Electric Boilers

MINI BTH

Models from 3 kW to 12 kW : 208/240V single phase

INSTALLATION & OPERATING MANUAL

Your *MINI BTH* Electric Boiler has been carefully assembled and factory tested to provide years of trouble-free service. The following information and safety measures are provided to enable proper installation, operation, and maintenance of this product.

It is imperative that all persons who are expected to install, operate or adjust this boiler should read these instructions carefully.

Any questions regarding the operation, maintenance, service or warranty of this electric boiler should be directed to the supplier.

When all installation steps have been completed, insert this installation manual in its original envelope, and keep in a safe place (close to the boiler) for future reference.

THERMO 2000 INCORPORATED revision: June 2014
Printed in Canada

Ratings & Specifications at 240** Vac / 1ph (3 wires L1-N-L2) :

MINI BTH					Cable**! 90C/240V		Breaker! **
Model	**Capacity* KW/BTU/H at 240V**	**Amps!* at 240V**	**Electric Element(s) 240V**	**Stage(s)**	**Cu**	**Al**	**Amp. at 240V**
MINI BTH 3	3 / 10,235	12.5	1 x 3 KW	1	12	10	20
MINI BTH 4.5	4.5 / 15,350	18.7	1 x 4.5 KW	1	12	10	25
MINI BTH 6	6 / 20,470	25	1 x 6 KW	1	8	6	40
MINI BTH 7.5	7.5 / 25,590	31	1X4.5+1X3KW	2	8	6	40
MINI BTH 9	9 / 30,710	37.5	2 x 4.5 KW	2	8	6	50
MINI BTH 12	12 / 40,940	50	2 x 6 KW	2	6	6	70

-Electric supply 120/240V or 120/208V 1 phase (L1-N-L2) with three conductors anc a ground
-Copper or Aluminum conductors can be used.
! Add the amperage (Max. 5amp) of the circulating pump if it is connected directly to the boiler
***** On applications working at 208V/1ph, multiply the capacity by .75 and the amperage by .87
****** A higher capacity cable could be required. In all cases the local Electrical Code has priority.

Dimensions

Connections		Overall dimensions	
Inlet/heating return	3/4 " NPT Fem.	Height	21-1/2 in.
Outlet/ heating supply	3/4 " NPT Fem.	Width	9in.
Pressure relief valve	3/4 " NPT Fem.	Depth	9 in.
Drain valve	3/4 " NPT Fem.	Shipment weight	40 lbs.

Operating temp. range: 50°F to 190°F. Maximum pressure : 30 psi
Boilers requiring to be built in conformity to ASME standards may be required in some provinces or state. If such models are required, model with an "H" suffix shall be used.

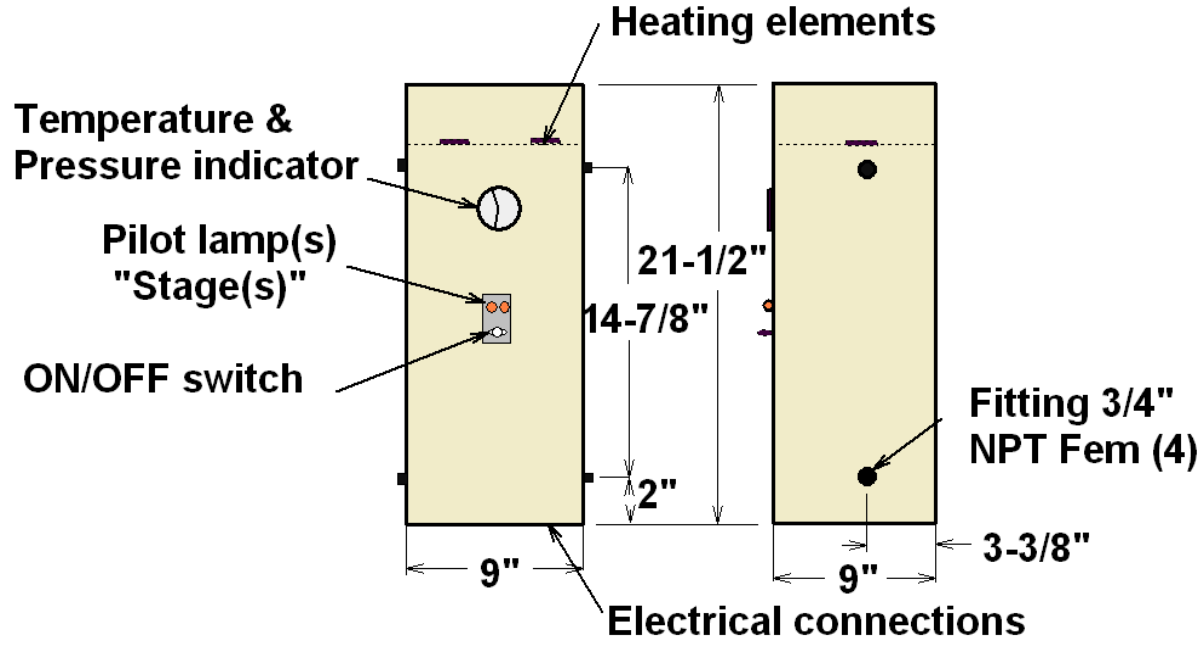


Figure 1.

