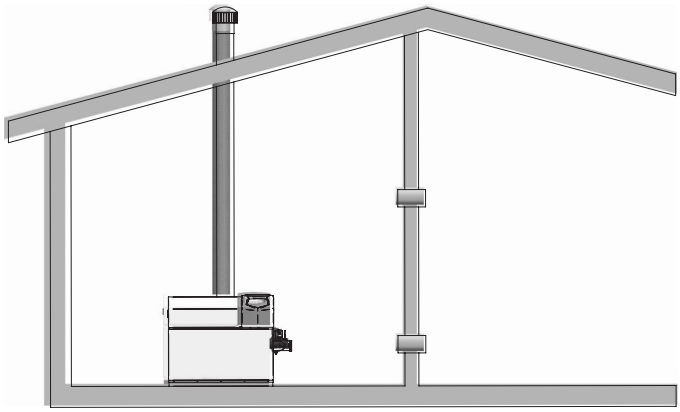


***Figure 1-4**_Combustion Air from Interior Space*

3. If air is taken from another interior space, each of the two openings specified above should have a net free area of one square inch for each 1000 Btu/hr of input, but not less than 100 square inches.

1 Determine pool heater location *(continued)*

TABLE - 1B
MINIMUM RECOMMENDED COMBUSTION AIR SUPPLY TO EQUIPMENT ROOM

Model Number	Outside Air from 2 Openings Directly from Outdoors		Outside Air from 1 Opening Directly from Outdoors, in²	Inside Air from 2 Ducts Delivered from Outdoors		Inside Air from 2 Ducts Delivered from Interior Space	
	Top Opening, in²	Bottom Opening, in²		Top Opening, in²	Bottom Opening, in²	Top Opening, in²	Bottom Opening, in²
ER152	38	38	50	75	75	150	150
ER202	50	50	67	100	100	200	200
ER252	63	63	83	125	125	250	250
ER302	75	75	100	150	150	300	300
ER402	100	100	133	200	200	400	400

Combustion air requirements are based on the latest edition of the National Fuel Gas Code, ANSI Z223.1, in Canada CAN/CGA-B149 Installation Code for Gas Burning Appliances and Equipment. Check all local code requirements for combustion air.

All dimensions are based on net free area in square inches. Metal louvers or screens reduce the free area of a combustion air opening a minimum of approximately 25%. Check with louver manufacturers for exact net free area of louvers. Where two openings are provided, one must be within 12" of the ceiling and one must be within 12" of the floor of the equipment room. Each opening must have net free area as specified in Table 1B. Single openings shall be installed within 12" of the ceiling.

⚠ CAUTION Under no circumstances should the equipment room ever be under a negative pressure. Particular care should be taken where exhaust fans, attic fans, clothes dryers, compressors, air handling units, etc., may take away air from the unit.

The combustion air supply must be completely free of any flammable vapors that may ignite or chemical fumes which may be corrosive to the pool heater. Common corrosive chemical fumes which must be avoided are fluorocarbons and other halogenated compounds, most commonly present as refrigerants or solvents, such as Freon, trichlorethylene, perchlorethylene, chlorine, etc. These chemicals, when burned, form acids which attack the heat exchanger finned tubes, headers, flue collectors, and the vent system. The result is improper combustion and a non-warrantable, premature pool heater failure.

EXHAUST FANS: Any fan or equipment which exhausts air from the equipment room may deplete the combustion air supply and/or cause a downdraft in the venting system. Spillage of flue products from the venting system into an occupied living space can cause a very hazardous condition that must be immediately corrected. If a fan is used to supply combustion air to the equipment room, the installer must make sure that it does not cause drafts which could lead to nuisance operational problems with the pool heater.

DirectAire Vertical, DirectAire Horizontal and E-Rite Venting systems have specific requirements for combustion air ducts from the outside which are directly connected to the pool heater. See the requirements for this combustion air duct in the Venting section for each specialized vent system.

2 General venting

Vent system options

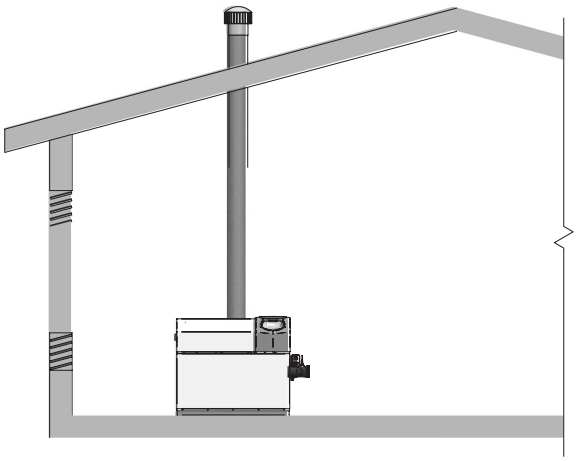


***Figure 2-1**_Conventional Negative Draft Venting - See page 17 for more details*

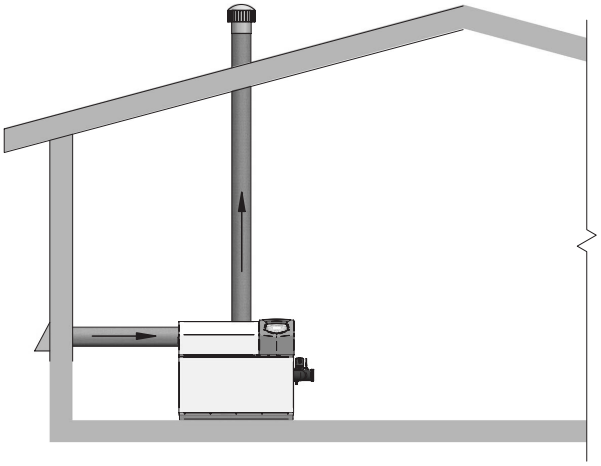


***Figure 2-2**_DirectAire Vertical w/Sidewall Air Inlet - See page 21 for more details*

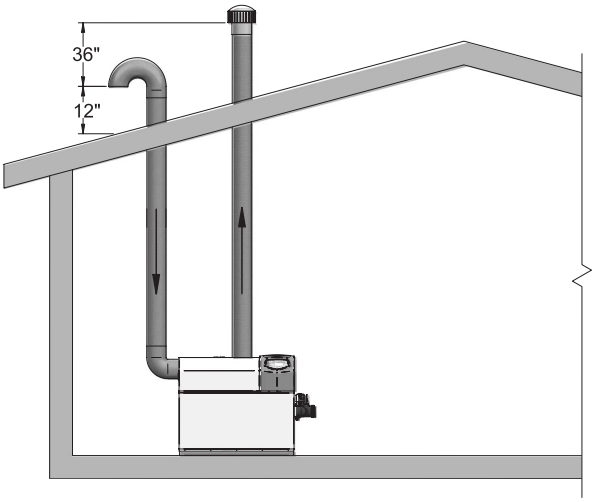


***Figure 2-3**_DirectAire Vertical Venting w/Vertical Air Inlet - See page 20 for more details*

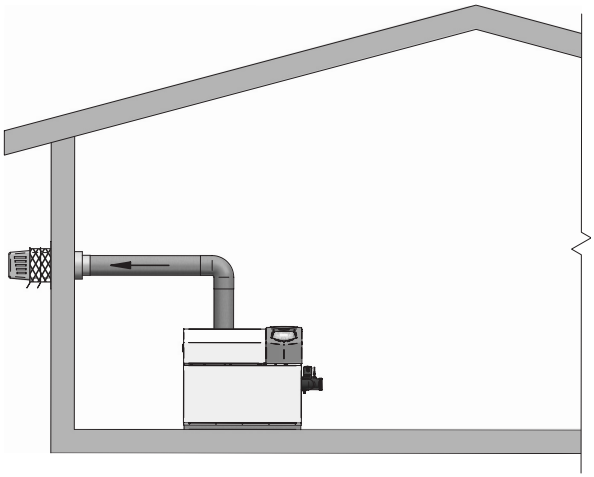


***Figure 2-4**_Power Sidewall Venting - See page 24 for more details*

2 General venting *(continued)*

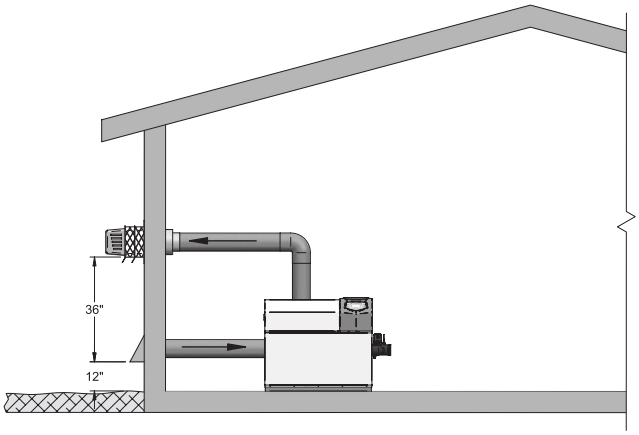


***Figure 2-5**_Power DirectAire Horizontal Venting - See page 25 for more details*

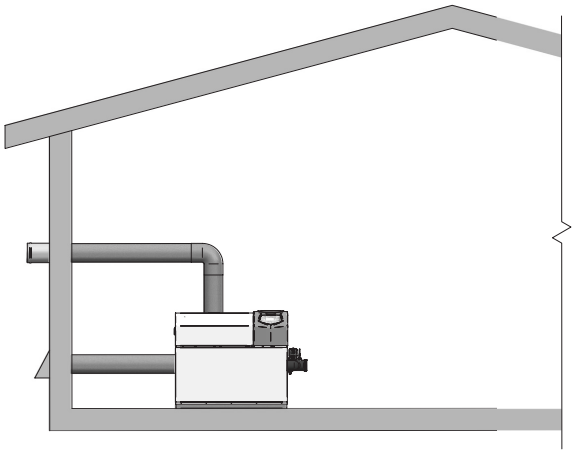


***Figure 2-6**_E-Rite Sidewall Venting - See page 27 for more details*

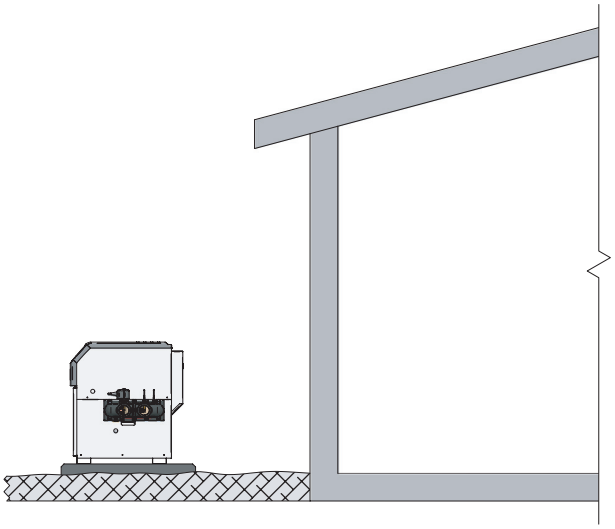


***Figure 2-7**_Outdoor Venting - See page 14 for more details*

This pool heater has six (6) venting options. They are: **(1) Conventional Negative Draft Venting** with vertical rooftop flue termination and combustion air supplied from the equipment room, **(2) DirectAire Vertical Venting** with a vertical conventional vent for flue products and a combustion air pipe from either the sidewall or rooftop, **(3) Power Sidewall Venting** to exhaust flue products out a sidewall with a powered vent assembly and combustion air supplied from the equipment room **(4) DirectAire Horizontal Venting** with a powered vent assembly to exhaust the flue products out a sidewall and a combustion air pipe from the sidewall, **(5) E-Rite Sidewall Venting** which uses the internal combustion air fan to exhaust the flue products out a sidewall vent termination with a limited vent length. Combustion air for an E-Rite Sidewall vent must be supplied with a combustion air pipe from the sidewall. The plenum divider must be removed for E-Rite Sidewall Venting, **(6) Outdoor Venting** using the factory supplied vent cap installed on the unit. All pool heaters are shipped from the factory equipped for Outdoor Installation. All other optional vent systems require the removal of the outdoor vent cap and installation of specific vent kits and venting materials. The following is a detailed explanation of the installation requirements for each venting system, components used and part numbers of vent kits for each model.

2 General venting

General

Vent installations for connection to gas vents or chimneys must be in accordance with "Venting of Equipment", of the latest edition of the National Fuel Gas Code, ANSI Z223.1, in Canada, the latest edition of CAN/CGA - B149 Installation Codes for Gas Burning Appliances and Equipment or applicable provisions of the local building codes.

Conventional negative draft venting and sidewall venting applications, where outside air is used, must have adequate combustion and ventilation air supplied to the equipment room in accordance with the latest edition of the National Fuel Gas Code, ANSI Z223.1, in Canada, the latest edition of CAN/CGA - B149 Installation Codes for Gas Burning Appliances and Equipment, or applicable provisions of the local building codes.

The distance of the vent terminal from adjacent buildings, windows that open and building openings, MUST comply with the latest edition of the National Fuel Gas Code, ANSI Z223.1, in Canada, the latest edition of CAN/CGA - B149 Installation Codes for Gas Burning Appliances and Equipment.

Vent connection is made directly to the flue outlet connection on the pool heater. No additional draft diverter or barometric damper is required on single unit installations when a negative draft is maintained within the specified range. The connection from the pool heater's vent to the stack must be made as direct as possible.

Barometric damper location

The preferred location for the barometric damper (if required) is in a tee or collar installed in the vertical pipe, rising from the pool heater's flue outlet. The barometric damper must not be installed in a bullhead tee installed on the unit's flue outlet. The tee or collar containing the barometric damper should be approximately three feet vertically above the connection to the unit's flue outlet. This location ensures that any positive velocity pressure from the unit's internal combustion fan is dissipated and the flue products are rising due to buoyancy generated from the temperature of the flue products. Adjust the weights on the damper to ensure that draft is maintained within the specified range.

NOTICE Examine the venting system at least once a year. Check all joints and vent pipe connections for tightness. Also check for corrosion or deterioration. Immediately correct any problems observed in the venting system.

Outdoor installation

Units are self venting and can be used outdoors when installed with the factory supplied outdoor vent cap. The outdoor vent cap is mounted directly to the rear of the pool heater as shipped from the manufacturer and covers the flue outlet and combustion air inlet openings on the jacket. No additional vent piping is required.

⚠WARNING The flue products discharged from the flue outlet on the outdoor vent cap may be very hot. Avoid touching or other direct contact with the flue gases or the vent cap assembly. These components are hot and direct contact can result in burns.

⚠WARNING Outdoor models must be installed outdoors and must use the outdoor vent cap assembly supplied by the manufacturer. Personal injury or product damage may result if any other cap is used or if an outdoor model is used indoors. All covers, doors, and jacket panels must be properly installed to ensure proper operation and prevent a hazardous condition.

⚠ CAUTION Pool heaters which are shut down or will not operate may experience freezing due to convective air flow in the outdoor vent cap installed on the unit. If operated in cold climates, continuous pump operation is recommended to help prevent freezing of pool water in an outdoor installation. Proper freeze protection must be provided. A pool heater that is not in use in the winter season must be properly drained and winterized. See the *Winterizing* section of the EnergyRite Service Manual.

Combustion air supply must be free of contaminants (see *Combustion and Ventilation Air Requirements* in the Determine Pool Heater Location section). To prevent recirculation of the flue products into the combustion air inlet, follow all instructions in this section.

The venting areas must never be obstructed. Keep area clean and free of combustible and flammable materials. Maintain a minimum clearance of 3 inches to combustible surfaces and a minimum of a 3 inch clearance to the air inlet. To avoid a blocked air inlet or blocked flue condition, keep the outdoor cap air inlet, flue outlet and drain slot clear of leaves, debris, snow, ice, etc.

A pool heater should not be located so that high winds can deflect off of adjacent walls, buildings, or shrubbery causing recirculation. Recirculation of flue products may cause operational problems, bad combustion or damage to controls. The pool heater should be located at least 3 feet from any wall or vertical surface to prevent adverse wind conditions from affecting performance.

2 General venting *(continued)*

The outdoor pool heater must not be installed in an area that is enclosed by walls or a fence that will block free wind movement around the pool heater. Free movement of wind around the outdoor unit is required to carry away the flue products and provide combustion air. The flue outlet/combustion air inlet cap of an outdoor pool heater must not be installed closer than 10 feet from an inside corner of an L-shaped structure. Walls or enclosed fencing may cause eddy currents which can recirculate the flue products into the combustion air inlet. Recirculation of flue products may cause operational problems, bad combustion or non-warrantable damage to controls.

Do not install the pool heater with outdoor venting under a deck.

Do not install an outdoor pool heater in a well, stairwell, alcove, courtyard, or other recessed area.

The outdoor unit must be located 4 feet below and 4 feet horizontally from any window, door, walkway, or gravity air intake.

The combustion air inlet of the outdoor cap must be located at least 1 foot above grade and above normal snow levels. The pool heater must be at least 10 feet away from any forced air inlet.

The pool heater must be at least 3 feet outside any overhang.

Clearances around outdoor installations can change with time. Do not allow the growth of trees, shrubs, or other plants to obstruct the proper operation of the outdoor vent system.

