

# AltSource

*Electric thermal mass boiler*

**Power capacity : 4.5 kW to 29 kW :  
120V- 208/240V (single phase)**

## INSTALLATION, USE AND CARE MANUAL



Your AltSource electric boiler has been carefully assembled and factory tested to provide years of trouble-free service. This manual contains instructions for the safe and proper installation, operation and maintenance of the boiler, in order to ensure your full satisfaction. It is imperative that all persons who are expected to install, operate or adjust this boiler read the instructions carefully.

Any questions regarding the operation, maintenance, service or warranty of this water heater should be directed to the dealer or distributor you purchased it from. When all installation steps have been completed, replace this installation manual in its original envelope, and keep in a safe place near the heater for future reference.

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# Section 1 : TECHNICAL SPECIFICATIONS

## 1.1 POWER AND DIMENSIONS

**Table 1: Boiler specifications 208V/240V/1ph.<sup>1</sup>:**

Model AltSource	Power (kW)		Heating Elements	Amperage <sup>2</sup>		Suggested electrical cable at 240V <sup>3</sup>		Suggested Breaker/Fuse at 240V <sup>3</sup>
	208 V	240V		208 V	240V	cu	al	
4.5	3.4	4.5	1 x 4,5 kW	16.3	18.9	10	10	30
7.5	5.6	7.5	1 x 4.5 kW + 1 x 3 kW	27.2	31.2	8	6	40
9	6.8	9	2 x 4,5 kW	32.6	37.5	8	6	50
12	9	12	2 x 6 kW	43.5	50	6	4	70
15	11.2	15	2 x 3 kW + 2 x 4,5 kW	54.3	62.5	6	4	80
18	13.5	18	4 x 4,5 kW	65.2	75	4	2	100
20	15	20	4 x 5 kW	72.5	83.3	3	2	110
24	18	24	4 x 6 kW	87	100	2	0	125
27 <sup>4</sup>	20.3	27	6 x 4,5 kW	97.9	112.5	1	00	150
29 <sup>4</sup>	21.8	29	2 x 4,5 kW + 4 x 5 kW	104	120	1	00	175

<sup>1</sup>Electrical supply: 120/240V or 120/208V single-phase (L1 – N – L2) with three 90°C conductors, or two conductors L1 – L2 if the boiler does not require power to a 120 VAC pump or accessories.

<sup>2</sup>Add the amperage of the circulating pump and other external accessories if they are connected to the boiler (max. 5A).

<sup>3</sup>A higher cable size could be required. In all cases the local electrical code has priority. The electrician has the responsibility to select the appropriate size.

<sup>4</sup>These models are only available on the AltSource 70.

Maximum operating pressure on the tank: 207 kPa / 30 psi

Tank temperature range : 10°C to 88°C (50°F to 190°F)

1 kW = 3412 BTU/h

**Table 2: Dimensions:**

	AltSource 50	AltSource 70
<b>Height</b>	56-7/16"	66-7/16"
<b>Diameter</b>	22"	24"
<b>Depth (with door)</b>	25-1/2"	28"
<b>Weight</b>	280 lb	380 lb
<b>Heating supply</b>	1" NPTM	1-1/4" NPTM
<b>Heating return</b>	1" NPTM	1-1/4" NPTM

## 1.2 BUFFER TANK

The AltSource boiler optimizes runtimes and limits on/off cycling of the energy source(s). When the minimum system load is lower than the energy source's minimum capacity, the system will generate short cycles. This causes premature wear of the equipment and substantially decreases the system's energy efficiency.

## 1.3 STORAGE TANK

Any hydronic heating system with the AltSource stores energy like a battery. When a demand is made for limited heating (for example, when there is little difference between indoor and outdoor temperatures) or when it is used with a low-capacity energy source, the energy required will first come from the tank's thermal storage.

## 1.4 HYDRAULIC SEPARATOR

Adding an AltSource boiler to a hydronic heating system helps to evacuate air, eliminates impurities, and ensures the optimal functioning of the pumps—not only for the energy source but also for the distribution system.

## 1.5 BACK UP BOILER

The addition of an AltSource electric boiler to a hydronic heating system acts as a back-up source to the main renewable energy system. The boiler can operate in two modes: **autonomous electrical mode** or **automatic transfer mode**.

For both modes, it is recommended to use the outdoor sensor supplied with the equipment. The outdoor sensor allows the boiler water temperature to be modulated according to the outside temperature. It also makes it possible to stop the heating of the electric elements when the outside temperature exceeds a certain temperature. The use of these functions makes it possible to optimize the start-up of the main renewable energy system.

### 1.5.1 Autonomous electrical mode

By default, the boiler operates in **autonomous electrical mode** where, on request of heat, the AltSource boiler turns on the distribution pump, reads the water temperature and activates the electrical elements according to the Parameters of the UltraSmart controller independently if the main renewable energy source is on or off.

In addition, for this mode, it is recommended to adjust the setpoint of the renewable energy source to a value greater than 10°F to 20°F than the AltSource to reduce the start-up of the electrical elements.

### 1.5.2 Automatic transfer mode

The boiler can also be operated in the **automatic transfer mode**, where the AltSource electric boiler turns on the distribution pump, reads the water temperature and activates the electrical elements if authorized by an external signal. The elements are then switched on according to the adjustment parameters of the UltraSmart controller.

# Ratings : *AltSource™ With Optional Copper Coil* heat exchanger

		AltSource™ 50 and 70						
		Domestic Hot Water Pre-heating						
Heat Pump heating capacity		80 °F	85 °F	90 °F	95 °F	100 °F	105 °F	
BTU/H	kW	GPM output from the AltSource coil for given temperatures						
<b>100 °F heating water</b>								
1	12 000	4	0,6	0,5	0,5	0,4		1
2	24 000	7	1,2	1,1	1,0	0,9		2
3	36 000	11	1,8	1,6	1,4	1,3		3
4	48 000	14	2,4	2,1	1,9	1,7		4
5	60 000	18	3,0	2,7	2,4			5
6	72 000	21	3,6					6
<b>110 °F heating water</b>								
7	12 000	4	0,6	0,5	0,5	0,4	0,4	7
8	24 000	7	1,2	1,1	1,0	0,9	0,8	8
9	36 000	11	1,8	1,6	1,4	1,3	1,2	9
10	48 000	14	2,4	2,1	1,9	1,7	1,6	10
11	60 000	18	3,0	2,7	2,4	2,2	2,0	11
12	72 000	21	3,6	3,2	2,9	2,6		12
13	84 000	25	4,2	3,7	3,4			13
14	96 000	28	4,8	4,3				14
<b>120 °F heating water</b>								
15	12 000	4	0,6	0,5	0,5	0,4	0,4	15
16	24 000	7	1,2	1,1	1,0	0,9	0,8	16
17	36 000	11	1,8	1,6	1,4	1,3	1,2	17
18	48 000	14	2,4	2,1	1,9	1,7	1,6	18
19	60 000	18	3,0	2,7	2,4	2,2	2,0	19
20	72 000	21	3,6	3,2	2,9	2,6	2,4	20
21	84 000	25	4,2	3,7	3,4	3,1	2,8	21
22	96 000	28	4,8	4,3	3,8	3,5	3,2	22
23	108 000	32	5,4	4,8	4,3	3,9	3,6	23
24	120 000	35	6,0	5,3	4,8			24
25	132 000	39	6,6	5,9				25
<b>130 °F heating water</b>								
26	12 000	4	0,6	0,5	0,5	0,4	0,4	26
27	24 000	7	1,2	1,1	1,0	0,9	0,8	27
28	36 000	11	1,8	1,6	1,4	1,3	1,2	28
29	48 000	14	2,4	2,1	1,9	1,7	1,6	29
30	60 000	18	3,0	2,7	2,4	2,2	2,0	30
31	72 000	21	3,6	3,2	2,9	2,6	2,4	31
32	84 000	25	4,2	3,7	3,4	3,1	2,8	32
33	96 000	28	4,8	4,3	3,8	3,5	3,2	33
34	108 000	32	5,4	4,8	4,3	3,9	3,6	34
35	120 000	35	6,0	5,3	4,8	4,4	4,0	35
36	132 000	39	6,6	5,9	5,3	4,8	4,4	36
37	144 000	42	7,2	6,4	5,8	5,2		37
38	156 000	46	7,8	6,9				38
39	168 000	49	8,4					39
40	180 000	53						40
<b>140 °F Heating Water</b>								
41	12 000	4	0,6	0,5	0,5	0,4	0,4	41
42	24 000	7	1,2	1,1	1,0	0,9	0,8	42
43	36 000	11	1,8	1,6	1,4	1,3	1,2	43
44	48 000	14	2,4	2,1	1,9	1,7	1,6	44
45	60 000	18	3,0	2,7	2,4	2,2	2,0	45
46	72 000	21	3,6	3,2	2,9	2,6	2,4	46
47	84 000	25	4,2	3,7	3,4	3,1	2,8	47
48	96 000	28	4,8	4,3	3,8	3,5	3,2	48
49	108 000	32	5,4	4,8	4,3	3,9	3,6	49
50	120 000	35	6,0	5,3	4,8	4,4	4,0	50
51	132 000	39	6,6	5,9	5,3	4,8	4,4	51
52	144 000	42	7,2	6,4	5,8	5,2	4,8	52
53	156 000	46	7,8	6,9	6,2	5,7	5,2	53
54	168 000	49	8,4	7,5	6,7	6,1	5,6	54
55	180 000	53	9,0	8,0	7,2			55
56	192 000	56	9,6	8,5				56
57	204 000	60						57
58	216 000	63						58

Based on 40 °F domestic cold water inlet



## General Safety Precautions

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**Be sure to read and understand the entire Manual before attempting to install or operate this unit. Pay particular attention to the following General Safety Precautions. Failure to follow these warnings could cause property damage, bodily injury or death. Should you have any problems understanding the instructions in this manual, STOP, and get help from a qualified installer or technician.**

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## Section 2 : INTRODUCTION



### WARNING

The important safeguards and instructions appearing in this manual are not meant to cover all possible conditions and situations that may occur. It should be understood that common sense, caution and care are factors which cannot be built into every product. These factors must be supplied by the person(s) caring for and operating the unit.

### 2.1 LOCAL INSTALLATION REGULATIONS

This AltSource electric boiler must be installed in accordance with these instructions and must conform to local regulation, or in the absence of local codes, with the current edition of the National Plumbing Code and the National Electric Code. In any case where instructions in this manual differ from local or national codes, the local or national codes take precedence.

### 2.2 CORROSIVE ATMOSPHERE

The electric boiler should not be located near an air supply containing halogenated hydrocarbons or high humidity. The limited warranty is voided when failure of the water heater is due to a corrosive atmosphere.

### 2.3 SHIPMENT INSPECTION

Inspect the electric boiler for possible shipping damage. The manufacturer's responsibility ceases upon delivery of goods to the carrier in good condition. Consignee must file any claims for damage, shortage in shipments, or non-delivery immediately against carrier.

### 2.4 TO VERIFY

Please check the boiler identification plate to ensure you have the right model.

The following items are factory installed and shipped with the unit:

- 207 kPa (30 psi) tank pressure relief valve.
- Tank drain valve
- Thermo manometer (heat and pressure indicator).
- Automatic air vent.
- Electric heating elements
- ULTRA SMART™ controller.



### WARNING

The AltSource electric boiler should not be located in an area where leakage from the tank or water connections will result in damage to the adjacent area or to lower floors of the structure. When such areas cannot be avoided, a suitable drain pan or non-flammable catch pan, adequately drained, must be installed under the boiler. The pan must be connected to a drain.

## Section 3: INSTALLATION



### WARNING

The manufacturer's warranty does not cover any damage or defect caused by installation or attachment or use of any special attachment other than those authorized by the manufacturer into, onto, or in conjunction with the water heater. The use of such unauthorized devices may shorten the life of the water heater and may endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices.

### 3.1 SAFETY MEASURES

All installations will include a pressure relief valve limiting the operating pressure to 207 kPa (30 psi).

This AltSource electric boiler is designed for a maximum operating temperature of 88°C (190°F). It is designed for hot water heating systems only. When allowed by local regulation a maximum 50% blend of water and antifreeze (designed specifically for water heating systems) may be used.

The boiler is equipped with an automatic high limit temperature control set at 210°F (99°C) and models sale in USA have a second limit device manually re-settable set at 227°F (108°C). If the heating distribution system on which the boiler is installed requires a high limit controller having a lower setting, this controller will be added to the system and connected in series with the factory installed limit control.

### 3.2 LOCATION

The AltSource boiler should be installed in a clean, dry location. Long hot water lines should be insulated to conserve energy. The boiler and piping should be protected from exposure to freezing.

The AltSource boiler must be installed levelled and vertically. Adjustable legs allow for levelling and stability.

The AltSource boiler must be located or protected so as not to be subject to physical damage, for example, by moving vehicles, area flooding, etc.

All models can be installed on combustible floors and in alcoves.

### 3.3 CLEARANCES

The minimal clearances required for proper inspection and servicing are as follows. Supplementary clearances could be required for piping installation.

Table 3: Minimum clearances required

Left side	0 mm/ 0 "
Right side	0 mm/ 0 "
Top	127 mm / 5 "
Front*	75 mm / 3 "
Back	0 mm/ 0 "

\*If the installation is inside a closet with an access door, ventilation openings could be required to maintain the ambient temperature below 32°C (90°F).

### 3.4 PIPING INSTALLATION

Make sure that the installation complies with one of the configuration shown below and that the water circulation is done in the right way.



Figure 1: Possible installation configurations

### 3.5 BOILER COMPONENTS

Figures 2 and 3 show various components of the AltSource electric boiler. Figures 4 and 6 show some installation drawings of the boiler in the autonomous electrical mode.

Figures 5, 7 and 8 show some installation drawings of the boiler in the automatic transfer mode.

