

Ω MEGA CE

Outdoor Wood Burning Appliance



Installation and Operation Manual

VERIFY WITH INSURANCE COMPANY AND ALL LOCAL CODES AND ORDINANCES
PRIOR TO INSTALLATION.

IT IS THE OWNER'S RESPONSIBILITY TO ENSURE THAT THE APPLIANCE IS
ACCEPTABLE TO THEIR INSURANCE CARRIER AND THAT THE APPLIANCE MEETS
ALL LOCAL CODES AND ORDINANCES.

Thank you for purchasing the WMEGA^{CE} outdoor solid fuel appliance .

The WMEGA^{CE} is a state of the art outdoor solid fuel appliance designed to efficiently and effectively heat structures. Please read and follow all safety instructions to ensure optimal performance.

The installation and operation of the WMEGA^{CE} is quite simple. Nevertheless, we recommend that the instructions be carefully read and followed. Pay particular attention to chimney and chimney connector installation as they present the greatest fire danger.

If you have any questions on the installation or operation of your outdoor solid fuel appliance, please contact our service department or your local WMEGA^{CE} Representative.

OBSERVE AND FOLLOW ALL SAFETY INSTRUCTIONS

Failure to install properly or follow safety instructions could result in severe personal injury, death or substantial property damage.

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.

Indicates presence of hazards that will cause severe personal injury, death or substantial property damage.

DANGER

Indicates presence of hazards that can cause severe personal injury, death or substantial property damage.

WARNING

Indicates presence of hazards that will or can cause minor personal injury or property damage.

CAUTION

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

NOTICE

SAVE THESE INSTRUCTIONS

Please fill in the following blanks and have this manual in front of you when you call the factory for assistance.

Model # _____

Serial # _____

Date of Purchase _____

Date of Installation _____

Dealer Name _____

Dealer Phone # _____

CONTENTS

1) GENERAL	<hr/>	
	Safety	4
	Specifications	5
	Product Description	6
2) INSTALLATION	<hr/>	
	Installation Tips	8
	Placement	9
	Clearances	10
	Site Preparation	11
	Transfer Line	12
	Lifting the Unit	13
	Contents.....	14
	Tapping Diagram.....	15
	Venting	16
	Plumbing	18
	Electrical	20
	Wiring Diagram.....	21
	Typical System Schematics	22
	Side Arm Heat Exchanger.....	29
3) START-UP	<hr/>	
	Initial Fill	30
	Setting up the Aquastat	33
4) OPERATION	<hr/>	
	Lighting.....	34
	Emergency Actions.....	37
	Maintenance	38
5) TROUBLESHOOTING	<hr/>	41
6) REPAIR PARTS	<hr/>	43
7) WARRANTY	<hr/>	44

SAFETY

ALL STATE or LOCAL CODES take precedence and MUST be observed

Many of these recommendations are based upon the National Fire Protection Assn. Code 211. Before installing or starting operation, read and familiarize yourself with all instructions. Installation is to be performed only by qualified heating professionals.

DANGER: RISK OF EXPLOSION OR PERSONAL INJURY

- ◆ Ensure that blower is 'OFF' prior to opening loading door or ash door. Failure to do so could result in severe burns.
- ◆ ALWAYS hesitate momentarily between the first and second latches when opening doors to allow unburned gases to ignite. Failure to do so could result in severe burns.
- ◆ DO NOT use chemicals, kerosene or other flammable liquids to start a fire; severe burns could result.
- ◆ DO NOT store combustible liquids or materials near the appliance.
- ◆ DO NOT store wood within the minimum clearance to combustibles.
- ◆ DO NOT burn gasoline, naphtha or engine oil.
- ◆ DO NOT burn garbage, tires, telephone poles, railroad ties or yard waste. In many areas this is illegal and will damage the appliance. Fired anything other than wood can void your warranty.
- ◆ DO NOT start a fire if flammable vapors or dust are present. An explosion could result.
- ◆ Most anti-freeze is glycol based. Never store glycol of any kind near the appliance or any potential ignition source. All glycol is flammable when exposed to high temperatures. If glycol is allowed to accumulate in or around the appliance or any other potential ignition source, a fire can develop.
- ◆ Never use automotive anti-freeze or ethylene glycol in the system. Using these glycols can destroy rubber pump and valve seals leading to hazardous leakage and system damage.
- ◆ Monitor and inspect the system and appliance regularly for leakage. Repair any leaks immediately to prevent possible accumulation of glycol.
- ◆ **NEVER** operate without a properly installed pressure relief valve (Watts Regulator M335 or equivalent), which will discharge water and relieve pressure at 30 psi. Use only a boiler relief valve designed to lift at 30 psi. Failure to use proper valve could result in an explosion, personal injury or property damage.
- ◆ Open the pressure relief valve at least annually to ensure waterways are clear. Avoid contact with the scalding water that will be released. Failure to open valve could result in an explosion if valve should stick.
- ◆ DO NOT install in home, basement or garage.
- ◆ Do not use petroleum-based cleaning or sealing compounds in the heating system. Pump and valve water seal deterioration will occur. This can result in substantial property damage.
- ◆ Do not use "homemade cures" or "boiler patent medicines". Serious damage to the appliance, personnel and/or property may result.
- ◆ To avoid electric shock, disconnect electrical supply before performing maintenance.
- ◆ To avoid severe burns, allow the appliance to cool before performing maintenance.
- ◆ This appliance requires electricity whenever in operation. Operation without electricity could result in the appliance overheating. If power outages are anticipated, a back-up electrical generator is recommended.
- ◆ Appliance Operation —
 - DO NOT block flow of combustion or ventilation air to the appliance.
 - DO NOT turn off the pump or prevent fluid flow during operation.
 - DO NOT restrict access to the rear of the unit for maintenance.

PRODUCT SPECIFICATIONS

MODEL	CE-20
Height	65"
Length (with Fan)	58"
Width	49"
Fire Box Length	42"
Fire Box Diameter	30"
Fire Box Volume	17 cubic Ft
Door Opening	20" x 26 ½"
Water Volume	59 Gal
Chimney Size	6" Double Wall
Weight	3,000
Sustained Output	70,000 Btu/Hr

Note: Output values are based on theoretical 12 hour sustained burn rate under optimal conditions and are provided as guideline only. Actual output will depend on a variety of factors beyond the manufacturer's control, including: boiler location, wood species, wood moisture, wood size, ash management and combustion air temperature along with many other variables.

PRODUCT DESCRIPTION

The WMEGA^{CE} by Aqua-Therm is a state of the art outdoor solid fuel boiler designed to burn seasoned split cordwood. It is to be installed in a building or shelter outside the structure being heated. A circulating pump moves the heated water to a heat emitter. This can be baseboard radiator, finned radiator (heat exchanger), unit heater or radiant floor heating systems.

The WMEGA^{CE} is designed to be loaded twice a day, though actual loading times will depend on the quality of the wood, the size and insulation of the structure to be heated, and the outdoor air temperature. It is designed to burn seasoned cordwood, either split or whole.

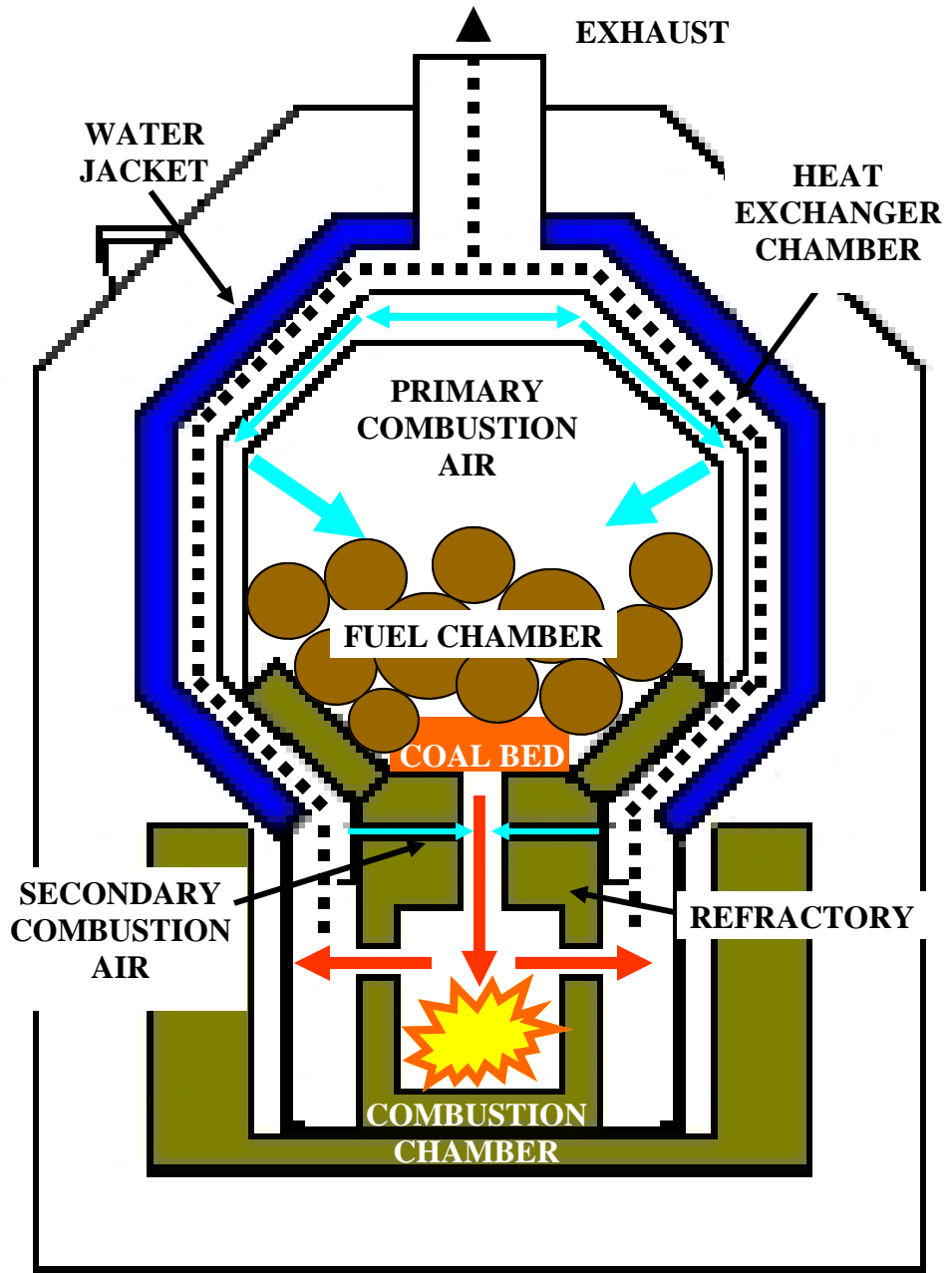
Wood is loaded into the FUEL CHAMBER. Primary combustion air is added to create a swirling, turbulent fire.

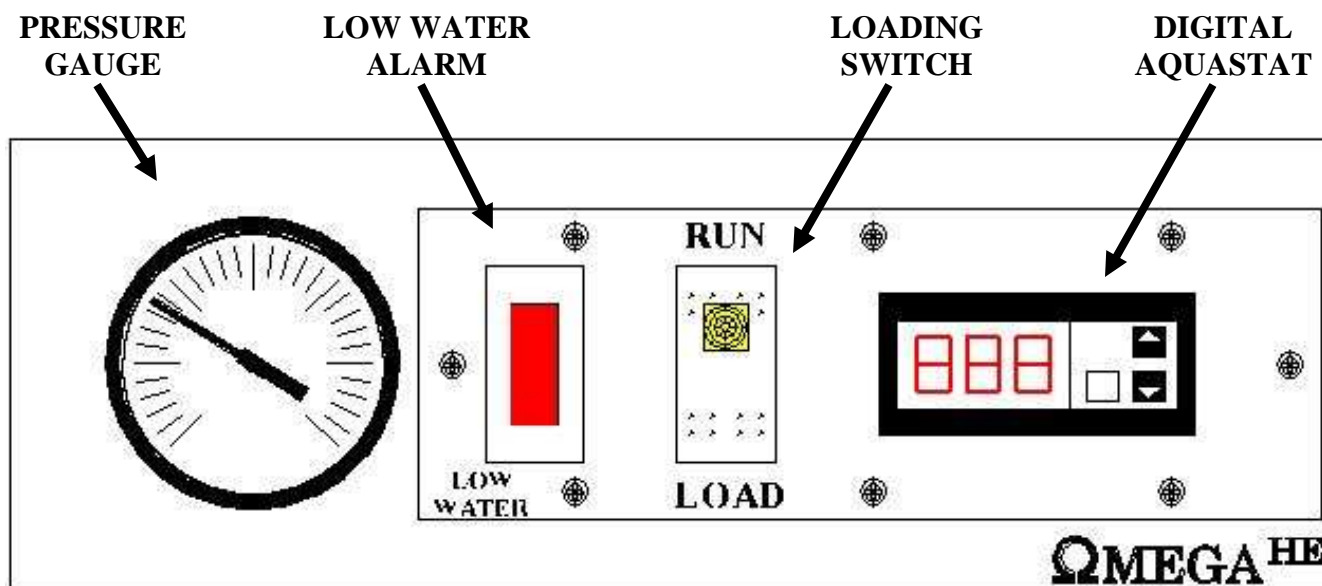
Smoke and combustion gases are forced down through the COAL BED and through a refractory lined nozzle.

Secondary combustion air in the nozzle adds extra oxygen to the heated gases to maximize the combustion process.

Combustion gases are allowed to generate intense heat in the refractory lined COMBUSTION CHAMBER.

Heat is transferred to the WATER JACKET as the gases transit the HEAT EXCHANGER CHAMBER.



CONTROL PANEL

The combustion process is controlled by an aquastat that senses exiting water temperature. The aquastat energizes a blower if water temperature is below setpoint. Once the desired water temperature has been obtained, the aquastat turns the blower off. If water temperature falls by a certain amount (called the “differential”) the aquastat starts the process over again.

The blower moves air through a motorized shutter that opens when the blower starts. When the blower stops, the shutter shuts, preventing smoke from backing up into the blower.

A loading switch on the control panel glows amber when in the “RUN” position, signifying that power is available to the blower through the aquastat. When in the “LOAD” position the amber light is off, signifying that the blower is off, reducing the fire prior to opening the loading door.

A second, “Safety” latch on both the loading door and the ash door allow unburned gases to combust prior to opening the door. Always pause between the first latch and the safety latch to minimize flare backs.

The water/antifreeze solution is continuously pumped through the appliance following a flow path designed to maximize heat transfer. A Low Water Cutoff (LWCO) is installed high in the appliance and will protect the appliance from “dry firing”. If there is a loss of water from the appliance, the LWCO will prevent the blower from operating and a red “LOW WATER” light will illuminate on the control panel.