General Safety Precautions

Be sure to read and understand the entire Installation & operation manual before attempting to install or to 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.

INTRODUCTION

WARNING

These important safeguards and instruction 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 electric boiler must be installed in accordance with these instructions and in conformity with local codes, or in the absence of local codes, with the National Plumbing Code and the National Electric Code, current edition. In any case where instructions in this manual differ from local or national codes, the local or national codes take precedence.
Boilers requiring to be built in conformity to ASME standards may be required in some provinces or state. If such models are required, model with an "H" suffix shall be used

SECURITY CONSIDERATIONS

Domestic and commercial installations have a maximum design operating pressure limited to 30 psi by a safety relief valve.

Boiler maximum operating temperature is 190°F by design. This boiler is designed **to be used only** in a hot water heating system.

CAUTION

The heat transfer medium must be water or other non-toxic fluid having a toxicity rating or class of 1, as listed in clinical Toxicology of Commercial products, 5th edition. Concentration of propylene-glycol shall be limited to 50%

CHECK LIST

Please check the identification tag on the unit to make sure you have the right model.

List of components shipped with the unit :

- **Pressure relief valve set at 30 PSI.**
- **Drain valve.**
- **Temperature & pressure indicator (Factory installed).**

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.

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 boiler and may endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices

LOCATION

The electric boiler should be installed in a clean, dry location. Long hot water lines should be insulated to conserve water and energy. The electric boiler and water lines should be protected from exposure to freezing temperature.
The electric boiler must be located or protected so as not to be subject to physical damage, for example, by moving vehicles, area flooding, etc.

⚠ CAUTION

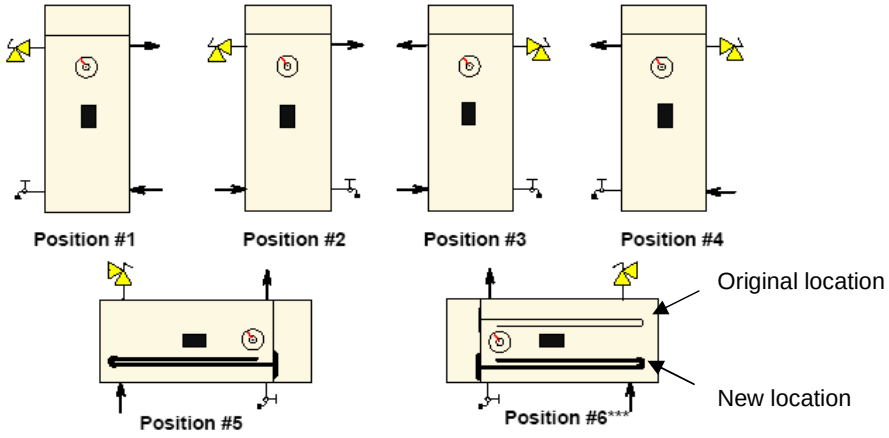
The electric boiler should not be located in an area where leakage of the tank or water connections will result in damage to the adjacent area or to lower floors of the structure. When such areas cannot be avoided, a suitable drain pan or non-flammable catch pan, adequately drained, and must be installed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

The boiler can be mounted directly on a wall with adequate screws. Make sure it is properly leveled.
All models in alcoves. The ambient temperature must not exceed 90F
The electric boiler should not be located near an air vent blowing a corrosive atmosphere or high humidity. The limited warranty is void when the failure of the electric boiler is due to a corrosive atmosphere.
The choice of the mounting position of the boiler shall be made in relation with the required clearances shown below and the fact that the electric element compartment of the boiler needs clearance to allow their replacement.
°

CLEARANCE

For adequate inspection and servicing the following minimum clearance is necessary:

Sides	4 inches
Electric elements side	14 inches
Front side of the boiler	24 inches
Back	0 inch



*****In Position #6 on models 3 to 6kW, the heating element must be relocated as shown.**

Fig. 2 Mounting positions

BOILER WATER CONNECTIONS

Make sure you connect the accessories and the piping to the proper connection fittings as indicated at figure 2 above and according the selected mounting position.
Figure 3 below shows typical connections of a MINI boiler to a radiant floor heating system. The location of the distribution system components may be different from what is represented.