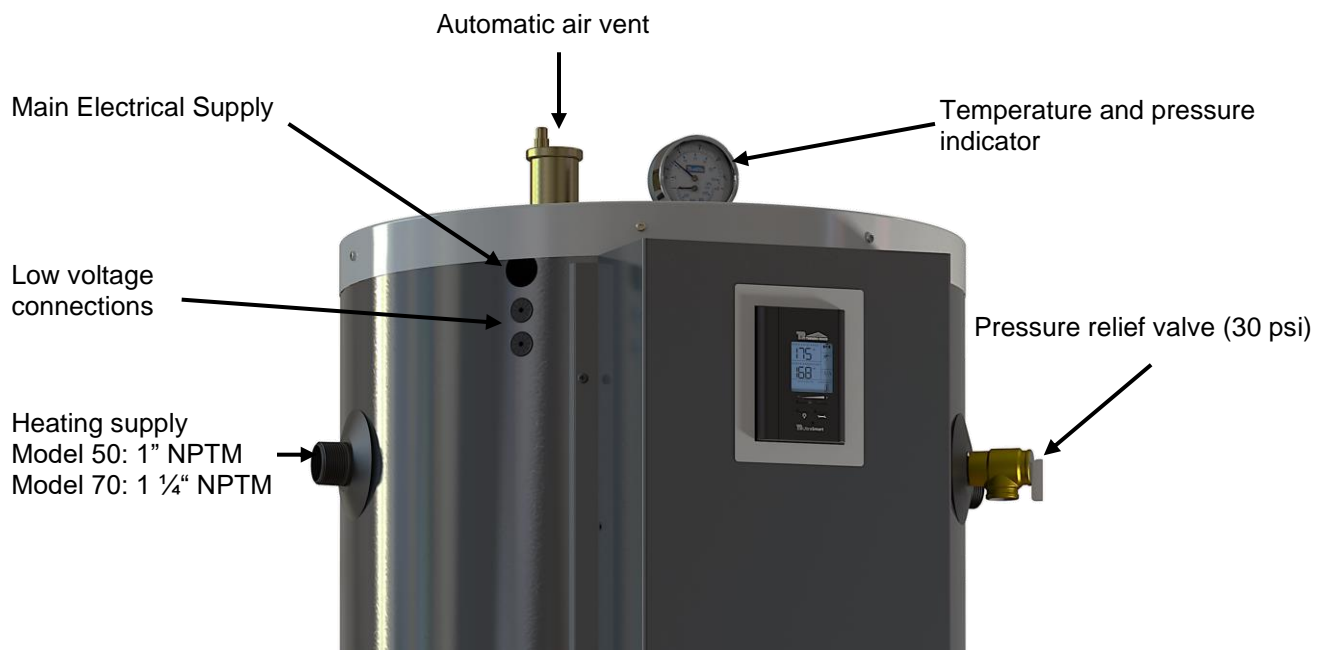
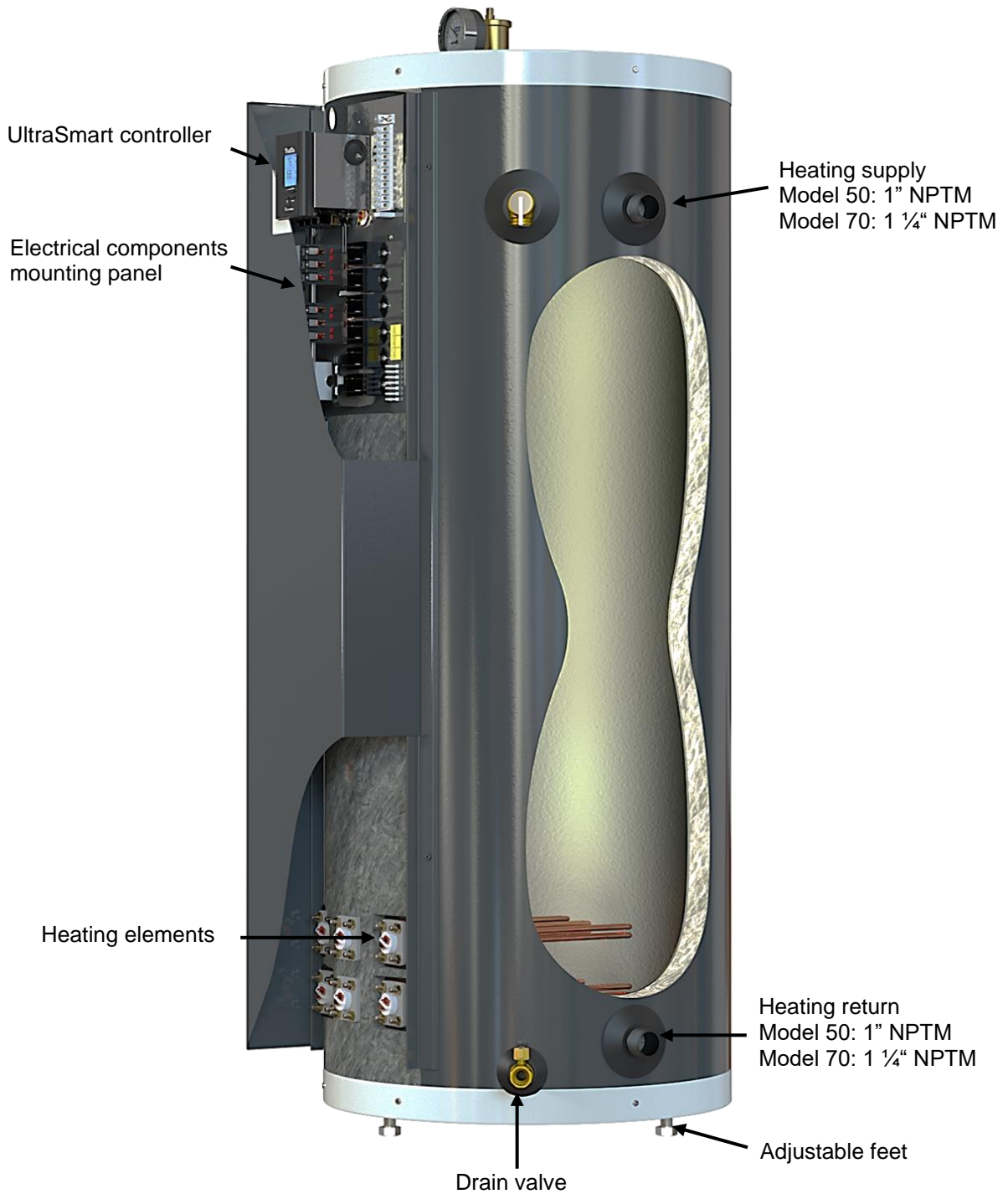


Figure 2 : Components identification and location (top right side view)





**Figure 3: Components identification and location (left side view)**





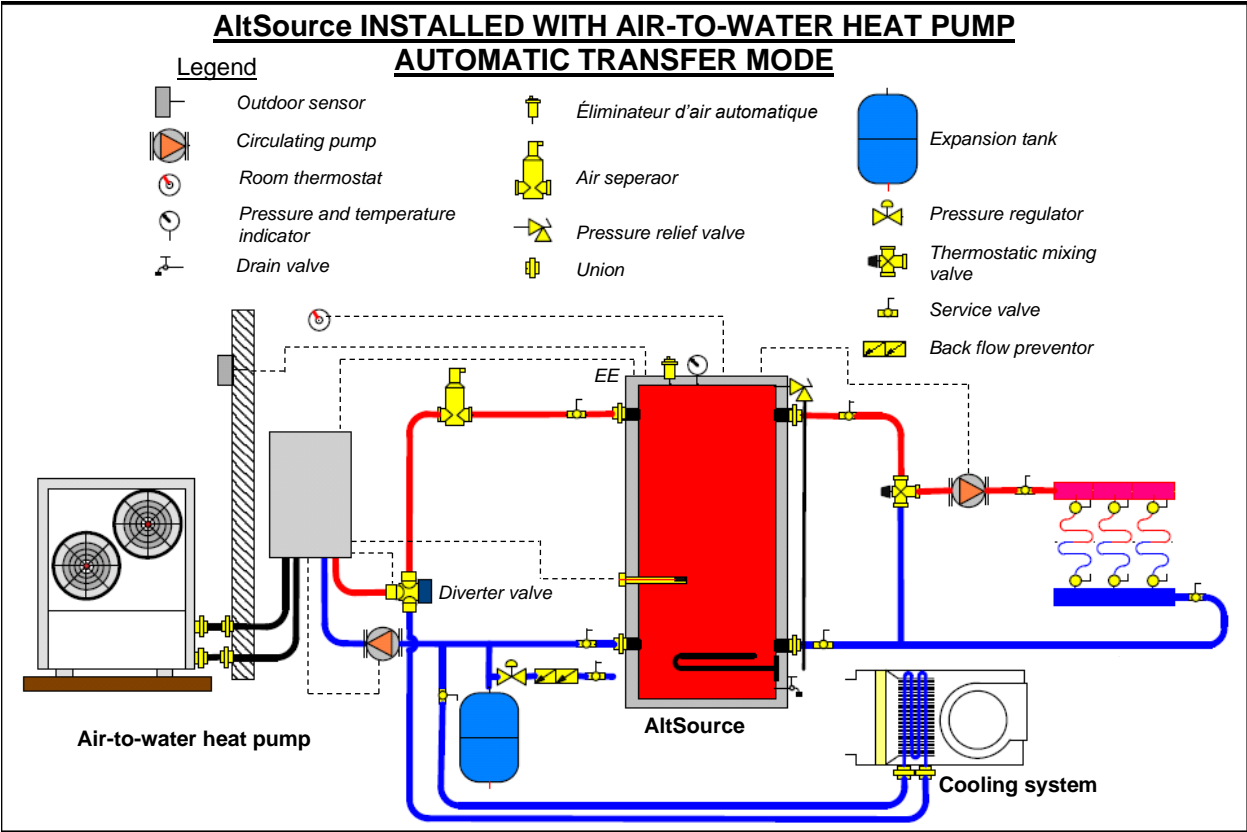


Figure 8: Dual energy Installation drawing for radiant floor and Air-to-water heat pump

### 3.6 SYSTEM SETUP

Figures 2 to 8 identify and show location of the different components. They also provide typical heating system installation. External components location may vary in order to accommodate specific installation and local codes and regulation.

#### 3.6.1 Connecting the boiler

The boiler heating supply and return connections are located on the left or right side and are 1" NPTM for Model 50 and 1-¼" NPTM for model 70. The connections at the left or right can be used.

Unions are recommended on the inlet and outlet pipes to disconnect the water heater easily for servicing if necessary.

Dielectric (insulating) unions should be used if copper-steel connections are made.

Insulate all pipes containing hot water, especially in unheated areas.

#### 3.6.2 Flow-check valve

If the heating system uses a single or multiple circulators without motorized zone valves, a **flow-check valve must be installed** to avoid all possibility of gravity flow and heat loss during non-draw periods. Modern circulators are typically provided with spring loaded check valves that will provide adequate protection.

If the heating system uses motorized zone valves, these will provide adequate protection.

#### 3.6.3 Pressure relief valve

The boiler is delivered with a factory installed tank pressure relief valve set at 207 kPa (30 psi).

**NEVER** replace the pressure relief valve by a higher set pressure one.

Connect the outlet of the relief valve downward toward a safe location.

Relief valve outlet pipe diameter must not be of smaller diameter than the relief valve outlet. The outlet pipe end must be visible in order to observe any relief incident and be protected from freezing.

**NEVER cap or plug a pressure relief valve** outlet. The pressure relief valve is a safety apparatus and preventing its proper operation may cause death, injury or property damage.

#### 3.6.4 Expansion tank

When operating the AltSource and the heating system, pressure will vary between 83 kPa and 193 kPa (12 psi to 28 psi). The operating pressure is affected by the type of heating system and the size of the expansion tank installed.

The expansion tank is used to absorb the increase of water volume from the boiler and the system when it is working.

The model selection should be based on the maximum working temperature and the water volume of the total system. For example, a system with radiators contains much more water volume than a baseboards system. Likewise, the AltSource also contains an important volume of water that has to be added :

AltSource 50 : 48 usgal

AltSource 70 : 71 usgal

With this information, the installer or distributor should be able to make an appropriate selection for an expansion tank.

Here are some minimal recommendations for different types of heating systems.

AltSource	Baseboards	Radiant floor	Cast-iron radiators
AltSource 50	#30	#30	#60
AltSource 70	#60	#60	#90

The expansion tank is generally installed on the wall or ceiling. It also has to be well supported.

#### 3.6.5 Water pressure regulator

The boiler should be installed in such a way that it can automatically be fed with water in the event of a pressure drop.

The minimum pressure obtained when the system is cold is generally 12 psi (83 kPa).

This accessory shall be equipped with one or more check valves to avoid all possibilities of the boiler water returning to the potable water supply network (local regulation should be applied)

#### 3.6.6 Automatic Air Vent

The AltSource has a factory installed tank automatic air vent. This air vent function is to vent any air present in the tank.

For proper operation, do not cap or block the air bleeder outlet.

For proper operation of the heating system, it may be necessary to add air bleeders to the heating system circuits.

### 3.6.7 Heating pump

A circulating pump (not included) is required for the heating system to deliver heating fluid to the different heating zones. Sizing of the pump is based on the heating system configuration and is done by the installer (heating technician, plumber).

## 3.7 BOILER WIRING:

### 3.7.1 Main power supply

The electrical wiring and grounding must conform to local codes or, in their absence, to the National Electrical Code. Local codes have authority for wiring and electric breaker sizing. It is the electrical technician's responsibility to insure that the installation meets the applicable code requirements.

On installation where a 120 Vac power is required for a heating pump and other outboard components, main power supply to the AltSource must be a 120/240 Vac, single phase, 60 Hz using 3 conductors (L1 – L2 – N) and a ground wire.

On installation where no 120 volts external components need to be powered by the AltSource, Power supply could then be supplied with only two conductors L1-L2 with a ground wire.

Electrical current draw for the boiler being installed is indicated on the boiler's name plate. The electrical technician needs this information in order to determine the proper electrical breaker and cable. The cable can be either aluminum or copper, but must be adequate for 75°C operation.

If aluminum cables are used, it shall be of an adequate size (generally bigger) and particular consideration will have to be respected such as the use of DE-OX inhibitors in order to meet the National electrical code.

### 3.7.2 Heating pump wiring

If the building heating system is designed for a single pump operation and the electrical power to the boiler is 120/240 Vac 3 conductors and ground type, the pump (1/6 HP max) can be directly connected to the boiler electric panel "PP" terminals. The boiler control will operate the pump as soon as a heat demand is signalled by the space thermostat.

### 3.7.3 Outdoor temperature sensor

If you want the boiler target temperature to modulate according to the outdoor temperature (when the outdoor temp. will get colder, the target temperature will get higher). The supplied outdoor sensor will have to be connected to S1 S1 **before turning the power on** to the unit.

The installation of this sensor cancels the operation of the boiler when the outdoor temperature exceeds the selected value corresponding to the maximum temperature required for heating.

This control strategy optimizes the use of the main renewable energy source by reducing the use of electric elements of the AltSource boiler.

#### 1. Sensor location:

-Outside the building at a location which best represents the heat demand of the building (a wall facing north for most of the buildings and on a south one on buildings with large windows facing south).

-It should not be exposed to external heat sources (dryer outlet, window openings, uninsulated walls).

-It should not be installed in a location where it could be covered with snow.

#### 2. Installation:

-Drill a 9/64" dia. hole through the wall and insert the sensor cable.

-Fix the sensor cover to the wall using supplied screw.

-With an electric cable (100ft max.) having 2 conductors 20ga. connect one end of this cable to the sensor cable using twist-on wire connectors and the other end to terminals S1 & S1 of the boiler.

If you wish to operate the boiler at a fixed target temperature, simply do not connect the sensor before applying the power to the unit (do not put a jumper between S1&S1 if the outdoor sensor is not used).