The system is a closed or sealed system pressurized to between 10 and 20 psig. An expansion tank located in the house allows the water to expand or contract as it changes temperature while maintaining a fairly constant pressure. A pressure relief valve is installed on the appliance to safely reduce system pressure if it ever exceeds 30 psig. The appliance is hydrostatically tested at the factory to 45 psig.

During mild outdoor temperatures, the aquastat setting should be adjusted downward to limit the unit from over heating.

INSTALLATION: TIPS

1) AVOIDING AIR LOCKS

The WMEGA^{CE} is designed to operate in a closed plumbing system. It is not vented to atmosphere but operates under pressure. Water running downhill balances the force required to move water uphill. Air trapped in the lines prevents circulation. Poor water circulation is a common start up problem. Reduced flow can be difficult to detect because the pipes will feel hot. It is essential to provide a means for air in the lines to escape as the system is being filled. Design piping to avoid high points where air can be trapped or install bleed vents at these locations. Various vent fittings are available such as vented brass elbows or baseboard tees. Vents should be open during the fill process. Close the vents when bubble-free water runs out. The auto air vents at the back of the WMEGA^{CE} and on top of the air scoop should remain open at all times.

2) BALL VALVES

Install ball valves in the lines to isolate various components or sections. The ball valves will eliminate the need to drain and refill the entire system should joints need to be re-soldered or plumbing modified. Normally, isolation pump flanges are supplied with the pump. These have built in ball valves that can be opened or closed with an Allen wrench. This allows the pump to be replaced without draining the system. It is recommended that isolation ball valves be installed in the home on each transfer line to assist in filling the system.

3) WATER SUPPLY

By adding a tee and an additional drain valve to the appliance line in your home, you can add water to the heating system from the basement. The WMEGA^{CE} should be filled the first time according to page 25. When adding water to system from basement, we suggest using a hose between boiler line and domestic water supply. Ensure that you can adequately monitor system pressure while filling. Ideally, system pressure should be visible from the valve being used to fill the system. When completed, disconnect water supply to prevent accidental filling or backflow, which may contaminate your domestic water.

4) CORROSION INHIBITOR/ANTIFREEZE

It is recommended that you protect your system with an anti-freeze solution. In addition to freeze protection, most hydronic anti-freeze solutions include an inhibitor package designed to reduce corrosion, potentially extending the life of the appliance. Any boiler or hydronic anti-freeze is acceptable. Check instructions with anti-freeze for recommended dilution percentage. Follow all instructions for the selected anti-freeze. Most require that the system be flushed prior to adding and that the water be within a certain pH band.

5) PLUMBING & WIRING

When plumbing and wiring, it is important to know which package you purchased (WO or FA). Check carefully to be sure you are using the proper instructions for your system. Note that the FA package requires purchasing the WO package as well.

6) RELIEF VALVES

Place a 5-10 gallon bucket under the relief valve to catch the water or anti-freeze solution if the relief valve would open.

7) 1" FITTINGS

Ensure the 1" fittings on both ends of the transfer lines are tight.

8) HEAT EXCHANGER POSITIONING

If using a forced air heat exchanger, position your heat exchanger so air won't be trapped in the "U's". This usually means the tubes should be horizontal. The hot (supply) line from boiler should enter the bottom opening on the heat exchanger. Examine your components and visualize how the air will escape before you solder the connections. If possible, leave room to access the heat exchanger for cleaning. Dust collects on the fins reducing its ability to transfer heat.

INSTALLATION: PLACEMENT

NOTE

CHECK WITH INSURANCE COMPANY PRIOR TO INSTALLATION. IT IS THE OWNER'S RESPONSIBILITY TO ENSURE THAT THE appliance IS ACCEPTABLE TO THEIR INSURANCE CARRIER.

NOTE

VERIFY ALL LOCAL CODES AND ORDINANCES PRIOR TO INSTALLATION. IT IS THE OWNER'S RESPONSIBILITY TO ENSURE THAT THE appliance MEETS ALL LOCAL CODES AND ORDINANCES

NOTE

LOCAL CODE OR ORDINANCE PLACEMENT REQUIREMENTS TAKE PRECEDENCE AND MUST BE OBSERVED

NOTE

Improper use or failure to maintain the outdoor wood boiler may cause nuisance conditions. Persons operating this outdoor wood boiler are responsible for operation of the outdoor wood boiler so as not to cause nuisance conditions. Even proper use and maintenance of the outdoor wood boiler, and meeting the distance and stack height recommendations and requirements in state and local regulations may not always be adequate to prevent nuisance conditions in some areas due to terrain or other factors.

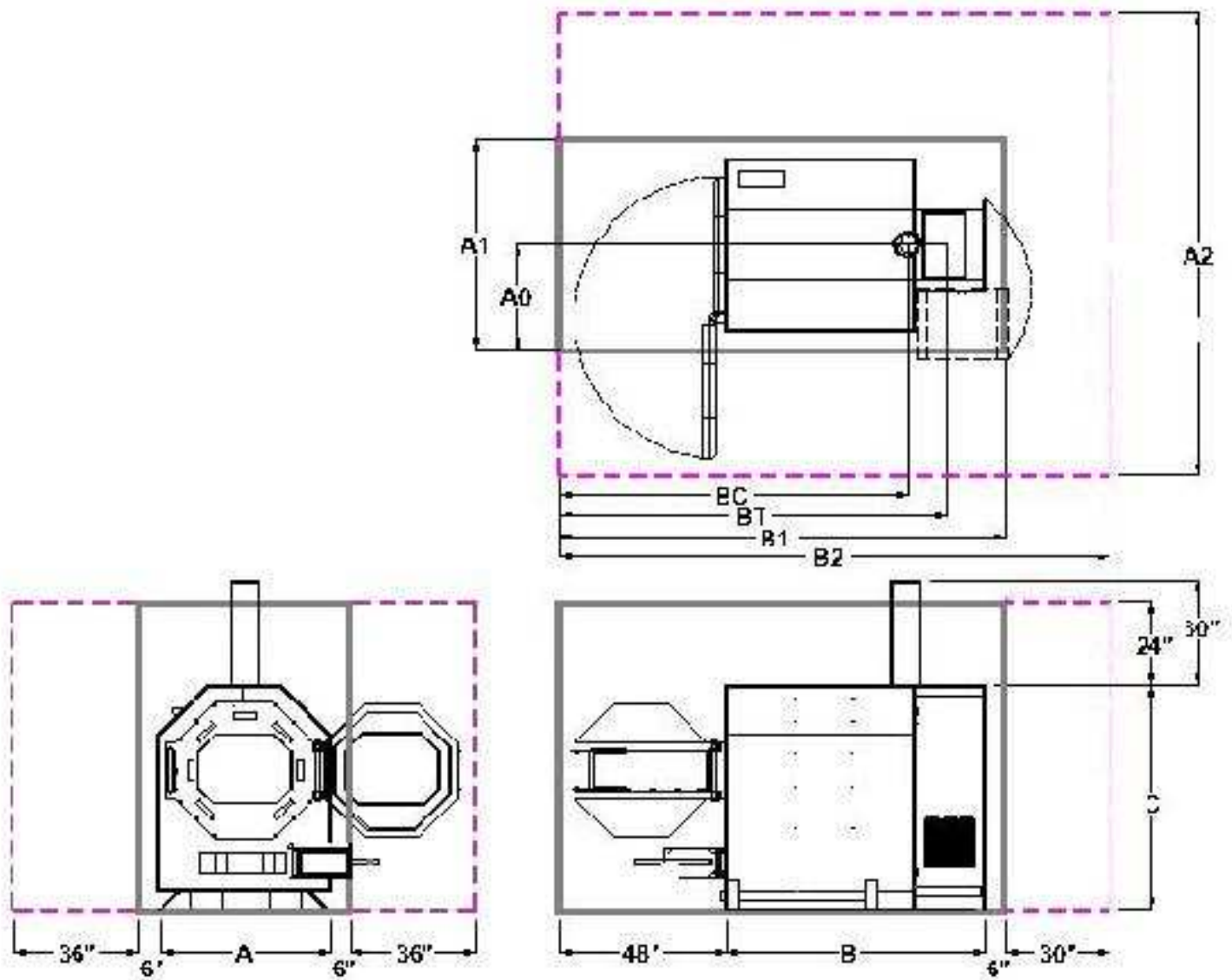
1) WHEN PLACING THE SOLID FUEL BOILER, THE FOLLOWING SHOULD BE CONSIDERED:

- A) Review the minimum clearances to combustibles on pages 10- 11.
- B) Review the recommended stack heights on page 18.
- C) Do not locate near any combustible materials, gasoline or other flammable liquids or gases.
- D) Locate away from dry grassy areas.
- E) Place far enough away from any building to minimize fire danger.
- F) Check with insurance company and local codes or ordinances.
- G) Do not install in an area where nearby structures or trees might cause down drafts.
- H) Typically outdoor solid fuel appliances are located 40 to 100 ft down wind from the served structure.
- I) Do not locate an outdoor solid fuel appliance within 100 ft of a residence not served by the appliance. Be considerate of neighboring residences, properties, parks, etc.
- J) Transfer lines in excess of 100 ft may require a larger size pump than the one provided with the appliance.
- K) Locate to allow easy access to wood supply.
- L) To aid in smoke dispersal, extra chimney lengths may be required depending on the distance to surrounding structures. See page 18 for guidance.
- M) It is recommended that the appliance be located with due consideration to the prevailing wind direction.
- N) It is recommended that the appliance be located with due consideration to any neighboring residences.
- O) The unit requires 115 V 15 Amp electrical service to operate.
- P) Locate the unit to provide access to wood supply. Wood should be split, stacked and seasoned for one year prior to use. Wood should not be stored within the minimum clearance to combustibles stated on page 10. Ensure that wood storage does not impede maintenance access to the sides or back of the appliance.

DANGER

Failure to keep area clear and free of combustible materials, gasoline and other flammable liquids and vapors can result in severe personal injury, death or substantial property damage.

INSTALLATION: CLEARANCES



	APPLIANCE DIMENSIONS			SLAB DIMENSIONS (MINIMUM)		BUILDING DIMENSIONS (INTERIOR)				CHIMNEY LOCATION		TRANSFER LINE LOCATION	
	A	B	C	A1	B1	MINIMUM	RCMD	MINIMUM	RCMD	A0	BC	A0	BT
HE 20	48"	74"	65"	60"	128"	60"	128"	132"	158"	30"	100"	30"	111"

INSTALLATION: SITE PREPARATION

Outdoor solid fuel appliances shall not be installed in a location where gasoline or other flammable vapors are likely to be present. The WMEGA^{CE} is designed to be installed away from the building being heated either as a stand alone unit or in a separate structure. All installations must be in accordance with local and state codes which may differ from this manual.

1) FOUNDATION

The WMEGA^{CE} should be located on a level 2” minimum thickness concrete foundation pad. At a minimum, there must be a non-combustible pad (concrete, brick or paver) the width of the appliance extending out 48 inches from the front of the unit.

DANGER

A non-combustible pad must be installed in front of the unit to contain any sparks or coals out of the Loading door or Ash door. Fire can result, causing severe personal injury, death or substantial property damage.

DO NOT INSTALL IN A GARAGE OR BASEMENT

2) FLOORING

The WMEGA^{CE} should be placed on a non-combustible floor which must extend a minimum of 6 inches beyond the appliance on both sides and back and 48 inches in front.

DANGER

Do not install appliance on carpeting even if foundation is used. Fire can result, causing severe personal injury, death or substantial property damage.

3) CLEARANCES

The WMEGA^{CE} must be installed with these minimum clearances from combustibles:

Top – 24” Front – 48” Back – 6” Sides – 6”

DANGER

All single wall chimneys must be at least 18” from any combustible surface. Fire can result, causing severe personal injury, death or substantial property damage.

The following clearances are recommended for access to doors, maintenance and the control panel:

Back – 36” Sides – 42” (Control panel is mounted on Left Side as facing unit)

INSTALLATION: TRANSFER LINES

1) PIPE

PEX-Aluminum-PEX, PEX with an EVOH oxygen barrier, or soft temper copper in a roll (type L or type K) may be used to conduct water from the appliance to the structure. Minimum pipe rating should be 180°F at 50 psi. Purchase in full lengths to avoid joints underground. Inside the house a rigid copper type M or PEX with an oxygen barrier are most commonly used.

The pipe size needed depends upon the distance between the solid fuel boiler and the structure being heated. Diameters that are too small will restrict water flow reducing the amount of heat available to the house. Use a minimum of 1" I.D. pipe regardless of the distance. Situations where the underground lines are more than 100 feet in one direction may require a larger pump than that provided. Contact your Aqua-Therm representative for assistance in sizing the appropriate pump.

The underground pipe and insulation are usually buried 18" to 24" deep. A 3' depth is recommended for under driveways. To go deeper can increase the chances of laying the pipes where ground water could rob heat.

2) FITTINGS

When using Pex-Aluminum-Pex tubing between the structure and the appliance, remember to use a beveling tool to bevel the inside edge of the tubing. Beveling will reduce chance of damaging the O-rings on the fittings.

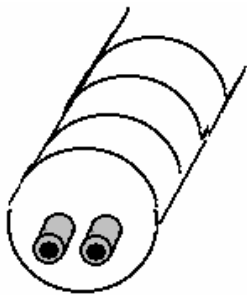
It is recommended that isolation valves be located on each transfer line at the structure being served. This will assist in initial filling of the system.

3) PIPE INSULATION

The underground pipe insulation is the key to an efficient heating system. Without proper insulation excessive heat will be lost to the ground. Insulation should be equivalent to R10 and must be installed such that it is water tight.

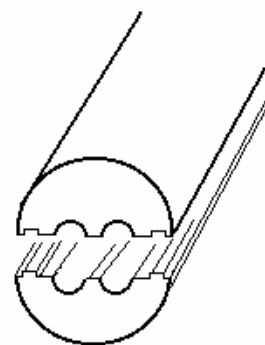
We offer two types of preformed pipe insulation.

FLEXSUL-SEAL



Flexsul-Seal is a prefabricated transfer conduit containing two 1" PEX lines and insulation encased in a plastic water tight, corrugated tube. Ensure that PEX fittings are used with Flexsul-Seal pipe

ROUND



For heavy soil or areas where ground water may be a problem, use the round design insulation. This is specially made to fit inside a 6" PVC. Slip insulation inside pipe to make a waterproof installation. Round insulation is made of Type II Polystyrene. It's important to keep water out of the pipe when it's being installed.

*Gluing of seams and joints is recommended.

INSTALLATION: LIFTING THE WMEGA^{CE}

HANDLING & PLACEMENT OF THE APPLIANCE

DANGER

Ensure that all lifting devices, chains, etc. be rated for the weight being lifted. Use caution when lifting the solid fuel boiler. Dropping of the appliance can cause severe personal injury, death or substantial property damage.