Do not install in locations where rain from building runoff drains will spill onto the pool heater.

Do not locate the pool heater so that water from sprinklers may spray directly on the unit. Water may damage controls or other electrical components.

Multiple unit outdoor pool heater installations require a minimum of 4 feet clearance between the vent cap and air inlet of adjacent heaters to prevent recirculation of flue products.

Flue gas condensate can freeze on exterior walls or on the vent cap of a pool heater operated in the winter months. Frozen condensate on the vent cap can result in a blocked flue condition. Some discoloration to exterior building or unit surfaces can be expected. Adjacent brick or masonry surfaces should be protected with a rust resistant sheet metal plate.

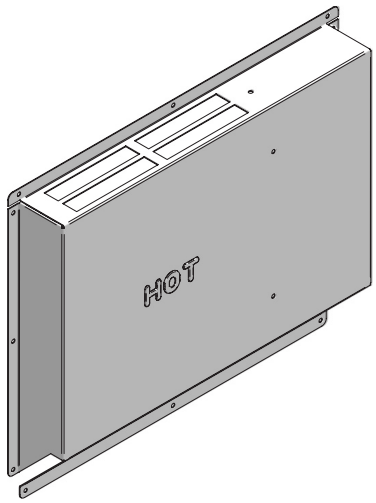


***Figure 2-8**_Outdoor Vent Cap (Outside View)*

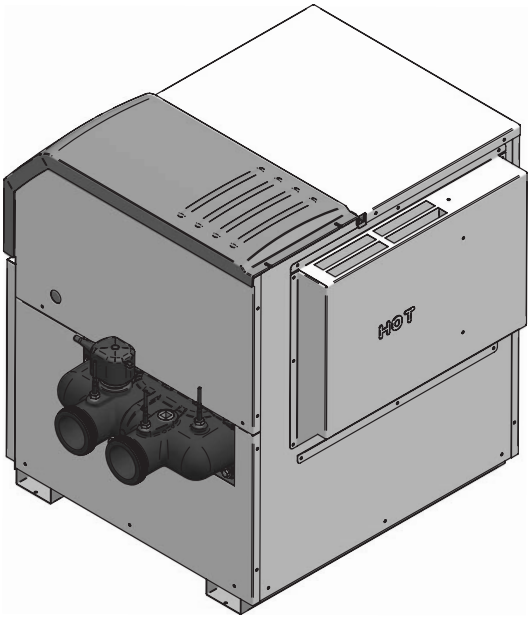


***Figure 2-9**_Outdoor Vent Cap Installed on Unit*

The outdoor vent cap

An outdoor vent cap is furnished by the manufacturer in accordance with CSA International requirements. An outdoor vent cap kit is mounted on the pool heater as shipped from the factory. The kit includes the flue outlet/combustion air inlet assembly and gasket.

⚠ CAUTION Pool heaters which are shut down or will not operate may experience freezing due to convective air flow through the vent cap installed on the unit. Proper freeze protection must be provided. A pool heater that is not in use in the winter season must be properly drained and winterized. See the *Winterizing* section of the EnergyRite Service Manual.

2 General venting

⚠WARNING An Outdoor Installation, DirectAire Vent or an E-Rite Vent into dead air spaces such as alleys, atriums, and inside corners can cause recirculation of flue gases. Recirculation of flue gases will cause incomplete combustion, sooting, premature failure of the jacket, vent and heat exchanger as well as icing of the combustion air intake during operation in severe cold weather. Minimum clearances between the combustion air intake and exhaust vent terminal are specified in the installation instructions. To prevent recirculation of the flue gases, maintain as much distance as possible between the combustion air intake and the exhaust vent terminal.

Failure to comply with the above could result in severe personal injury, death or substantial property damage.

Installation of optional vent kits

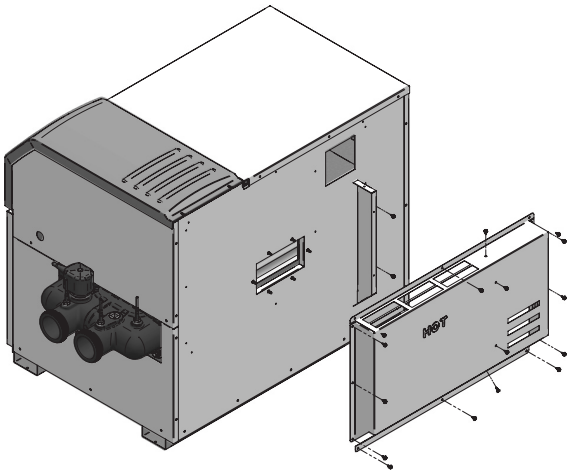


***Figure 2-10**_Removal of Outdoor Vent Cap*

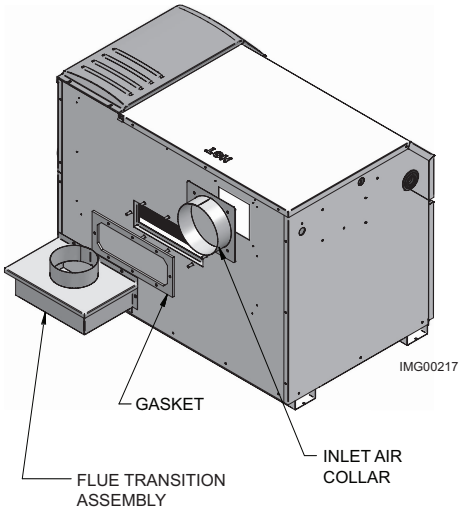


***Figure 2-11**_Installation of Flue Adapter and Air Inlet Collar*

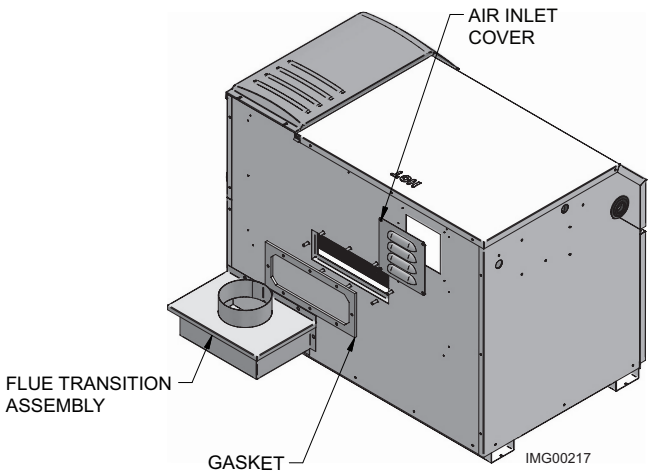


***Figure 2-12**_Installation of Flue Adapter and Air Inlet Cover*

Whenever a vent option other than outdoor installation is desired, the outdoor vent cap assembly must be removed and an optional vent kit must be installed on the pool heater. The vent kit allows connection of the flue and/or a combustion air pipe. The vent kit includes the flue adapter*, assembly instructions and an air inlet collar to allow connection of an air inlet pipe or an air inlet cover when combustion air is drawn from the equipment room. Remove the screws surrounding the outdoor vent cap and the four screws in the divider between the flue outlet and air inlet chambers on the vent cap.

*A flue adapter is not provided in the E-Rite Vent Kit.

3 Conventional venting

A conventional negative draft venting system

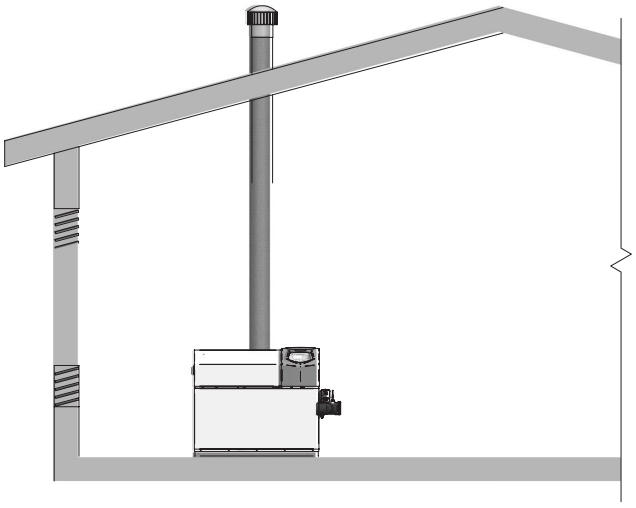


***Figure 3-1**_Conventional Negative Draft Vertical Venting with Combustion Air Louvers*

The outdoor vent cap assembly must be removed before any connection to a conventional negative draft vent system can be made. A conventional vent adapter kit must be installed on the pool heater's flue outlet. The conventional vent kit includes the flue adapter and an air inlet cover. Mount the air inlet cover over the combustion air inlet opening on the rear of the jacket. No additional draft diverter or barometric damper is required on single unit installations with a dedicated stack and a negative draft within the specified range of a negative 0.02 to 0.08 inches water. If the draft in a dedicated stack for a single unit installation exceeds the maximum specified draft, a barometric damper must be installed to control draft. Multiple unit installations with combined venting or common venting of this pool heater with other Category I negative draft appliances requires that each pool heater must have a barometric damper installed to regulate draft within the proper range.

TABLE - 3A
CONVENTIONAL VENT DATA

Model Number	Conventional Vent Flue Size	Conventional Vent Kit Number
ER152	5"	100140481
ER202	5"	100140481
ER252	6"	100140482
ER302	6"	100140483
ER402	6"*	100140483

*On the ER402 model you MUST have at least 8 feet of vertical vent to use a 6" vent , if less than 8 feet the vent size must increase to 7".

The negative draft in a conventional vent installation must be within the range of a negative 0.02 to 0.08 inches water to ensure proper operation. All draft readings are made while the unit is in stable operation (approximately 2 to 5 minutes). Remember that the draft in a conventional negative draft vent may vary seasonally. A pool heater with a high draft when operating in the winter months may have a much lower draft in the summer. Initial set-up of a vent system with a draft of not more than a negative 0.05 inches water will generally ensure that increased draft in the winter months will not exceed the specified maximum. Maximum draft can not exceed a negative 0.08 inches of water.

On a conventionally vented, negative draft pool heater, the connection from the vent to the stack or vent termination outside the building must be made with listed Type "B" double-wall (or equivalent) vent connectors and must be direct as possible with no reduction in diameter. Use the National Fuel Gas Code venting tables for double-wall vent to properly size all vent connectors and stacks. The Type "B" vent and accessories, such as firestop spacers, thimbles, caps, etc., must be installed in accordance with the manufacturer's instructions. The vent connector and firestop must provide correct spacing to combustible surfaces and seal to the vent connector on the upper and lower sides of each floor or ceiling through which the vent connector passes.

Any vent materials specified must be listed by a nationally recognized test agency for use as vent material.

Locate the pool heater as close as practicable to chimney or gas vent.

Avoid long horizontal runs of the vent pipe, 90° elbows, reductions and restrictions. Horizontal portions of the venting system shall be supported to prevent sagging. Horizontal runs must slope upwards not less than 1/4 inch per foot from the appliance to the vent terminal.

Do not use an existing chimney as a raceway for a flue pipe if another appliance or fireplace is vented through the chimney.

The weight of the venting system must not rest on the unit. Adequate support of the venting system must be provided in compliance with local codes and other applicable codes. All connections should be secured with rustproof sheet metal screws.

Vent connectors serving appliances vented by natural draft MUST NOT be connected to any portion of a mechanical draft system operating under positive pressure. Connection to a positive pressure stack may cause flue products to be discharged into the living space causing serious health injury.

3 Conventional venting

Common venting systems may be too large when an existing unit is removed. At the time of removal of an existing appliance, the steps below shall be followed with each appliance remaining connected to the common venting system placed in operation, while other appliances remaining connected to the common venting system are not in operation.

a. Seal any unused opening in the common venting system.

b. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other unsafe condition.

c. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any other appliances not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.

d. Place in operation the appliance being inspected. Follow the operating instructions on page 38 of this manual. Adjust thermostat so appliance will operate continuously.

e. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as above, return doors, windows, exhaust fans, fireplace dampers, and other gas burning appliances to their previous conditions of use.

f. Any improper operation of the common venting system should be corrected so that the installation conforms to the latest edition of the National Fuel Gas Code, ANSI Z223.1, in Canada, the latest edition of CAN/CGA - B149 Installation Codes for Gas Burning Appliances and Equipment. When resizing any portion of the common venting system, the common venting system should be resized to approach the minimum size as determined using the appropriate tables in the latest edition of the National Fuel Gas Code, ANSI Z223.1, in Canada, the latest edition of CAN/CGA - B149 Installation Codes for Gas Burning Appliances and Equipment.

4 Vertical venting

Vertical venting termination

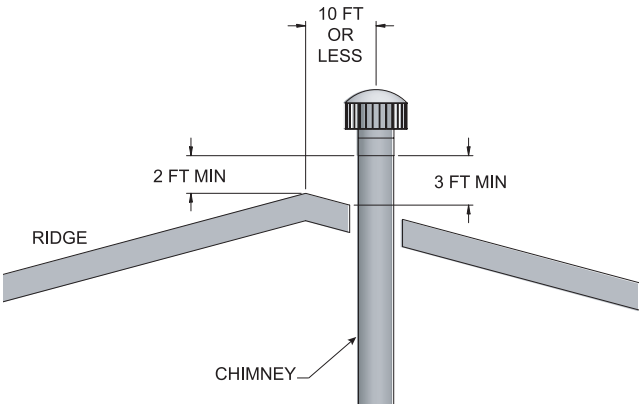


***Figure 4-1**_Vent Termination from Peaked Roof - 10 Feet or Less From Ridge*

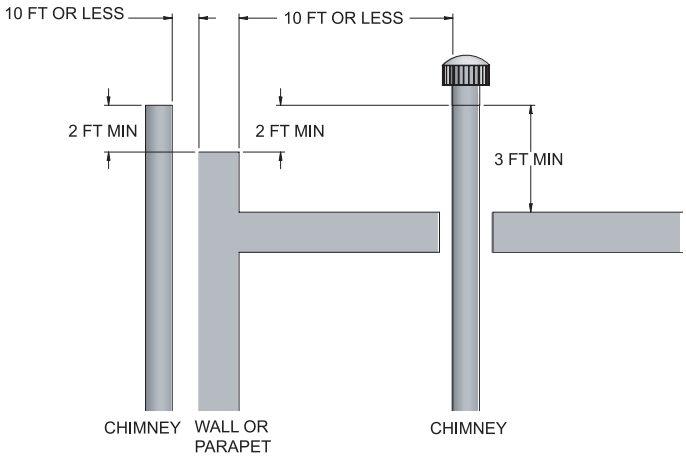


***Figure 4-2**_Vent Termination from Flat Roof 10 Feet or Less from Parapet Wall*

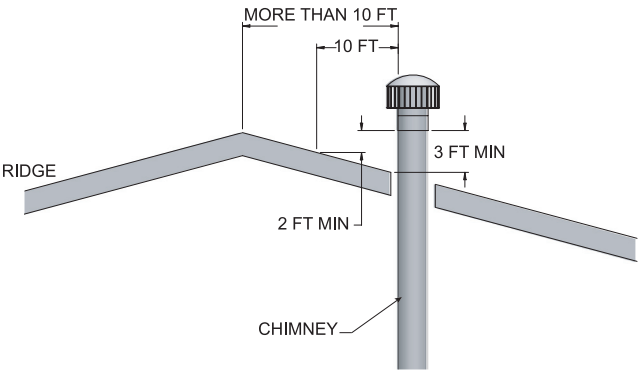


***Figure 4-3**_Vent Termination from Peaked Roof More Than 10 Feet From Ridge*

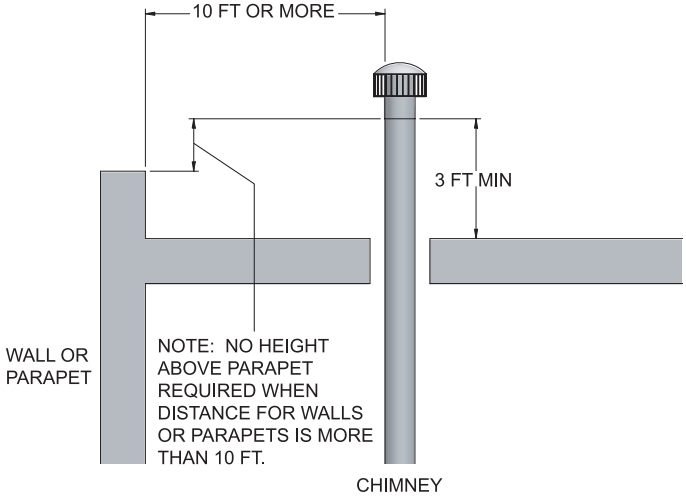


***Figure 4-4**_Vent Termination from Flat Roof More Than 10 Feet from Parapet Wall*

The vent terminal should be vertical and exhaust outside the building at least 2 feet above the highest point of the roof within a 10 foot radius of the termination.

The vertical termination must be a minimum of 3 feet above the point of exit.

A vertical termination less than 10 feet from a parapet wall must be a minimum of 2 feet higher than the parapet wall.

The vent cap should have a minimum clearance of 4 feet horizontally from and in no case above or below, unless a 4 foot horizontal distance is maintained from electric meters, gas meters, regulators, and relief equipment.