### 3.7.4 Room thermostat wiring

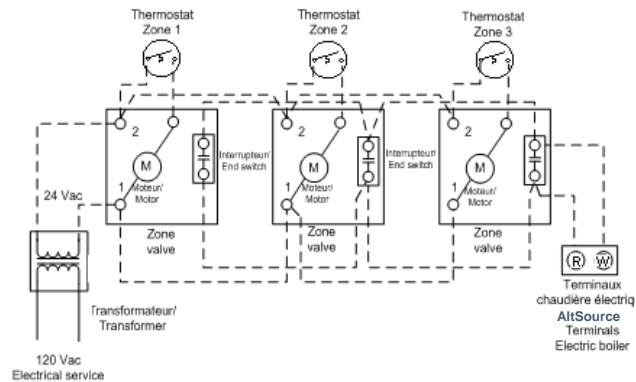
#### 3.7.4.1 Single heating zone

Using a two (2) wires central thermostat, connect the low-voltage thermostat dry contact to the W and R terminals on the AltSource electrical panel. Using a three (3) wires central thermostat, connect the C, W and R terminals to the boiler electric panel corresponding terminals.

**DO NOT apply external current to these terminals.**

### 3.7.4.2 Zone valve zoning

Connect the low-voltage thermostat to the zone valve motor. The components must be wired such that, upon a heating demand from a thermostat, only the corresponding zone valve will be actuated and will in turn activate the *AltSource*. Connect the zone valve dry end switch contact to the **W** and **R** boiler electrical panel terminals



**The 24 Vac power supply transformer used must be powerful enough to supply simultaneously all zone valves.**

### 3.7.5 Automatic transfer mode wiring

If needed, The *AltSource* boiler is designed to automatically transfer the right energy source to be in function. The automatic transfer mode is not set by default. This mode allows to activate the electric elements upon reception of an external signal. The *AltSource* will select the appropriate energy source and will activate the renewable energy source or the electric boiler. If the heating distribution system is equipped with a single pump connected to the **PP** terminals of the boiler, it will be activated on heat calls from the thermostat, whichever the energy source selected.

To allow the operation in automatic transfer mode:

- Open the front access panel to the boiler electric compartment. Remove the screw at the bottom of the controller; raise the upper section of the controller. You will see a switch at the back of the controller having

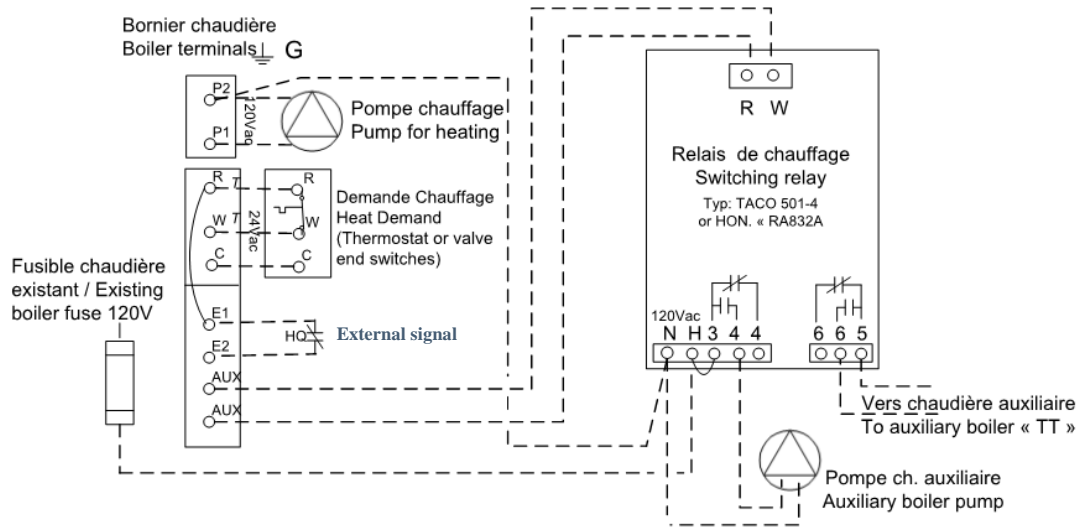
two positions “ELECT” and “Bi-Energ”. Position the switch at “Bi-Energ” (see fig.9)

- Install a 2 wire 18ga cable between the contact (NC contact to allow the operation in electricity) of the external device making the selection of the operating mode and terminals **E<sub>1</sub>** **E<sub>2</sub>** (see fig.10)
- Install a pump relay (such as Honeywell RA832 or TACO SR501-4) near the renewable energy source to authorize the *AltSource* control the start up your renewable energy source. (see fig.10)
  - The relay can be supplied by an external 120V source or directly from the boiler fuse and P2 neutral.
  - Install a 2 wire 18-gauge cable between the “**AUX**” of the *AltSource* and “**TT**” of the relay RA832 (or R and W of relay TACO 501-4)
  - Connect the auxiliary pump wires on the relay terminals.
  - Connect the electric terminal of the renewable energy on the “**XX**” relay RA832 terminals or 6-5 of the relay TACO 501-4 (see fig.10)
  - The renewable energy source must be be controlled by its own operation and limiting controller.

**Do not connect the main electrical supply of the renewable energy source to AUX terminals.**



**Figure 9: Back of the Controller**



**Figure 10: Wiring diagram with auxiliary energy source**

It is also possible to allow the renewable energy source to be operated according to its own controls at all times (do not use the AltSource contact of the "AUX" terminals) and when the main renewable energy source is not sufficient to

the request, (closed contact between **E1 & E2**) the heating elements will be activated according to the operating parameters of the controller.



### 3.8 WIRING DIAGRAMS

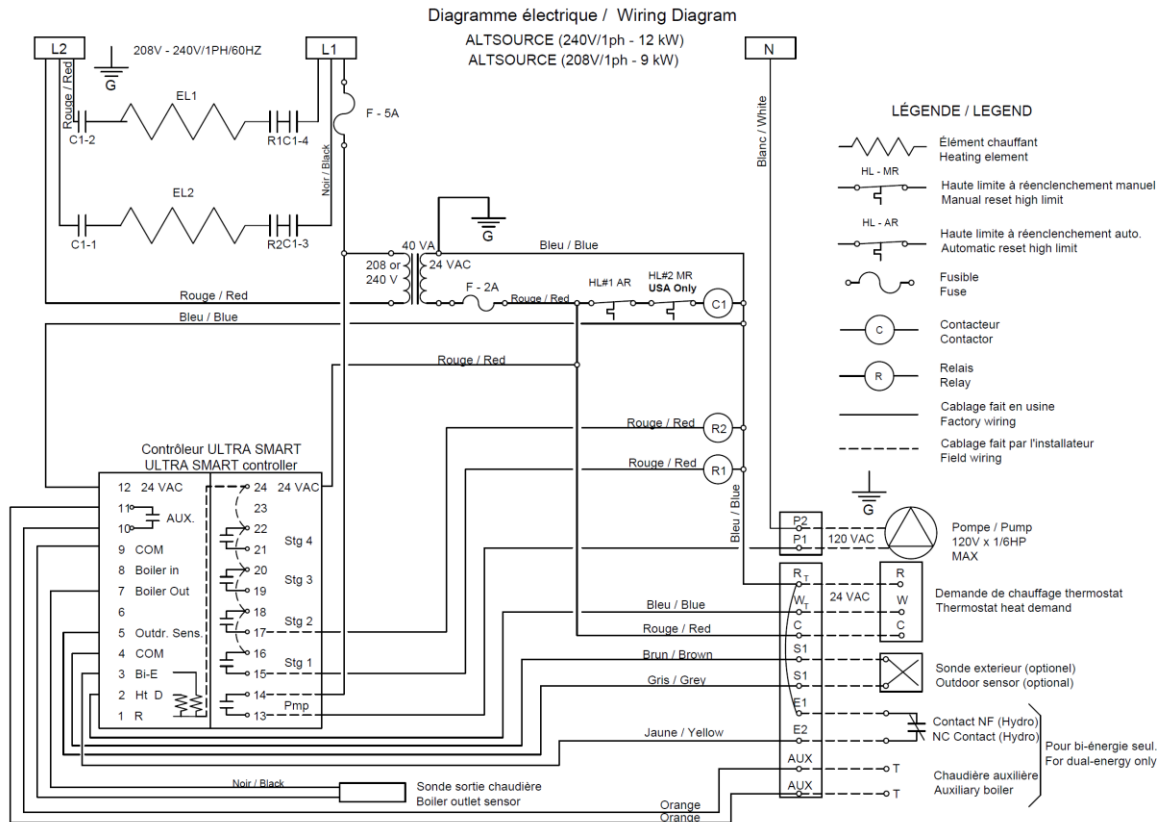
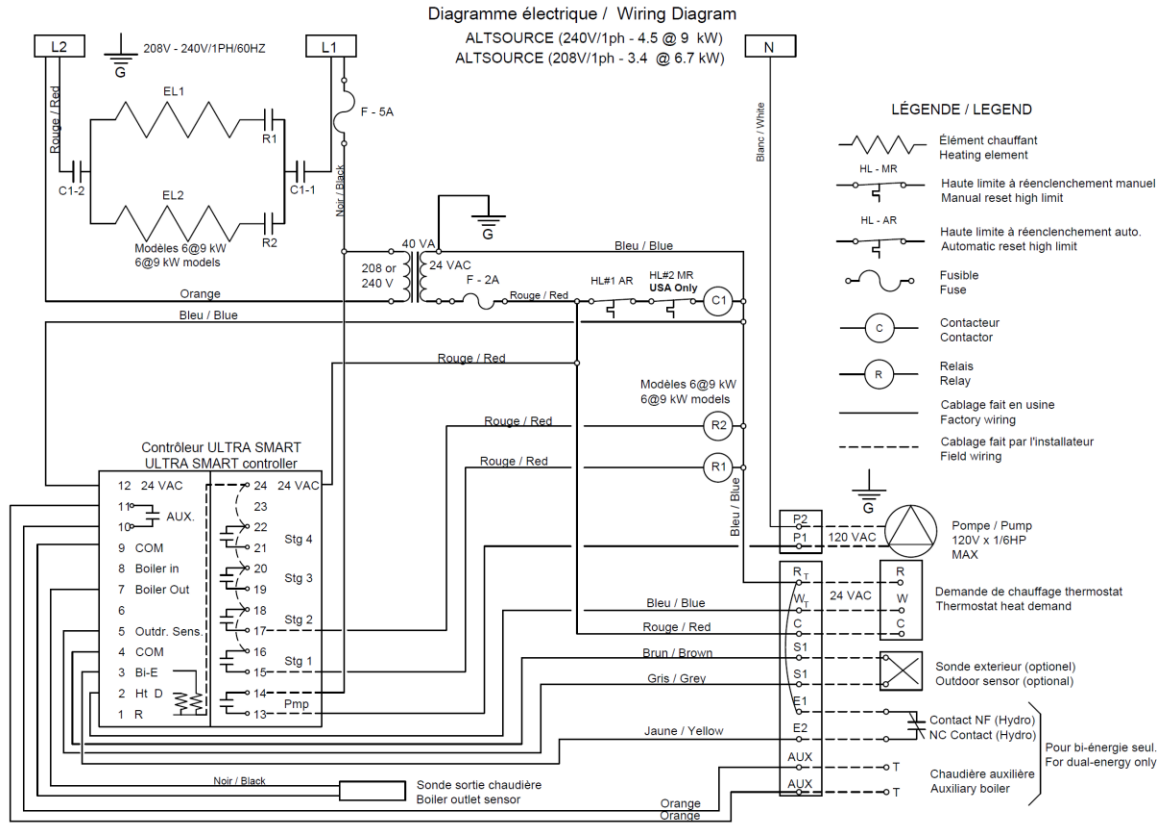


Diagramme électrique / Wiring Diagram

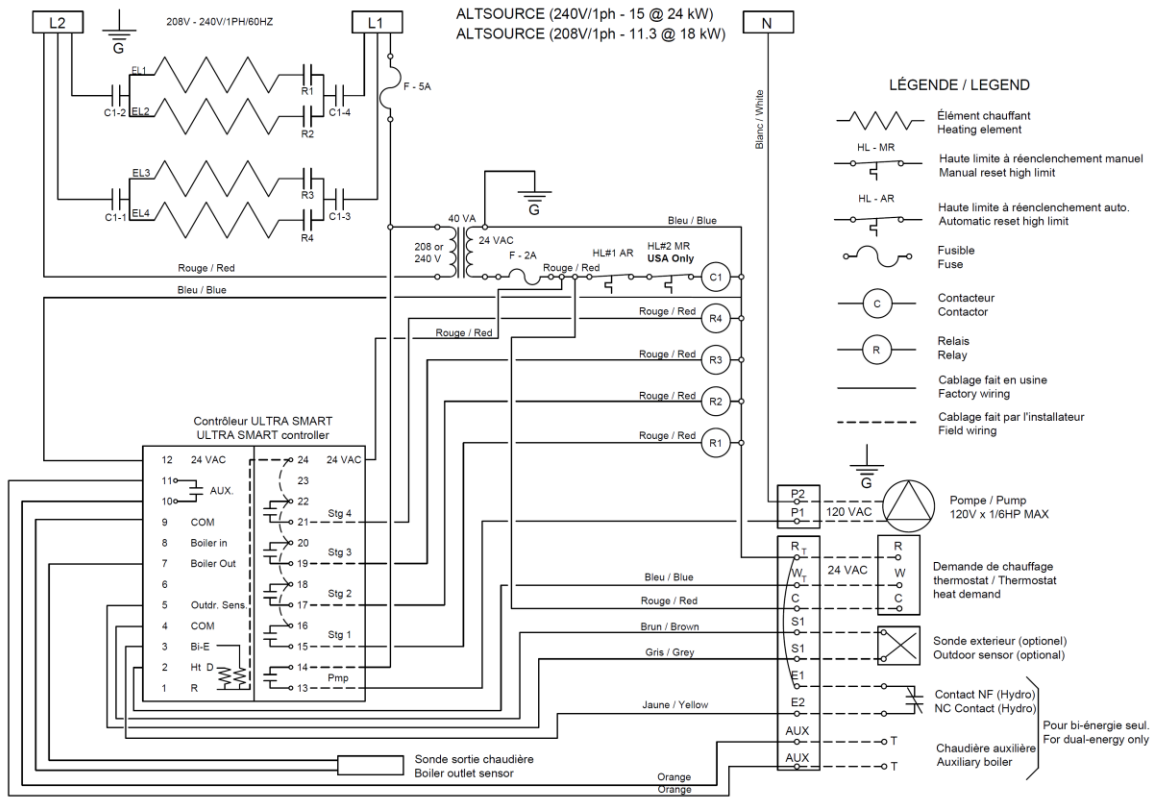
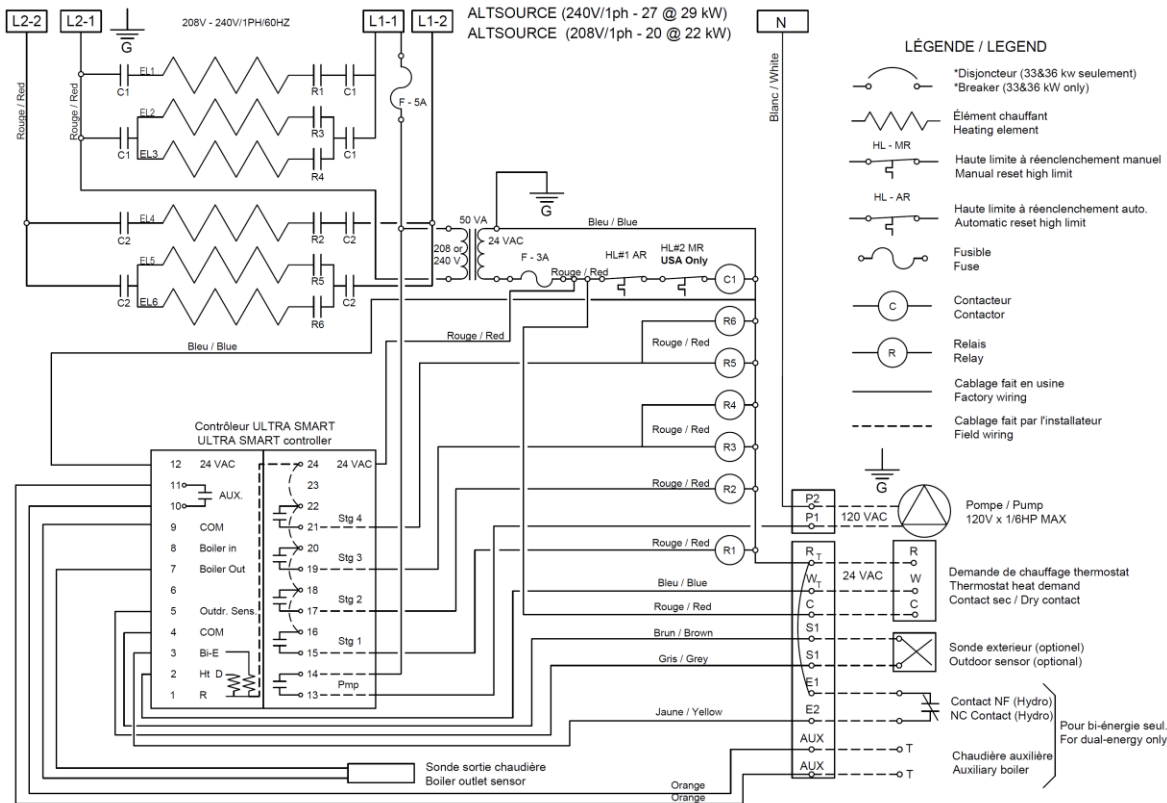