- 1) The appliance can be moved by forklift from the front or the sides. Do not fork from the back
- 2) The appliance can also be lifted from the top using a chain attached to the lifting eyes on the top front and top back of the appliance. If lifting from the top:
 - A) It is recommended that the chain have lifting hooks on the ends.
 - B) It is recommended that some sort of spreader bar (or the bucket on the loader) be employed to protect the jacket from damage by the chains.
 - C) Lift SLOWLY to verify balance point prior to moving.
- 3) The appliance should be placed on a concrete slab. Level the unit to allow free opening and closing of doors. See page 10 for slab dimensions

INSTALLATION: INSPECTING CONTENTS

1) COMPONENTS SHIPPED LOOSE INSIDE:

- Chimney, 6" diameter Class A, 3' Length
- Chimney Storm Collar
- Literature Envelope

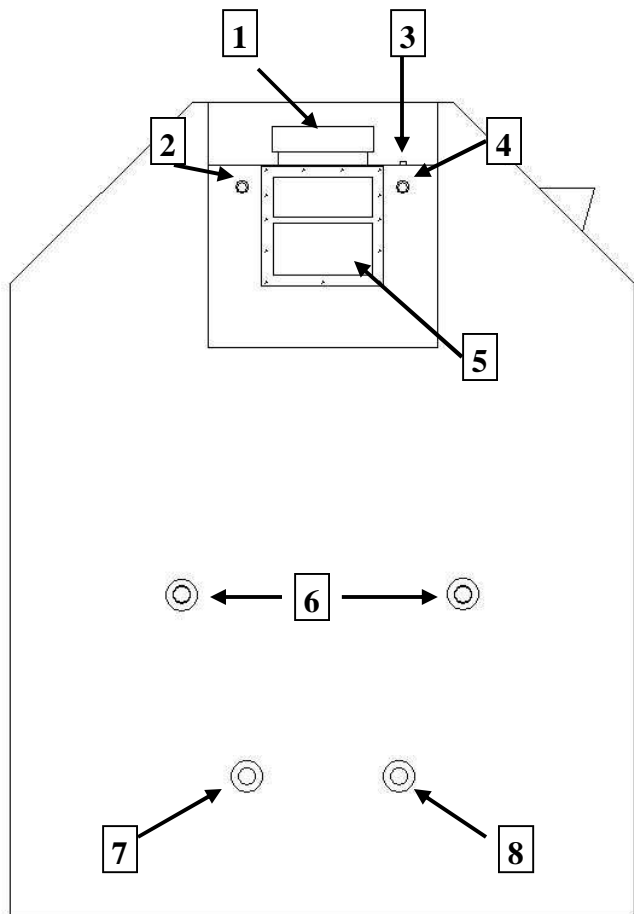
2) REFRACTORY

The Refractory comes factory installed in the firebox.

3) PLUMBING KIT

The unit comes plumbed to the first ball valves. Additional plumbing components are required. See pages 18-19 and the plumbing supplemental instructions.

INSTALLATION: TAPPING DIAGRAM



	SIZE	USE
1		6" Double Wall Chimney Connection
2	3/4" M NPT	Pressure Relief Valve Watts M335: 30 psi and Low Water Cut Off
3	1/4" F NPT	Air Vent
4	3/4" F NPT	Temperature Relief Valve Cash Acme: 210°F, 80 psi
5		Blower
6	1" M NPT	COLD Return Lines (2)
7	1" M NPT	Boiler Drain Valve
8	1" M NPT	HOT Supply Line

Refer to the plumbing instructions on page 18 for details

Fan Mounting Mount fan/shutter assembly to the appliance.

INSTALLATION: VENTING

DANGER

All single wall chimneys must be at least 18" from any combustible surface. Fire can result, causing severe personal injury, death or substantial property damage.

DANGER

A major cause of chimney-related fires is failure to maintain required clearances (air spaces) to combustible materials. It is of the utmost importance that all chimneys be installed in accordance with the manufacturer's instructions.

1) CHIMNEY MATERIAL

The appliance must be connected to either a:

- A) Class "A" masonry chimney
- B) All fuel metal insulated chimney (8")
- C) Listed type "HT" double wall chimney approved for temperatures up to 1400 °F (8")

2) CHIMNEY CONNECTORS

Connectors shall be installed to join appliance to the vertical chimney unless chimney is attached direct.

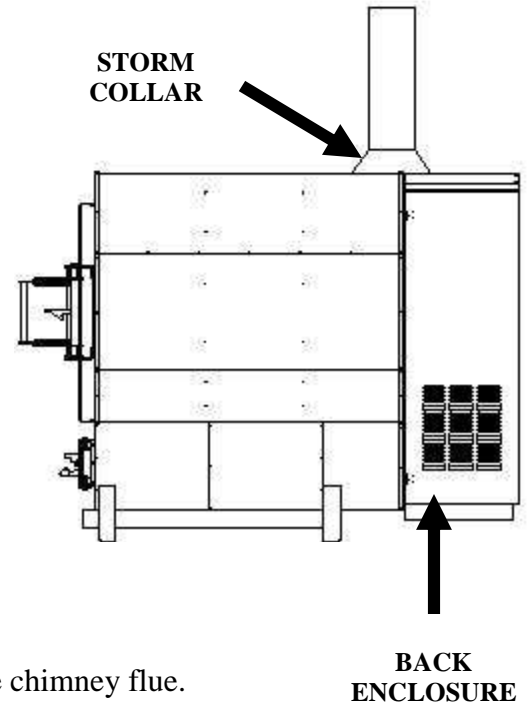
- A) Chimney connector can either be:
 1. 8" galvanized stove pipe.
 - Maintain 18" clearance to combustibles.
 - Minimum thickness: .28 inches.
 2. 8" listed type "HT" double wall chimneys.
 - Maintain 2" clearance to combustibles.

B) Boiler must be the only heating appliance connected to a single chimney flue.

C) Keep the connector as straight and short as possible.

1. Minimize elbows.
2. Maximum horizontal distance between boiler and chimney: 6 Ft.
3. "Male" end should point back to boiler.
4. Horizontal runs must be pitched back to the boiler in accordance with local building codes (typically 1/4" pitch per Ft of run).
5. Secure each connection with a minimum of 3 screws.

D) Assemble in accordance with the vent manufacturers instructions. Additional sections may be required to clear the peak of the structure. Do not install more than one appliance per flue.



DANGER

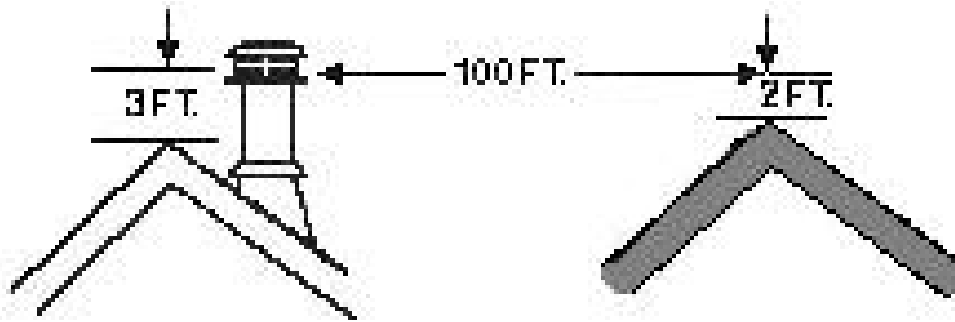
DO NOT install more than one appliance per flue. Flue gas spillage and carbon monoxide emissions can occur causing severe personal injury or death.

CHIMNEY MUST BE INSTALLED OR INSPECTED BY A PROFESSIONAL AND MEET ALL LOCAL AND STATE REQUIREMENTS AND CODES FOR WOOD OR COAL BURNING APPLIANCES

INSTALLATION: VENTING

3) CHIMNEY HEIGHT

To prevent downdrafts, chimney, or vent without a listed cap should extend at least 3 feet above the highest point where it passes through a roof and at least 2 feet higher than any portion of a building within a horizontal distance of 100 feet. A chimney or vent must not extend less than the distances stated above. Check local codes or ordinances for additional requirements.



In general:

- A) Do not locate within 100 feet of any residence not served by the appliance.
- B) If located between 100 to 300 feet to any residence, it is recommended that the stack be at least 2 feet higher than the peak line of that residence.
- C) Nearby structures, trees or hills can cause downdraft conditions which force smoke to the ground. Chimney height may have to be raised to overcome downdraft conditions.

NOTE

Improper use or failure to maintain the boiler may cause nuisance conditions. Persons operating this solid fuel boiler are responsible for operation so as not to cause nuisance conditions. Even proper use and maintenance of the boiler, and meeting the distance and stack height recommendations and requirements in State and local regulations may not always be adequate to prevent nuisance conditions in some areas due to terrain or other factors.

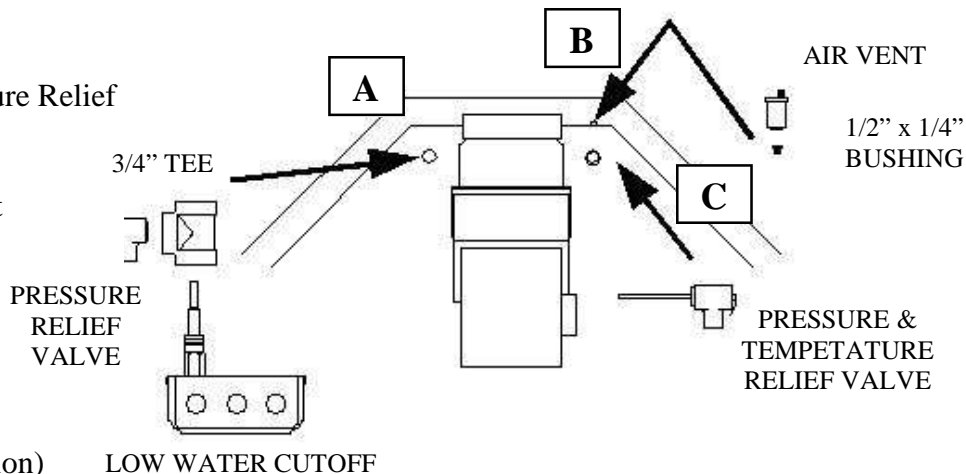
ALL LOCAL AND STATE REGULATIONS OR CODES AND VENTING SYSTEM MANUFACTURER'S INSTRUCTIONS TAKE PRECEDENCE OVER THESE INSTRUCTIONS

ALL SOLID FUEL APPLIANCES CREATE VISIBLE SMOKE DURING SOME OPERATING CONDITIONS

INSTALLATION: PLUMBING

1) TAPPINGS

- A. 3/4" M NPT (LWCO and Pressure Relief Valve)
- B. 1/2" F NPT (Air Vent)
- C. 3/4" M NPT (Well for Aquastat sensor)
- D. 1" M NPT (WMEGA^{HE} Returns — "Cold" inlet)
- E. 1" M NPT (WMEGA^{HE} Supply — "Hot" outlet)
- F. 1" M NPT (Boiler Drain)
- G. 1" NPT (Supply Line Connection)
- H. 1" NPT (Return Line Connection)



Plumb the Supply and Return Headers as shown in the above diagram and per the instructions provided with the Plumbing Kit

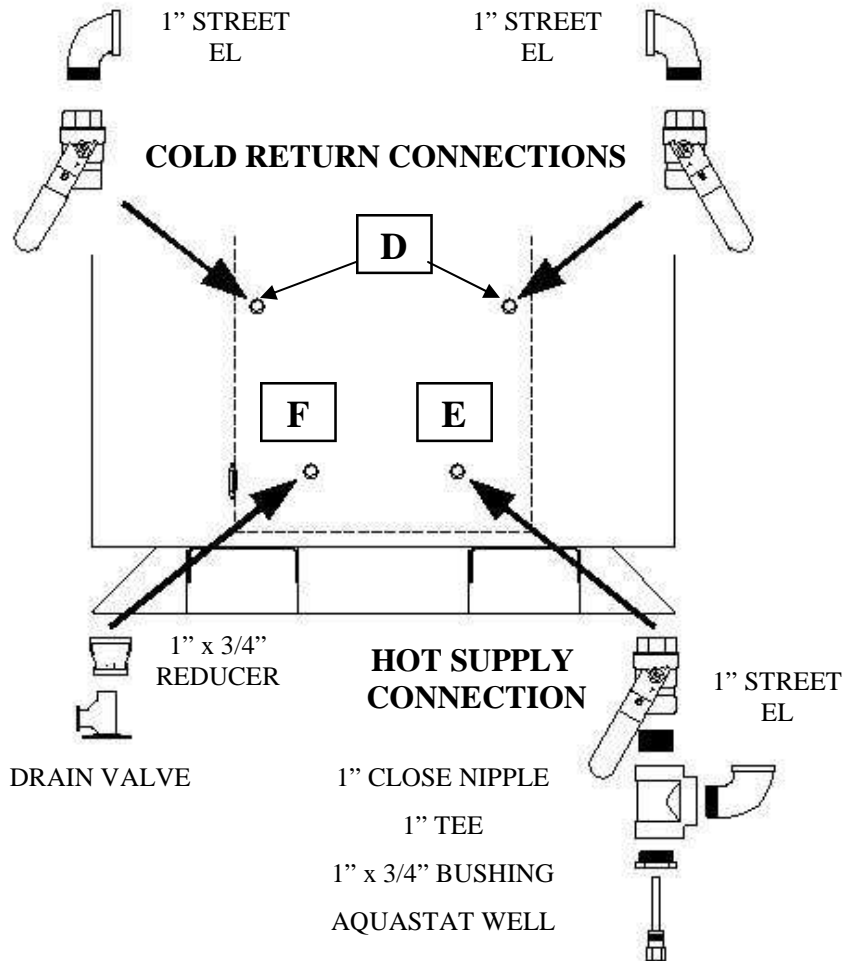
If a feed **WARNING** water line and valve for adding water are incorporated, a backflow preventer is required to preclude heating system water from entering the domestic system.

2) GENERAL PIPING INFORMATION

An automatic fill valve is not recommended.

If a relief valve would open, the automatic fill valve would continuously dump water through the appliance diluting the anti-freeze. In some situations all the anti-freeze could be lost. It's also more difficult to recognize a leak in a system with a valve continuously making up lost water. If an auto fill valve is installed, it is recommended that it be isolated once the system is filled.

If installation is to comply with ASME or Canadian requirements, an additional **high temperature limit** is needed. Install control in supply piping between the appliance and the isolation valve. Set second control to minimum 20 °F above setpoint of first control. Maximum allowable setpoint is 240 °F.



INSTALLATION: PLUMBING (Cont.)

3) TRANSFER LINE CONNECTIONS

The Transfer Lines connect at the rear of the appliance at “G” and “H” per the diagram on page 15. Use connectors appropriate for the Transfer Line being installed. The Hot Line (Supply Line) connects to the Street ELL “G” and the Cold Line (Return Line) connects to the Ball Valve “H” . .

If serving multiple buildings, install TEE’s to “G” and “H”. Do not split the returns between the two “D” tapplings.

4) LOW WATER CUTOFF

A **low water cutoff device (LWCO)** is required when the heat source is installed above radiation level or by certain state or local codes or insurance companies. The LWCO comes factory installed.