The venting system shall terminate at least 3 feet above any forced air inlet within 10 feet.

4 Vertical venting

The venting system shall terminate at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window, or gravity air inlet into any building.

Do not terminate the vent in a window well, stairwell, alcove, courtyard, or other recessed area. The vent cannot terminate below grade. The bottom of the vent terminal shall be located at least 12 inches above grade.

To avoid a blocked flue condition, keep the vent cap clear of snow, ice, leaves, debris, etc. Flue gases will form a white plume in winter. Plume could obstruct window view.

Flue gas condensate can freeze on exterior surfaces or on the vent cap when a pool heater is operated in the winter months. Frozen condensate on the vent cap can result in a blocked flue condition. Flue gas condensate can cause discoloration of exterior building surfaces. Adjacent brick or masonry surfaces should be protected with a rust resistant sheet metal plate.

Masonry chimney installation

A masonry chimney must be properly sized for the installation of a high efficiency gas fired appliance. Venting of a high efficiency appliance into a cold or oversized masonry chimney can result in operational and safety problems. Exterior masonry chimneys, with one or more sides exposed to cold outdoor temperatures, are more likely to have venting problems. The temperature of the flue products from a high efficiency appliance may not be able to sufficiently heat the masonry structure of the chimney to generate proper draft. This will result in condensing of flue products, damage the masonry flue/tile, insufficient draft and possible spillage of flue products into an occupied living space. Carefully inspect all chimney systems before installation. If there is any doubt about the sizing or condition of a masonry chimney, it must be relined with a properly sized and approved chimney liner system.

Inspection of a masonry chimney

A masonry chimney must be carefully inspected to determine its suitability for the venting of flue products. A clay tile lined chimney must be structurally sound, straight, and free of misaligned tile, gaps between liner sections, missing sections of liner or any signs of condensate drainage at the breaching or clean out. If there is any doubt about the condition of a masonry chimney, it must be relined. An unlined masonry chimney must not be used to vent flue products from this high efficiency appliance. An unlined chimney must be relined with an approved chimney liner system when a new appliance is being attached to it. Metallic liner systems (Type "B" double-wall or flexible or rigid metallic liners) are recommended. Consult with local code officials to determine code requirements or the advisability of using or relining a masonry chimney.

The directaire vertical vent system

A vertical negative draft venting system with a combustion air pipe from a sidewall or rooftop inlet cap

Follow all requirements in the *General Venting* section and *Conventional Negative Draft Venting* for venting flue products to the outdoors and general installation instructions.

The DirectAire Vertical vent system requires the installation of two pipes directly to the unit, one vertical pipe with a rooftop termination for the flue products and one pipe for combustion air. The combustion air pipe may terminate horizontally with a sidewall air inlet or vertically with a rooftop air inlet. Vent connection is made directly to the unit after the outdoor vent cap assembly is removed and the conventional flue outlet and direct air inlet adapters are installed. No additional draft diverter or barometric damper is required on single unit installations with a dedicated stack and a negative draft maintained between 0.02 to 0.08 inches water. The flue may be combined with the vent from any other negative draft, Category I appliance. Multiple unit installations common vented with other negative draft appliances require that each pool heater MUST have a barometric damper installed to regulate draft within the proper range. The common vent and connectors from multiple pool heaters must be sized per the requirements of the venting tables for Type "B" double-wall vents in the latest edition of the National Fuel Gas Code, ANSI Z223.1 or in Canada, CAN/CGA - B149 Installation Codes.

The DirectAire sidewall or vertical rooftop combustion air supply system has specific material and installation requirements. The air inlet pipe connects directly to the pool heater to supply combustion air. In most installations, the combustion air inlet pipe will be a dedicated system with one air inlet pipe per pool heater. Multiple air inlets for DirectAire systems may be combined if the guidelines in the *Combined Air Inlet Points* section on page 22 are followed. The air inlet pipe will be connected to a combustion air inlet cap as specified in this section.

Combustion air supplied from outdoors must be free of contaminants (see *Combustion and Ventilation Air Requirements* in the *Determine Pool Heater Location* section).

4 Vertical venting *(continued)*

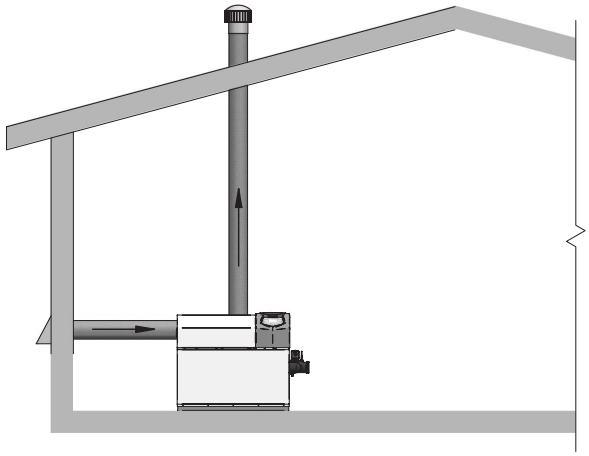


***Figure 4-5**_DirectAire Vertical with Sidewall Venting*

Sidewall air inlet

The sidewall air inlet cap kit is supplied as one of the DirectAire Vent kits which must be ordered from the manufacturer. This sidewall cap will supply combustion air for a single pool heater only.

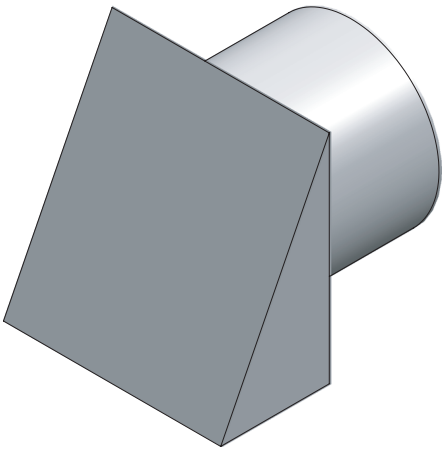


***Figure 4-6**_Air Inlet Cap for Sidewall Termination*

Locate units as close as possible to the sidewall where the combustion air supply system will be installed.

To prevent recirculation of the flue products from an adjacent vent cap into the combustion air inlet, follow all applicable clearance requirements in the latest edition of the National Fuel Gas Code and instructions in this manual.

The combustion air inlet cap must be installed at least one foot above ground level and above normal snow levels.

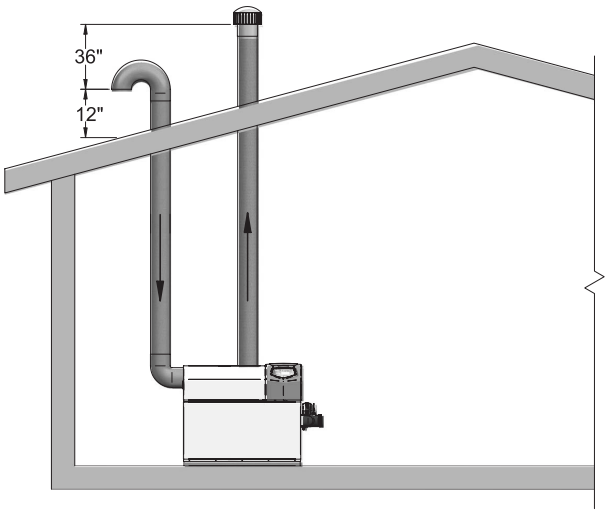


***Figure 4-7**_DirectAire Vertical Installation with Rooftop Combustion Air*

Vertical rooftop air inlet

The air inlet arrangement as shown in FIG. 4-7 is fabricated using commercially available elbows (field supplied) with the same diameter as the air inlet pipe.

The combustion air inlet opening must be at least 3 feet below the point of flue gas termination (vent cap) if it is located within 10 feet horizontally of the flue outlet.

The combustion air inlet opening must not be located closer than 10 feet from an inside corner of an L-shaped structure.

The combustion air inlet opening must be located at least one foot above the rooftop and above normal snow levels.

4 Vertical venting

Incorrect installation and/or location of the air inlet opening can allow the discharge of flue products to be drawn into the combustion process on the pool heater. This can result in incomplete combustion and potentially hazardous levels of carbon monoxide in the flue products. This will cause operational problems with the pool heater and possible spillage of flue products which can cause personal injury, death, or property damage.

Length of air inlet pipe

The total equivalent length of the DirectAire sidewall or vertical rooftop combustion air inlet pipe must not exceed a maximum of 50 equivalent feet in length. Subtract 5 feet for each elbow in the air intake system. Do not exceed limits for the combustion air inlet piping lengths.

Combined air inlet points

The air inlet pipes from multiple pool heaters installed with the DirectAire venting system can be combined to a single common connection. The common air inlet pipe must have a cross sectional area equal to or larger than the total area of all air inlet pipes connected to the common air inlet pipe. [Example: two 5" air inlet pipes (19.6 in^2 area each) have a total of 39.2 in^2 and will require a single 8" (50.3 in^2 area) common air inlet pipe.] The air inlet point for multiple pool heater air inlets must be provided with an exterior opening which has a free area equal to or greater than the total area of all air inlet pipes connected to the common air inlet. This exterior opening for combustion air must connect directly to the outdoors. The total length of the combined air inlet pipe must not exceed a maximum of 50 equivalent feet. Subtract 5 feet for each elbow in the air inlet pipe. You must deduct the restriction in area provided by any screens, grills, or louvers installed in the common air inlet point. These are common on the sidewall air inlet openings. Screens, grills, or louvers installed in the common air inlet can reduce the free area of the opening from 25% (metal louvers) to 75% (wood louvers) based on the materials used.

Air inlet pipe materials

The DirectAire Vertical system requires installation of a separate pipe to supply combustion air from outdoors directly to the unit. The following air inlet pipe materials and sealing recommendations apply whenever an optional venting system is used to duct combustion air directly to the pool heater.

The air inlet pipe(s) must be sealed. Choose acceptable combustion air inlet pipe materials from the following specified materials in this section.

PVC, CPVC, or ABS (4" or 5" I.D.)*

Dryer Vent (not recommended for rooftop air inlet)

Galvanized steel vent pipe with joints and seams sealed as specified below.

Type "B" double-wall vent with joints and seams sealed as specified below.

* Plastic pipe requires an adapter (not provided) to transition between the air inlet and cap.

Sealing of single-wall galvanized or Type "B" double-wall vent material used for combustion air supply in a DirectAire Vent System:

a. Seal all joints and seams of the air inlet pipe using either aluminum foil duct tape meeting UL Standard 723 or 181A-P or a high quality UL listed silicone sealant such as those manufactured by Dow Corning or General Electric.

b. Do not install seams of air inlet pipe on the bottom of horizontal runs.

c. Secure all joints with a minimum of three sheet metal screws or pop rivets. Apply aluminum foil duct tape or silicone sealant to all screws or rivets installed in the air inlet pipe.

d. Ensure that the air inlet pipe is properly supported.

⚠ CAUTION Using other vent or air intake materials, failure to properly seal all seams and joints or failure to follow vent pipe manufacturer's instructions can result in personal injury, death, or property damage. Mixing of venting materials will void the warranty and certification of the pool heater.

NOTICE The use of double-wall vent material for the combustion air inlet pipe is recommended when the pool heater is operated in cold climates to prevent the condensation of airborne moisture in the incoming combustion air.

Vent kits

The DirectAire Vertical Vent kit for sidewall or rooftop air inlet must be ordered from the pool heater manufacturer for single unit installations. The part number for each kit is listed by unit size. Each kit includes the flue outlet adapter, air inlet collar and in sidewall air kits, a sidewall combustion air inlet cap to supply air to a single pool heater. Each kit includes instructions for proper installation. The flue pipe, rooftop vent cap for the flue, vertical air inlet cap, and air inlet pipe are purchased locally. The air inlet cap for the combined air supply from multiple units must be purchased locally.

4 Vertical venting *(continued)*

TABLE - 4A DIRECTAIRE VENT KITS				
Model Number	**Conventional Vent Flue Size**	**Air Inlet Pipe***	**DirectAire w/rooftop air inlet**	**DirectAire w/sidewall vent cap**
ER152	5"	4"	100172053	100172050
ER202	5"	4"	100172053	100172050
ER252	6"	5"	100172054	100172051
ER302	6"	5"	100172055	100172052
ER402	6"**	5"	100172055	100172052

*Minimum diameter, installer may increase diameter one pipe size for ease of installation if needed.

**On the ER402 model you MUST have at least 8 feet of vertical vent to use a 6" vent , if less than 8 feet the vent size must increase to 7".

⚠ CAUTION The air inlet cap supplied in the DirectAire Vertical Vent kit is used to supply combustion air to a single pool heater. The rooftop vent cap for flue products should be a standard commercial cap purchased locally. The use of a sidewall or rooftop air inlet cap other than the manufacturer's recommended cap for single pool heater installations or use of a common air inlet cap for multiple pool heaters with insufficient free area and/or protection from wind and weather may result in operational problems with the pool heater or potentially hazardous spillage of flue products which can cause personal injury, death, or property damage.

Venting of flue products

For venting of flue products vertically to the outdoors, follow all requirements in the *Conventional Venting* section.

The termination point for the flue products must follow the clearance requirements in the *Vertical Venting Termination* section.

A barometric damper is NOT required in the flue on DirectAire Vertical installations if the draft is within the negative 0.02 to 0.08 inches water required for proper operation. If the draft exceeds this range, a barometric damper MUST be installed.

⚠ CAUTION Pool heaters which are shut down or will not operate may experience freezing due to convective air flow in the air inlet pipe connected to the unit. If operated in cold climates, continuous pump operation is recommended to help prevent freezing of pool water on DirectAire systems. Proper freeze protection must be provided. A pool heater that is not in use in the winter season must be properly drained and winterized. See the *Winterizing* section of the EnergyRite Service Manual.

5 Sidewall venting

The power sidewall venting system

Power sidewall venting with combustion air from the equipment room

This venting system uses a power vent assembly which pulls the flue products from the pool heater and exhausts out a sidewall. The fan in the power vent cap generates a negative draft at the unit. Combustion air is drawn from the equipment room (see *Combustion and Ventilation Air Requirements* in the *Determine Pool Heater Location* section). The outdoor vent cap must be removed and the optional Sidewall Vent kit must be installed. See the *Installation of Optional Vent Kits* section.

CAUTION **The Power Sidewall Vent kit is to be used for 120 VAC applications ONLY.**

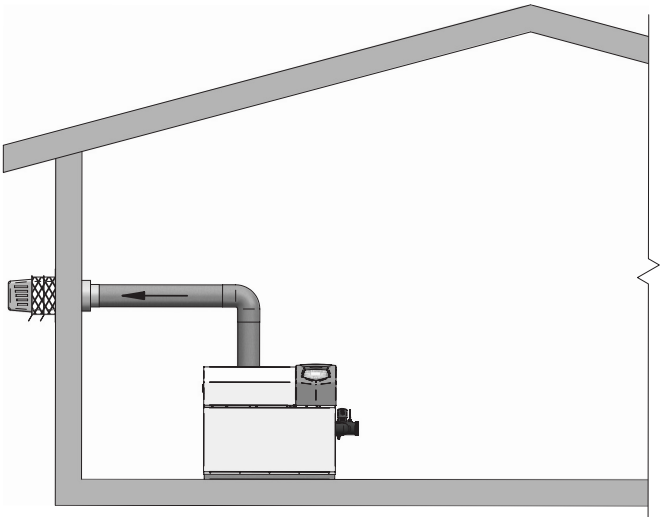


***Figure 5-1**_Power Sidewall Venting Installation*

The sidewall fan is mounted in a vent cap which is installed on an exterior wall. The sidewall fan and accessories are included in a venting kit which must be furnished by the manufacturer in accordance with CSA International requirements. This venting kit includes a flue adapter, an air inlet cover, the sidewall fan/cap, barometric damper, proving switch and all necessary relays to interlock with the pool heater's control system. A barometric damper is required in the flue on Power Sidewall Venting installations. A barometric damper is supplied with each Power Sidewall Vent kit and MUST be installed in the flue of each unit. The barometric damper must be adjusted to maintain a negative draft between 0.02 to 0.08 inches water when the power sidewall vent cap is operating. The barometric damper controls draft and provides dilution air to the vent system to prevent condensate formation. When a barometric damper is installed, the equipment room must have adequate air to supply dilution air to the barometric damper.

Length of flue pipe

The maximum total equivalent length of flue pipe connected to the power sidewall cap cannot exceed 75 equivalent feet. Subtract 5 feet for each elbow in the vent. Do not exceed the limit for total equivalent vent pipe length.

Sidewall vent termination

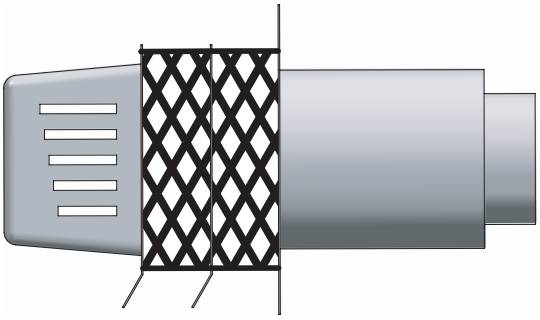


***Figure 5-2**_Power Sidewall Vent Cap*

The power sidewall vent cap must be installed on an exterior sidewall. The power sidewall vent cap and accessories are included in a venting kit which must be furnished by the manufacturer in accordance with CSA International requirements. This venting kit includes a flue adapter, an air inlet cover, the power sidewall cap, barometric damper, proving switch, and all necessary relays to interlock with the heaters control system.