Diagramme électrique / Wiring Diagram



## Section 4 : ADJUSTMENT OF THE CONTROLLER

### 4.1 INTRODUCTION

The AltSource boiler is mainly designed to be installed on closed circuit applications where the water of the heating system flows directly from the boiler to the heating distribution system (Standard parallel Piping system)

Two operation modes are then offered:

Fixed boiler temperature set point (the outdoor sensor shall not be installed)

Or

Outdoor reset

### 4.2 DISPLAYED INFORMATION

The electronic control uses an LCD display to make all adjustments and to visualize the operation of the system.

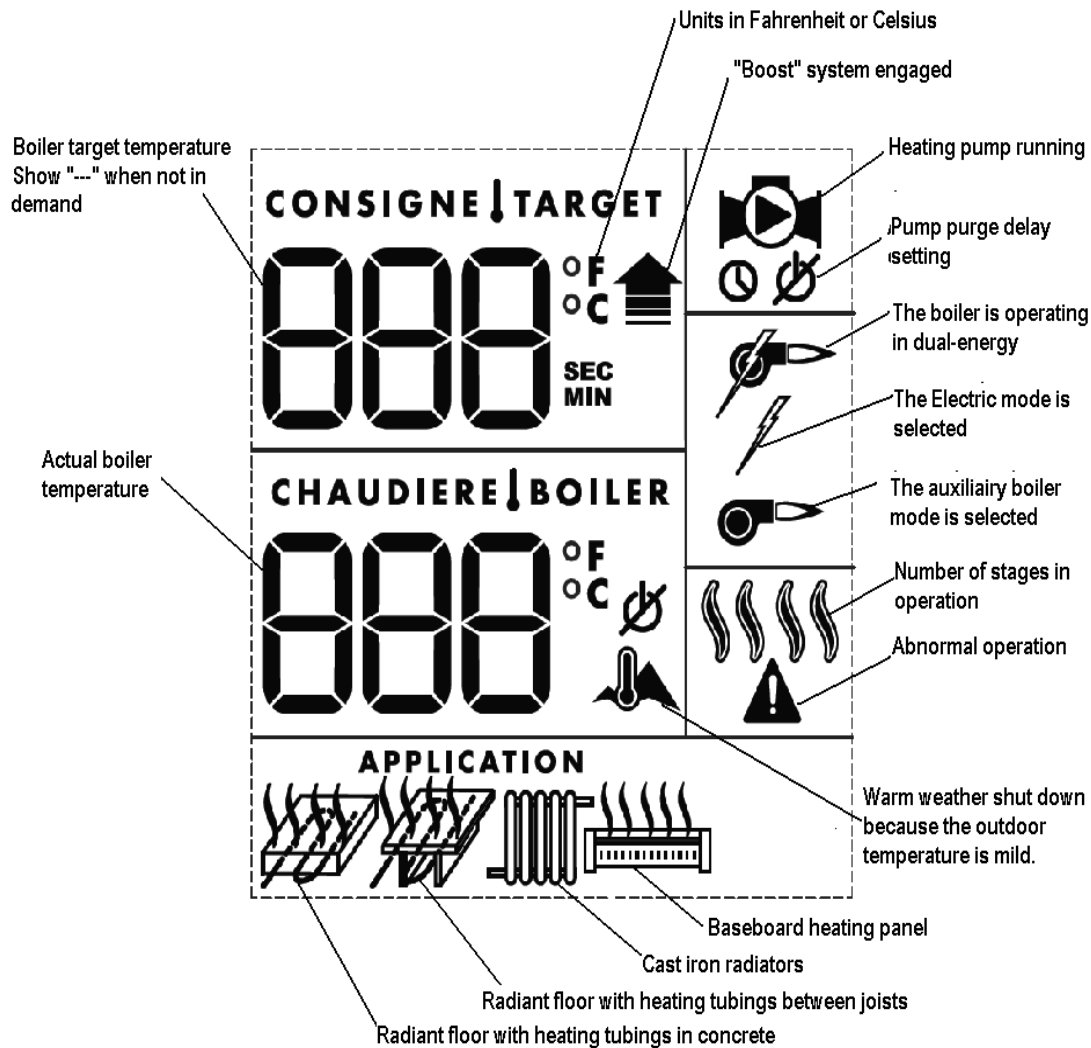






Figure 11 : UltraSmart Controller Display

### 4.3 OPERATION OF THE INTERFACE

The controller uses four push buttons at the bottom of the display to select and adjust the parameters.

The button  is used to access the configuration menu and confirm a selection.

The   buttons are used to select an item or adjust a value.

The  button enables the illumination of the display under two different modes.


The default mode will enable the illumination of the display for a period of 10 sec. each time a button is pressed. If the  is pushed, the light will be continuously illuminated. Just press the button to change the mode of activation.



Figure 12 : UltraSmart Control Module

### 4.4 OPERATION IN “FIXED BOILER TEMPERATURE SET POINT”

For installation where the boiler target temperature shall be maintained at a fixed temperature that will not vary in relation to the outdoor temperature, the sequence of operation will be as follow:

On a call for heat from the room thermostat, the circulating pump will start and the boiler will activate the number of stages required to get to and maintain the outlet temperature of the boiler near the selected target temperature. A rotation of the stages based on an equal time period of operation is provided.

**N.B.** The supplied outdoor temperature sensor shall not be connected before applying the electrical power to the unit

### 4.5 OPERATION WITH “OUTDOOR RESET”:

For installation where the boiler target temperature shall modulate in relation to the outdoor temperature; when the outdoor temperature gets colder, the boiler target temperature will increase.

On a call from the room thermostat, the circulating pump will start and the boiler will activate the number of stages required to get to and maintain the outlet boiler temperature near the target temperature established by the controller according to the outdoor temperature. A rotation of the stages based on an equal time period of operation is provided.

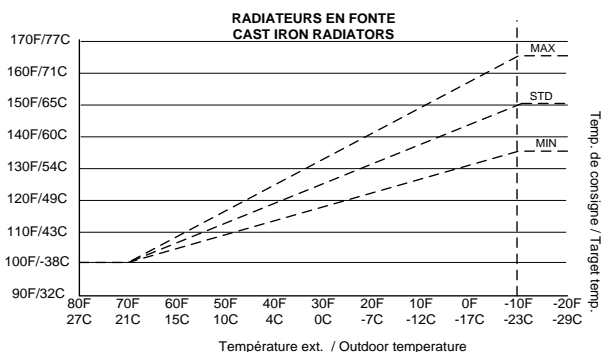
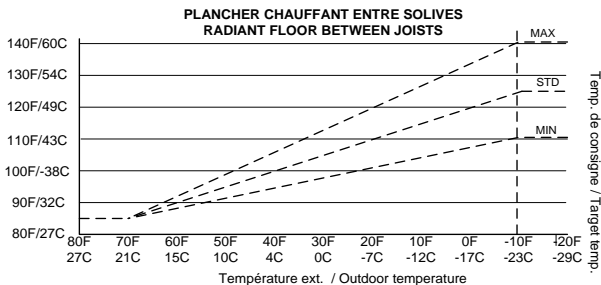
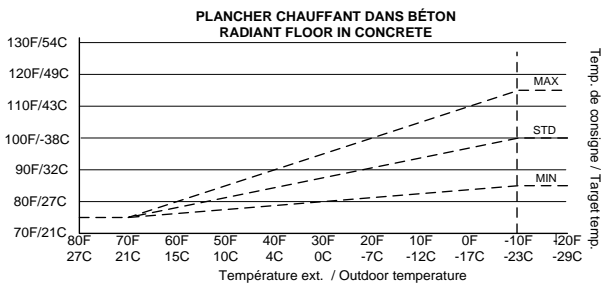
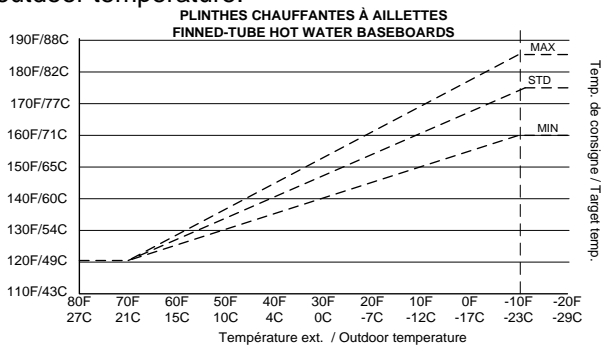
N.B. The supplied outdoor temperature sensor must be connected before applying the electrical power to the unit.

The boiler target temperature will be calculated by the controller in relation to the parameters selected in the menu



and the maximum target temperature required when the outdoor temperature will get to -10°F (-23°C). The “STD” curve corresponds to the default maximum temperature for a typical system and this value can be modified from the “MIN” to “MAX” value shown on the following tables.

The following tables show the values of the target temperature that will be obtained in relation to the outdoor temperature.



#### 4.6 PURGE DELAY OF THE PUMP



The controller offers the possibility to stop the operation of the pump after an adjustable delay once the heat demand has been completed.

The following choices are offered:

- "OFF" The pump will stop immediately when the heat demand has been satisfied. This selection shall be selected on systems equipped with motorised fast closing zone valves in order to prevent noise from water hammering.
- "15 sec to 60 min" delay where the pump will be kept running to enable the pump to circulate water into the system to equilibrate the heat in all the building.
- "ON" The pump is in continuous operation. Required on particular heating distribution systems.

#### 4.7 AUTOMATIC HEATING SHUT DOWN



When the outdoor sensor is installed and the unit then operates in the "outdoor reset" mode, the controller offers the user the possibility to automatically stop the boiler when the outdoor temperature reaches an adjustable value (0°F (-17°C) à 105°F (40°C)). This characteristic is especially interesting on the following applications:

-Heating systems equipped with many thermostats where the user wants to prevent the operation of the unit if one of the thermostats has inadvertently been activated.

-Heating systems where the owner supplies heat to a lodger

**-Systems connected to a geothermic or air-water heat pump where we do not want the electric boiler to be operating unless the outdoor temperature drops to a selected degree.**

#### 4.8 CONFIGURATION OF THE CONTROLLER

Since each type of heating distribution system is designed to operate at water temperatures that are particular to its operation, the proper configuration of the operating parameters of this particular system is important to maximize its performance.

In order to do this, the installer will first have to tell the controller if the application is in automatic transfer mode or autonomous electric mode. The selection is made by selecting the position "Elect." for the autonomous electric mode Or "Bi-Energ" for the automatic transfer mode on the switch located at the back of the controller. This selection will have to be made before applying voltage to the unit. The default setting is the autonomous electric mode "Elect."



Figure 13 : Back of the controller

This being done, the installer will have to access the configuration menu by pressing the button for 2 sec. until the first menu appears. The selection of the item or value is made by pressing the button and by pressing the button to get to the next menu. See table 1 below to visualize the menu list that will gradually be displayed.

If the buttons remain untouched for a period of 10 sec., the controller will register the value of the selection made and return to the regular display position. It will also return to the regular display after reviewing all the operating parameters of the controller.



In case of a power failure, the parameters will be restored as they were established before the failure.

Table 5 below shows the presentation sequence of the menus.

Table 6: CONFIGURATION SEQUENCE OF THE MENU (Press on the button for 2 seconds)


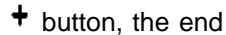
ITEM	DESCRIPTION	RANGE	DEFAULT
	Choose the units the user prefers to work with	°F or °C	°F
	Select the type of heating system on which the boiler will be installed.	<ul style="list-style-type: none"> <li>-Radiant Floor in concrete</li> <li>-Radiant Floor between joists</li> <li>-Cast iron radiator</li> <li>-Hot water baseboards</li> </ul>	
CONSIGNE   TARGET 	<p>Adjust the maximum boiler target temperature required to adequately heat the building when the outdoor temperature is very cold.</p> <p>It is recommended to adjust the setpoint of the renewable energy source to a value greater than 10 ° F to 20 ° F to the one of the AltSource to reduce the start-up of the electrical elements, more particularly when the autonomous electric mode is used.</p>	<ul style="list-style-type: none"> <li>-Radiant Floor in concrete 85°F to 115°F</li> <li>-Radiant Floor between joists 110°F to 140°F</li> <li>-Cast iron radiator 135°F to 165°F</li> <li>-Baseboard 160°F to 185°F</li> </ul>	<ul style="list-style-type: none"> <li>100°F</li> <li>125°F</li> <li>150°F</li> <li>175°F</li> </ul>





	Select the purge period that the pump will be running once the heat demand is completed. Select OFF if the heat system is equipped with electric zone valves.	OFF 15 sec. to 60min. ON	30sec
	Select the outdoor temperature at which no heating of the building is required or the outdoor temperature at which you allow the electrical elements to be in function as a backup to your main system. (the outdoor sensor has to be installed)	0°F à 105°F	75°F

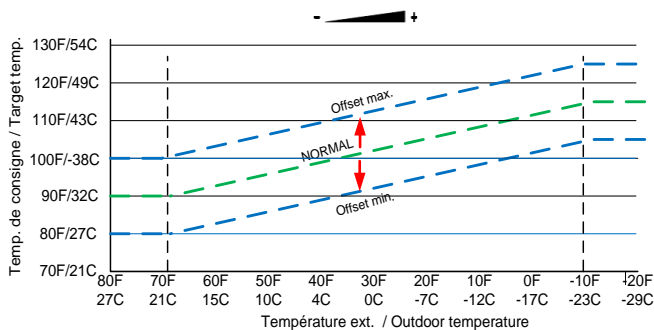
Note 1: Once the operating parameters have been set, the controller will automatically come back to normal display screen. If the user needs to increase or decrease the target temperature, he can do it without having to enter in the configuration menu (see the following section).