5) RELIEF VALVE

DANGER

Before pressurizing the system, ensure the pressure relief valve is installed. Use only a boiler relief valve set to limit pressure to 30 psi. Failure to use proper valve could result in an explosion.

To avoid water damage or scalding due to relief valve operation:

- A) Discharge line must be connected to relief valve outlet and run to a safe place of disposal.
- B) Terminate the discharge line in such a way as to eliminate possibility of severe burns should the valve discharge.
- C) Discharge line must be as short as possible and be the same dimension as the valve discharge connection throughout its entire length.
- D) Discharge line must pitch downward from the valve and terminate at least 6" above the floor drain where any discharge will be clearly visible.
- E) The discharge line shall terminate plain, not threaded, with a material serviceable for temperatures of 375 °F or greater.
- F) Do not pipe the discharge to any place where freezing could occur.
- G) Place a 5-10 gallon pail beneath discharge piping to catch any anti-freeze should the relief valve lift.
- H) Ensure that the discharge line ends at least 6 inches above the top of the bucket to prevent freezing.
- I) No shutoff valve shall be installed between the relief valve and boiler, or in the discharge line. Do not plug or place any obstruction in the discharge line.

DANGER

Failure to comply with the above guidelines could result in failure of the relief valve to operate, resulting in possibility of severe personal injury, death or substantial property damage.

Test the operation of the valve after filling and pressurizing system by lifting the lever. Ensure the valve discharges freely. If the valve fails to operate correctly, replace it with a new relief valve

6) AQUASTAT SENSOR AND WELL

The Aquastat well, sensor and control come factory installed.

INSTALLATION: ELECTRICALS

1) BASIC ELECTRICALS

For your safety, **turn off electrical power supply at service entrance panel before making any electrical connections** to avoid possible electric shock hazard. Failure to do so can cause severe personal injury or death.

WARNING

Ensure power is shut off while making connections. Failure to do so may result in severe personal injury or death.

2) WIRING CONNECTIONS

- A) Appliance is shipped with controls completely wired.
- B) Route 115-volt power supply to the junction box in the back of the appliance. Follow all local and state codes.
- C) Attach the power supply in the junction box in accordance with all local and state codes. Attach the black wire to the tab on the fuse. Attach the white wire to the white wires under the wire-nut
- D) The pump can be located either in the structure being heated or on the appliance. If it is to be located at the appliance, attach the black wire from the pump to the appliance side of the fuse and the white wire to the white wires under the wire-nut.

NOTICE

To ensure that the appliance always has flow when operating, it is recommended that the pump and the appliance receive power from the same breaker. This is most important if the pump is located remote from the appliance in the structure being heated.

WARNING

DO NOT apply power to the pump (located either in the heated structure or at the appliance) until system has been filled. The pump is water lubricated and must never be run dry

3) ELECTRICAL INSTALLATION MUST COMPLY WITH:

- A) National Electrical Code and any other national, state, provincial or local codes or regulations.
- B) In Canada, CSA C22.1 Canadian Electrical Code Part 1, and any local codes.

Appliance must be **electrically grounded** as required by National Electrical Code ANSI/NFPA 70–latest edition. Ensure **ground wiring** is installed per wiring diagram. Good grounding is extremely important for proper operation.

INSTALLATION: GENERIC SYSTEMS

WARNING

The system diagrams provided are only suggested schematics for generic systems and do not purport to show all required components necessary to meet all required codes. Complex systems should be designed by a professional heating system installer.

1) KITS

A) Water Kit (WO)

- Pump
- Flanges
- Expansion Tank
- Air Scoop
- Air Vent
- Surface Aquastat

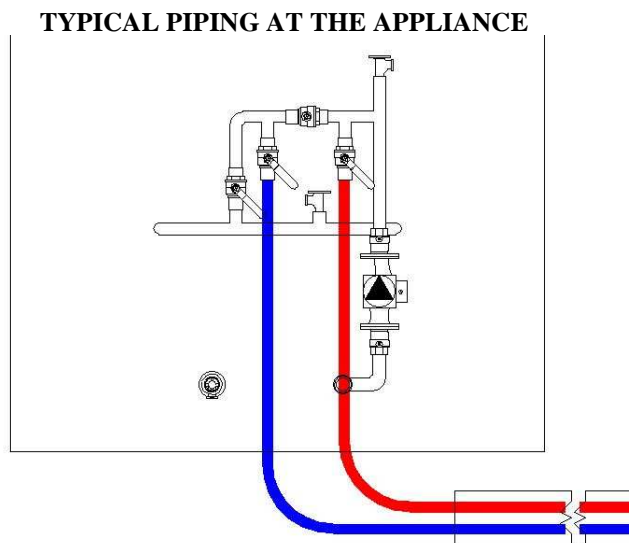
B) Forced Air Kit (FA)

- Water to Air Heat Exchanger
- Fan Control Relay

2) GENERAL COMMENTS

A) Piping at the Appliance

The Piping at the appliance does not change with most applications. In the Applications Drawings on pages 23 to 28 it is not shown but is assumed to be as shown above.



B) Pumps

A Pump is required. This pump is typically located in the structure being heated but can alternately be located at the appliance. Additionally, depending on transfer line length and system design, additional pumps might be required. All pumps must be appropriately sized for the application to ensure optimum performance. If using isolation flanges, ensure that they are positioned so that shut off is accessible.

Pump motors are water lubricated and can burn out if incorrectly mounted. The motor canister must be horizontal. Body has arrow on the front that indicates direction of flow. To rotate body, remove the four body bolts, rotate body and replace bolts. Ensure the junction box is NOT located underneath the circulator. When boiler is operating, pump will feel hot to the touch. This is normal.

C) Expansion Tank

All closed hydronic heating systems require an expansion tank to allow water to expand/contract as it heats or cools without adversely affecting system pressure. A diaphragm type expansion tank is recommended. The tank should be installed in the heated structure as close as possible to the suction of the system pump. The tank must be installed vertically, typically it is attached to the bottom of an Air Scoop. Ensure that the expansion tank is large enough to handle both the volume of the appliance and the volume of the system.

D) Air Elimination

Install an air scoop (or similar air separator) and air vent in the heated structure. Attach the expansion tank to the bottom of the air scoop and install the resulting assembly near the suction of the pump.

TYPICAL SYSTEM SCHEMATICS

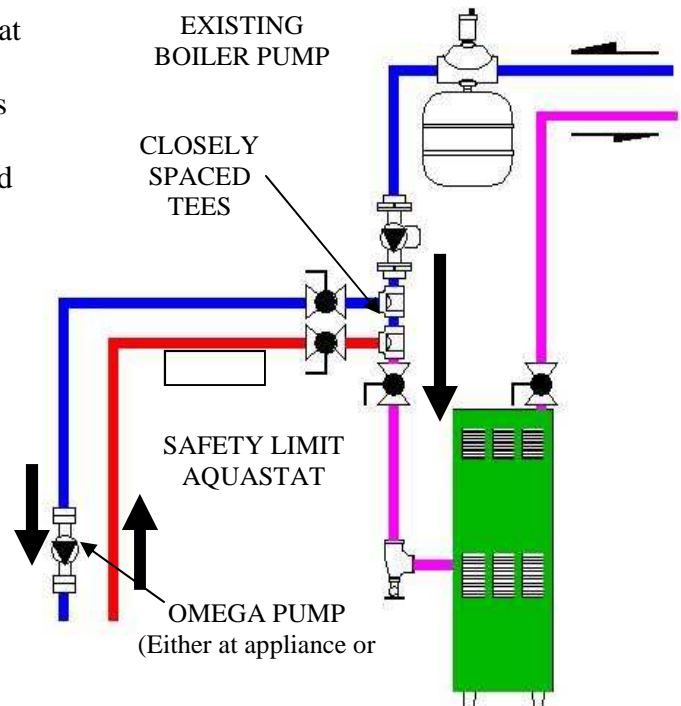
CONNECTING TO AN EXISTING BOILER SYSTEM

CAUTION

Do not install the safety limit aquastat on PEX or PEX-AL-PEX tubing. Plastic does not transfer heat well as metal and the aquastat might not operate properly. It must be strapped onto a copper line.

1) OPERATION

- A) Water circulates continuously through the WMEGA^{CE} and the existing boiler.
- B) If the thermostat calls for heat, the existing boiler will start its pump, but the burner will not fire as long as water temperature is above the boiler aquastat setting.
- C) If the temperature from the WMEGA^{CE} falls below the boiler aquastat setting, the boiler will fire as normal.

**2) PIPING INSTALLATION**

- A) Install closely spaced Tee connections (4" to 6" apart) between the existing boiler pump (if on the return side of the existing boiler) and the cold return of the existing boiler as shown in the diagram.
- B) Connect the "hot" line from the WMEGA^{CE} to the Tee closest to the return of the existing boiler.
- C) Connect the "cold" line from the WMEGA^{CE} to the Tee farthest to the return of the existing boiler.
- D) Mount the safety limit aquastat to hot water line close to existing boiler
- E) Ensure that neither the existing boiler nor the WMEGA^{CE} are isolated from an expansion tank.

DANGER

Do Not remove or alter the Relief Valve on the existing boiler. Failure to do so could result in explosion causing severe injury, death or property damage.

DANGER

For your safety, **turn off electrical power supply at service entrance panel before making any electrical connections** to avoid possible electric shock hazard. Failure to do so can cause severe personal injury or death.

3) SAFETY LIMIT AQUASTAT (IF USED)

Turns on existing pump if boiler overheats. Set 10° higher than fan control aquastat on boiler, but never over 200°F. It is wired with low voltage.

- A) Designate one zone as the "heat dump" zone. If you have several zones in your heating system, wire safety aquastat to allow circulation through largest zone.
- B) Route low voltage wire from 'R' screw and 'W' spade on safety limit aquastat to the thermostat for the dump zone. Connect the wires across the thermostat connections, so that the safety limit aquastat is in parallel with the thermostat.

TYPICAL SYSTEM SCHEMATICS

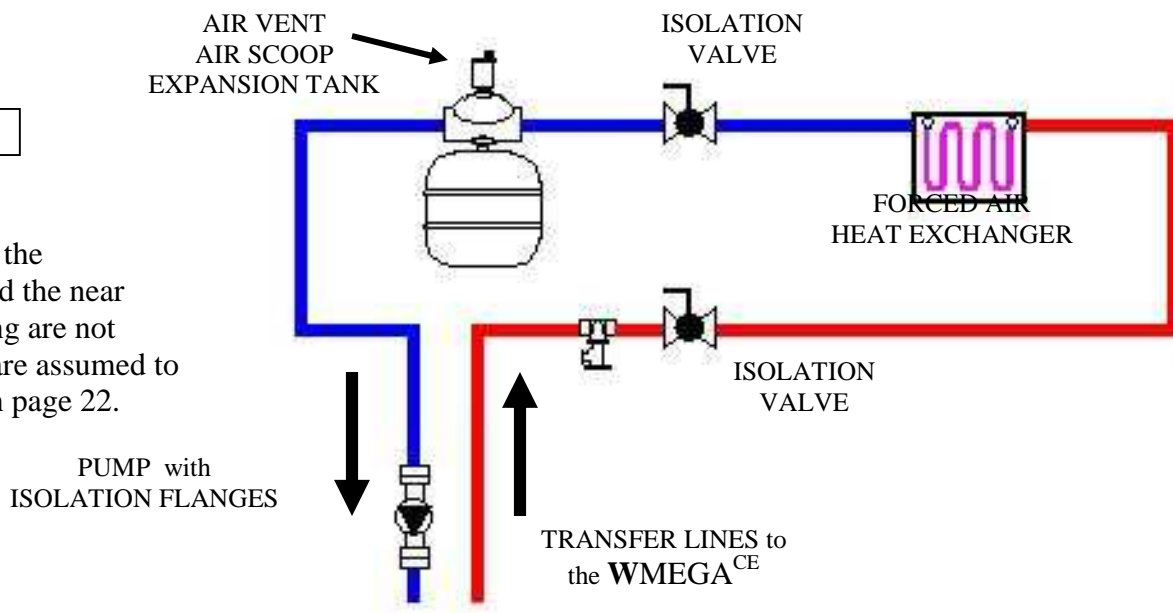
HIGH TEMP FORCED AIR SYSTEM

CAUTION

Do not install the safety limit aquastat on PEX or PEX-AL-PEX tubing. Plastic does not transfer heat well as metal and the aquastat might not operate properly. It must be strapped onto a copper line.

NOTICE

For simplicity, the WMEGA^{CE} and the near appliance piping are not shown. They are assumed to be as shown on page 22.

**1) OPERATION**

- A) Water circulates continuously between the WMEGA^{CE} and the forced air heat exchanger.
- B) The forced air heat exchanger is located in the existing furnace plenum.
- C) Thermostat in the house cycles the blower on the furnace.

2) PIPING INSTALLATION:

- A) Ensure that the expansion tank is not isolated from the WMEGA^{CE}.
- B) Install the forced air heat exchanger in the plenum as close as possible to the furnace fan. Ensure that no air is allowed to bypass the heat exchanger. The exchanger must fill the entire plenum cavity. All air from the furnace fan must be forced through the exchanger. Baffles may need to be installed below the exchanger to direct the airflow.
- C) Position heat exchanger so air won't be trapped in the "U's". Drawing above is illustrative only — the tubes should be horizontal. The hot (supply) line from boiler should enter the bottom opening on the heat exchanger.
- D) If the furnace has an air conditioning 'A' coil, the forced air heat exchanger can be placed above or below the 'A' coil.

NOTICE

Dust can accumulate on the coil so it's good to allow room for vacuuming between fan and coil.

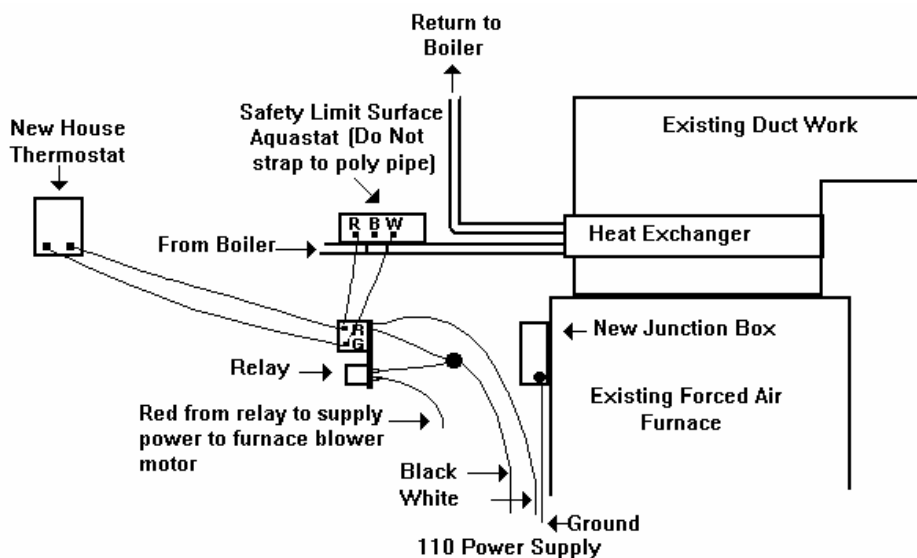
TYPICAL SYSTEM SCHEMATICS

HIGH TEMP FORCED AIR SYSTEM

3) ELECTRICAL INSTALLATION

DANGER

For your safety, **turn off electrical power supply at service entrance panel before making any electrical connections** to avoid possible electric shock hazard. Failure to do so can cause severe personal injury or death.