The power sidewall vent cap MUST be interlocked with the pool heater's control system to start the fan on a call for heat and prove fan operation before the pool heater fires. Terminal strip connections are provided on the unit for easy connection of the factory supplied vent kit and control package for the sidewall vent fan. See the installation instructions provided with the vent kit.

Sidewall vent pipe requirements

The connection from the vent to the power sidewall fan/cap MUST be made with listed type "B" double-wall (or equivalent) vent and accessories. There shall be no reduction in vent size from the units flue outlet to the inlet of the sidewall vent fan. Vent pipe material must be supplied by the installer.

Follow all requirements in the *General Venting* and *Venting of Flue Products* sections for venting flue products to the outdoors. See *Combustion and Ventilation Air Requirements* in the *Determine Pool Heater Location* section to ensure that adequate combustion and ventilation air is supplied to the equipment room. All other general installation requirements must be followed.

5 Sidewall venting *(continued)*

Venting of flue products

The sidewall vent cap shall terminate at least 3 feet above any forced air inlet within 10 feet.

The sidewall vent shall terminate at least 4 feet below, 4 feet horizontally from or 1 foot above any door, window, or gravity air inlet to the building.

Do not terminate the sidewall vent in a window well, stairwell, alcove courtyard, or other recessed area. The sidewall vent can not terminate below grade.

The sidewall vent system shall terminate at least 1 foot above grade, above normal snow levels, and at least 7 feet above grade when located adjacent to public walkways. The sidewall vent shall not terminate directly above a public walkway.

The sidewall vent terminal shall not be installed closer than 10 feet from an inside corner of an L-shaped structure.

The sidewall vent cap should have a minimum clearance of 4 feet horizontally from and in no case above or below, unless a 4 foot horizontal distance is maintained from electric meters, gas meters, regulators and relief equipment.

Flue gas condensate can freeze on exterior walls or on the vent cap. Frozen condensate on the vent cap can result in a blocked flue condition. Some discoloration to exterior building surfaces can be expected. Adjacent brick or masonry surfaces should be protected with a rust resistant sheet metal plate.

Power sidewall vent kits

The Power Sidewall Vent kit MUST be ordered from the pool heater manufacturer. The part number for each kit is listed by unit size. Each kit includes a flue adapter, an air inlet cover, a powered sidewall fan/cap assembly, barometric damper, control relay, proving switch and instructions for proper installation. The outdoor vent kit, installed on the pool heater as shipped from the factory, must be removed to install the Power Sidewall Vent kit.

TABLE - 5A
POWER SIDEWALL VENT KITS

Model Number	Flue Size	Power Sidewall Kit
ER152	4"	100169238
ER202	4"	100169238
ER252	5"	100169239
ER302	5"	100169240
ER402	6"	100169241

⚠ CAUTION Pool heaters which are shut down or will not operate may experience freezing due to convective air flow into the equipment room. If operated in cold climates, continuous pump operation is recommended to help prevent freezing of pool water. Proper freeze protection must be provided. A pool heater that is not in use in the winter season must be properly drained and winterized. See the *Winterizing* section of the EnergyRite Service Manual.

The power directaire horizontal vent system

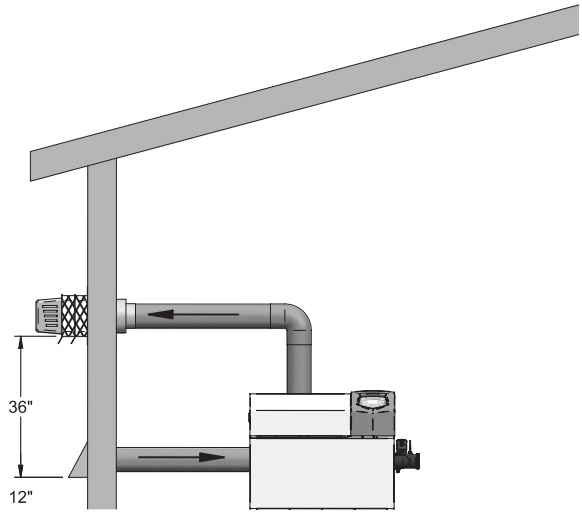


Figure 5-3_*Power DirectAire Horizontal Installation Illustration*

Power directaire horizontal with a sidewall flue and sidewall air inlet

Follow all requirements in the *General Venting* section and *Sidewall Venting* for venting flue products to the outdoors and general installation instructions.

CAUTION **The Power Sidewall Vent kit is to be used for 120 VAC applications ONLY.**

The Power DirectAire Horizontal vent system requires the installation of two pipes directly to the pool heater, one pipe for flue products and one for combustion air. Both pipes are installed horizontally with a sidewall termination point. Vent connection is made directly to the pool heater. Flue products are carried to the sidewall by a power sidewall cap/fan assembly. A barometric damper is supplied with each DirectAire Horizontal Vent kit and MUST be installed in the flue of each unit. The barometric damper must be adjusted to maintain a negative draft between 0.02 to 0.08 inches water when the power sidewall vent cap is operating.

5 Sidewall venting

The Power DirectAire Horizontal combustion air supply system has specific material and installation requirements. The air inlet pipe uses an adapter to supply combustion air and for connection directly to the pool heater. The combustion air inlet pipe will be a dedicated system with one air inlet pipe per pool heater. The air inlet pipe must be connected to a combustion air inlet cap as specified in this section. Combustion air supply pipes for multiple pool heater installations can **NOT** be combined into a single pipe and inlet termination point.

Combustion air supplied from outdoors must be free of contaminants (see *Combustion and Ventilation Air Requirements* in the *Determine Pool Heater Location* section).

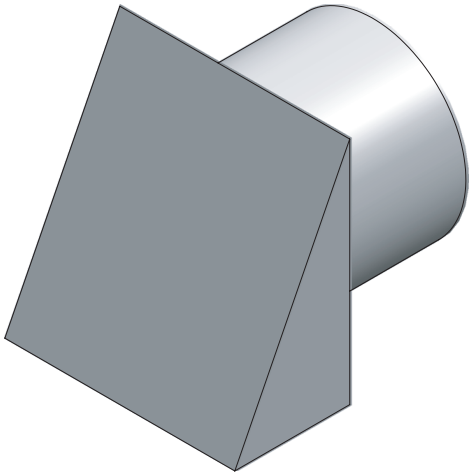


***Figure 5-4**_Air Inlet Cap for Sidewall Termination*

Sidewall air inlet

The sidewall air inlet cap is supplied in the Power DirectAire Horizontal Vent kit which must be ordered from the manufacturer. This sidewall cap will supply combustion air for a single unit only.

Locate units as close as possible to a sidewall where the combustion air supply system will be installed.

To prevent recirculation of flue products from an adjacent vent cap into the combustion air inlet, follow all applicable clearance requirements in the latest edition of the National Fuel Gas Code and instructions in this manual.

The combustion air inlet cap must be installed at least one foot above ground level and above normal snow levels.

The point of termination for the combustion air inlet cap MUST be at least 3 feet below the point of flue gas termination (power vent cap) if it is located within 10 feet of the flue outlet from the power vent cap.

Use care to ensure that the air inlet cap assembly is properly installed on the air inlet pipe. The combustion air inlet cap and the power vent cap MUST be installed on the same wall and the same pressure zone.

The combustion air inlet cap must not be installed closer than 10 feet from an inside corner of an L-shaped structure.

Incorrect installation and/or location of the air inlet cap can allow the discharge of flue products to be drawn into the combustion process on the pool heater. This can result in incomplete combustion and potentially hazardous levels of carbon monoxide in the flue products. This will cause operational problems with the pool heater and possible spillage of flue products which can cause personal injury, death, or property damage.

Length of air inlet pipe

The total equivalent length of the Power DirectAire Horizontal combustion air inlet pipe must not exceed a maximum of 75 equivalent feet in length. Subtract 5 feet for each elbow in the air intake system. Do not exceed limits for the combustion air inlet piping lengths.

Air inlet pipe materials

The Power DirectAire Horizontal system requires installation of a separate pipe to supply combustion air from outdoors directly to the pool heater. See the air inlet pipe materials specified in the *DirectAire Venting* section for material requirements and sealing recommendations for the air inlet pipe in a DirectAire Horizontal system.

⚠ CAUTION Using other vent or air intake materials, failure to properly seal all seams and joints or failure to follow vent pipe manufacturer's instructions can result in personal injury, death, or property damage. Mixing of venting materials will void the warranty and certification of the pool heater.

NOTICE The use of double-wall vent material for the combustion air inlet pipe is recommended when the pool heater is operated in cold climates to prevent the condensation of airborne moisture in the incoming combustion air.

Vent kits

The Power DirectAire Horizontal Vent kit for sidewall installation MUST be ordered from the pool heater manufacturer. The part number for each kit is listed by unit size. Each kit has a flue adapter, inlet air collar, sidewall power vent cap, barometric damper, proving switch, controls, and combustion air inlet cap to supply air to a single pool heater and instructions for proper installation. The flue pipe and air inlet pipes are purchased locally.

5 Sidewall venting *(continued)*

TABLE - 5B POWER DIRECTAIRE HORIZONTAL VENT KITS			
Model Number	**Flue Size**	**DirectAire Inlet Pipe***	**Power DirectAire Horizontal Kit**
ER152	4"	4"	100169242
ER202	4"	4"	100169242
ER252	5"	5"	100169243
ER302	5"	5"	100169244
ER402	6"	5"	100169245

*Minimum diameter, installer may increase diameter one pipe size for ease of installation if needed.

The sidewall air inlet cap supplied in the Power DirectAire Horizontal Vent kit is used to supply combustion air to a single pool heater. Combustion air supply pipes from multiple units can NOT be combined into a single air inlet pipe and inlet point. The use of a sidewall air inlet cap other than the manufacturer's recommended cap may result in operational problems with the unit or potentially hazardous spillage of flue products which can cause personal injury, death, or property damage.

For venting flue products horizontally to the outdoors, follow all requirements in the installation instructions for sidewall venting.

The termination point for the flue products must follow the clearance requirements in the *Sidewall Vent Termination - Venting of Flue Products* section.

A barometric damper is required in the flue on Power DirectAire Horizontal installations. The barometric damper must be adjusted to maintain a negative draft within the 0.02 to 0.08 inches water required for proper operation. The barometric damper provides dilution air to the vent system to prevent condensate formation.

⚠ CAUTION Pool heaters which are shut down or will not operate may experience freezing due to convective air flow in the air inlet pipe connected to the unit. If operated in cold climates, continuous pump operation is recommended to help prevent freezing of pool water on DirectAire systems. Proper freeze protection must be provided. A pool heater that is not in use in the winter season must be properly drained and winterized. See the *Winterizing* section of the EnergyRite Service Manual.

E-Rite sidewall venting system

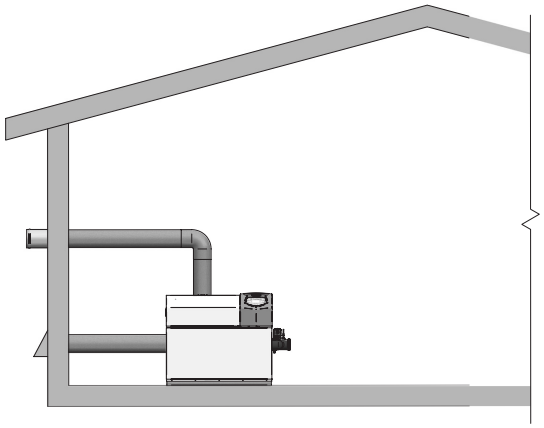


***Figure 5-5**_E-Rite Sidewall Vent Installation*

The E-Rite venting option provides an alternative to vent the appliance to a sidewall under limited vent lengths without the need for an external powered sidewall venter. The maximum vent length of 20 equivalent feet allows for up to 15 feet of horizontal vent length between a sidewall and the pool heater, and includes one 90° elbow fitted at the flue and air inlet connections on the cabinet. A listed AL29-4C stainless steel sealed vent system suitable for venting direct vent applications must be used. Refer to page 28 of this manual for specific recommendations from listed AL29-4C vent system manufacturers.

The combustion air fan of the pool heater forces the flue products to the outside through the vent terminal while at the same time drawing in combustion air from the outside through the air inlet terminal. Both inlet and vent terminals must be located in the same pressure zone, and a specific dimensional relationship of intake to exhaust terminal orientation must also be followed. This is sometimes referred to as a "balanced flue" or "direct vent" application. Since both terminals are in the same pressure zone, any pressure exerted on one terminal is also exerted on the other terminal, canceling out identical wind pressure effects.

When this option is used, an optional E-Rite Sidewall Vent kit must be purchased and installed. The plenum divider must be removed. See *Installation of Optional Vent Kits* on page 16 of this manual.

The air shutter on the combustion air fan may require adjustment after the E-Rite Sidewall Vent kit is installed. Reference *Table 5C - Air Shutter Adjustment Opening for E-Rite Vent Systems* on page 28 of this manual.

5 Sidewall venting

TABLE - 5C AIR SHUTTER ADJUSTMENT OPENING FOR E-RITE VENT SYSTEMS		
Model Number	**"A" Dimension Opening**	**Chamber Pressure**
ER152	1 1/4"	1.4"
ER202	1 1/4"	1.4"
ER252	1 3/8"	1.4"
ER302	1 9/16"	1.4"
ER402	1 3/4"	1.4"

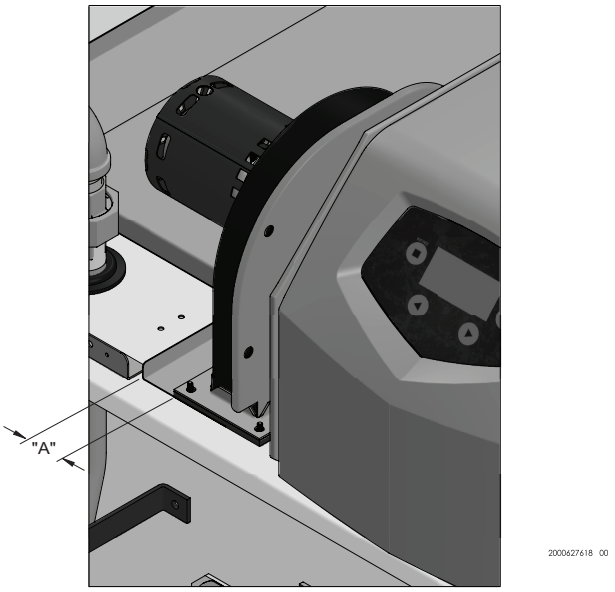


***Figure 5-6**_Combustion Air Fan with Air Shutter "A" Dimension*

The E-Rite Sidewall Vent kit includes recommendations to purchase and install specific sidewall vent terminations from recommended AL29-4C vent system manufacturers. This venting kit includes installation instructions, a flue adapter, air pipe adapter, air inlet collar assembly, air inlet terminal, flexible steel re-enforced air hose, clamps, gaskets, and fasteners necessary to install the venting system.

TABLE - 5D E-RITE SIDEWALL VENT KITS		
Model Number	**Inlet & Outlet Vent Diameter**	**E-Rite Sidewall Vent Kit**
ER152	4"	100147165
ER202	4"	100147165
ER252	5"	100147166
ER302	5"	100147167
ER402	6"	100147168

The connection from the vent to the sidewall cap must be made with a listed AL29-4C stainless steel sealed vent system suitable for venting direct vent applications. There shall be no reduction in vent size from the pool heater's flue outlet to the inlet of the sidewall vent cap. Vent pipe material may be purchased locally by the installer.

Recommended manufacturers of listed AL29-4C vent system materials are identified as follows:

Protech Systems Inc., www.protechinfo.com

Z-Flex, www.Z-Flex.com

Heat-Fab Inc., www.heat-fab.com

Metal-Fab Inc., www.mtlfab.com

5 Sidewall venting *(continued)*

Sealing of venting materials

The AL29-4C vent materials must be installed and sealed per the vent manufacturer's installation instructions.

The E-Rite Sidewall Vent System requires installation of a separate pipe to supply combustion air from outdoors directly to the pool heater. This pipe is referred to as the combustion air inlet pipe, with one end connecting to the air inlet collar at the rear of the cabinet the other end connecting to the air inlet cap at the wall. The pipe must be either a single or double-wall metal pipe that has all joints and connections sealed with tape or suitable sealant. For multiple pool heater installations, each pool heater must have combustion air provided independently by a dedicated air inlet pipe. Combustion air supplied from outdoors must be free of contaminants (see *Combustion and Ventilation Air Requirements* in the *Determine Pool Heater Location* section).

If Type "B" double-wall vent material or single-wall galvanized vent pipe material is used for the air inlet pipe, follow the sealing instructions of the assembled pipe sections as follows:

1. Seal all joints and seams of the air inlet pipe using either aluminum foil duct tape meeting UL Standard 723 or 181A-P or a high quality UL listed silicone sealant such as those manufactured by Dow Corning or General Electric.