#### 4.9 ADJUSTMENTS OF THE TARGET TEMPERATURE BY THE USER:

By pressing the   button, the end user has the possibility to offset the programmed target temperature without going through the tool menus. When the + or - button is pressed, the value "0" will appear and blink to show a "0" offset value from the original settings. When the + or - buttons are pressed again the offset value will change up to a value of ± 10°F (5°C) from the original setting made in the configuration menu. The new value will blink during 5 sec. and the display will then go back to the standard view and the new target temperature will be shown.

Afterward, when the   button will be pressed, it will show the value of the offset made previously and can be re-adjusted.

OPERATION OF THE +/- BUTTONS





#### 4.10 BOOST SYSTEM OPERATION


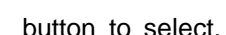
The controller incorporates a unique feature that enables the target boiler temperature to automatically be increased when the building heat load increases but cannot be fulfilled with the actual boiler target temperature and consequently the room thermostat(s) cannot be satisfied within a pre-determined period.

Example:


-Return to normal heat load after low demand periods occurring during sunny days.

-Long periods without heating which needs higher boiler temperature to recuperate.  
-Return to normal room temperature after thermostat's "night set back" program.

Three "Boost" operating options are available when the  is pressed for 6 sec. The  icon will appear and the three options **ON1**, **ON2** and **OFF** will be proposed.

Press the   button to select. The controller will register the selected item and will return to normal operation after 5 sec.

##### Operation in "Boost" Option ON1 (default setting)

The controller will engage the "Boost" program when the heat demand on terminals RW has been maintained for a pre-determined period according to the type of selected application. Once this period has been reached, the "Boost"  icon will appear on the display and the boiler target temperature will start increasing very slowly over a pre-determined period and up to a pre-calculated maximum value until the heat demand applied on RW terminals has been completed.

On a new heat demand, the previous boost period is forgotten and the boiler target gets back to its original setting

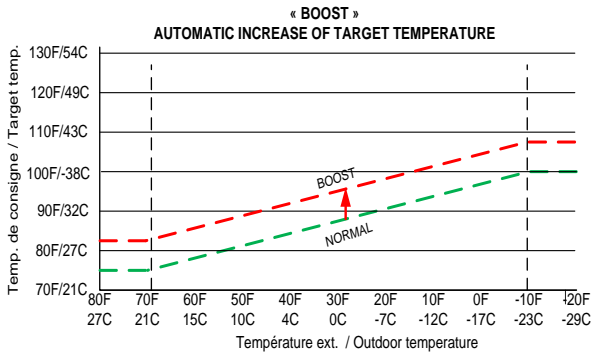
##### Operation in "Boost" Option ON2 (only offered on installation not operating in Dual-energy)

The boost program is a marvellous feature that works fine on applications where the number of room thermostats is in limited quantity otherwise it may happen that during very cold periods the heat demand from all the thermostats may not become satisfied.

This option requires the installation of one or two stages heating thermostats. The second stage of the thermostat(s) will have to be connected to **E1-E2** of the boiler and the option ON2 selected.

Then the Boost mode will be instantaneously started increasing the target temperature when the signal from

the second heating stage will be received. The target temperature will immediately start increasing.



N.B. If the system is in “boost” most of the time, this means that the boiler target parameter established during “Setting procedure” would be too low for the heating system on which the unit is applied. This boiler target could simply be gradually increased by pressing the + button or by re-setting the operating parameters using the tool menus . The Boost menu can be cancelled by selecting “OFF” in the Boost menu.

#### 4.11 OPERATION IN AUTOMATIC TRANSFER MODE:

In automatic transfer mode, the display will indicate that this mode is active in showing the icon



If it is not shown, check the position of the switch located at the back of the controller. It must be set to “Bi-Energ” position.

N.B. The controller will have to be reset to register the new mode of operation. Just turn the power OFF and back ON to the unit.

#### Operation in automatic transfer mode with Electric Boiler

When the authorisation signal to operate in electricity is received, (closed contact between **E<sub>1</sub>** & **E<sub>2</sub>**), the following icons will be shown.



The circulating pump and the heating elements will be activated according to the operating parameters established earlier.

#### Operation in automatic transfer mode with Renewable energy source

When the authorisation signal will be absent (open contact between **E<sub>1</sub>**&**E<sub>2</sub>**), the following icons will be shown.



Upon reception of a heat demand on terminals **R W** of the AltSource boiler, terminals **P<sub>1</sub>**&**P<sub>2</sub>** will be energized at 120volts and the pump will be activated. At the same time, the contact will close on the “**AUX**” terminals to activate the auxiliary boiler. This boiler will be activated only when there will be a heat demand to the **R W** terminals and when the auxiliary boiler temperature will be lower than the settings of its own temperature controls.

Using the “**AUX**” terminals on the AltSource to allow the start-up of the renewable energy source, you operate either with the renewable energy source or with electricity.

It is also possible to allow the renewable energy source to be operated according to its own controls at all times (do not use the contact of the “**AUX**” terminals) and when the latter is not sufficient to the request, (closed contact between **E<sub>1</sub>** & **E<sub>2</sub>**) the heating elements will be activated according to the operating parameters established previously.

#### Manual selection for the electricity or renewable energy source.

If the user wishes to manually select the electricity or renewable energy source, it can be done in following the sequence below:

- Push on the button for 6 sec. and the following icons will appear

The selection of the dual-energy or electric only or auxiliary boiler only is made with the + - button. Once the selection has been made it will be registered by pressing the or by waiting for 5sec.

If the electricity only or auxiliary boiler only has been selected, the corresponding icon and the icons will blink to advise the user that an unusual heating mode has been selected.



## Section 5 : START UP OPERATION





### SAFETY PRECAUTIONS

Before operating this boiler, be sure to read and follow these instructions, as well as the warnings printed in this manual. Failure to do so can result in unsafe operation of the boiler resulting in property damage, bodily injury, or death. Should you have any problems reading, following or difficulty in understanding the instructions in this manual, STOP, and get help from a qualified person.

Do not turn on the boiler unless it is filled with water. Do not turn on the boiler if the cold water supply shut-off valve is closed.

#### 5.1 PREPARATORY STEP

- ❑ Make sure that all the piping and electrical connections have been made.
- ❑ Fill the boiler and the heating system with water.
- ❑ Check for leaks.
- ❑ Check the pressure reading at the temperature and pressure indicator. It should be around 12 psi.
- ❑ Turn On the electrical supply to the boiler with no heat demand from the thermostat(s).
- ❑ If the boiler is installed in automatic transfer mode, adjust the external device making the selection of the heating mode for an operation on Electricity (close contact between E1&E2).
- ❑ Completely eliminate all the air from the boiler and the distribution piping system. To do so, activate the circulating pump without the heating elements. If the pump is connected directly on PP terminals of the boiler, it can be activated by selecting "ON" in the  configuration menu after having pressed  for 2 seconds.
- ❑ Do not set the room thermostat at ON to avoid the operation of the heating elements.
- ❑ Adjust the UltraSmart boiler temperature controller as explained earlier and set the purge delay of the pump from On to its normal operation setting. The pump should stop.

#### 5.2 STARTUP & INSPECTION

- ❑ Set the room thermostat ON to generate a heat demand.
- ❑ The pump shall start. The heating elements shall gradually come on and the boiler temperature will increase.  
N.B: A rapid activation of all the elements and external components can be done by pressing

simultaneously the + and – buttons and maintaining the pressure on the buttons until all the components are operating

- ❑ Measure the amperage value drawn by the unit. It shall be around the value indicated on the boiler name plate.
- ❑ **Partially** close the isolating valve at the outlet of the boiler to reduce the water flow and consequently **slowly** increase the outlet temperature. The heating elements shall gradually stop as the temperature increases and gets near the target temperature.
- ❑ Lower the adjustment of the room thermostat(s). The heating elements shall stop and the pump shall stop after the delay set on the controller.
- ❑ Check the pressure reading on the gauge of the unit. It should not be higher than 28 psi when the distribution system will get to its maximum operating temperature.

#### 5.3 COMPLEMENTARY CHECKS ON AUTOMATIC TRANSFER MODE

- ❑ Check the proper operation of the external authorization signal to operate on electricity or auxiliary in simulating the operation of the signal (open or close contact) on E<sub>1</sub> and E<sub>2</sub>. Verify the change of the operating mode.
- ❑ Check the operating sequence in the "AUX" mode as described in section 4.11 of the manual.
- ❑ Adjust and check the operation of the auxiliary boiler.

**N.B.** On initial startup it may take a considerable amount of time before the water reaches the target temperature. Further adjustments may be necessary as you use your boiler and the space heating system.

## Section 6 : MAINTENANCE

### 6.1 INTRODUCTION

Regular water heater maintenance will ensure trouble-free service for many years. It is recommended that you set up and follow a maintenance program. All components may fail eventually. The use of incorrect replacement parts or disregarding safety procedures and warnings during repairs may reduce the boiler safety level and shorten its useful life.

The owner should set up the following maintenance program.

### 6.1 AT ALL TIMES

The boiler should be immediately inspected in case of:

- ❑ Overheating or burn plastic odours are detected.
- ❑ Water leak from the boiler or the space heating system is found.

If the hot water is leaking from the boiler pressure relief valve, it may indicate a problem with some components of the space heating system or the domestic hot water system. Immediate attention and repair by a qualified technician are required. NEVER CLOSE OR PLUG A PRESSURE RELIEF VALVE.

### 6.2 EVERY 6 MONTHS

- ❑ Check automatic air vent proper operation.
- ❑ Using hand operated air vent installed on the heating system radiators or in other location, bleed air from the heating system.

### 6.3 YEARLY INSPECTION



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**Make sure that the power supply to the water heater has been turned off at the circuit breaker before attempting any work on the water heater.**

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- ❑ Visual inspection of the water heater electrical cabinet. Check for leaks at the heating elements, sign of overheating of electrical components and wiring. At the beginning of the heating season, check for proper operation of the boiler controller, circulating pump(s), mixing

valve for low temperature heating system, room thermostat(s) and other heating system components for proper operation.

- ❑ Check for proper operation of the automatic air vent, located on top of the water heater, by removing its cap and by pressing on the knob, releasing air until water began to be expelled.
- ❑ Do not open the tank drain tap unless repair to the water heater is required. Opening the drain tap will eventually force fresh water into the tank. This water introduces oxygen diluted in the fresh water. This oxygen will cause corrosion of the tank internal surfaces, damage the reservoir and void the warranty.
- ❑ If repair is required, it should be accomplished as soon as possible, by a qualified technician and using genuine replacement parts.



### WARNING




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**The manufacturer's warranty DOES NOT cover problems caused by improper installation or maintenance. If the safety valve opens periodically, it may be due to the expansion tank. Immediately call a qualified technician to appraise and repair the problem.**

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## Section 7 : TROUBLE SHOOTING

### 7.1 TROUBLE SHOOTING TABLE

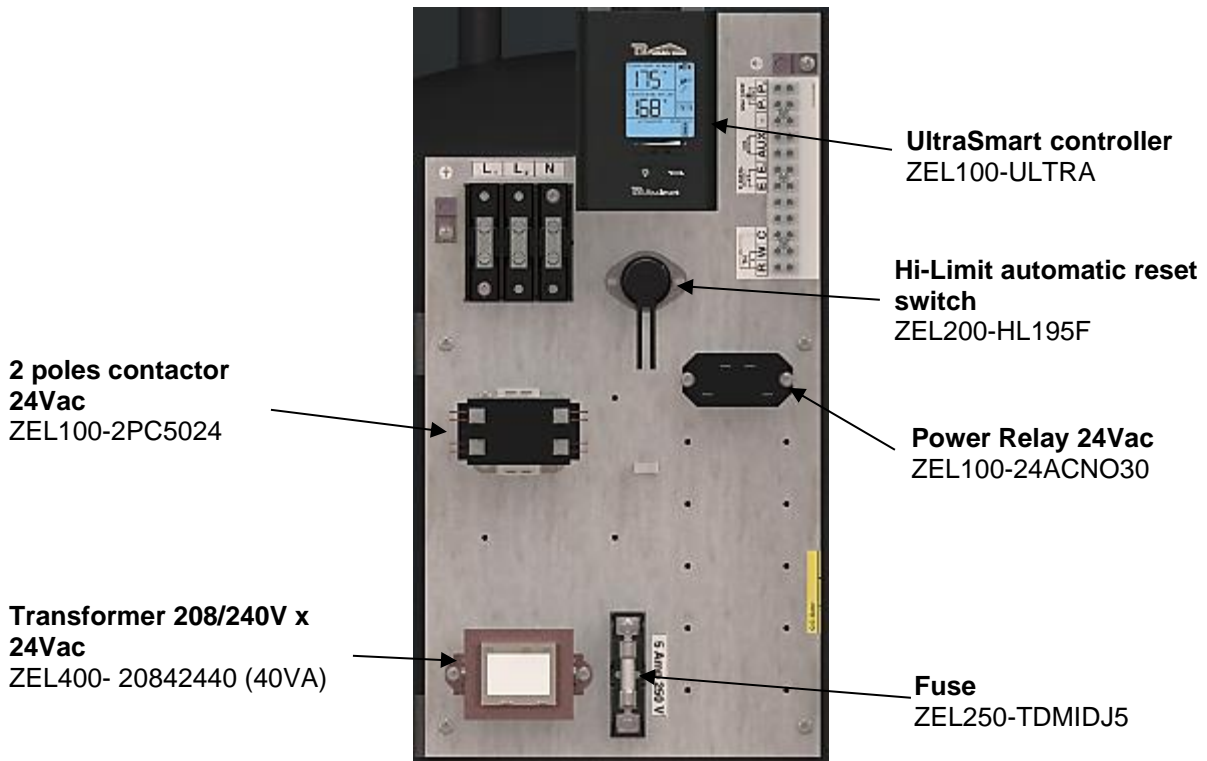
PROBLEM	CAUSES	SOLUTION
The display shows --- in "TARGET TEMP"	-There is no heating demand when the outdoor sensor  is used and the icon shown, the outside temperature is above the boiler shut down setting. -The switch located on the back of the controller is set to "Bi-Energ" and the icon  is shown.	-Generate a heat demand -Temporarily increase the value of this setting on the controller configuration.  -Set the switch to "Elect"
The display shows "Er1" and the icon  is displayed.	The controller is not detecting the presence of the outdoor sensor.	-Make sure that the sensor cable connected to the unit is not in short or open circuit. Do not install a jumper between S1-S1 when the sensor is not required. -Check the resistance value (ohms) of the sensor. It should correspond to the value shown on the table below otherwise it should be replaced. Check for proper connection of the wires inside the boiler connected to S1S1 and at the controller terminals.
The display shows "Er2" and blinks	The controller is not detecting the presence of the boiler temperature sensor.	-Check the state of the sensor located in the immersion well located at the top of the elect. element compartment. --Check the resistance value (ohms) of the sensor. It should correspond to the value shown on the table below otherwise it should be replaced.
Stage 2 is ON but not Stage 1	There is no problem. A rotation of the stages is provided to allow an equal time of operation of the stages	
When stage 3 or 4 comes ON, stage 1 or 2 comes OFF	This sequence is normal on boilers from 27 to 29kW since stage 2 and 3 activate two elements. Stage 1 or 2 is deactivated to obtain an equal increase of capacity of the boiler.	
The boiler target temperature does not change when the outdoor temperature varies	The outdoor sensor has not been detected when the power has been applied to the unit.	Check the connection of the outdoor sensor to terminals S1S1. Turn OFF the power to the unit for 5 sec. and set it back ON.
The controller shows that the heating stages are ON but the heating elements do not heat.	The main contactor inside the unit is not activated. There is no 24Vac at his coil.	The contact of the hi limit temp. control (automatic reset or manual reset in some models) is open. Reset the control and check for proper operation.
The boiler water temperature at the outlet of the unit "BOILER T <sup>o</sup> " does not get to the "BOILER TARGET T <sup>o</sup> "	-The room thermostat is not in constant demand.	-Adjust the thermostat anticipator (If available) to obtain longer operating cycles