- A) The relay and safety limit surface (strap on) aquastat will be installed in the building being heated. (Thermostat not included in kit.)
- B) Mount a 4" steel junction box (not included) on side of existing forced air furnace. The relay mounts on this box with the low voltage side exposed (side with 'R' & 'G' terminals where thermostat wires are connected). Junction box need not be large enough to house entire relay.

CAUTION

Do not install the safety limit aquastat on PEX or PEX-AL-PEX tubing. Plastic does not transfer heat well as metal and the aquastat might not operate properly. It must be strapped onto a copper line

- C) From the same source that is feeding existing furnace, route 110-volt power supply to junction box.
- D) Connect the black wire from power supply to the two black wires from back side of relay.
- E) Connect the white wire from power supply to white wire on relay.
- F) The red wire from relay powers furnace fan, so connect to furnace fan. The brown wire on relay is not used, cap with a wire nut.
- G) An additional thermostat should be installed in your living quarters. From the thermostat contacts run low voltage wires to the 'R' and 'G' screws of relay.
- H) Mount the safety limit aquastat to hot water line, close to the heat exchanger.
- I) Route a low voltage wire from 'R' screw on safety limit aquastat to 'R' screw on relay.
- J) Route a wire from 'W' spade on safety limit aquastat to 'G' screw on relay.

If the existing forced air furnace is an electric or has a 240-volt blower motor, a 220-volt relay may be required, rather than the 110-relay included in the standard package.

TYPICAL SYSTEM SCHEMATICS

HIGH TEMP BASEBOARD SYSTEM

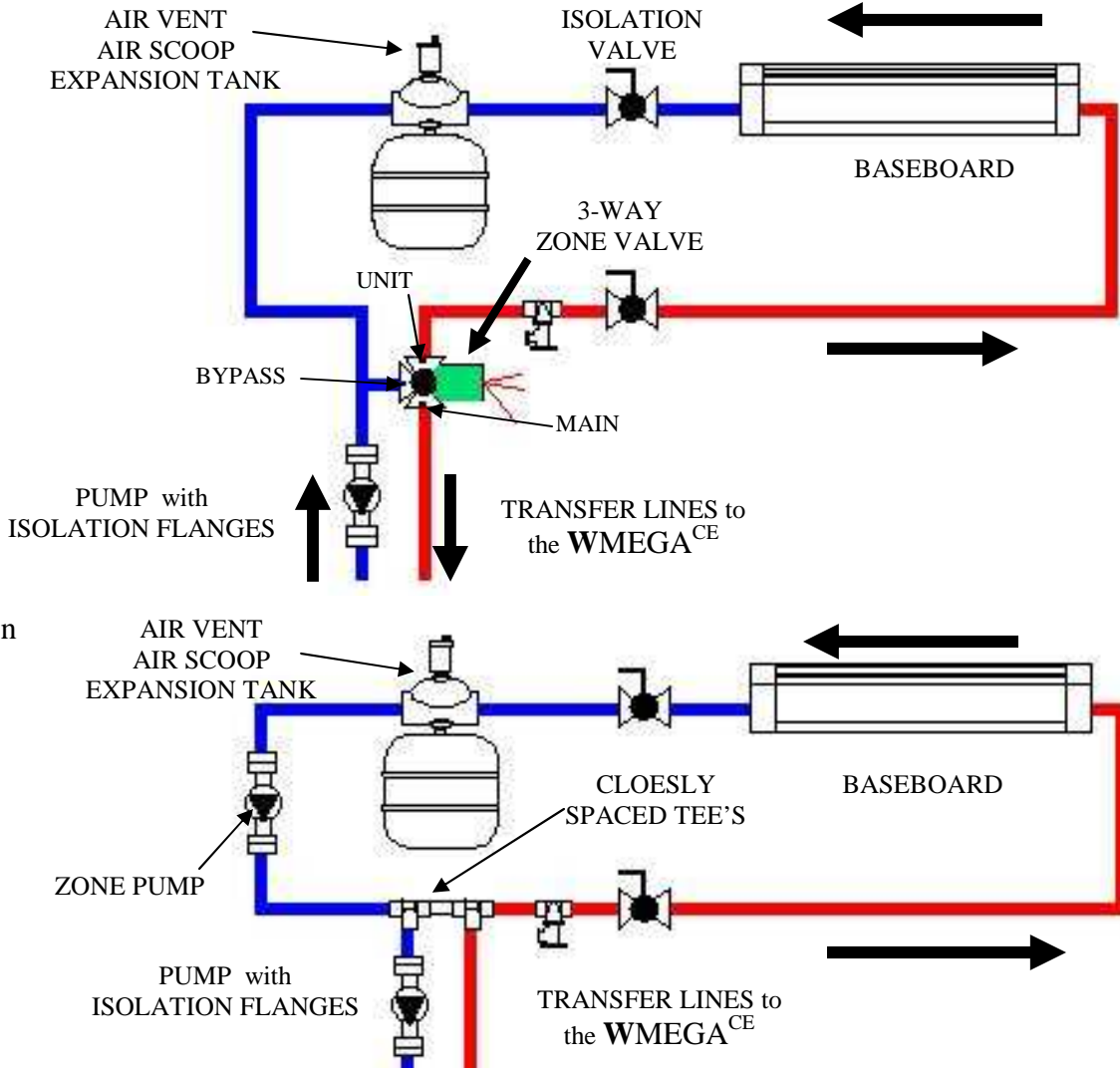
Do not install the safety limit aquastat on PEX or PEX-AL-PEX tubing. Plastic does not transfer heat well as metal and the aquastat might not operate properly. It must be strapped onto a copper line

CAUTION

USING 3-WAY ZONE VALVE

NOTICE

For simplicity, the WMEGA^{CE} and the near appliance piping are not shown. They are assumed to be as shown on page 22.



USING PRIMARY SECONDARY PIPING

1) OPERATION

- A) Water circulates continuously between the WMEGA^{CE} and the structure being heated.
- B) If using 3-way zone valve, when the thermostat calls, the valve repositions “Main to Unit” to allow water to flow to the baseboard.
- C) If using primary-secondary piping, when the thermostat calls, zone pump turns on allowing water to flow to the baseboard.

2) PIPING INSTALLATION

- A) Ensure that the expansion tank is not isolated from the appliance.
- B) If using 3-way zone valve, pipe as shown above.
- C) If using primary-secondary piping:
 - 1. Position closely spaced Tees 4 to 6 inches apart.
 - 2. For the zone pump use either a zoning circulator (with built-in relay) or a regular pump with a zone pump control panel.

TYPICAL SYSTEM SCHEMATICS HIGH TEMP BASEBOARD SYSTEM

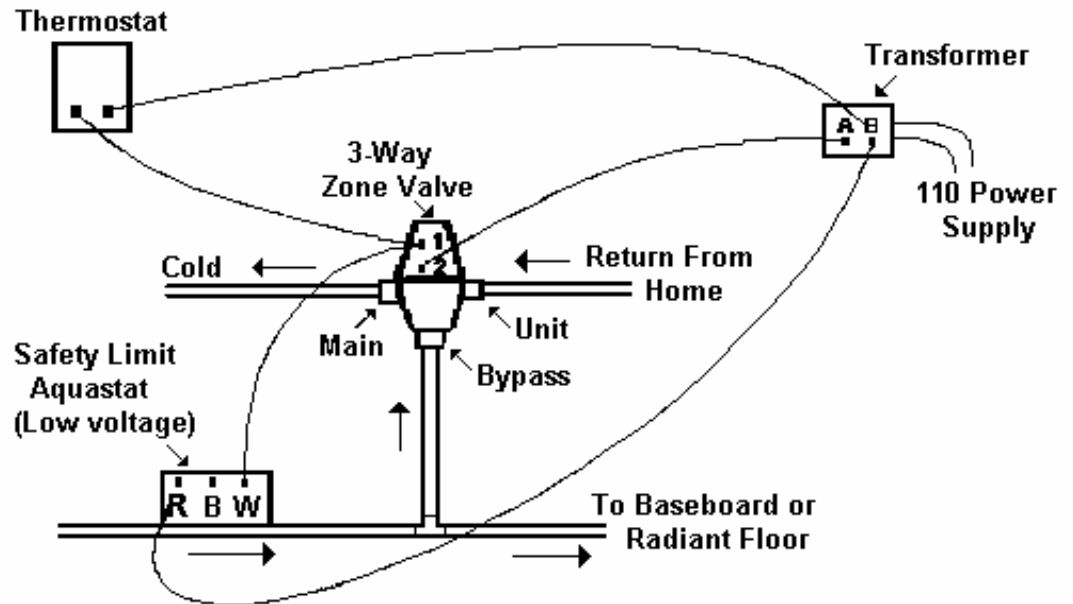
4) ELECTRICAL INSTALLATION

DANGER

For your safety, **turn off electrical power supply at service entrance panel before making any electrical connections** to avoid possible electric shock hazard. Failure to do so can cause severe personal injury or death.

WIRING SHOWN ONLY FOR 3-WAY VALVE OPTION.

FOLLOW DIRECTIONS BELOW FOR PRIMARY SECONDARY WIRING OPTION



The relay and safety limit surface (strap on) aquastat will be installed in the building being heated. (Thermostat not included in kit.)

CAUTION

Do not install the safety limit aquastat on PEX or PEX-AL-PEX tubing. Plastic does not transfer heat well as metal and the aquastat might not operate properly. It must be strapped onto a copper line.

A) SAFETY LIMIT AQUASTAT

Opens zone valve if boiler overheats. Set 10° higher than fan control aquastat on boiler, but never over 200°F.

B) WIRING 3-WAY VALVE

1. Route 110-volt power supply to transformer.
2. Route wire from 'A' on transformer to '2' on zone valve.
3. Route wires from 'B' on transformer to 'R' on safety limit aquastat and to thermostat.
4. Route wire from thermostat to '1' on zone valve.
5. From 'W' on safety limit aquastat, run wire to '1' on zone valve.

C) WIRING PRIMARY SECONDARY WITH A ZONE PUMP

1. Route wire from thermostat to 'R' on safety limit aquastat.
2. Route wire from 'W' on safety limit aquastat to '1' on zone pump.
3. Route wire from '2' on zone pump to thermostat.

TYPICAL SYSTEM SCHEMATICS LOW TEMP RADIANT or MIXED TEMP SYSTEM

Low temperature radiant systems require some sort of tempering device, most commonly a thermostatic mixing valve. Low temperature and high temperature applications can be easily accommodated by the WMEGA^{CE}.

1) MIXING VALVE DETAILS

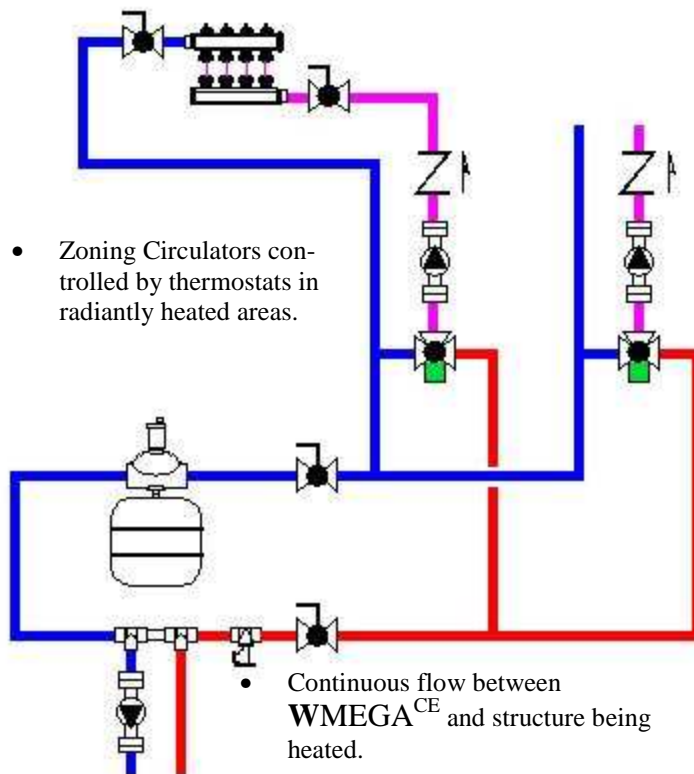
- A) The mixing valve **MUST** be piped such that a pump “pulls” water through it.
- B) The best location for the pump is 10” to 12” down stream of the “Mixed” port of the mixing valve.
- C) Multiple pumps in parallel require check valves on the outlet of each pump.

2) LOW TEMPERATURE RADIANT

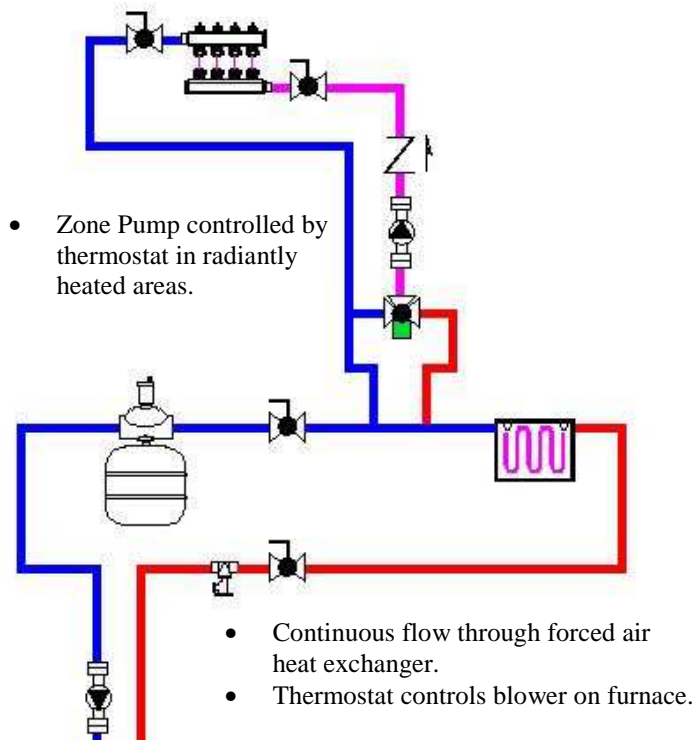
- A) Recommend primary-secondary piping be used.