2. Do not install seams of vent pipe on the bottom of horizontal runs.

3. Secure all joints with a minimum of three sheet metal screws or pop rivets. Apply aluminum foil duct tape or silicone sealant to all screws or rivets installed in the vent pipe.

4. Ensure that the air inlet pipes are properly supported.

NOTICE The use of double-wall vent material for the combustion air inlet pipe is recommended when the pool heater is operated in cold climates to prevent the condensation of airborne moisture in the incoming combustion air.

⚠ CAUTION Using other vent or air intake materials, failure to properly seal all seams and joints or failure to follow vent pipe installation instructions can result in personal injury, death, or property damage. Improper sealing of venting materials will void the warranty and certification of the pool heater.

Length of flue pipe and air inlet pipe for an e-rite sidewall vent system

The maximum total equivalent length of the flue or the combustion air inlet pipe must not exceed a maximum of 20 equivalent feet in length. Subtract 5 feet for each elbow in the flue pipe or the air intake system. The transition adapter mounted to the flue outlet on the pool heater does not count as one of the elbows in the venting system. Do not exceed limits for the combustion air inlet and flue outlet piping lengths.

Drain tee installation

A drain tee must be installed in the vent pipe to collect and dispose of any condensate that may occur in the vent system. The drain tee must be installed as the first fitting after the horizontal ell on the top of the unit. See the typical vent installation drawings. Plastic drain tubing, sized per the vent manufacturer's instructions, shall be provided as a drain line from the tee. The drain tubing must have a trap provided by a 3" diameter circular trap loop in the drain tubing. Prime the trap loop by pouring a small quantity of water into the drain hose before assembly to the vent. Secure the trap loop in position with nylon wire ties. Use caution not to collapse or restrict the condensate drain line with the nylon wire ties. The condensate drain must be routed to a suitable drain for disposal of condensate that may occur in the direct vent system. Refer to the condensate drain installation instructions as supplied by the manufacturer of the vent material.

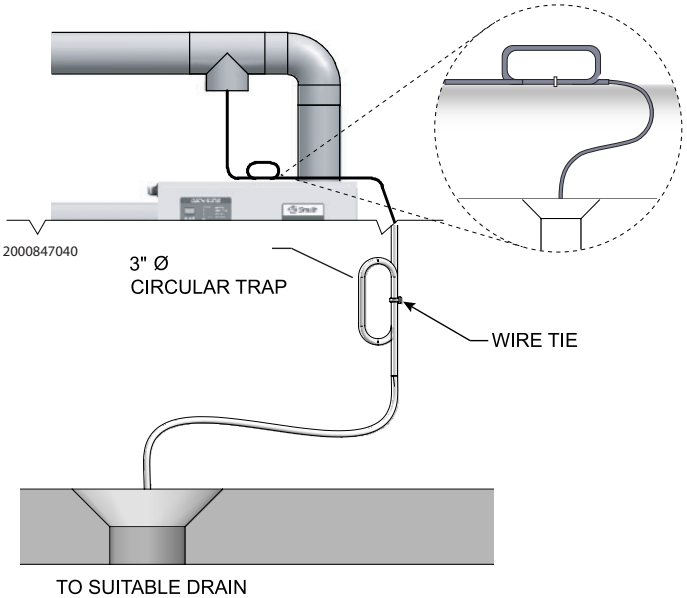


Figure 5-7_Drain Tee Installation

5 Sidewall venting

When an E-Rite Sidewall Vent System is disconnected for any reason, the flue must be reassembled and resealed according to the vent manufacturer's instructions to ensure that flue products will not be discharged into the equipment room or other occupied spaces in the building. The air inlet pipe must also be resealed to ensure that combustion air will be free of contaminants and supplied in proper volume.

The connection from the vent to the vent termination outside the building must be made with one of the specified vent materials and must be direct as possible with no reduction in diameter. The vent accessories not otherwise provided, such as firestop spacers, thimbles, caps, etc., must be from the same vent material manufacturer and installed in accordance with the manufacturer's listing. The vent connection through the sidewall must provide correct spacing to combustible surfaces. The vent pipe connection to the sidewall vent cap must have a gastight seal to prevent the leakage of flue products.

Installation of an E-Rite Sidewall Vent System requires that each pool heater in a multiple unit installation have a dedicated flue pipe and sidewall vent cap. The flue discharge or air inlet from multiple pool heaters installed with the E-Rite Sidewall Vent System may not be combined to a single common vent.

⚠ DANGER Failure to properly seal all joints and seams as required in the flue piping may result in flue gas recirculation, spillage of flue products, and carbon monoxide emissions causing severe personal injury or death.

Follow all requirements in the *General Venting* and *Venting of Flue Products* sections for venting flue products to the outdoors. See *Combustion and Ventilation Air Requirements* in the *Determine Pool Heater Location* section to ensure that adequate combustion and ventilation air is supplied to the equipment room. All other general installation requirements must be followed.

E-Rite sidewall vent termination

The sidewall vent cap shall terminate at least 3 feet above any forced air inlet within 10 feet.

The sidewall vent shall terminate at least 4 feet below, 4 feet horizontally from or 1 foot above any door, window, or gravity air inlet to the building.

Do not terminate the sidewall vent in a window well, stairwell, alcove courtyard or other recessed area. The sidewall vent can not terminate below grade.

The sidewall vent system shall terminate at least 1 foot above grade, above normal snow levels and at least 7 feet above grade when located adjacent to public walkways. The sidewall vent shall not terminate directly above a public walkway.

The sidewall vent terminal shall not be installed closer than 10 feet from an inside corner of an L-shaped structure.

The sidewall vent cap should have a minimum clearance of 4 feet horizontally from and in no case above or below, unless a 4 foot horizontal distance is maintained from electric meters, gas meters, regulators and relief equipment.

Flue gas condensate can freeze on exterior walls or on the vent cap. Frozen condensate on the vent cap can result in a blocked flue condition. Some discoloration to exterior building surfaces can be expected. Adjacent brick or masonry surfaces should be protected with a rust resistant sheet metal plate.

Combustion air inlet termination

Combustion air supply pipes can not be combined into a single pipe for multiple unit installations.

To help prevent recirculation of flue products:

- The combustion air inlet cap must not be installed above the flue outlet cap.
- The combustion air inlet cap must be installed horizontally or below the flue outlet and must maintain a minimum 3 foot radius clearance from the flue outlet cap.
- The combustion air inlet cap and vent cap for flue outlet must be located on the same sidewall and in the same pressure zone.
- The combustion air inlet cap must not be installed closer than 10 feet from an inside corner of an L-shaped structure.
- The combustion air inlet cap must be installed at least one foot above ground level and above normal snow levels.

5 Sidewall venting *(continued)*

The combustion air inlet caps for multiple unit installations must maintain the minimum 3 foot radius clearance below or horizontally from the closest flue outlet. Multiple flue outlet caps may be installed side by side and multiple air inlet caps may be installed side by side but the 3 foot radius minimum clearance between air inlet and flue outlet must be maintained. All clearance and installation requirements in this section and the applicable portions of the *General Venting* section must be maintained on multiple unit installations.

⚠ CAUTION Pool heaters which are shut down or will not operate may experience freezing due to convective air flow in the air inlet pipe connected to the unit. If operated in cold climates, continuous pump operation is recommended to help prevent freezing of pool water on DirectAire systems. Proper freeze protection must be provided. A pool heater that is not in use in the winter season must be properly drained and winterized. See the *Winterizing* section of the EnergyRite Service Manual.

6 Gas connections

Gas supply

Verify unit is supplied with the type of gas specified on the rating plate. This unit is orificed for operation up to 4000 feet altitude. Consult factory for installations above 4000 feet elevation.

TABLE - 6A
INLET GAS PRESSURE

Measured at the inlet pressure tap located upstream of the combination gas valve.

Model Number	Natural Gas	LPG
ER152 - ER202 Min. (Inches Water Column)	4.0	8.0
ER252 - ER302 Min. (Inches Water Column)	4.5	8.0
ER402 Min. (Inches Water Column)	5.0	8.0
ER152 - ER402 Max. (Inches Water Column)	14.0	14.0

Maximum inlet gas pressure must not exceed the value specified. Minimum value listed is for the purposes of input adjustment.

MANIFOLD PRESSURE: Measured as a net pressure between the pressure tap on the downstream side of the gas valve and the chamber pressure. Connect one side of the manometer to the chamber pressure, and the other to the outlet pressure tap. If adjustment of the regulator pressure is required, see the *Manifold Adjustment Procedure* section in the EnergyRite Service Manual. Do not increase regulator pressure beyond specified pressure settings.

TABLE - 6B
NET MANIFOLD PRESSURE

Model Number	Natural and LP Gas Regulator Setting
ER152 - ER402 (Inches Water Column)	1.8 (Nat.) 4.6 (LP)

Gas pressure test

1. The pool heater must be disconnected from the gas supply piping system during any pressure testing of that system at a test pressure in excess of 1/2 PSIG (3.5 kPa).

2. The pool heater must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 PSIG (3.5 kPa).

3. The pool heater and its gas connection must be leak-tested before placing the heater in operation.

Gas connection

Safe operation of the unit requires properly sized gas supply piping. See the following data:

1. Gas pipe size may be larger than heater connection.

2. Installation of a union is highly recommended for ease of service. Install union as close as possible to gas valve inlet.

3. Install a manual main gas shutoff valve, outside of the appliance gas connection and before the gas valve, when local codes require.

4. A trap (drip leg) must be provided in the inlet of the gas connection to the unit.

5. The combination gas valve has an integral vent limiting device and does not require venting to atmosphere, outside the building.

6. Optional gas controls may require routing of bleeds and vents to the atmosphere, outside the building when required by local codes.

TABLE - 6C
LOW PRESSURE SINGLE UNIT INSTALLATIONS
SUGGESTED GAS PIPE SIZE

	DISTANCE FROM METER				
Model Number	0 - 50'	51' - 100'	101' - 200'	201' - 300'	301' - 500'
ER152	3/4"	1"	1 1/4"	1 1/4"	1 1/2"
ER202	1"	1"	1 1/4"	1 1/2"	2"
ER252	1"	1 1/4"	1 1/2"	1 1/2"	2"
ER302	1 1/4"	1 1/4"	1 1/2"	1 1/2"	2"
ER402	1 1/4"	1 1/4"	1 1/2"	2"	2"

For each elbow or tee, add equivalent straight pipe to total length from Table 6D.

TABLE - 6D
FITTINGS TO EQUIVALENT STRAIGHT PIPE

Diameter Pipe	3/4"	1"	1 1/4"	1 1/2"	2"	3"	4"	5"
Equivalent length of Straight Pipe	2'	2'	3'	4'	5'	10'	14'	20'

6 Gas connections *(continued)*

LP gas installations

⚠ WARNING LP (propane) gas is heavier than air and will remain at floor level if there is a leak. Basements, crawl spaces, alcoves, and areas below ground level will serve as pockets for accumulation of leaking gas. Before lighting, sniff at floor level. If you smell gas, follow instructions on page 3 of this manual. Shut off gas at LP tank outside of the building. DO NOT operate appliance until leakage is corrected.

LP gas cylinders shall be located outdoors and away from the pool structure in accordance with the latest edition of the Standard for the Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA 58, or CAN/CSA B149.2, and applicable local codes.

NOTICE If an inline high gas pressure regulator is used, it must be located a minimum of 10 feet from the appliance. Failure to do so may result in insufficient gas volume supplied to the appliance.

Gas piping

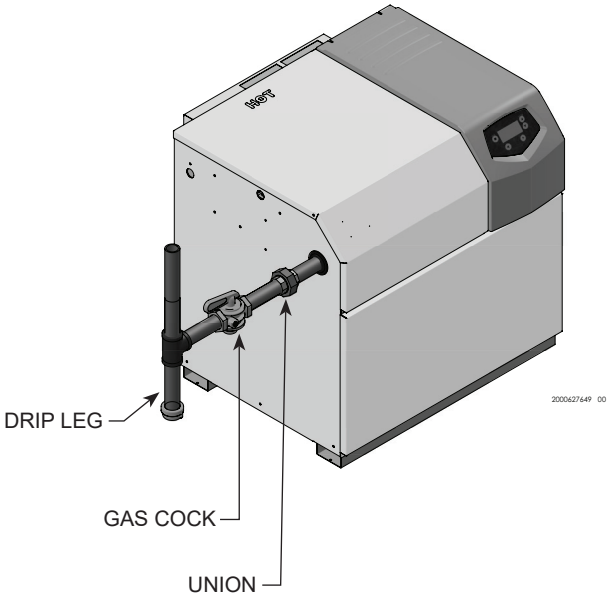


***Figure 6-1**_Gas Line Connection to unit w/sediment trap and manual main gas shut-off valve*

All gas connections must be made with pipe joint compound resistant to the action of liquefied petroleum and natural gases. All piping must comply with local codes and ordinances. Tubing installations must comply with approved standards and practices.

Install piping to gas valve

1. The gas line should be a separate line direct from the meter unless the existing gas line is of sufficient capacity. Verify pipe size with your gas supplier.
2. Use new, properly threaded black iron pipe free from chips. If tubing is used, make sure the ends are square, deburred, and clean. All tubing bends must be smooth and without deformation. Avoid flexible gas connections. Internal diameter of flexible lines may not provide the unit with the proper volume of gas.
3. Install a manual main gas shutoff valve at the pool heater's gas inlet, outside of the pool heater and before the gas valve. When the pool heater is installed in, under, or directly attached to the pool or spa structure, the manual main gas shutoff valve must be located outside the pool structure.
4. Run pipe or tubing to the pool heater's gas inlet. If tubing is used, obtain a tube to pipe coupling in order to connect the tubing to the pool heater's gas inlet.
5. Install a sediment trap (drip leg) in the supply line to the pool heater's gas inlet (see FIG. 6-1).
6. Apply a moderate amount of good quality pipe compound (DO NOT use Teflon tape) to pipe only, leaving two end threads bare.
7. Remove seal over gas inlet to pool heater.

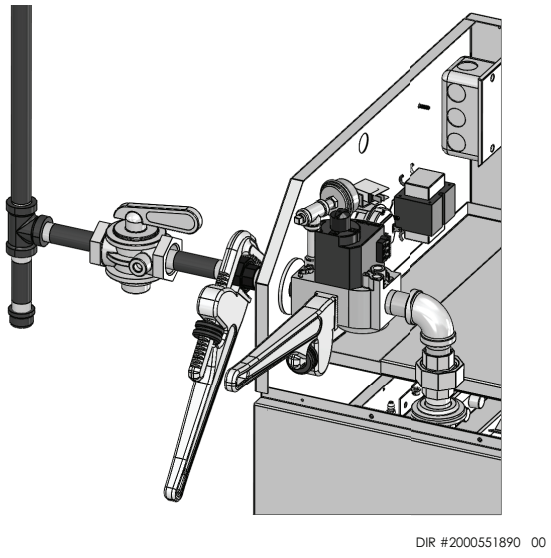


***Figure 6-2**_Wrench to Support Gas Valve for Piping Connection*

8. Connect the gas pipe to the inlet of the unit. Use a wrench to support the gas manifold on the unit (FIG. 6-2).
9. For LP gas, consult your LP gas supplier for expert installation.
10. Ensure that all air is properly bled from the gas line before starting the ignition sequence. Start up without properly bleeding air from the gas line may require multiple reset functions of the ignition control module to achieve proper ignition.

7 Water connections

This pool heater is equipped with an automatic, built-in bypass located in the front header. This bypass is flow actuated to maintain proper flow through the pool heater at flow rates of less than 100 GPM. If the water flow rate to the pool heater exceeds 100 GPM, an auxiliary bypass must be installed in the piping to the pool heater. See the *Auxiliary Bypass* section for piping and adjustment.

If the flow rate is unknown, ensuring the temperature rise across the pool heater is between 7-10°F (152-202) and 10-14°F (252-402) will ensure the proper flow rate (reference the Service Menu Descriptions - Delta T section of the EnergyRite Service Manual).

TABLE - 7A
MINIMUM WATER FLOW REQUIREMENTS

Minimum water flow rates to ensure proper operation are as follows:

Model	Minimum Flow
ER152	15 GPM
ER202	20 GPM
ER252	25 GPM
ER302	30 GPM
ER402	40 GPM

Inlet and outlet connections

Connections can be made with 2" slip connections to both the inlet and outlet connections. Included with the unit are two CPVC union nuts (100173709), two CPVC tail pieces (100162936), and two gaskets (100146487). Assemble the gasket and tail piece with the union nut as shown in FIG. 7-1. Make slip connections to the tail pieces using proper cement and primer.

To use something other than PVC or CPVC pipe, connect the tail pieces and gaskets with the union nuts as described above. Connect six inches of PVC or CPVC pipe to the tail pieces as described above. Connect a slip NPT adapter to the other end of the six inch pipe. All other piping can be made there.