	-Some heating elements are defective -The total capacity of the boiler is expelled to the heating distribution system at this temperature.	-Replace defective elements -If a higher boiler water temperature is required to satisfy the heat demands of the thermostats, a boiler having a larger capacity is required.
Boiler stays in demand even when the thermostat is not in demand. (Systems with more than one thermostat)	-On systems with electric zone valves, one or many end switches included in the valve is defective. -A jumper has been installed on terminals TT of the boiler	-Change defective "end switch".  -Make appropriate connections as shown in fig.7
An overheated plastic odour is released from the boiler	Turn the power OFF to the boiler. Open the front and left side panel of the boiler. Check the components and electric wires for indications of overheating.	Replace overheated components and check supply voltage to the boiler.
Boiler safety valve is leaking	-Pressure reading at the indicator shows a pressure above 28psi  -Pressure is below 28psi	-The pressure regulator on the distribution system is defective or the expansion tank is too small or defective. -Replace the safety valve

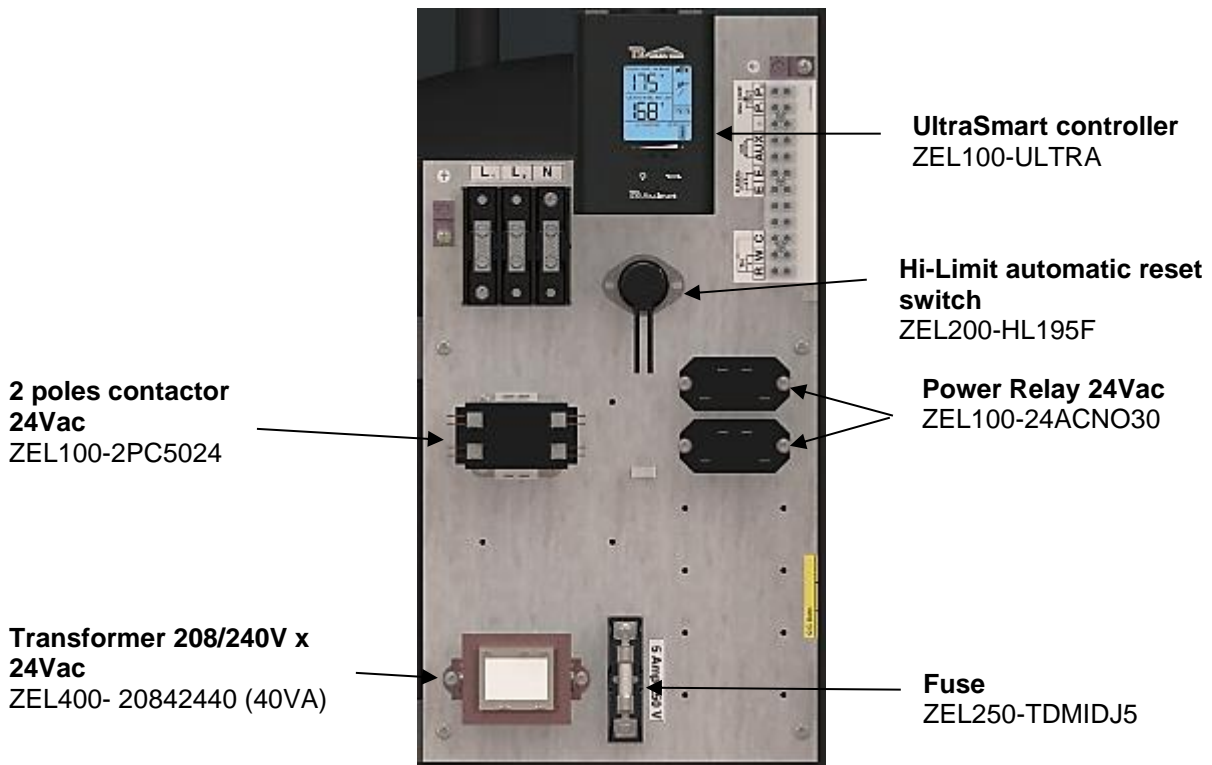
**Table 7: Resistance value of the outdoor sensor vs outdoor temperature**

Temperature		Resistance	Temperature		Resistance	Temperature		Resistance	Temperature		Resistance
°F	°C	Ω	°F	°C	Ω	°F	°C	Ω	°F	°C	Ω
-50	-46	490,813	20	-7	46,218	90	32	7,334	160	71	1,689
-45	-43	405,71	25	-4	39,913	95	35	6,532	165	74	1,538
-40	-40	336,606	30	-1	34,558	100	38	5,826	170	77	1,403
-35	-37	280,279	35	2	29,996	105	41	5,21	175	79	1,281
-30	-34	234,196	40	4	26,099	110	43	4,665	180	82	1,172
-25	-32	196,358	45	7	22,763	115	46	4,184	185	85	1,073
-20	-29	165,18	50	10	19,9	120	49	3,76	190	88	983
-15	-26	139,402	55	13	17,436	125	52	3,383	195	91	903
-10	-23	118,018	60	16	15,311	130	54	3,05	200	93	829
-5	-21	100,221	65	18	13,474	135	57	2,754	205	96	763
0	-18	85,362	70	21	11,883	140	60	2,49	210	99	703
5	-15	72,918	75	24	10,501	145	63	2,255	215	102	648
10	-12	62,465	80	27	9,299	150	66	2,045	220	104	598
15	-9	53,658	85	29	8,25	155	68	1,857	225	107	553

## 7.2 SPARE PARTS



**Figure 14: Electrical panel - AltSource 4,5 kW**



**Figure 15: Electrical panel - AltSource 7,5 & 9 kW**

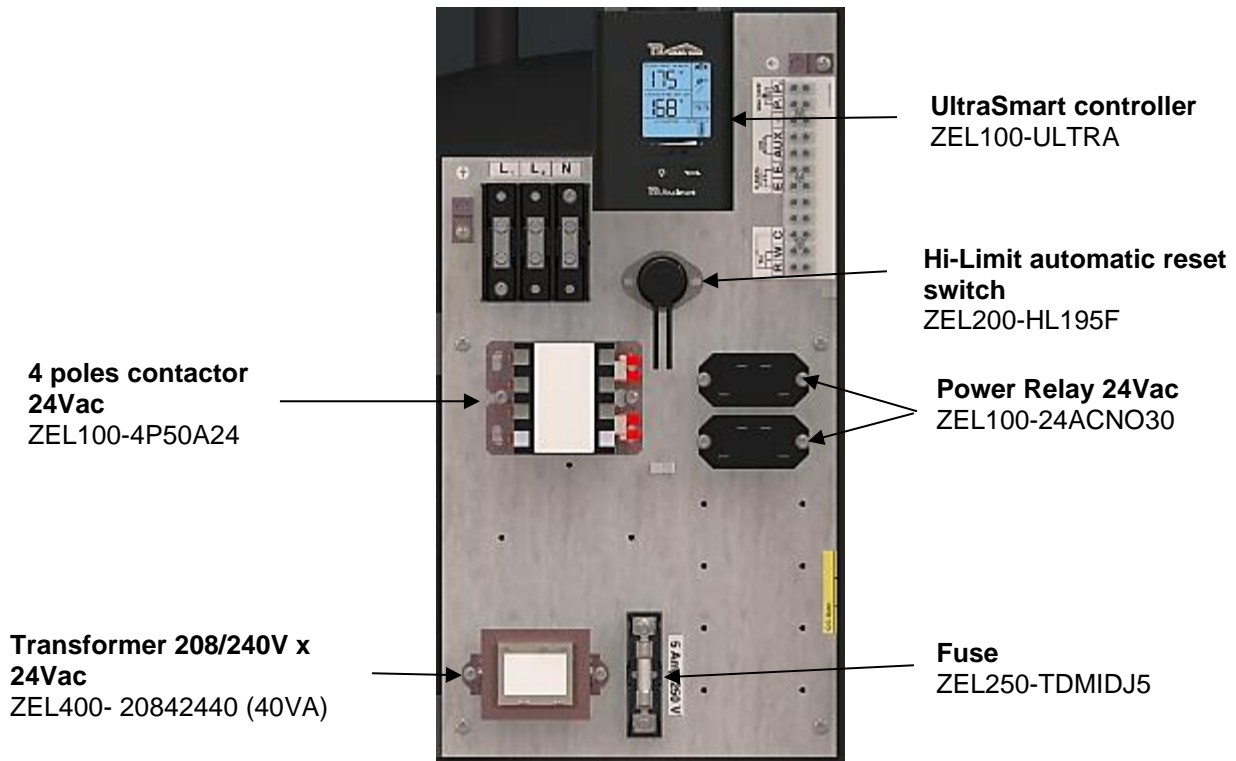


Figure 16: Electrical panel - AltSource 12 kW

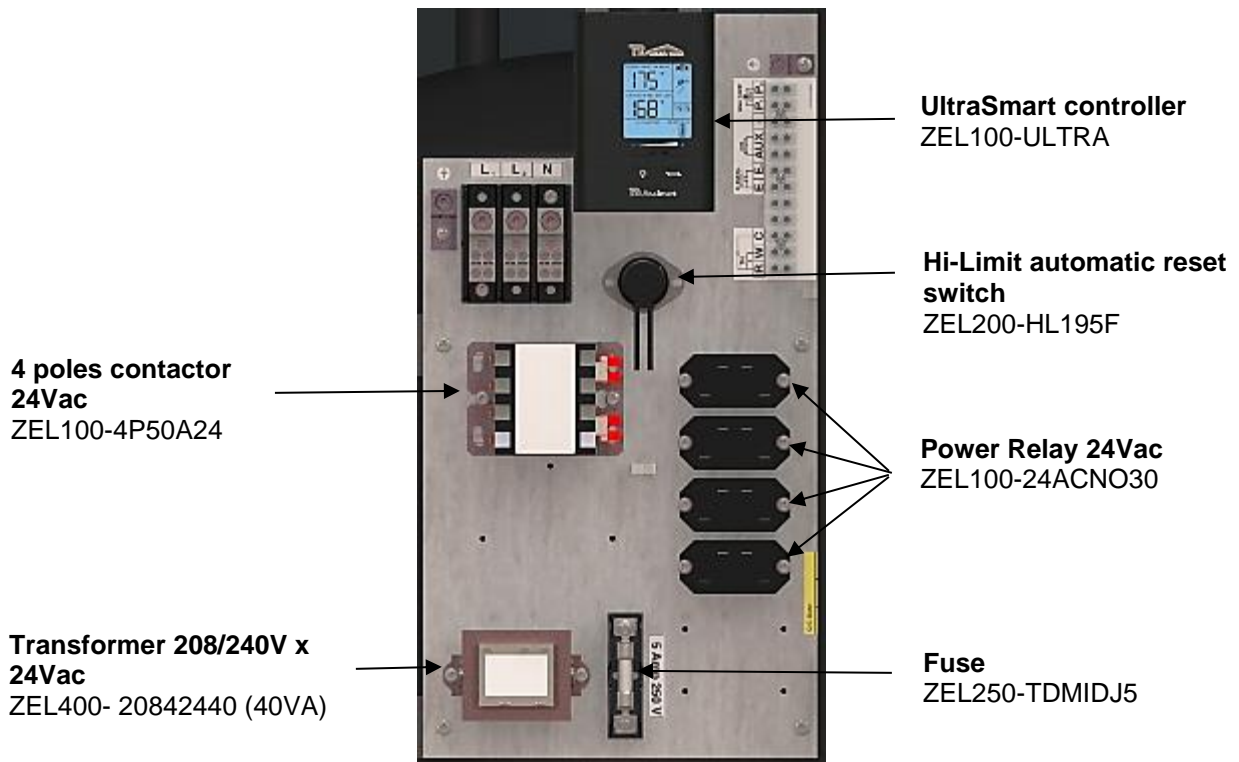
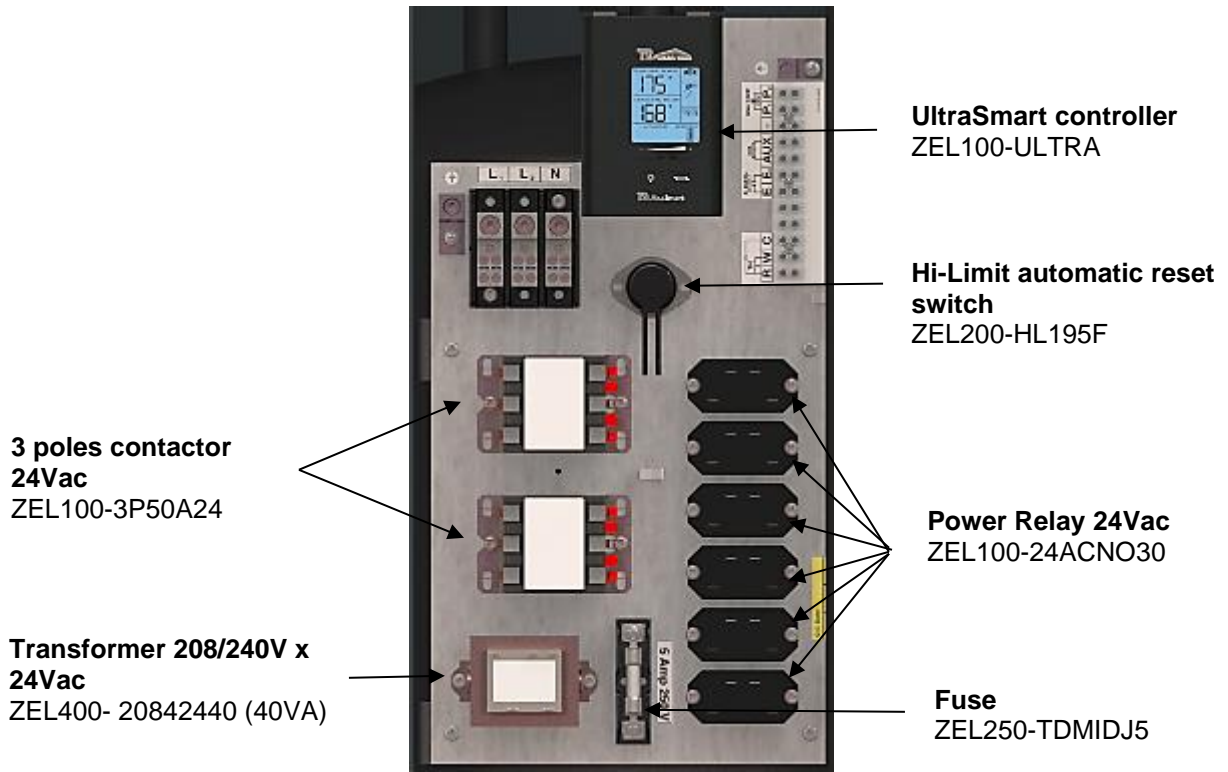