3) MIXED TEMPERATURE SYSTEMS

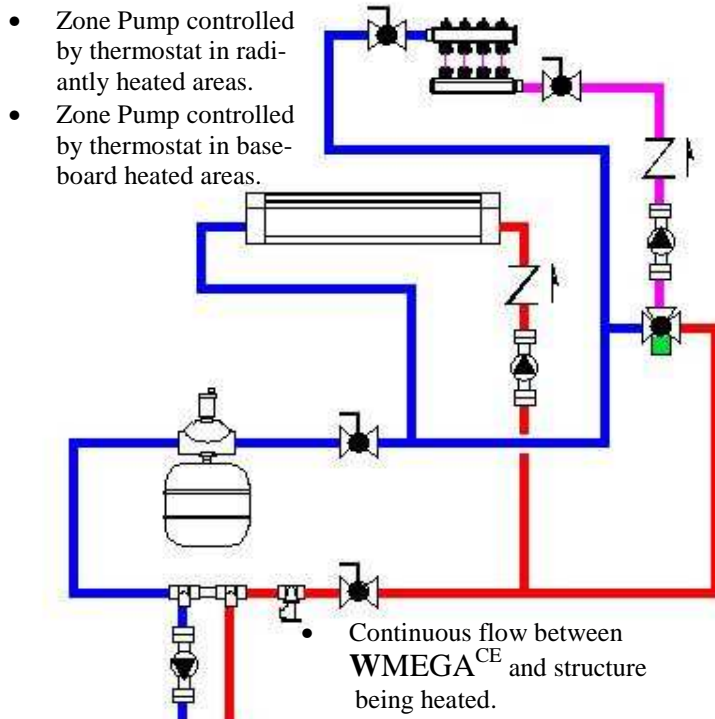
- A) Follow the instructions for high temperature systems as modified by the diagrams below.
- B) Refer to the Applications Manual for specific applications.
- C) Call Aqua-Therm Technical services with specific design questions.



LOW TEMPERATURE RADIANT WITH HIGH TEMPERATURE FORCED AIR



LOW TEMPERATURE RADIANT WITH HIGH TEMPERATURE BASEBOARD



TYPICAL SYSTEM SCHEMATICS

CONNECTING TO A SIDEARM HEAT EXCHANGER

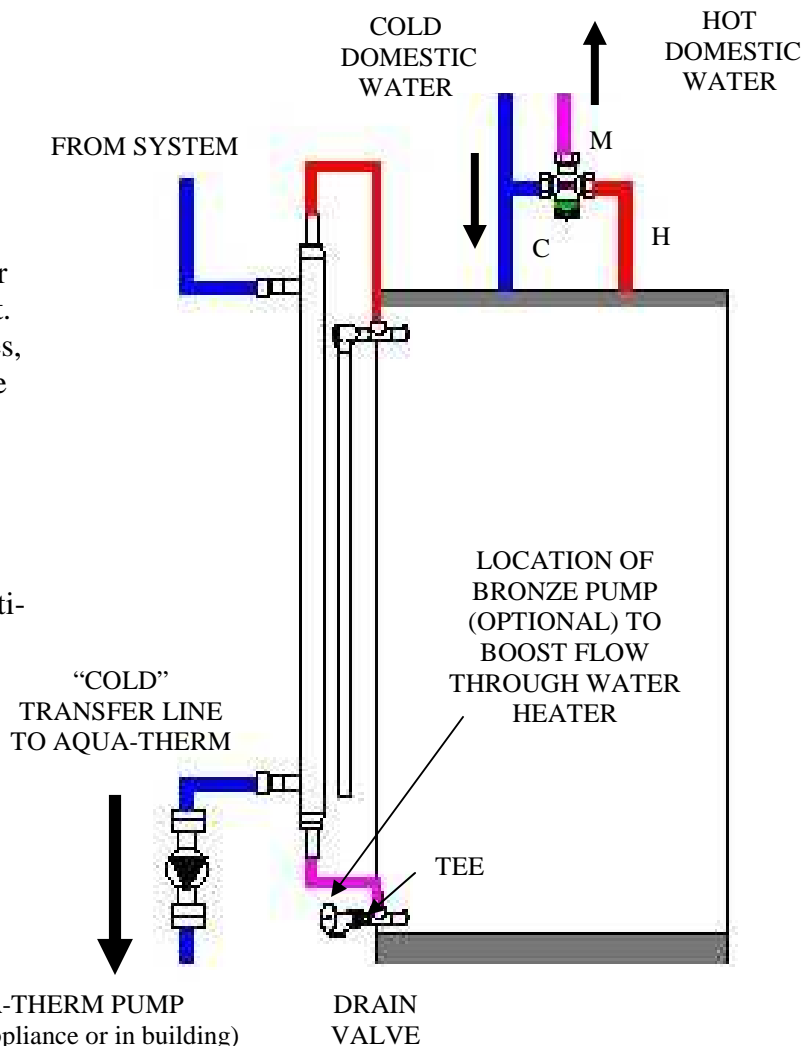
1) KIT INCLUDES

- Water-to-Water Heat Exchanger
- ¾" Mix Valve

2) OPERATION

The domestic water runs through the smooth inner tube. Heat is transferred from the boiler water that is running through the outer jacket. As the domestic water starts to heat up it rises, causing it to thermosiphon counter clockwise through the water heater. Between the outer and inner tubes, there is a small air chamber which protects your domestic water supply from being contaminated. If a leak should develop, the water would drain out the exchanger. This assures that even with an anti-freeze solution in the WMEGA^{CE}, the domestic water is safe.

The domestic water heat exchanger should be installed vertically next to the existing water heater.



3) PIPING INSTALLATION

- A) Pipe into the return line to the WMEGA^{CE} (just prior to the "cold" transfer line).
- B) Plumb the WMEGA^{CE} water such that it flows in the top side port and out the bottom side port.
- C) Connect the top and bottom copper tube into the existing water heater as shown.

Hot water mix valves cannot be used for tempering water temperature at fixtures. Severe bodily injury (i.e., scalding or chilling) and/or death may result depending upon system water pressure changes and/or supply water temperature changes. Anti-scald devices should be used at fixtures to prevent possibly injury.

DANGER

NOTE

Sidearm heat exchanger is designed to **SUPPLEMENT NOT REPLACE** the existing water heater. **DO NOT** disconnect the heat source (gas, oil, electric) from the existing Water Heater. The Aqua-Therm is designed to be the primary heat source for a structure. It is not intended to be fired for summer hot water use.

START-UP: INITIAL FILL

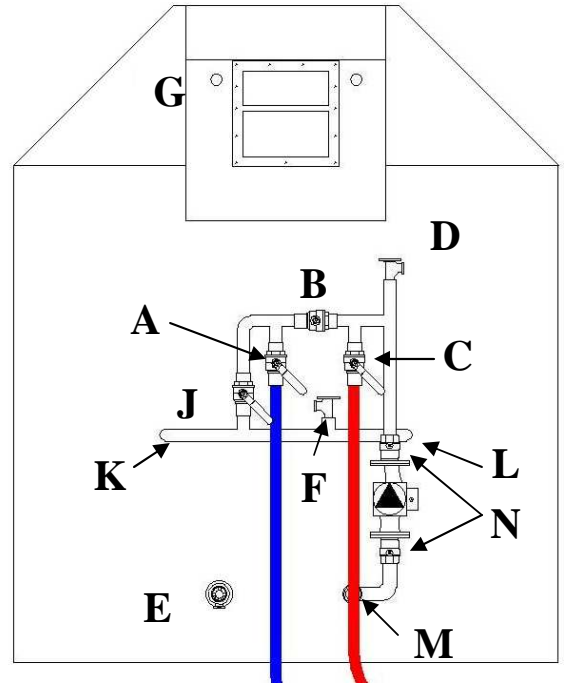
INITIAL FILL OVERVIEW:

- 1) Fill and isolate WMEGA^{CE}. Pressure test.
- 2) Fill system with TSP solution and flush.
- 3) Test water to determine if water treatment is necessary.
- 4) Re-fill system with water and bleed air.
- 5) Inspect system for leaks. Drain and repair as necessary.
- 6) Add Anti-freeze as necessary.

1) FILL, ISOLATE AND PRESSURE TEST WMEGA^{CE}

Though the WMEGA^{CE} is factory pressure tested, it should be tested in the field to ensure that no damage has occurred during shipping. Isolate the WMEGA^{CE} from the system prior to pressure testing.

- A) Remove pressure relief valve from Tee at "G".
- B) Plug the opening at "G" with a 3/4" NPT plug.
- C) Shut appliance isolation valves "A" and "B".
- D) Shut small cap on top of auto air vent at top of appliance.
- E) Attach hose to drain valve "D".
- G) Connect the other end of the hose to a water source with pressures between 30 and 45 psig.
- H) Slowly open drain valve "D" until test pressure on pressure gauge reaches no more than 45 psig.



The person pressurizing the appliance must either be able to see the pressure gauge or must be in direct communications with someone who can see the pressure gauge.

WARNING

DANGER

DO NOT EXCEED 45 PSIG. Failure can result in severe personal injury, death or substantial property damage.

- I) Test for no longer than 10 minutes at 45 psig. Ensure constant gauge pressure has been maintained throughout test. Check for leaks. Repair if necessary.

WARNING

Leaks must be repaired at once. Failure to do so can damage boiler, resulting in substantial property damage.

DANGER

Do not leave appliance unattended. A cold water fill could expand as it heats up and cause excessive pressure, resulting in severe personal injury, death or substantial property damage.

- J) Remove hose from water source and slowly open drain valve "D" to depressurize the appliance.
- K) Remove plug from "G" and install pressure relief valve.

DANGER

The Relief Valve must be Installed in the system prior to operation. Failure can result in severe personal injury, death or substantial property damage.

START-UP: INITIAL FILL (Cont.)

2) FILL SYSTEM WITH TSP SOLUTION AND FLUSH

It is recommended to flush the system (if new) with a Trisodium Phosphate (TSP) solution upon initial filling. This is to remove any solder balls or residual flux that could clog and damage pumps or valves. Circulate the TSP solution in accordance with the manufacturer's instructions (typically 2 to 4 hours) prior to flushing.

3) TEST WATER QUALITY

Test system water pH to determine if water treatment is necessary. System water pH of 7.0 to 8.5 is recommended. Consult local water treatment companies for unusually hard water areas (above 7 grains hardness) or low pH water conditions (below 7.0). Use only water treatment designed for Hydronic systems.

4) RE-FILL SYSTEM WITH WATER AND BLEED AIR

It is recommended to fill the system initially with water (even if anti-freeze will be used) unless the temperatures are below freezing. This will make it easier to drain and refill if it is necessary to repair leaks or bleed out air.

It is important to bleed air correctly when filling the Appliance. Do not have appliance pump running during filling and bleeding.

- A) Shut isolation valves "A", "C", "M" and "H1" & "H2" in the house.
- B) Open isolation valves "B", "J", "K" and "L". Verify that pump isolation flanges "N" are open.
- C) Open both drain valves "D" and "E".
- D) Open pressure relief valve "G".

- E) Attach garden hose to drain valve "D" and turn water on. The sides of the appliance will fill first (through valves "K" and "L") because valve "M" is shut. Water will then flow through the top, filling the back tank.
- F) When the back is full, and water comes out of drain "E", shut drain "E".

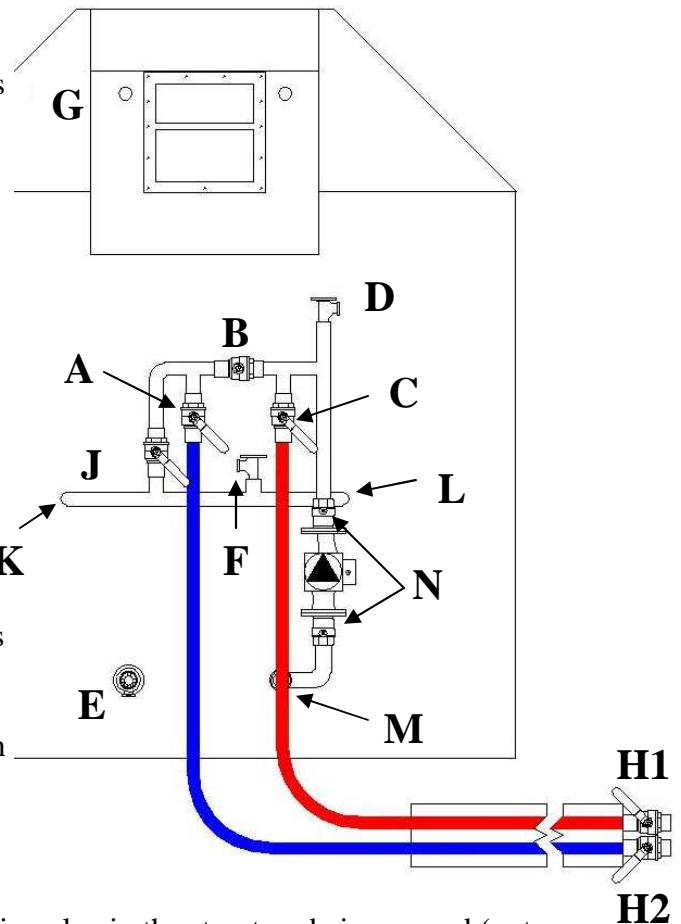
- G) When water comes out the relief valve "G", shut relief "G". Monitor system pressure. Shut drain valve "D" if pressure exceeds 20 psig.

- H) Open isolation valves "A" and "H1". Open the drain valve in the structure being served (not shown) to fill the transfer line with water.

- I) Open isolation valves "B" and "H2" to fill the other Transfer Line. 10-20 gallons may be drained out before the air is purged.

- J) When the transfer lines are full and the system in the structure being heated is full, open all isolation valves (the relief valve should be shut) and continue to fill the appliance until the pressure gauge reads approximately 12 lbs.

- K) Turn pump on (turn master switch "ON").



START-UP: INITIAL FILL (Cont.)

- L) Verify pump is running.
- M) Open (do not remove) small cap on auto air vent.

The pump will circulate water and any air should escape out the auto air vent. Pressure may drop from air escaping. Add more water with the garden hose. When adding more water, fill garden hose with water before attaching to the appliance to prevent from pushing more air into system.

5) INSPECT SYSTEM FOR LEAKS

After filling the appliance and system with water, **inspect all piping** throughout the system for leaks. If found, repair immediately. Repeat this inspection after the system has heated up.

WARNING

Leaks must be repaired at once. Failure to do so can damage the appliance, resulting in substantial property damage.

WARNING

Do not use **petroleum-based cleaning or sealing compounds** in the heating system. Severe damage to the appliance can occur, resulting in substantial property damage.

6) ADD ANTI-FREEZE

WARNING

Antifreeze must be used in any systems where there is danger of freezing (ambient temperatures below 32 degrees F). Severe property damage can result.

Use only antifreeze made especially for hydronic systems. Inhibited propylene glycol is recommended.

WARNING

Do not use **ethylene glycol, Automotive, RV or undiluted antifreeze**. Use only Hydronic or Boiler Antifreeze. Follow all of Antifreeze Manufacturer's Instructions. Severe personal injury, death or property damage can result.