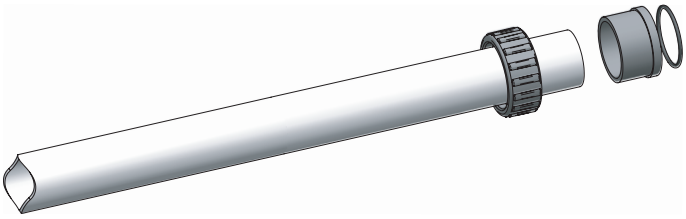


***Figure 7-1**_Piping Connection Assembly*

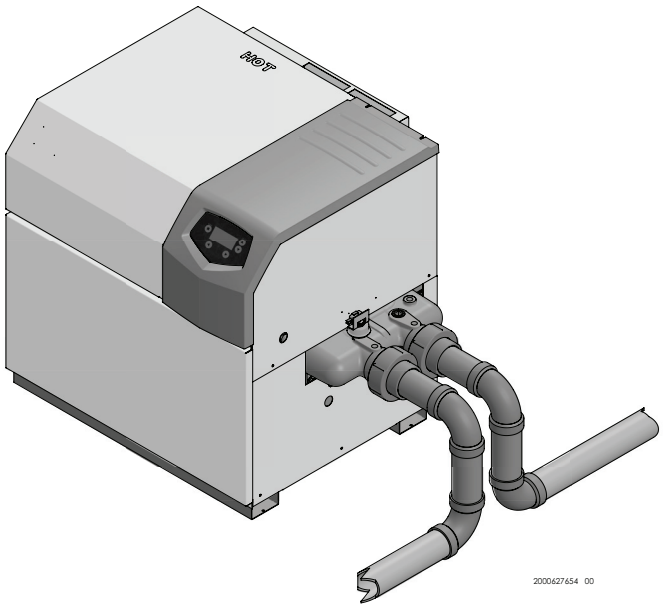


***Figure 7-2**_Typical Piping for Water Connections*

For ASME models please see the ASME Addendum section of this manual for water connections.

A metallic pipe heat sink is not required on pool heater installations. When the pool heater is used with a spa or therapy pool, CPVC or metallic pipe is recommended. The filtration pump must operate simultaneously when the heater is in service to ensure that there is no damage to the piping connected directly to the pool heater. A check valve should be installed in the piping to the heater if there is the possibility of "back siphoning" when the pump stops.

Auxiliary bypass

When water flow rates to the pool heater exceed 100 GPM, a portion of this high water flow must be diverted with an external bypass. High performance pumps can provide flows in excess of 100 GPM. An auxiliary bypass as shown in FIG. 7-3 must be installed when the maximum flow is exceeded. The bypass must have a valve installed between the connections to the pool heater to allow a portion of the excess flow to be diverted to the pool. The bypass allows the proper volume of water to be supplied to the pool heater to prevent sweating and condensate. The bypassed water prevents needless pressure drop and reduction in flow rates.

7 Water connections *(continued)*

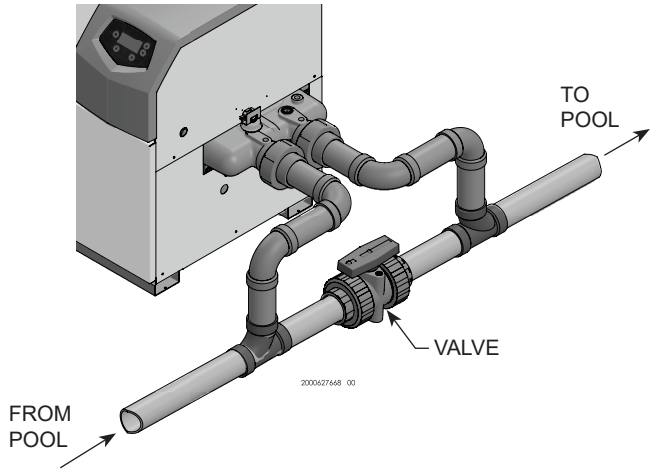


Figure 7-3_ *Auxiliary Bypass Piping*

Adjustment of auxiliary bypass

1. Backwash and clean pool filters.
2. Start with the bypass valve in the half open position.
3. Start the pool heater.
4. Check the temperature rise across the pool heater (reference the *Menu Descriptions - Delta T* section of the EnergyRite Service Manual).
5. If the temperature rise across the pool heater is more than 14°F, close the bypass valve to increase flow to the pool heater. If the temperature rise across the pool heater is less than 10°F, open the valve to decrease flow to the pool heater.
6. High water flow can cause condensate and operational problems which are non-warrantable.

Automatic chlorinators and chemical feeders

All chemicals must be diluted into the pool or spa water before they are circulated through the pool heater. Any concentration of chlorine in the pool heater can cause damage to the unit. Do not place chlorine tablets or bromine sticks in the skimmer. High chemical concentrations will result when the pump is not running.

Chlorinators must feed downstream of the pool heater and have an anti-siphoning device to prevent chemical back-up in the heater when the pump is shut off.

CAUTION High chemical concentrations from improperly adjusted feeders, chlorinators, or salt levels above 5000 ppm can cause rapid corrosion to the heat exchanger.

Water chemistry

We recommend a periodic analysis be performed to maintain and ensure proper operation of your pool heater (see Table 7B).

TABLE 7B
RECOMMENDED POOL CHEMISTRY LEVELS

Test	Recommended Level
Bromine	2.0 - 4.0 ppm
Calcium Hardness	200 - 400 ppm
Cyanuric Acid	50 - 75 ppm
Free Chlorine	1.0 - 3.0 ppm
pH	7.4 - 7.6
Salt (residential pool)	3000 ppm
Salt (commercial pool)	5000 ppm
TDS	300 - 1500 ppm
Total Alkalinity	80 - 120 ppm

Relief valve

An optional pressure relief valve may be field installed in the front header if required by local codes. Remove the 3/4" NPT plug in the outlet side of the front header. The relief valve should be properly sized based on local code requirements. In the absence of local code requirements, the relief valve should be sized in accordance with ASME Boiler and Pressure Vessel Code, Section IV ("Heating Boilers"). The relief valve is installed in the vertical position and mounted in the front header on the hot water outlet side of the pool heater. No valve is to be placed between the relief valve and the unit. To prevent water damage, the discharge from the relief valve shall be piped to a suitable floor drain for disposal when relief occurs. No reducing couplings or other restrictions shall be installed in the discharge line. The discharge line shall allow complete drainage of the valve and line. Relief valves should be manually operated at least once a year.

A pressure relief valve is offered as standard equipment on all ASME units; see the ASME Addendum section in this manual.

⚠ CAUTION Avoid contact with hot discharge water.

8 Electrical connections

This appliance is wired for 240 VAC service. The pool heater can be converted to 120 VAC by moving the jumper connector from the connector labeled 240 VAC to the connector labeled 120 VAC as shown in FIG. 8-1. The jumper connector is located inside the appliance on the left-hand side. The unit, when installed, must be electrically grounded and bonded in accordance with the requirements of the local codes or in the absence of local codes, with the latest edition of the National Electrical Code ANSI/NPA No. 70. When the unit is installed in Canada, it must conform to the CSA-C22.2, No. 3, Electric Features of Fuel Burning Equipment and/or local electrical codes.

1. The electrical power circuit to this pool heater shall be installed with a ground fault circuit interrupter. Local codes shall govern the installation of this device.
2. All wiring between the unit and field installed devices shall be made with type T wire [63°F (35°C) rise].
3. Line voltage wire exterior to the appliance must be enclosed in approved conduit or approved metal clad cable.
4. The filter pump must run continuously when the pool heater is being fired.
5. To avoid serious damage, DO NOT energize or operate the pool heater until the pool, filter system, and related piping is properly filled with water. Serious damage may result.
6. Provide the pool heater with proper overload protection.

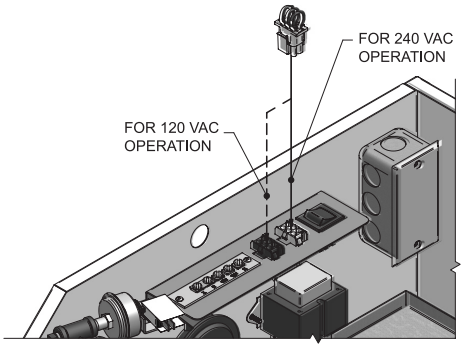


***Figure 8-1**_Voltage Jumper - 240 VAC to 120 VAC*

TABLE - 8A AMP DRAW DATA		
Model	**Approximate Total Amps**	
	120 VAC	**240 VAC**
ER152	1.4	0.7
ER202	1.9	1.0
ER252	2.0	1.0
ER302	2.0	1.0
ER402	2.0	1.0

Terminal strip for third party remote or proving switch

2-Wire Remote TSTAT:

A 2-wire remote system has its own thermostat which acts as the primary thermostat. Connect the two wires per the remote manufacturer's instruction manual to the **R** and **Wp** terminals on the terminal strip. See the *Setup Menu Descriptions - Pool/Spa Remote* section in the *EnergyRite Service Manual* for remote configuration.

3-Wire Remote Contacts:

A 3-wire remote is one that utilizes the thermostat on the heater. Connect the three wires per the remote manufacturer's instruction manual to **R**, **Wp**, and **Ws** terminals on the terminal strip. **R** = Common; **Wp** = Pool; **Ws** = Spa

Proving Switch:

Wire the external proving switch to the **X** and **B** terminals on the terminal strip. External proving switches consist of louvers, power vent kits, make-up fan interlock, etc.

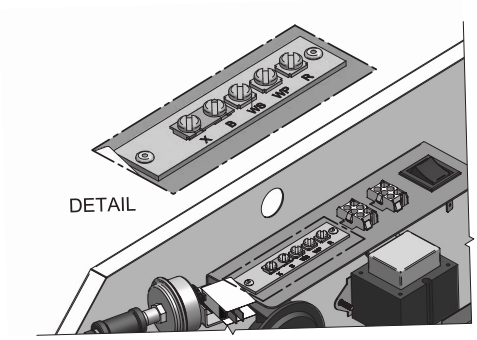


***Figure 8-2**_Terminal Strip*

Remove the brass jumper between the terminals to be used. Reference Table 8B in this section to determine maximum allowable wire length and gauge recommended to connect the switching contacts of the remote thermostat or control to the appropriate terminals on the terminal strip.

TABLE - 8B WIRE GAUGE FOR REMOTE CONNECTION	
Wire Gauge	**Maximum Allowable Length**
12 GA	100 ft.
14 GA	75 ft.
16 GA	50 ft.
18 GA	30 ft.

8 Electrical connections *(continued)*

Integrated controller

The pool heater is equipped with a microprocessor based adjustable digital integrated controller to provide ON/OFF operation. Operation is based on temperature input from an immersion sensor. The immersion temperature sensor senses inlet water temperature to the pool heater and is located in the inlet side of the front header. The integrated controller allows two temperature set points to be programmed into the control, one for pool operation and one for spa operation. The sensor is a negative temperature coefficient thermistor. A liquid crystal display is provided to indicate sensed temperature and operating parameters.

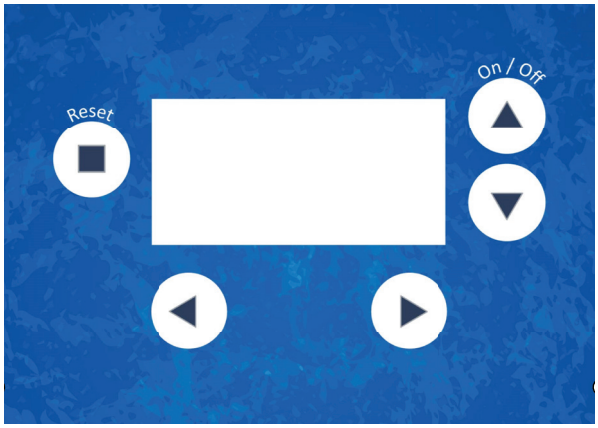


Figure 8-3_Integrated Controller and Display Keys

Temperature adjustment procedure

The pool heater allows for two different temperature set points, one for Pool Mode and one for Spa Mode. To adjust the pool temperature set point while in Pool Mode and not in the Service or Setup Menu, press the UP or DOWN button once to bring up the Temperature Adjustment Screen. Press the UP or DOWN button again to adjust the setting. Repeat this process while in Spa Mode to adjust the spa set point.

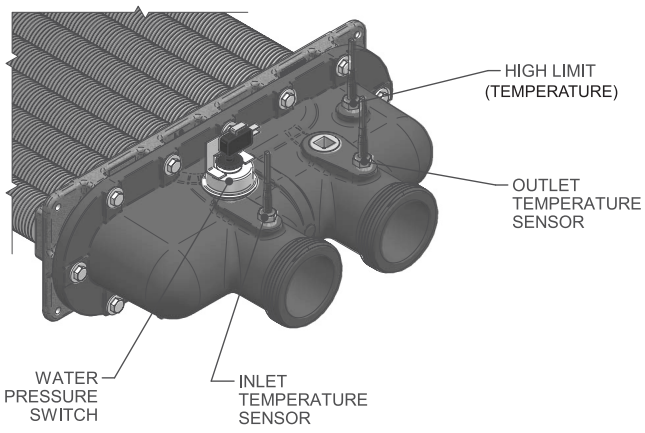


Figure 8-4_Front Header with Limits

High water temperature limit controls

The pool heater is equipped with one auto-reset high water temperature limit control. If water temperature exiting the heat exchanger exceeds the trip point, the limit will break the control circuit and shut down the unit. The limit control will only be reset after the water temperature has cooled below the reset point of the limit. The high water temperature limit controls are mounted in the outlet side of the front header (FIG. 8-4).

The heater is also equipped with an outlet temperature limiting thermostat. The thermostat will limit the outlet temperature of the mixed water (bypass and heat exchanger) to less than 140°F.

NOTICE The limit control will not reset until the water temperature has dropped below the reset point of the high limit.

Water pressure switch

The pressure switch is factory preset for normal installations at deck level. The switch will stop operation of the pool heater on low water flow. The water pressure switch is factory preset at 5 PSI. Do not adjust the pressure switch unless the pool heater is located more than four feet above or below the deck level.

Pressure switch adjustment

The pressure switch is located in the front header, above the water connections. When required, the pressure switch can be reset with the following procedure:

1. Clean filter and skimmer.
2. Start filter pump.
3. Set digital thermostat to highest setting.
4. Turn the adjustment knob on the pressure switch clockwise until the combustion air fan in the front control panel turns off. Fan will not turn off if system pressure exceeds 5 PSI.
5. Slowly turn the adjustment knob counterclockwise until the combustion air fan turns on. Turn the knob an additional 1/4 turn counterclockwise.
6. Turn the filter pump off and on several times. The heater should shut down immediately when the pump stops.
7. If the heater does not shut down immediately as the filter pump stops, repeat steps 4, 5, and 6 until proper operation is achieved.
8. Reset thermostat to desired temperature setting.

⚠ WARNING Operation of the pool heater without proper flow will cause immediate non-warrantable damage to the heat exchanger.

9 Start-up

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

FOR YOUR SAFETY
"WHAT TO DO IF YOU SMELL GAS"

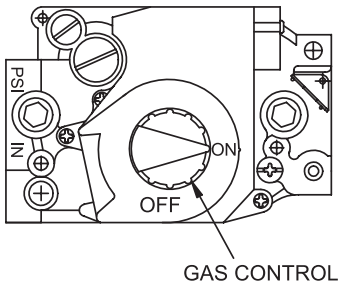
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Turn off all electric power to the appliance.
3. Open control access panel.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.



GAS CONTROL KNOB
SHOWN IN THE "ON" POSITION

5. Push in gas control knob slightly and turn clockwise to "OFF."

NOTE: On the 36C valve, knob cannot be turned to "OFF" unless knob is pushed in slightly. Do not force.

6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step".
7. Turn gas control knob counterclockwise to "ON."
8. Replace control access panel.
9. Turn on all electric power to the appliance.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the appliance if service is to be performed.
2. Open control access panel.
3. Push in gas control knob slightly and turn clockwise to "OFF". Do not force.
4. Replace control access panel.

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9 Start-up *(continued)*

Energy saving recommendations

1. Keep the pool/spa covered when not in use. This will cut heating cost, reduce water evaporation, conserve chemicals and reduce load on the filtering system.

2. Reduce pool thermostat to 78°F (25°C) or lower, reduce spa temperature to 100°F (38°C).

3. Use an accurate pool/spa thermometer to monitor water temperature.

4. Record the proper temperature settings for your pool and spa set points and discourage further adjustments of the digital control.

5. Use a time clock to start filter pump no earlier than 6 a.m. during pool/spa season. This is the time when nightly heat loss stabilizes.

6. Turn the pool/spa heater off and drain during long periods when the pool will not be used (winter, vacations, etc.,).

7. Follow a regular program of preventative maintenance for your heater each new swimming season. Check heat exchanger, controls, burners, and operation of the unit.

8. For pools used only on weekends, the thermostat may be set lower than 78°F (25°C) during the week. Lower setting to a range that can be easily achieved in one day's operation of the pool heater.

Checking gas supply pressure

1. Turn the main power switch to the "OFF" position.

2. Shut off gas supply at the field installed manual gas cock in the gas piping to the appliance. If fuel supply is LP gas, shut off gas supply at the tank.

3. On ER152 - ER202 models remove the 1/8" hex plug, located on the "inlet" side of the gas valve. An inlet pressure tapping is located on the top side of the valve body (see FIG. 9-1).

   On ER252 - ER402 models remove the 1/8" hex plug, located in the tee between the low gas pressure switch and the gas valve (see FIG. 9-2).