Figure 17: Electrical panel - AltSource 15 to 24 kW



**Figure 18: Electrical panel - AltSource 27 & 29 kW**



## Section 8 : OPTION DHW HEAT EXCHANGER

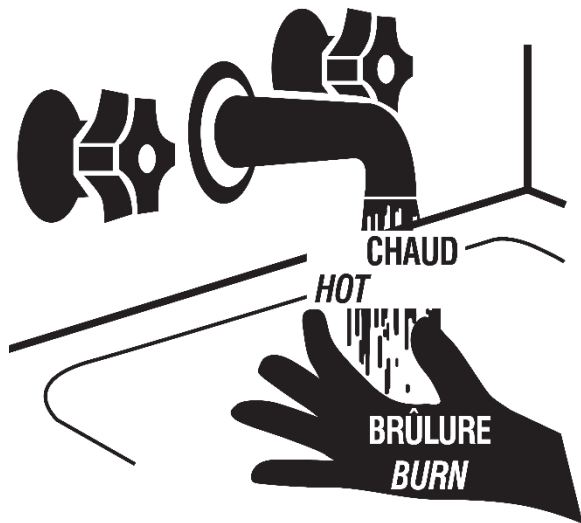


### General Safety Precautions

Be sure to read and understand the entire Use & Care Manual before attempting to install or operate this water heater. Pay particular attention to the following General Safety Precautions. Failure to follow these warnings could cause property damage, bodily injury or death. Should you have any problems understanding the instructions in this manual, STOP, and get help from a qualified installer or technician.

However water temperatures over 125°F can cause severe burns instantly or death from scalds. 125°F is the preferred starting point for setting the control to supply general-purpose hot water.

Safety and energy conservation are factors to be considered when setting the water temperature on the aquastat. The most energy efficient operation will result when the temperature setting is the lowest that satisfied the needs consistent with the application.



### DANGER

Water temperature above 125°F/52°C can cause severe burns or death from scalds. Children, disabled and elderly are at highest risk of being scalded.

For that reason, a certified ASSE1017 mixing valve for reducing the domestic hot water must be installed on the distribution piping. The manufacturer installation instructions and the applicable local codes must be respected.

To find hot water temperature being delivered, turn on a hot water faucet and place a thermometer in the hot water stream and read the thermometer.

The following chart details the relationship of water temperature and time with regard to scald injury and may be used as a guide in determining the safest water temperature for your applications.

TIME VS TEMPERATURE RELATIONSHIPS IN SCALDS	
Temperature	Time to Produce Serious Burn
120°F	More than 5 minutes
125°F	1-1/2 to 2 minutes
130°F	About 30 seconds
135°F	About 10 Seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1-1/2 seconds
155°F	About 1 second

Table courtesy of Shriners Burn Institute



### DANGER

There is a Hot Water Scald Potential if the aquastat is set too high. When this water heater is supplying general purpose hot water requirements for use by individuals, a thermostatically controlled mixing valve for reducing point-of-use water temperature is recommended to reduce the risk of scald injury. Contact a licensed plumber or local plumbing authority for further information.



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## Introduction

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### **⚠ WARNING**

**The important safeguards and instructions appearing in this manual are not meant to cover all possible conditions and situations that may occur. It should be understood that common sense, caution and care are factors, which cannot be built into every product. These factors must be supplied by the person(s) caring for and operating the unit.**

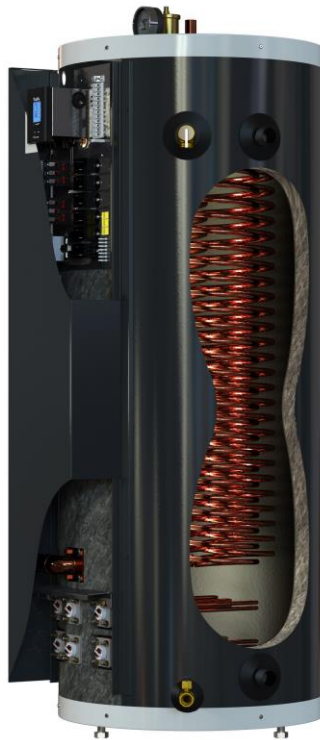
### **LOCAL INSTALLATION REGULATIONS**

This water heater must be installed in accordance with these instructions and must conform to local, or in the absence of local codes, with the current edition of the National Plumbing Code and the

National Electric Code. In any case where instructions in this manual differ from local or national codes, the local or national codes take precedence.

### **⚠ CAUTION**

**The heat transfer medium must be water or other non-toxic fluid having a toxicity rating or class of 1 (ex: propylene glyco), as listed in Clinical Toxicology of Commercial Products, 5<sup>th</sup> edition. The domestic water pressure must be higher to the pressure relief valve boiler.**



**Figure 19: AltSource with domestic hot water heat exchanger option**

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## Installation

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### WARNING

**The manufacturer's warranty does not cover any damage or defect caused by installation or attachment or use of any special attachment other than those authorized by the manufacturer into, onto, or in conjunction with the water heater. The use of such unauthorized devices may shorten the life of the water heater and may endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices**

### DOMESTIC WATER CONNECTIONS

The AltSource boiler with optional heat exchanger for DHW could be install in autonomous electrical mode or automatic transfer mode. Figures 20 and 21 show installation in automatic transfer. According the supply temperature of the renewable energy source the DHW heat exchanger will heat or pre-heat the domestic water. When supply temperatures are in a range of 80°F to 130 °F un back-up water heater need to be add.

The HOT WATER OUTLET and the COLD WATER INLET connections are clearly marked. Inlet water connections (COLD WATER INLET) are to be made to the copper pipe (sweat connection) at the bottom of the heater. Outlet water connections (HOT WATER OUTLET) are to be made to the copper pipe (sweat connection) at the top of the heater.

The installation of copper unions or copper alloy unions is recommended on the HOT and COLD water lines, so that the water heater may be easily disconnected for servicing if necessary.

Dielectric unions are required for protection of the water heater if dissimilar pipe material like galvanized pipe is used.

Install shutoff (ball) valves for servicing convenience.

Use only clean copper or approved plastic pipe for water connections. Local codes or regulations shall govern the exact type of material to be used.

To minimize heat loss during non-draw periods, a heat trap formed from piping can be used.

Insulate all pipes containing hot water, especially in unheated areas.

Cap or plug unused connections. If the water heater is replacing a tankless coil in the boiler, do not cap tube outlets in the tankless coil after disconnecting from plumbing.

Thermometer(s) should be installed to indicate the temperature of the water at or near the outlet of the water heater and storage tank(s), if provided.

### EXPANSION TANK FOR POTABLE WATER

Determine if there is a check valve, a back flow preventer, a pressure-reducing valve, a water meter or a water softener in the cold water supply line.

A check valve creates a closed system and prevents the water, as it is being heated, from expanding back into the cold water supply line. Pressure can build up within the water heater, causing the relief valve to operate during a heating cycle. This excessive operation can cause premature failure of the relief valve and possibly of the water heater itself.

Replacing the relief valve will not correct the problem. One method of preventing pressure build-up is to install an expansion tank for potable water in the cold water supply line between the heater and check valve. Contact your installing contractor, water supplier, local plumbing inspector or plumbing supply house for assistance.

### RECIRCULATION LINE (IF APPLICABLE)

If a recirculation line is installed, the return connection should be made to a tee close to the inlet connection on the water heater. A check valve should always be installed in the recirculation line to prevent cold water from entering.

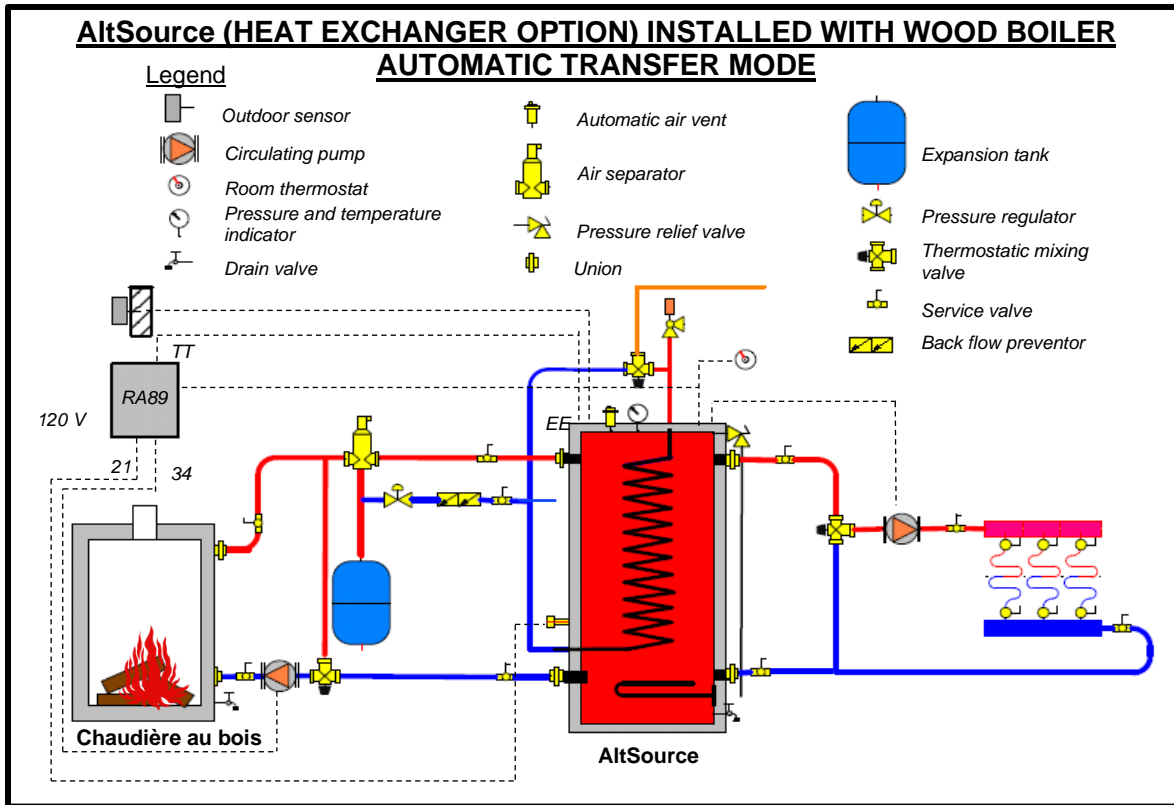


Figure 20 : Dual energy Installation drawing for radiant floor and wood boiler.

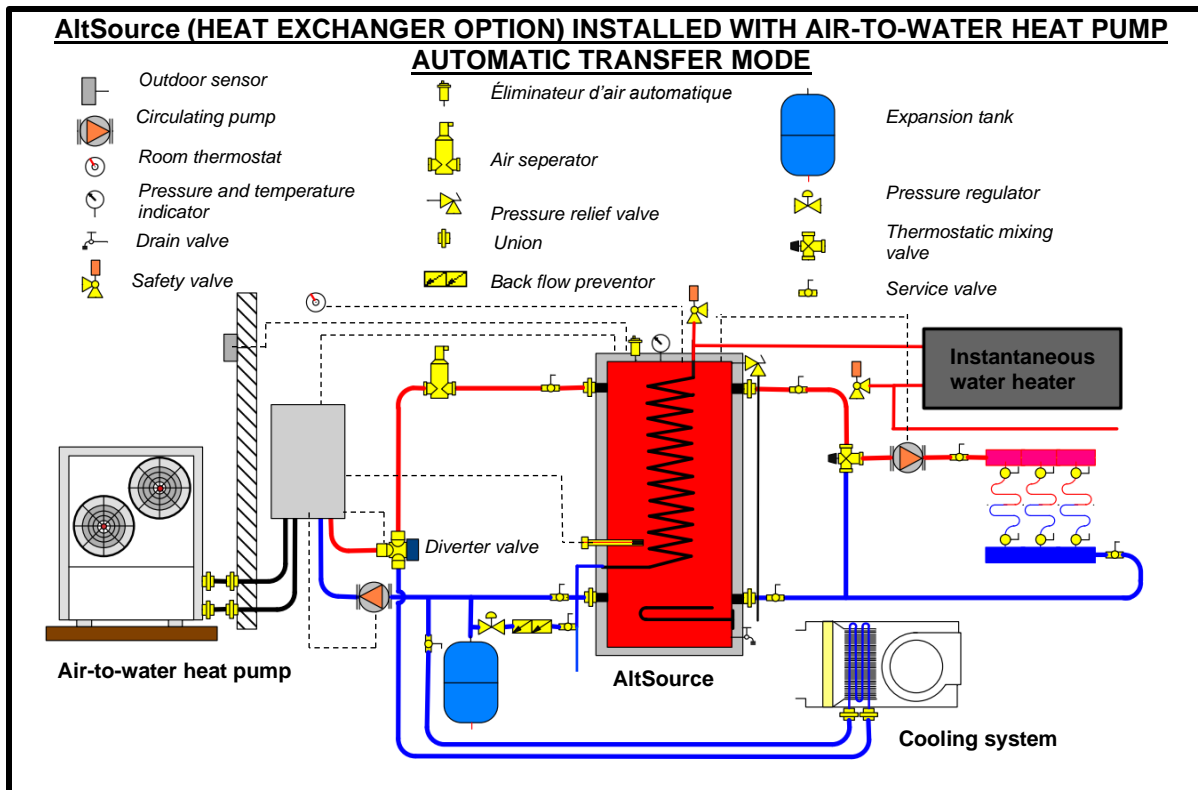


Figure 21: Dual energy Installation drawing for radiant floor and Air-to-water heat pump

## **DOMESTIC HOT WATER TEMPERATURE & PRESSURE RELIEF VALVE**

An automatic temperature & pressure relief valve with a temperature probe of sufficient length must be installed at the time of the installation. No valve of any type should be placed between the T&P relief valve and the water heater. Use a tee to install the relief valve onto the hot water outlet. The pressure rating of the relief valve must not exceed 150 psi.