- A) Determine **antifreeze quantity** according to system water content. **WMEGA^{CE}** water content is listed on page 4. Remember to include system water content.
- B) A 50% solution of propylene glycol/water provides maximum protection to about -30 °F.
- C) Follow antifreeze manufacturer's instructions.
- D) Local codes may require **back flow preventer** or actual disconnect from city water supply.
- E) To add anti-freeze, drain the water from system by opening drain valve "D".
- F) Close drain valve "D" when the proper amount of water has been drained out of the appliance.
- G) Attach discharge hose from a transfer pump to drain valve "C". Pump the desired amount of anti-freeze into the appliance.
- H) Raise system pressure to 10 to 12 psi.

WARNING

Do not use an automatic fill valve in a system with antifreeze. Glycol will leak before the water begins to leak, causing glycol level to drop. Added water will dilute the antifreeze, reducing the freeze protection level. Severe property damage can result.

START-UP: SETTING THE AQUASTAT

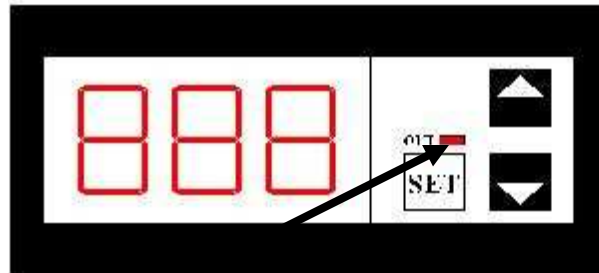
SETTING THE AQUASTAT

NOTICE

For troubleshooting or specific questions, refer to the Aquastat instructions packaged in the Literature folder.

NOTICE

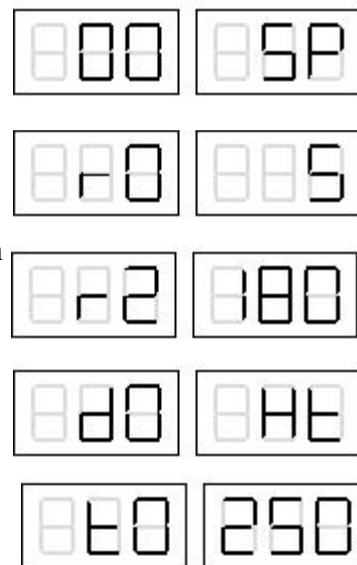
The Aquastat does not come preprogrammed from the factory and must be set up at the jobsite.



“Out” Light indicates that the Aquastat is sending power to the Blower

1) PROGRAMMING INITIAL PARAMETERS

- To enter Programming Mode; Press and Hold **SET** for 8 seconds. The access code “00” will be displayed.
- Press **SET** to acknowledge the access code, “SP” will be displayed.
- Press **UP** arrow until “r0” is displayed This is the Temperature Offset.
- Press **SET** to view the value, press **UP** arrow until value reads “5”, then press **SET** to accept the new value.
- Press **UP** arrow until “r2” is displayed. This is the Max Aquastat Setting.
- Press **SET** to view the value, press **UP** arrow until value reads “180”, then press **SET** to accept the new value.
- Press **UP** arrow until “d0” is displayed. This is the Aquastat Mode (Heating or Cooling).
- Press **SET** to view the value, press **UP** arrow until value reads “Ht”, then press **SET** to accept the new value.
- Press **UP** arrow until “t0” is displayed Note: the letter “t” appears as an upside down “F”. This is the Max Temperature that the Aquastat will display.
- Press **SET** to view the value, press **UP** arrow until value reads “250”, then press **SET** to accept the new value.
- Press **SET** and **DOWN** at the same time to exit Programming Mode or wait one minute and the display will automatically exit.



***** **IMPORTANT: COMPLETE STEP 2 FOR PROPER OPERATION!** *****

2) ENTERING DESIRED TEMPERATURE

NOTICE

Set Point (**SP**) is the only parameter the user can access without entering Programming Mode.

- Press **SET** until “SP” appears on the display.
- Press **SET** again. The set point temperature is shown on the display.
- Press **UP** or **DOWN** arrows to desired temperature.
It is recommended to set the Aquastat at 160. If the House Thermostat will not reach temperature, the Aquastat can be adjusted up to 180.
- Press **SET** again to accept the new value. “SP” appears on the display.
- Press **SET** and **DOWN** at the same time to exit or wait one minute and the display will automatically exit.



OPERATION

FOLLOW ALL SAFETY PRECAUTIONS

1) START-UP: CHECKLIST

- Inspect system piping
- Verify water chemistry/pH
- Verify anti-freeze concentration
- Open all isolation valves
- Verify pump running
- Verify relief valve installed and operational
- Verify chimney is installed and clear
- Inspect door gasket
- Inspect door tightness
- Verify aquastat operation
- Verify proper blower operation
- Review all safety precautions



2) BEFORE STARTING A FIRE

- A) Verify “START-UP CHECKLIST” is complete.
- B) **ENSURE** the isolation valves are open.
- C) Start the pump. The pump is lubricated with water. **DO NOT** run dry.
- D) Cycle the fans to check for proper operation.
- E) Ensure the shutters on both draft fans close properly when the fans stop.
- F) Inspect the loading door gasket before lighting the first fire and a few days after, looking for any indications of a poor seal.

3) FUEL SELECTION

- A) Burn only split cordwood that has been seasoned for 12-18 months. Fired unseasoned wood is wasteful and inefficient using much of the combustion energy to boil off the excess moisture. Ideally the wood should be split to aid in seasoning and should be around 25% moisture content by weight.
- B) The following are general guidelines for wood selection:
 1. Hardwoods burn better than softwoods.
 2. Larger pieces burn better than small pieces.
 3. 25% moisture content is optimum:
 - a. Higher moisture content wastes energy boiling off water.
 - b. Lower moisture content burns rapidly and inefficiently.

OPERATION (Cont.)

DANGER

DO NOT use gasoline, kerosene or other flammable liquids. To do so could cause a flash fire or explosion resulting in serious personal injury and property damage.

WARNING

DO NOT BURN GARBAGE, HOUSEHOLD WASTE OR YARD WASTE. In most areas this is illegal. The unit is designed to burn seasoned cord wood, Fired other materials can reduce the life of the unit and will void your warranty.

4) FUEL STORAGE

- A) Locate the appliance to provide access to wood supply.
- B) Wood should be split, stacked and seasoned for one year prior to use.
- C) Wood should not be stored within the minimum clearance to combustibles stated on page 10.
- D) Ensure that wood storage does not impede maintenance access to the sides or back of the appliance.
- E) While placing the appliance in a site built structure allows space for storing some wood, the wood still must not be stored within the minimum clearances to combustibles or such that it restricts access for maintenance of the appliance.

5) LIGHTING THE INITIAL FIRE

- A) Build a **SMALL** fire. Allow the water temperature to rise. When the water temperature reaches 120°F, set the draft control aquastat to 110°F. The draft fans should stop and the shutters close. Reset to operating temperature of 160 - 180°F.
- B) If a safety limit aquastat is used, set the safety limit aquastat below water temperature. In a hot water baseboard system the zone valves should open and the circulating pump should start. In a forced air system the furnace fan should start. Reset to 10° higher than fan control aquastat setting. Never set safety limit aquastat higher than 200°F.
- C) Monitor water pressure. Maintain about 18 psi (hot water pressure) by adding water as air is purged from the system. It may take several days operation to purge all the air. Ensure the vent opening on the automatic air vent is clear and the cap is loose to allow air to escape. This vent always stays open with the cap halfway unthreaded.

NOTE

Fill appliance to about 10 psi (cold) pressure will rise as system temperature rises maintain 18 psi (hot).

Condensation in the firebox will occur for the first 3 or 4 days of operation resulting in water or water/creosote combination running out of the ash door. This should clear up in less than a week. You may want to place a pan under ash door to keep concrete clean.

WARNING

During “mild” weather (temperatures above 15 deg F), set the aquastat at 150 to limit over heating. Monitor appliance temperature. If temperatures over 185 are noted, then reduce the aquastat setting.

OPERATION (Cont.)

6) FIRING THE APPLIANCE

- A) **NEVER** start a fire without water in the system. Damage to the appliance and controls will result.
- B) Load the appliance with regard to the required heat load. On mild days, load less fuel in to the appliance. A small, intense fire will burn cleaner, more efficiently and with less creosote formation than a large smoldering fire.
- C) Do not load the appliance above the top of the loading door.
- D) Start the fire with crumpled paper and kindling beneath the logs.
- E) Close the door securely.
- F) Turn the draft fan on.
- G) The Aqua-Therm will maintain water temperature based on the aquastat settings.
- H) Heated structure temperature is controlled by a thermostat in the structure.
- I) The loading door and ash removal door must tightly shut and the seals maintained in good condition during operation, otherwise overheating will occur.



7) WHEN LOADING

- A) Place **LOAD** switch in **LOAD** position. Switch light should go out.
- B) Open Loading door – pausing momentarily between the first latch and the safety latch to allow any combustion gases to burn off

DANGER

The WMEGA^{CE} will not operate without electrical power. The combustion air shutter **MUST NOT** be manually opened or altered for any reason; overheating will result.

WARNING

Ash door must be closed and latched during operation. Failure to latch door will result in overheating which could damage the appliance and controls.

8) CREOSOTE FORMATION

All wood fired devices create some creosote. Creosote vapors condense and accumulate in the relatively cool chimney flue. When ignited this creosote makes an extremely hot fire. It is better to build a small, intense fire than a large smoldering one that will create more creosote. The chimney connector and chimney should be inspected at least monthly during the heating season to determine if a creosote buildup has occurred. If creosote has accumulated it should be removed to reduce the risk of a chimney fire.

9) DISPOSAL OF ASHES

Ashes should be placed in a metal container with a tight-fitting lid. The closed container of ashes should be placed on a noncombustible surface, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

EMERGENCY ACTIONS

OVER HEATING

- 1) Manually turn off the draft fan at the fan switch (place switch in OFF position).
- 2) **DO NOT TURN OFF THE MASTER SWITCH.** The pump must have power to remove heat from the appliance.
- 3) Turn the thermostats fully up in the structure being heated by boiler to remove heat from the appliance as fast as possible.
- 4) Allow the appliance to cool down.
- 5) If the appliance does not cool down, then with a shovel, remove as much of the wood and coals from the fire box. Place the removed fuel away from combustibles.
- 6) Once the unit has cooled down:
 - Determine and correct the cause of the overheating
 - Refill the system if necessary

WARNING

During “mild” weather (temperatures above 15 deg F), set the aquastat at 150 to limit over heating. Monitor appliance temperature. If temperatures over 185 are noted, then reduce the aquastat setting.

CHIMNEY FIRE

- 1) **CALL 911.**
- 2) Manually turn off the draft fan at the FAN switch (place switch in OFF position).
- 3) Leave the doors securely closed.
- 4) **DO NOT TURN OFF THE MASTER SWITCH.** The pump must have power to remove heat from the appliance.

LOSS OF ELECTRICAL POWER

- 1) Shut blower damper fully.
- 2) Restore Electrical Power.

If electrical power is off for a long duration, the appliance will probably over heat. Remove fuel and coals from the fire box. Place removed fuel away from combustibles

MAINTENANCE

Keeping the WMEGA^{CE} in good repair will result in more efficient operation and longer appliance life. You are responsible for safely maintaining the unit. Follow the **Service and maintenance** procedures given throughout this manual and in component literature shipped with the appliance.

Failure to perform the service and maintenance could result in damage to the boiler or system. Failure to follow the directions in this manual and component literature could result in severe personal injury, death or substantial property damage.

DANGER

1) DAILY

- A) Check system temperature and pressure. Adjust aquastat temperature and add or remove fluid as necessary.

2) EVERY 2-3 DAYS

- A) **Rake out ashes** - Ashes should be raked out every 2-3 days. Excessive buildup of ashes in the ash trough will eventually plug up the unit.

3) MONTHLY

- A) Check Exhaust Clean-out (located above the Blower) and Shutter Clean-out (located behind the Blower) for soot and creosote. Clean when soot layer is greater than 1/8 inch.
- B) Use a Flue Brush in the front Clean-out Ports to push any ash down into the Secondary Combustion Chamber.
- C) Examine door gasket and draft fan shutter. Ensure airtight seal. Replace as required.

4) EVERY THREE MONTHS

- A) Clean heat exchanger and baseboard radiators. Dust and dirt buildup reduces heat transfer.

5) END OF SEASON

- A) **Power:** Turn off power supply at the appropriate circuit breaker.
- B) **Chimney:** Clean and inspect chimney. **Cap the chimney to keep rain water out.**
- C) **Fire box & Ash trough:** Remove ashes, soot, and hardened deposits from the fire chamber by using putty knife or wire brush. Oil door hinges and latch.
- D) **Plumbing:** Shut all Isolation Valves. Ensure 1" fittings on both ends of tubing are tight.

Moisture from rain or condensation must not be allowed to accumulate in the firebox or ash pan during the off season. Failure to perform preventive maintenance may result in corrosion damaging the boiler resulting in possible severe property damage.

WARNING

MAINTENANCE (Cont.)

6) BEGINING OF SEASON

- A) **Chimney:** Remove cap from chimney. Inspect chimney. Ensure chimney is not blocked (check for animal or bird nests).
- B) **Fire box & Ash trough:** Oil door hinges and latch.
- C) **Plumbing:** Open all Isolation Valves. Ensure 1” fittings on both ends of tubing are tight. Ensure that all system Isolation valves are open.
- D) **Pump:** The circulator shipped with the appliance is water-lubricated. No oiling is required. Check other circulators in the system. Oil any circulators requiring oil, following circulator manufacturer’s instructions. Over-oiling will damage the circulator.
- E) **Blower motor:** Place a few drops of S.A.E. 20 motor oil in each of the two oil cups.

WARNING

Use only **S.A.E. 20 motor oil** to lubricate the motor. Do not use universal household oils. Motor could be damaged, resulting in possible severe property damage.

- F) **Pressure:** Verify cold pressure is approximately 10 psig. Fill if necessary.
- G) **Water Chemistry:** Verify heating system water pH of 7.0 to 8.5. Adjust as necessary. Add corrosion inhibitor package to raise pH.
- H) **Antifreeze:** Verify Antifreeze percentage. Add as necessary.
- I) **Power:** Turn on power supply at the appropriate circuit breaker. Ensure that the pump is running.
- J) **Aquastat:** Inspect and test the Aquastat. Verify operation by turning Aquastat temperature below the appliance temperature. The **WMEGA^{CE}** should cycle off. Return Aquastat to original setting.
- K) **Air Vents:** Inspect automatic air vents . The cap must be unscrewed one turn to allow air to escape. If the air vent is leaking, remove cap and briefly push valve and then release to clean the valve seat. Replace cap by twisting all the way onto valve and then unscrewing one turn.
- L) **Start-up:** Review Start-up Checklist and Start-up Procedures.
- M) **Safety:** Review all Safety Precautions.
- N) **Housekeeping:** Verify that area is free of any **combustible materials**, gasoline and other flammable vapors and liquids or rags.