   A tapping on the field installed main manual gas cock may also be used. Install a fitting in the inlet pressure tapping suitable to connect to a manometer or magnahelic gauge. Range of scale should be 14" w.c. or greater to check inlet pressure.

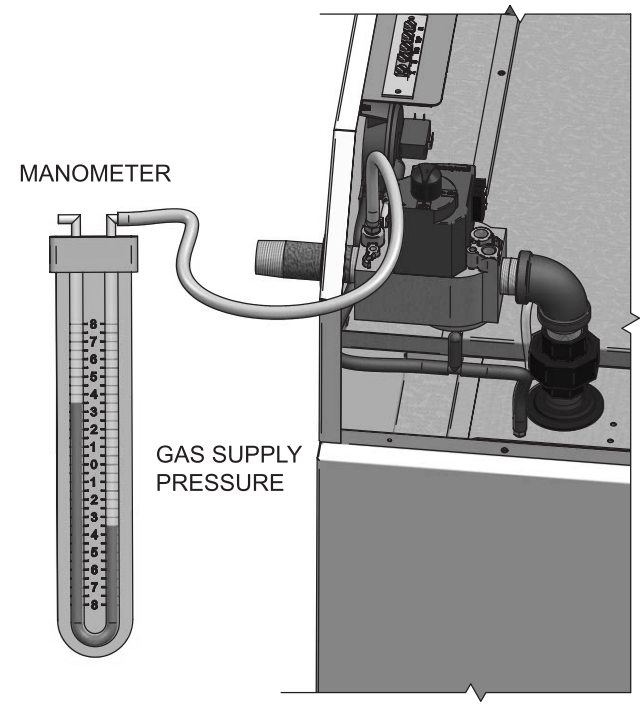


***Figure 9-1**_Gas Supply Pressure Measurement - Models ER152 - ER202*

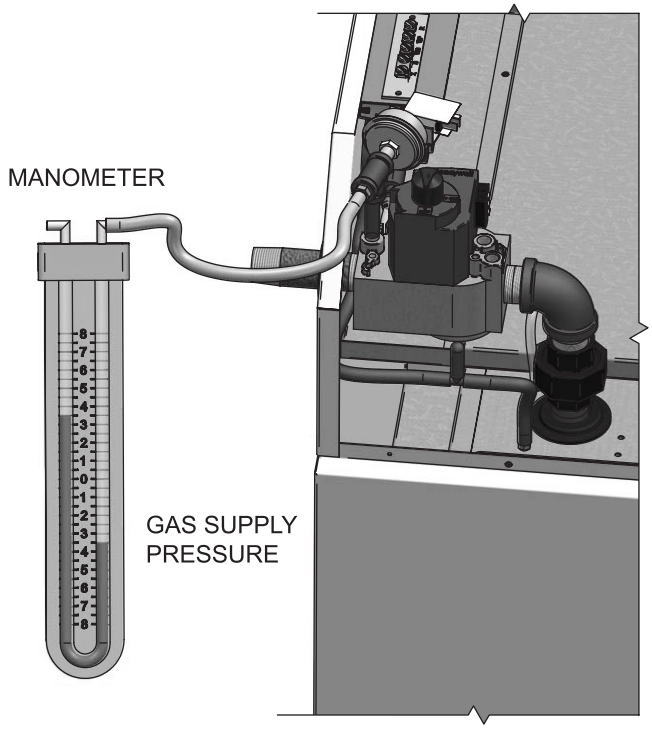


***Figure 9-2**_Gas Supply Pressure Measurement - Models ER252 - ER402*

9 Start-up

4. Turn on gas supply at the manual gas cock, turn on LP gas at tank if required.

5. Turn the power switch to the "ON" position.

6. Ensure that the "ON/OFF" knob or the valve is in the "ON" position.

7. Set the electronic temperature control to call for heat.

8. Observe the gas supply pressure as all burners are firing. Ensure that inlet pressure is within the specified range. Minimum and maximum gas supply pressures are specified in the *Gas Supply* section and on the rating plate.

9. If gas pressure is out of range, contact a gas utility, gas supplier, qualified installer, or service agency to determine necessary steps to provide proper gas pressure to the control.

10. If the gas supply pressure is within normal range, proceed to remove gas manometer and replace pressure tap fittings in the gas control.

11. Turn the power switch to the "OFF" position.

12. Shut off gas supply at the manual gas cock in the gas piping to the appliance. If fuel supply is LP gas, shut off gas supply at the tank.

13. Remove the manometer and related fittings from the "inlet" side of the gas valve, replace the 1/8" hex plug in the tee (Models ER252 - ER402) or gas valve (Models ER152 - ER202) and tighten.

14. Turn on the gas supply at the manual valve, turn on the LP gas at the tank if required.

15. Turn the power switch to the "ON" position.

16. Ensure that the "ON/OFF" knob or the valve is in the "ON" position.

17. Set the electronic temperature control to call for heat.

If proper ignition and burner operation is not achieved after checking gas supply pressure and setting the correct manifold pressure, see the *Maintenance* section in the EnergyRite Service Manual for Combustion Air Shutter Adjustment. Follow the procedure to adjust the combustion air fan.

NOTICE

Upon completion of any testing on the gas system, leak test all gas connections with a soap and water solution while main burners are operating. Do not spray soap and water solution on the gas valve housing. The use of an excessive amount of soap and water solution can damage the valve. Immediately repair any leak found in the gas train or related components. Do not operate an appliance with a leak in the gas train, valves, or related piping.

Check burner performance by cycling the system while you observe burner response. Burners should ignite promptly. Flame pattern should be stable, see the *Maintenance Normal Flame Pattern* section in the EnergyRite Service Manual. Turn system off and allow burners to cool, then cycle burners again to ensure proper ignition and flame characteristics.

NOTICE

If a pressure drop of more than 2" w.c. occurs between Stand by (Static) Mode and Operating (Dynamic) Mode occurs, a gas volume problem exists. Contact the gas utility, gas supplier, qualified installer, or service agency to determine the necessary steps to provide the proper gas volume to the appliance.

10 Operating information

General

How the pool heater operates

The EnergyRite uses a copper finned tube heat exchanger and an electronic control module. The blower provides both primary and secondary air to the burners and forces the flue products out of the combustion chamber and into the vent system. The combination gas valve both regulates the manifold pressure and provides gas to the manifold, which then supplies the burners. The control and gas supply system is a fixed rate and only contains ON/OFF operation.

How the control module operates

The EnergyRite control monitors the inlet sensor which is indicative of pool/spa water temperature. The control will begin an ignition sequence when the water temperature has dropped below the set point minus the differential. It will also monitor all safety circuits and will terminate or prevent an ignition cycle if a safety circuit is open. In addition, the control will monitor the outlet temperature and will terminate a call for heat if the outlet temperature gets too high.

Control inputs and outputs

Remote control

The remote control allows the remote operation of the heater.

Temperature regulation

Operating temperature (pool/spa temperature)

The EnergyRite control module monitors inlet water temperature and will initiate a call for heat to maintain the desired pool/spa temperature. The operating temperature is adjustable from 55°F to 104°F.

Outlet temperature

An outlet water sensor is used to monitor the outlet water temperature. The outlet water temperature is created by mixing the water temperature from the discharge of the internal bypass and the water temperature from the discharge of the heat exchanger. If the outlet water temperature exceeds 135°F the control module will shut the unit down until the water temperature drops below 120°F.

Protection features

High limit

A high limit device is used to monitor the water temperature at the discharge of the heat exchanger. If the water temperature exceeds 175°F the control module will shut the unit down and display high limit open in the display until the water temperature drops below 135°F.

Low water protection

A water pressure switch is used to monitor the water flow through the heat exchanger. The switch is factory preset at 5 PSI and will shut the unit down due to low water flow. The control module will display low water flow in the display. The switch is preset for normal installations at deck level. Installations that are lower than deck level may require an adjustment of the switch or the installation of an optional flow switch to protect the unit from low water flow conditions.

Low air protection

A differential air pressure switch is used to monitor the difference in air pressure between the front lower cabinet and the negative pressure created by air flow through the burner. Before the fan starts on a call for heat, the control module will determine if the switch is in an open or closed position. If the switch is in a closed position before the fan starts, the control module will not start the fan and will show AIR SWITCH SHORT in the display. If the switch is in an open position, the control module will start the fan and will allow 20 seconds for the switch to close. If the switch does not close within 20 seconds, the control module will show DISPLAY AIR SWITCH OPEN in the display and go to post purge. The control module will wait 5 minutes and will retry the ignition sequence unless the MENU button is pressed. This sequence will continue for as long as the switch is open.

Monitor external safeties

Proving switch

An external proving switch may be connected to the control module. When a call for heat is initiated and the fan starts, the control module will allow 65 seconds for the switch to close. After 65 seconds, if the switch is not closed the control module will show PROVING SWITCH in the display and go to post purge. The control module will wait 5 minutes and will retry the ignition sequence. This sequence will continue for as long as the switch is open.

10 Operating information

Auxiliary safety 1 and 2

Two auxiliary safeties may be connected to the control module. The control module will not initiate or will terminate a call for heat if either safety is open. The control module will show AUXILIARY SAFETY 1 OPEN or AUXILIARY 2 OPEN in the display. The control module will not initiate a call for heat until this condition is corrected.

Data logging

Cycle counting

The control module will monitor the number of cycles the unit has been through. Each time the unit has successfully completed an ignition the cycle count will be increased by one.

Error logging

The control module will hold the last 10 lockouts in memory. Only the 10 most current occurrences will be held in memory.

10 Operating information *(continued)*

Sequence of operation

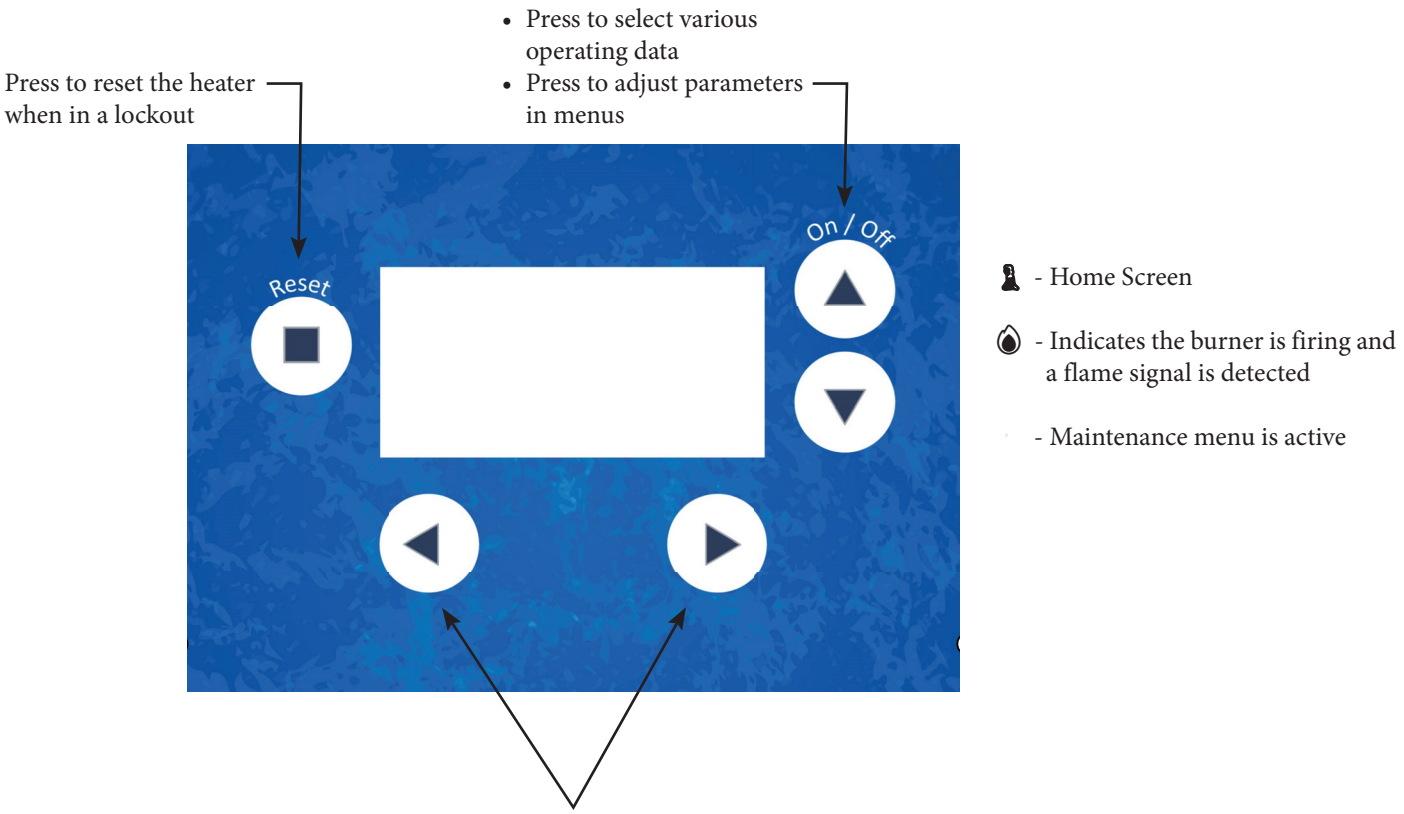
OPERATION	DISPLAY
1. Upon a call for heat, the control module will look at the high limit, the water pressure switch, and the auxiliary safeties. If any of these devices are open, the control module will not initiate an ignition sequence.	POOL: Standby POOL INLET: 78°F
2. The control will enter the Pre-Purge Mode. After a few seconds it will begin to look for the air pressure switch to be closed. It will also look to see that the proving switch is closed.	POOL: Standby POOL INLET: 78°F
3. Once both the air pressure switch and the proving switch are sensed closed the blower will provide an additional pre-purge period before initiating a trial for ignition.	POOL MODE PREPURGE
4. Once the prepurge period is complete, the control module starts the trial for ignition by sending spark voltage to the spark electrode and opening the gas valve.	POOL MODE IGNITION
5. If the control module does not detect flame by the end of the trial for ignition period, the control module will close the gas valve and initiate a prepurge period. After the prepurge period another trial for ignition sequence will begin. If the control module does not detect flame by the end of the 4th trial for ignition period, the control module will lockout and display ignition failure in the display.	POOL MODE INTER-PURGE, IGNITION, LOCKOUT IGNITION FAILURE
6. If the control module detects a flame before the trial for ignition period ends, the spark shall be de-energized and the gas valve will remain open.	POOL: Run POOL TEMP: 78°F
7. Once the call for heat has been satisfied, the control module will de-energize the gas valve. The blower will continue to run for the post purge period.	POST PURGE POOL MODE
8. The unit waits for the next call for heat.	POOL: Standby POOL TEMP: 78°F

10 Operating information

EnergyRite control module

Use the control panel (FIG. 10-1) to set temperatures, operating conditions, and monitor unit operation.

Figure 10-1_ *Control Panel*



Home screen

The Home Screen can be used to view the current operating information of the pool heater. The ▲ and ▼ buttons can be used to page through the screen sequence, displaying various operating statistics.

10 Operating information *(continued)*

Access modes

Modes of operation

There are three modes of operation: 1) Off, 2) Pool, and 3) Spa. The factory default mode is Off.

Off mode

When in Off Mode the control will display CONTROL OFF and does not monitor any of the inputs.

Setup menu

Additional features can be accessed and adjusted through the Setup Menu. Please reference the EnergyRite Service Manual for a detailed description of the Setup Menu.