The BTU per hour rating of the relief valve must equal or exceed the BTU per hour exchange capacity of the AltSource in the specific operating conditions or the input of the boiler(s) or heat source(s) as marked on the boiler(s) rating plate.

For a circulating tank installation, the separate storage tank(s) must have similar protection.

Connect the outlet of the relief valve to a suitable open drain, so discharge can exit only 6" above the structural floor; and cannot contact any live electrical parts. The discharge line must pitch downward from the valve to allow complete draining (by gravity) of the relief valve and discharge line, and be no smaller than the outlet of the valve. The end of the discharge line should not be threaded or concealed and should be protected from freezing. No valve of any type, restriction or reducer coupling should be installed in the discharge line. Local codes shall govern the installation of relief valves.

## **THERMOSTATIC MIXING VALVE**

When this water heater is supplying general-purpose hot water requirements for use by individuals, a thermostatically controlled mixing valve is recommended to reduce the risk of scald injury. Contact a licensed plumber or the local plumbing authority for further information.

Keep temperature control of the mixing valve at the lowest setting which is satisfactory.

When installing a mixing valve, locate it at the bottom of anti-thermosiphon loop at least 24" high to prevent excessive hot water from entering mixed water supply.

## **VACUUM BREAKER (IF REQUIRED)**

Install a vacuum breaker (or vacuum relief valve) for water heater protection. Prevents siphoning of the water from the system and collapse of the water heater.

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## Operation

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### SAFETY PRECAUTIONS

**Before operating this water heater, be sure to read and follow these instructions, as well as the warnings printed in this manual. Failure to do so can result in unsafe operation of the water heater resulting in property damage, bodily injury, or death. If you have any problems reading, following or difficulty in understanding the instructions in this manual, STOP, and get help from a qualified person.**

**Do not turn on the water heater unless it is filled with water. Do not turn on water heater if cold water supply shut-off valve is closed.**

After the water heater has been plumbed and wired, it is now ready to be set for automatic operation.

### FILLING THE HEATER COILS

Make sure all drains valves on the cold or hot water supply piping are closed.

Open the nearest hot water faucet and any shutoff valves on the domestic hot water supply piping from the heater's domestic hot water outlet (the top copper pipe connection).

Open the shutoff valve on the cold water supply piping to the heater's domestic cold water inlet.

When water discharges from faucet, close it. Check for system leaks and repair if necessary.

Any other water faucets fed by this heater may be opened to purge air from their supply piping, and then shut off after a steady flow of water is observed from the faucet.

### OPERATING THE WATER HEATER

After the system has been manually purged of its air, and all components (valves, vents, controllers) have been set properly, the AltSource boiler can be started. Never operate this heater until this has been done.

Safety and energy conservation are factors to be considered when setting the water temperature on the controller. The most energy efficient operation will result when the temperature setting is the lowest that satisfies the needs consistent with the application.

The maximum setting for the boiler water supply to the heater coil is 210°F. The boiler supply temperature should be from 20°F up to 40°F higher than the domestic water temperature. More exactly, the boiler supply temperature should be higher than the domestic supply temperature by more than half the boiler temperature drop (TD) through the TURBOMAX.

### DANGER

**There is a Hot Water Scald Potential if the controller is set too high.**

**When this water heater is supplying general purpose hot water requirements for use by individuals, a thermostatically controlled mixing valve for reducing point of use water temperature is highly recommended to reduce the risk of scald injury.**

**Valves for reducing point-of-use temperature by mixing cold and hot water are also available. Consult a licensed plumber or local plumbing authority for further information.**

When the temperature of the boiler water in the AltSource boiler is below the setting on the control or aquastat, the circulator should start and the boiler water will be heated by the renewable energy source. The electric elements will turn only if the temperature continues to decrease.

When the temperature of the boiler water in the boiler reaches the temperature setting on the tank control, the boiler and circulator should turn off.

On initial start-up with a cold tank, a considerable amount of time may be required for the tank to reach desired temperature. Check the temperature at a hot water faucet soon after the burner has completed the first heating cycle.

Note that setting to a lower setting will not have an immediate effect. The stored boiler water will first have to be used. Additional checks of the water temperature should follow completion of a cycle. Further adjustments may be necessary as you use your water heater and space heating system.

## **OPERATING THE WATER HEATER WITH A THERMOSTATIC MIXING VALVE**

A thermostatic mixing valve provides for automatic operation through the use of a thermostatic element inside the valve. The element will control the mixing of the hot and cold water supply streams to provide a safe blend to connected fixtures. This provides constant water temperature under different working conditions.

When using models which are certified ASSE 1017 and, in addition, have successfully passed the cold water supply failure test (ASSE 1016), loss of either hot or cold water to the thermostatic mixing valve will result in a reduction in flow from the valve to less than .5 GPM within seconds of the loss. Pressure difference between Hot and Cold ports should not exceed 10 psi. Valves require a minimum difference of 20°F between the Hot and Mixed temperature for proper operation.

To set the thermostatic mixing valve carefully open a hot water tap. Protect yourself against the risk of scalding. Use a thermometer and measure hot water temperature from the faucet. Reduce or increase the hot water temperature by adjusting the valve knob to the proper position. Lock the knob at the set temperature. Refer to the valve manufacturer's manual to get the proper guidelines.

By mixing domestic cold water to the hot water supplied by the heater, the thermostatic mixing valve allows the boiler to work at higher temperature range. Thus boiler water stored inside the AltSource tank acts as a buffer which increases boiler efficiency and the amount of domestic hot water produced by the heater.

To increase hot water production and storage capacity set the UltraSmart controller at a higher temperature (from 140°F to 180°F). And secondly set the thermostatic mixing valve at the desired temperature (from 90°F to 120°F).

For sanitation purposes use a different temperature range or install a dedicated hot water line to the equipment.

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## Maintenance

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Properly maintained, your water heater will provide years of dependable, trouble-free service. It is recommended that a regular routine maintenance program be established and followed by the user. Components, however, may be subject to failure that require service. Failure to use the correct procedures or parts in these circumstances may make the unit unsafe or reduce the life of the heater.

The owner should arrange to have the following inspections and maintenance procedures done:

### **DANGER**

**Before manually operating the relief valve, make certain no one will be exposed to the danger of coming in contact with hot water released by safety relief valves. The water may be hot enough to create a SCALD hazard. The water released should be directed to suitable drain to prevent injury or damage**

#### **Domestic water piping:**

- Yearly visual inspection.

Check all piping for signs of leakage at joints, unions and shut-off valves. Remedy as needed.

#### **Temperature & pressure valve:**

- Yearly Inspection.

Must be manually operated to ensure safe and proper operation. Make sure that the discharged water is directed to a suitable drain or some collection method, and will not spray onto any person. Use lever on the temperature & pressure valve to open. A steady discharge of hot water should be noticed. After releasing this lever the safety relief valve should close and fully shut off this flow. If the temperature & pressure valve does not function properly, it must be replaced with the same model or its equivalent. Do not plug the outlet of this valve if a dripping condition occurs.

#### **Scale:**

- Monthly Inspection.

Scale problems occur rarely and under very specific conditions. A domestic water flow rate reduction may indicate scale build-up. A water softener will prevent this problem.

A chemical cleaning process, however, is the most effective process if done properly. If

chemical lime dissolving cleaners are preferred, carefully follow the instructions supplied with the cleaner. DO NOT use a muriatic or hydrochloric acid (HCl) based cleaner. Be sure that the manufacturer's directions and warnings on the container are followed. After treatment flush cleaning solution thoroughly. Your plumbing contractor should be contacted to clean the heater of these deposits.

## TROUBLESHOOTING SYSTEM PROBLEMS

SYMPTOM	POSSIBLE CAUSE	ACTION
Insufficient domestic hot water (boiler supplies space heating and hot water needs).	System incapable of prioritizing boiler water for domestic water use.	Install a pump or a valve-zoning panel with the domestic hot water priority feature. When demand occurs for domestic hot water, the zoning panel turns off the space heating system and shunts all its energy into producing DHW.
Insufficiently hot or lack of hot water at the faucet.	The controller UltraSMART temperature setting too low.	Set temperature controller to a higher setting.
	Peak use of hot water is greater than boiler output capacity or TURBOMAX® storage.	Determine peak usage and compare to boiler recovery capacity & tank volume.
	Scale build-up in thermostatic mixing valve or coil	Clean as described in the Maintenance section.
	Faulty UltraSmart control.	Replace temperature controller (aquastat).
No hot water at faucet.	Boiler not operating.	Press reset button. Check main cut-off switch. Check fuse. Call boiler service.
	Improper controller setting or calibration.	Set TURBOMAX® temperature to a higher setting. Call boiler service.
	Electrical problems (relays, wiring, fuse, etc.	Check fuses and replace. Check circuit breaker and reset. Check power supply.
	Scale build-up in thermostatic mixing valve or coil	If boiler, circulator and TURBOMAX® temperature controls are operating satisfactory, the coil system may have scale coating. Clean the coil as described in the Maintenance section.
Water at faucet is too hot.	Thermostatic mixing valve temperature setting is too high.	Lower the temperature setting of the mixing valve.
	Controller temperature setting is too high.	Lower the temperature setting of the aquastat or lower the boiler temperature.
	Improper system plumbing.	Compare plumbing to installation guide.
	Improper system wiring.	Compare wiring to installation guide.
Water hammer noise	Use of hot water at high velocity or high flow rate.	Install a water hammer absorber. Reduce water supply pressure. Check water pressure regulator. Use slower closing valves.
	Expansion tank for potable water or heating loop expansion tank problem. Expansion tank locked due to high system pressure.	Check inlet pressure reducing valve setting. Reset if reduced pressure setting is too high. Drain expansion tank and refill with air. If bladder is broken in the expansion tank, replace expansion tank.
	The zone valves have to deal with the high velocity.	Install valves designed to better handle these punishing circumstances.
Water noise in hydronic system.	Air in the hydronic system.	Purge the air from the boiler and the radiator. If persistent call service.
	Differential pressure across the valve is too high.	Check if the pump or the valves are properly sized.





## AltSource LIMITED WARRANTY

### Warranty Coverage for Residential Installation.

Thermo 2000 Inc. hereby warrants to the original residential purchaser that the AltSource tank and exchanger installed in a residential setting shall be free of leaks during normal use and service for a period of fifteen (15) years from the date of purchase as long as the original residential purchaser owns the home in which the unit was originally installed. Residential setting shall mean usage in a single-family dwelling in which the consumer resides on a permanent basis. Also, residential setting shall mean use in multiple family dwellings in which one (1) AltSource tank and exchanger is to be used in only one (1) dwelling. In the event that a leak should develop and occur within this limited warranty period due to defective material or workmanship, such leak having been verified by an authorized company representative, Thermo 2000 inc. will repair or replace at our sole option the failed unit with the nearest comparable model at the time of replacement.

The original residential purchaser is responsible for all costs associated with the removal and reinstallation, shipping and handling to and from manufacturing plant. The replacement unit will be warranted for the remaining portion of the original Warranty.

### Warranty Coverage for Commercial Installation.

Thermo 2000 Inc. hereby warrants to the original residential purchaser that the AltSource tank and exchanger (coil assembly) installed in a commercial setting shall be free of leaks during normal use and service for a period of ten (10) years from the date of purchase. Commercial setting shall mean use in other than residential setting stated above in the residential setting definition. In the event that a leak should develop and occur within this limited warranty period due to defective material or workmanship, such leak having been verified by an authorized company representative, Thermo 2000 inc. will repair or replace at our sole option the failed unit with the nearest comparable model at the time of replacement.

The original purchaser is responsible for all costs associated with the removal and reinstallation, shipping and handling to and from Manufacturer. The replacement unit will be warranted for the remaining portion of the original Warranty.

### Limited two years warranty on all AltSource components & parts

All other AltSource components & parts are warranted for a period of two (2) years against defects due to defective material or workmanship. The original purchaser is responsible for all costs associated with the removal and reinstallation, shipping and handling to and from Manufacturer. The components, repaired or replaced are warranted for the residual period of the initial warranty on the unit.

### Exclusions

This warranty is void and shall not apply if:

- A) Defects or malfunctions resulting from installation, repair, maintenance and/or usage that are not done in conformity with the manufacturer's installation manual; or
- B) Defects or malfunctions resulting from installation, maintenance, or repair that are not done in accordance with regulations in force; or

- C) Defects or malfunctions resulting from improper installation, maintenance or repair done carelessly or resulting from consumer damage (improper maintenance, misuse, abuse, accident or alteration); or
- D) Installation in which a relief valve (pressure) is not installed or if it is not functioning properly, or when it is not connected to a drain to avoid damage to the property; or
- E) Installation in which liquid circulating in the tank does not remain in closed circuit or installation in which piping is leaking; or
- F) A polybutylene pipe or radiant panel installation without an oxygen absorption barrier is used; or
- G) Installation where the acidity of water is not within the normal Environmental Protection Agency (EPA) (between pH 6.5 – 8.5) guidelines or the domestic water contains abnormal levels of particulate matter or water exceeding 10.5 gpg; or
- H) Your home contains any type of water softener system and the unit is not installed and maintained in accordance with the manufacturer specifications; or
- I) When installed with a low pressure steam boiler, if sludge is allowed to accumulate in the AltSource tank and boiler water acidity is lower than pH 6.5 or higher than pH 8.5; or
- J) The AltSource unit is being subject to non authorized modifications; or
- K) Defects or malfunction resulting of storing or handling done elsewhere than Thermo 2000's manufacturing plant; or
- L) Units on which the serial number is removed or obliterated.

### Limitations.

Thermo 2000 inc. shall not be responsible for any damage, loss, and inconvenience of any nature whatsoever, directly or indirectly, relating to the breakdown or malfunction of the unit. This warranty limits its beneficiary's rights. Nevertheless, the beneficiary may have other rights, which vary from state to state.

This warranty replaces any other expressed or implicit warranty and constitutes the sole obligation of Thermo 2000 towards the consumer. The warranty does not cover cost of removal, reinstallation or shipping to repair or replace the unit, nor administration fees incurred by the original consumer purchaser.

Thermo 2000 reserves its rights to make changes in the details of design, construction, or material, as shall in its judgment constitute an improvement of former practices.

This warranty is valid only for installations made within the territorial limits of Canada and the United States.

### Warranty service procedure

Only authorized AltSource dealers are permitted to perform warranty obligations. The owner or its contractor must provide Thermo 2000's head office or authorized depot with defect unit together with the following information: AltSource model and serial number, copy of the original sales receipt and owner's identification certificate.



## **THERMO 2000 INC.**

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