WARNING

Do not use **petroleum-based cleaning or sealing compounds** in the heating system. Severe damage to the heating system will occur, resulting in substantial property damage.

WARNING

Eliminate all system leaks. Continual fresh makeup water will reduce appliance life. Minerals can build up in the appliance, reducing heat transfer, overheating the metal. Leaking water may also cause severe property damage.

DANGER

Electrical shock hazard — Turn off power to the appliance before any service operation on the appliance except as noted otherwise in this instruction manual. Failure to turn off electrical power could result in electrical shock, causing severe personal injury or death.

DANGER

Failure to inspect for the above conditions and have them repaired can result in severe personal injury or death.

MAINTENANCE (Cont.)

7) PRESSURE (SAFETY) RELIEF VALVE

DANGER

Failure to reinspect the Pressure Relief Valve as directed could result in unsafe pressure buildup, which can result in severe personal injury, death or substantial property damage.

A) AT LEAST ONCE A YEAR

Safety Relief Valves **must be operated** to ensure that waterways are clear.

Certain naturally occurring mineral deposits may adhere to the valve, rendering it inoperative. When manually operating the lever, water will discharge and precautions must be taken to avoid contact with hot water and to avoid water damage. Before operating lever, check to see that a discharge line is connected to this valve directing the flow of hot water from the valve to a proper place of disposal otherwise severe personal injury may result.

If no water flows, valve is inoperative. Shut down the appliance until a new relief valve has been installed.

B) AT LEAST ONCE EVERY THREE YEARS

Safety Relief Valves should be **re-inspected** by a licensed plumbing contractor or authorized inspection agency, to ensure that the product has not been affected by corrosive water conditions and to ensure that the valve and discharge line have not been altered or tampered with illegally.

Certain naturally occurring conditions may corrode the valve or its components over time, rendering the valve inoperative. Such conditions are not detectable unless the valve and its components are physically removed and inspected. This inspection must only be conducted by a plumbing contractor or authorized inspection agency — not by the owner.

TROUBLESHOOTING

1) PROBLEM: Losing Pressure in System.

- A) Air bleeding out of system will cause pressure loss. When the appliance is first filled, it may take 3-4 days to purge all the air. Add water as needed until pressure stabilizes.
- B) If pressure consistently drops, it indicates a leak in system. Check joints, fittings, relief valves, etc.

2) PROBLEM: Unit over heats.

- A) Air leaks can cause appliance to overheat. Ensure loading and ash door are sealing properly.
- B) Draft fan shutter may not be operating properly. When the fan stops, the shutter should drop down completely covering fan intake.
- C) Fan control aquastat or safety limit aquastat may be set too high. Fan control aquastat must not be set over 180°F. Maximum setting for safety limit aquastat is 190°F.
- D) Water is not circulating. If pump is not running or an isolation valve is shut, or an air lock is stopping circulation, appliance can overheat.

3) PROBLEM: Not Enough Heat in the structure being heated.

If the appliance reaches operating temperature and draft fan shuts off, it is working properly. (If draft fan does not shut off, see Problem IV.) Check the following:

A) System water flow rate too low. This can be caused by:

1. Transfer Lines are too small in diameter.
2. Distance between the appliance and the heating system too great for the pump in use.
3. The circulating pump may not have enough capacity.
4. The system could be air bound. (See Problem V.)

B) The fan control Aquastat may be set too low. Set Aquastat up 10° but not over 180°F.

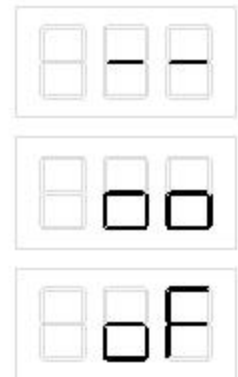
C) The house heating system may not be extracting enough heat from the water. Dust buildup on the baseboard fins or forced air heat exchanger system will reduce heat output.

D) The house heating system may not have enough capacity. More baseboards may need to be added to a hot water system. In a forced air system, more airflow through the heat exchanger will boost output.

To check for a flow problem, call our service department at 1-320-346-2264. Have the following information available: BTU need of home. If your existing furnace was adequately heating the home, look on furnace for BTU rating, diameter and length of underground pipe, model number of circulating pump and information from page 2 of this manual.

4) PROBLEM: Aquastat Error Codes

- A) “—” : Sesnor is shorted. Replace Sensor
- B) “oo” : Sesnor is opened. Check for loose sensor connection to Aquastat
- C) “oF” : Aquastat failure. Replace Aquastat



TROUBLESHOOTING (Cont.)

5) PROBLEM: Water Temperature Does Not Reach Fan Control Aquastat Setting. (Draft fan runs continuously.)

- A) Wood may be too wet or green. Try mixing woods.
- B) Check for obstructions in draft fan.
- C) A partially clogged Smoke Damper may be restricting air flow in the appliance. Open the top of the Smoke Damper and verify that it is free of obstructions. Remove the cap inside the Smoke Damper Box and ensure that the “cup” is free to move up and down.
- D) A partially clogged chimney or exhaust plenum may be restricting air flow in the appliance.
- E) A buildup of ashes in the ash trough can restrict the exhaust of combustion air.
- F) A buildup of ashes on top of the grates can restrict combustion air.
- G) Heat is being lost through underground pipes. Temperature coming into house should be no more than 2-3° different than temperature of water leaving the appliance.
- H) Appliance is undersized for building being heated.

6) PROBLEM: No Water Flow

- A) Air could be trapped in the line.
 1. Repeat filling and venting procedure on page 23.
 2. Temporarily add more water to system to bring pressure to around 27 lbs; the increased pressure helps push air bubbles out. When done, drain some water back out to bring pressure back to approximately 15-20 lbs.
- B) Pump is not running. You should be able to feel the vibration of pump when it's running.
 1. Defective pump - check if installed properly (See page 16.) If installed incorrectly, pump will burn out. With 180° water circulating through pump, it will be hot to the touch.
 2. Pump is not wired correctly. Refer to wiring diagram. (See page 18.)
- C) Pump flanges are closed. Flanges are open when screw slot is parallel with the pipe.
- D) The system is frozen somewhere.

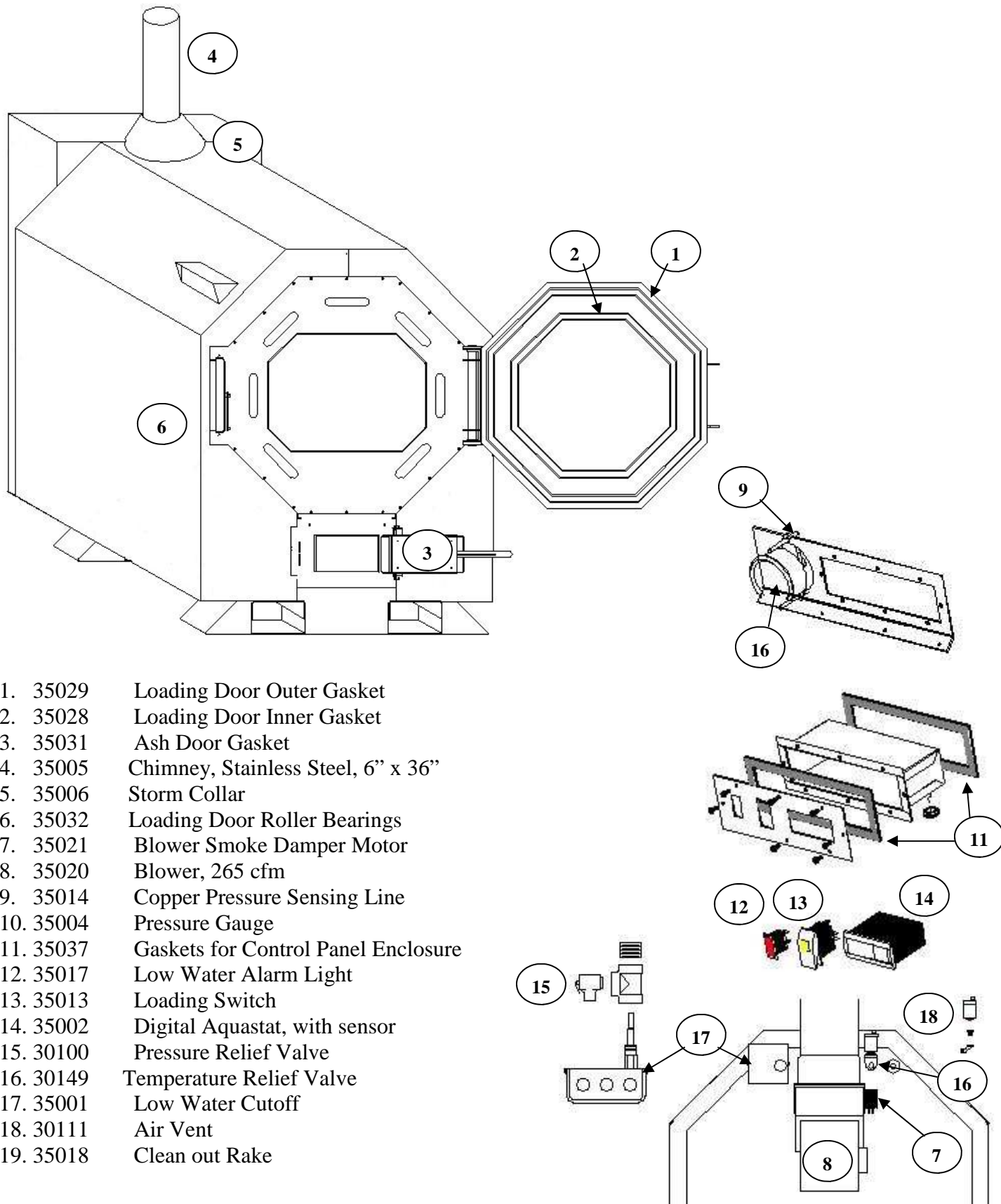
7) PROBLEM: Excessive Creosote is Building up in Ash Trough.

- A) Ash build up above grates or in ash trough area will cause restrictions in combustion air.
 1. Appliance may not be burning hot enough.
 2. Set fan control aquastat to 180°F.
 3. Set differential on fan control aquastat to 20°. (See page 27.) This will let water temperature drop 20° before fan is started, causing a longer burn cycle.
- B) Burning small pieces of extra dry wood can cause creosote. Try burning large pieces of wood for a few days.
- C) If problem persists call service department for additional help. 1-320-346-2264.

8) PROBLEM: Appliance shuts down, “LOW WATER” Light is illuminated.

- A) Verify system pressure ... low pressure is indicative of loss of water.
- B) Vent and fill as necessary.
- C) Crack open pressure relief valve to vent header containing the LWCO probe.

REPLACEMENT PARTS LISTING



- 1. 35029 Loading Door Outer Gasket
- 2. 35028 Loading Door Inner Gasket
- 3. 35031 Ash Door Gasket
- 4. 35005 Chimney, Stainless Steel, 6" x 36"
- 5. 35006 Storm Collar
- 6. 35032 Loading Door Roller Bearings
- 7. 35021 Blower Smoke Damper Motor
- 8. 35020 Blower, 265 cfm
- 9. 35014 Copper Pressure Sensing Line
- 10. 35004 Pressure Gauge
- 11. 35037 Gaskets for Control Panel Enclosure
- 12. 35017 Low Water Alarm Light
- 13. 35013 Loading Switch
- 14. 35002 Digital Aquastat, with sensor
- 15. 30100 Pressure Relief Valve
- 16. 30149 Temperature Relief Valve
- 17. 35001 Low Water Cutoff
- 18. 30111 Air Vent
- 19. 35018 Clean out Rake

Lifetime Limited Warranty

On Aqua-Therm Outdoor Wood Burning Stoves With Stainless Steel Fireboxes

Aqua-Therm outdoor wood burning stoves are warranted by Aqua-Therm LLC to the original user against defects in workmanship under normal use for life, from the date of purchase.

This warranty is subject to the condition that the Aqua-Therm Product(s) must have been installed in accordance with manufacturers' instructions. This warranty is extended only to the first retail purchaser of the product and only to a product that has not been moved from its original installation site. Any warranty claims on outdoor wood burning stoves or component parts should be reported to the Aqua-Therm dealer from whom the product(s) were purchased. Any stove which is determined to be defective in material or workmanship within the first six (6) years and returned to Aqua-Therm, freight prepaid, will be repaired or replaced at Aqua-Therm's option at no charge to you. In years seven (7) through the life of the product Aqua-Therm will pay a prorated share of any repair or replacement cost. The proportionate charge will be equal to the appropriate percentage of the list price of the product at the time the warranty claim is made, and will be determined as follows: 7th year – 50 %; 8th year – 45%; 9th year – 40%; 10th year – 35%; 11th year – 30%; 12th year – 25%; 13th year – 20%; 14th through 19th years – 15%; 20th year and beyond – 10%.

All components: fans, baffles, pumps, aquastats, relays, gauges, relief valves, expansion tanks, heat exchangers, etc. are warranted by their manufacturers. In addition, Aqua-Therm warrants the original factory installed components for 1 year from date of purchase.

In addition to the warranty above, the Aqua-Therm warranty does not cover:

1. Components that are part of the heating system (products) but were not furnished by Aqua-Therm as a part of the heating system (products).
2. The workmanship of any installer of Aqua-Therm product(s). In addition, this warranty does not assume any liability of any nature for unsatisfactory performance caused by improper installation.
3. Any costs for labor for removal and reinstallation of the alleged defective stove or part, transportation to Aqua-Therm, if necessary, and any other materials necessary to perform the exchange.
4. Any products that have a failure or malfunction resulting from improper or negligent operation, accident, abuse, freezing, over temping, poor water quality, misuse, unauthorized alteration or improper repair or maintenance. Improper adjustments, control settings, care or maintenance. Information is in the installation manual and other printed/technical information provided with the product or direct from Aqua-Therm or www.aqua-therm.com.

NOTE: THE WARRANTY DESCRIBED HEREIN IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY. AQUA-THERM EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL, INCIDENTAL, INDIRECT OR PUNITIVE DAMAGES FOR BREACH OF ANY EXPRESS WARRANTY. For prompt product warranty claims, notify the Aqua-Therm dealer from whom the product was purchased. If this action does not result in warranty resolution, contact Aqua-Therm, 48301 State Hwy 55, Broton, Minnesota 56316, with details in support of the warranty claim. Alleged defective part or parts must be returned through the same dealer channel in accordance with the Aqua-Therm procedure currently in force for handling returned goods for the purpose of inspection to determine cause of failure. Aqua-Therm will furnish new part(s) to an authorized Aqua-Therm dealer who, in turn will furnish the new part(s) to the purchaser. If there are any questions about the coverage of this warranty, contact Aqua-Therm at the address above.

Owner's registration card must be completed and returned to Aqua-Therm for warranty to be in effect.