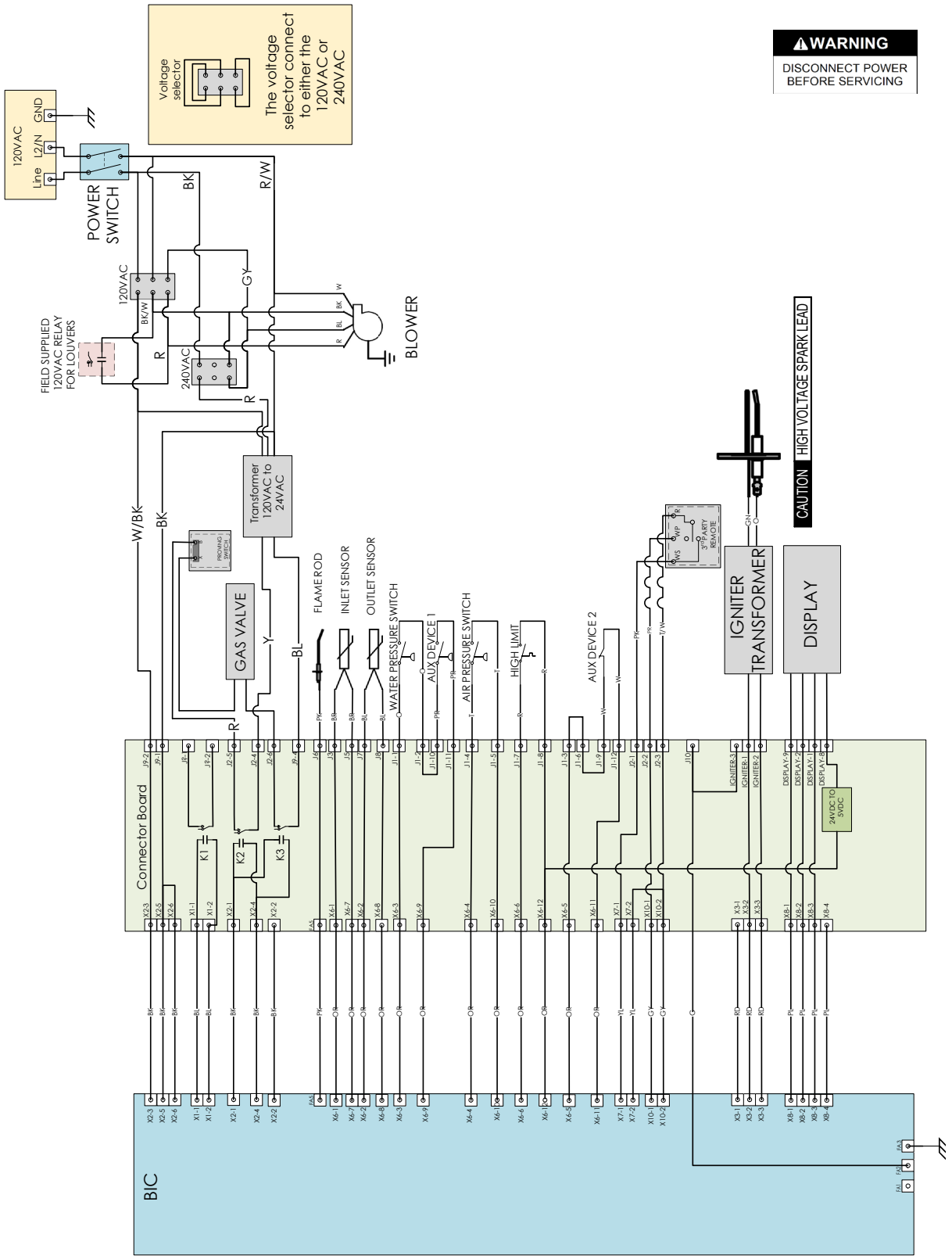
Service menu

Temperature rise and data logging information can be accessed from the service menu. Please reference the EnergyRite Service Manual for a detailed description of the Service Menu.

Status Display Screens	
Display shows:	**Description**
Control: OFF	The control module has been placed in the Off Mode.
Pool: Standby	The unit has not received a call for heat.
Pool Inlet = *°F**	Indicates the current inlet water temperature.
Pool Mode Prepurge	A call for heat has been initiated. The blower has been powered and the air pressure switch has closed.
Pool Mode Ignition	After the prepurge period, the unit has begun a spark period to light the main burners.
Pool: Run	The burners have fired and the flame has been detected.
Standby	Remote is active and has either satisfied the set point or there is no call for heat from the remote.

10 Operating information

Figure 10-2_Wiring Diagram



Notes:
1. All wiring must be installed with local, state, provincial, and national code requirements per either N.E.C. in USA or C.S.A. in Canada.
2. If any original equipment wire as supplied with appliance must be replaced, then it must be replaced with wire having same wire gauge (AWG) and rated for a minimum of 105°C. Exceptions: Replacement high voltage spark lead and ribbon cables must be purchased from the factory. Use of a non-approved spark lead or ribbon cables can lead to operational problems which could result in non-repairable damage to the integrated controller or other components.
3. Actual connector block locations may vary from those shown on diagrams. Refer to actual components for proper connector block locations when using diagrams to troubleshoot unit.

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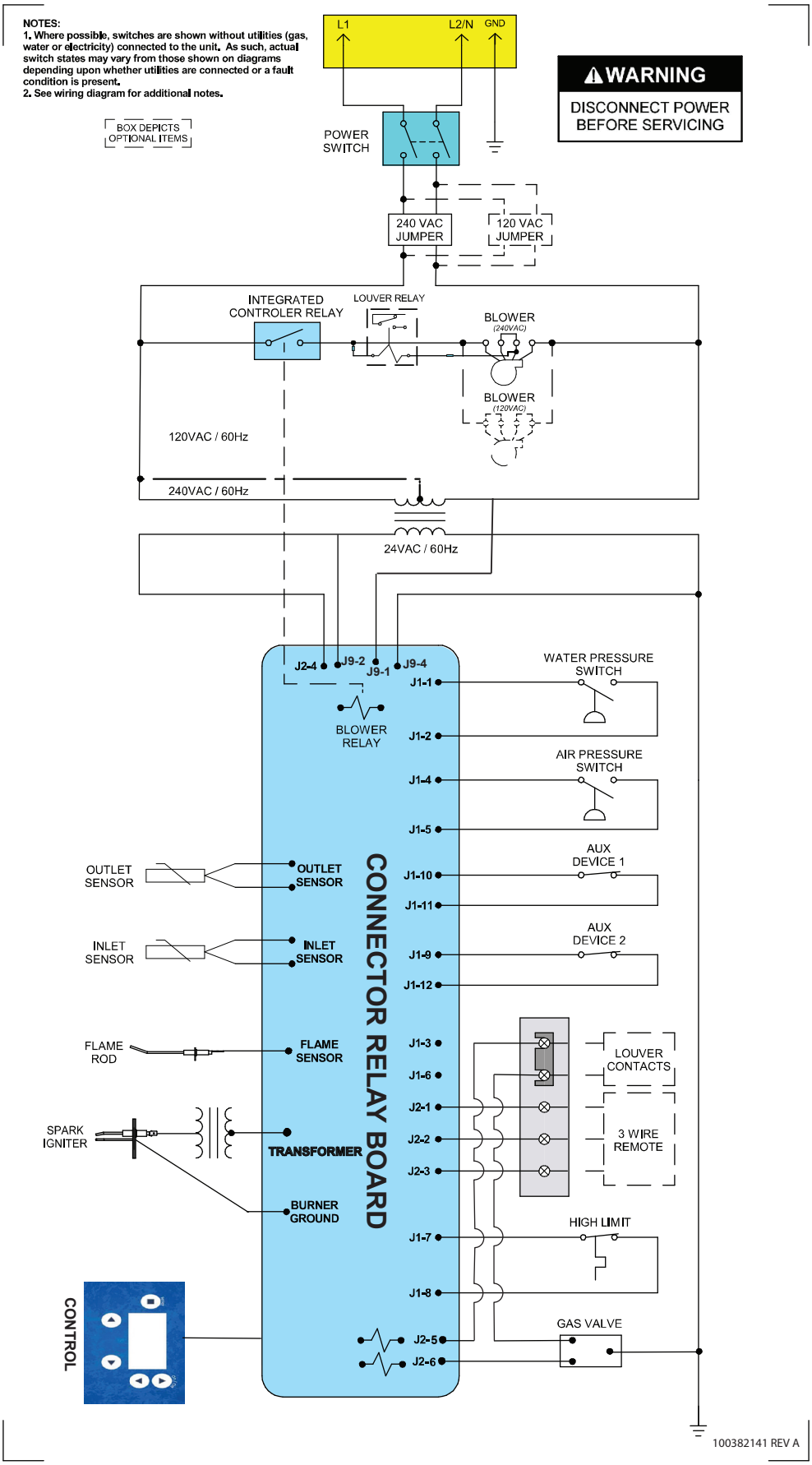
10 Operating information *(continued)*

Figure 10-3_Ladder Diagram



11 ASME addendum

The EnergyRite - How it works...

1. **Heat exchanger**
   Allows pool water to flow through specially designed tubes for maximum heat transfer, while providing protection against flue gas corrosion.

2. **Outlet temperature sensor**
   This sensor monitors outlet water temperature and will shut down the unit if this temperature gets too high.

3. **Inlet temperature sensor**
   This sensor monitors the inlet water temperature and will be used by the integrated control to determine whether an ignition cycle should begin.

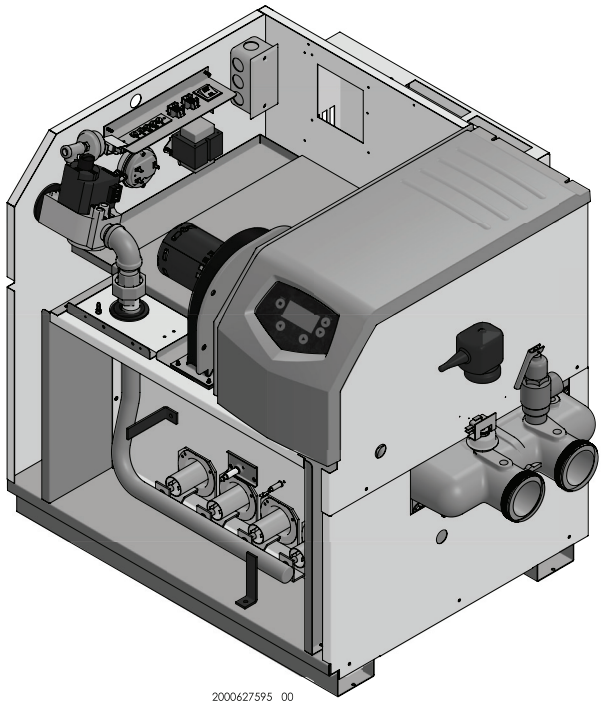
4. **Water outlet (pool supply)**
   For an ASME unit, connection to the pool heater can be made with either 2" threaded pipe or a slip connection with 1 1/2" or 2"pipe.

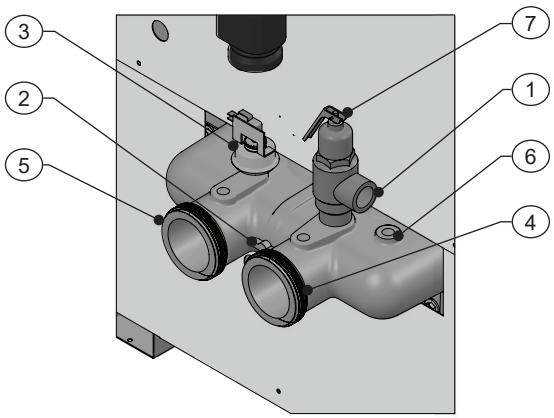
5. **Water inlet (pool return)**
   For an ASME unit, connection to the pool heater can be made with either 2" threaded pipe or a slip connection with 1 1/2" or 2" pipe.

6. **High limit sensor**
   Device that monitors the outlet water temperature. If the temperature exceeds 175°, it will break the control circuit, shutting the pool heater down.

7. **Pressure relief valve**
   A pressure relief valve is installed in the vertical position and mounted in the front header on the hot water outlet of the pool heater. To prevent water damage, the discharge from the relief valve shall be piped to a suitable floor drain for disposal when relief occurs.

8. **Pool heater drain port (total of 3 - not shown)**
   Location from which the heat exchanger can be drained.





11 ASME addendum *(continued)*

Water connections

Inlet and outlet connections

Connection to the pool heater can be made with either 2" threaded pipe or a slip connection with 1 1/2" or 2" pipe. Two inch threaded pipe may be directly screwed into the flanged header connections for both inlet and outlet piping. Each pool heater is supplied with two sets of gaskets to allow a flanged compression attachment of either 2" or 1 1/2" copper pipe directly to the front header. Ensure that the correct gasket is used to match the pipe diameter used. Minimum pipe size for installation of the pool heater is 1 1/2" diameter.

NOTICE

The pool heater installation may require a 3/4" drain pipe. Check with your local code authorities. In these applications, install a 3/4" threaded connection in the piping, located immediately downstream of the inlet/outlet connection on the front header for system drainage.

TABLE - 11A
MINIMUM WATER FLOW REQUIREMENTS

Minimum water flow rates to ensure proper operation are as follows:	
Model	**Minimum Flow**
ER152-A	15 GPM
ER202-A	20 GPM
ER252-A	25 GPM
ER302-A	30 GPM
ER402-A	40 GPM

A metallic pipe heat sink is not required on pool heater installations. PVC, CPVC, or other high temperature plastic piping may be used to pipe directly to the pool heater if permitted by local codes. When the pool heater is used with a spa or therapy pool, CPVC or metallic pipe is recommended. A silicon type sealant with a high elasticity must be used at flanged connections to prevent leakage. This helps to compensate for the large differences in expansion and contraction of the materials used in piping and the flanged connections. The filtration pump must operate simultaneously when the heater is in service to ensure that there is no damage to PVC piping connected directly to the pool heater. A check valve should be installed in the piping to the heater if there is the possibility of "back siphoning" when the pump stops.

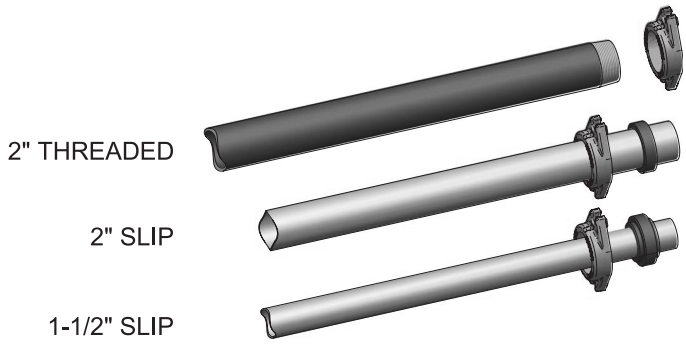


Figure 11-1_ *Alternate Piping Connections*

Auxiliary bypass

When water flow rates to the pool heater exceed 100 GPM, a portion of this high water flow must be diverted with an external bypass. High performance pumps can provide flows in excess of 100 GPM. An auxiliary bypass as shown in FIG. 11-2 must be installed when the maximum flow is exceeded. The bypass must have a valve installed between the connections to the pool heater to allow a portion of the excess flow to be diverted to the pool. The bypass allows the proper volume of water to be supplied to the pool heater to prevent sweating and condensate. The bypassed water prevents needless pressure drop and reduction in flow rates.

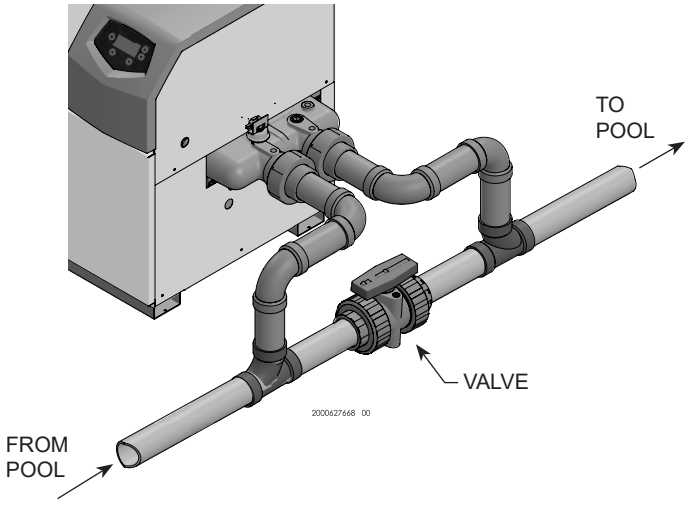


Figure 11-2_ *Auxiliary Bypass Piping*

11 ASME addendum

Adjustment of auxiliary bypass

1. Backwash and clean pool filters.
2. Start with the bypass valve in the half open position.
3. Start the pool heater.
4. Check the temperature rise across the pool heater (reference the *Menu Descriptions - Delta T* section of the EnergyRite Service Manual).
5. If the temperature rise across the pool heater is more than 14°F, close the bypass valve to increase flow to the pool heater. If the temperature rise across the pool heater is less than 10°F, open the valve to decrease flow to the pool heater.
6. High water flow can cause condensate and operational problems which are non-warrantable.

Relief valve

A pressure relief valve is installed in the vertical position and mounted in the front header on the hot water outlet of the pool heater. No valve is to be placed between the relief valve and the unit. To prevent water damage, the discharge from the relief valve shall be piped to a suitable floor drain for disposal when relief occurs. No reducing couplings or other restrictions shall be installed in the discharge line. The discharge line shall allow complete drainage of the valve and line. Relief valves should be manually operated at least once a year.

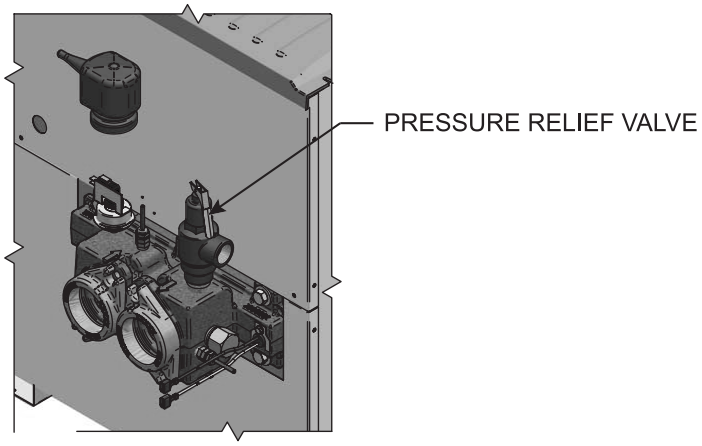


Figure 11-3_ *Pressure Relief Valve*

NOTES

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Revision Notes: *Revision A (PCP #3000056996 / CN #500043263*

Revision B (PCP #3000059105 / CN #500045150) reflects the addition of series 101.

Revision C (PCP #3000062522 / CN #500048395) reflects updated ladder and wiring diagrams.

Revision D (PCP #3000065917 / CN #500051528) reflects updates to figure 5-7.

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