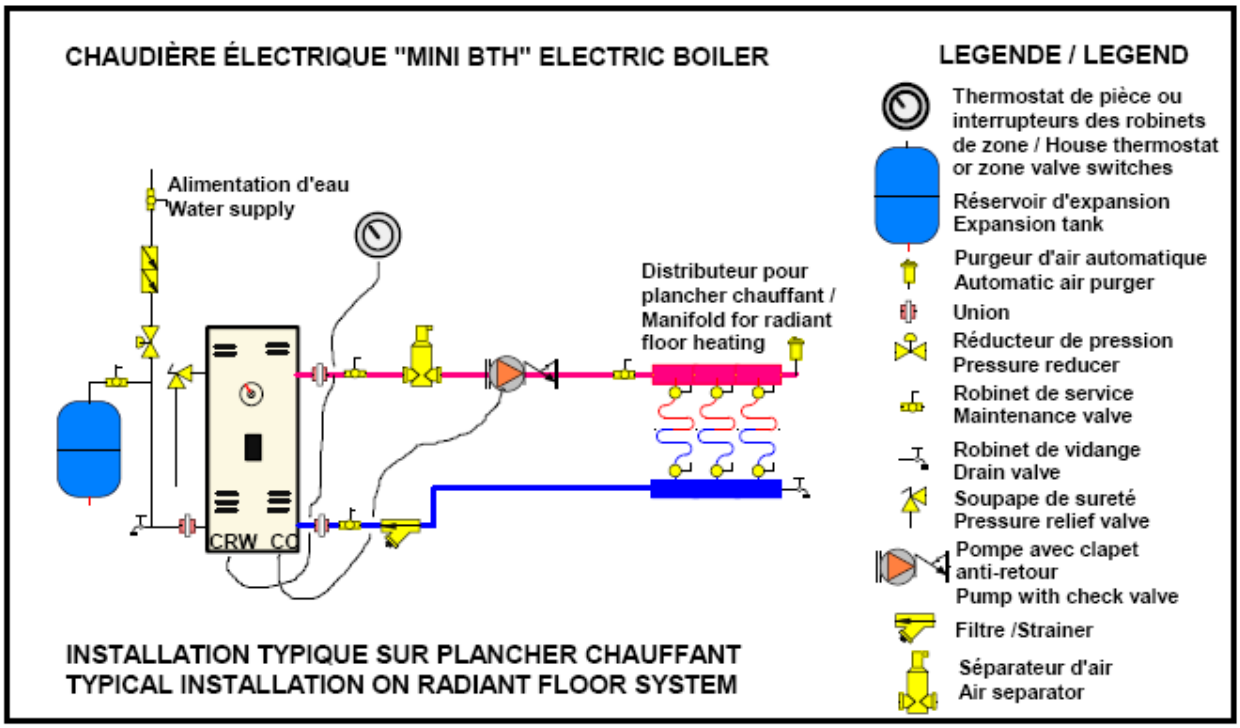


Figure 3 : Typical piping lay-out

Flow check valve

If the heating system includes a single pump, without motorized zone valve and that the heating distribution system is located above the boiler, **a flow check valve must be installed** on the supply distribution piping system to eliminate hot water to flow by gravity in the heating distribution piping when there is no heat demand. As an alternative, a circulating pump incorporating a spring check valve could be used.
On heating systems having more than one pump, each pump will need to be equipped with a flow check valve either incorporated into the pump or separated.
On heating systems with motorized zone valves this component is not required because the valve stops all water flow when closed.

Pressure relief valve

This component supplied with the unit must be installed directly to the boiler housing to the appropriate connection according to the mounting position.

Connect the outlet of the relief valve downward to a safe location in case of discharge.
The piping diameter used for the discharge piping shall not be smaller than that of the valve outlet. .
No valve of any type, restriction or reducer coupling should be installed on the discharge line.
Local codes shall govern the installation of relief valves.

Expansion tank

The expansion tank must be able to store the required volume of boiler water during maximum design operating temperature. The maximum allowable operating pressure is 30PSI.Contact your installing contractor, plumbing supply house, or local plumbing inspector for assistance.

Water pressure makeup regulator

Make-up systems **must be employed** as required by codes. An a**utomatic fill valve** must be used with a backflow preventer as required, to maintain minimum system pressure by supplying water to make up for leakage.
The minimum pressure obtained when the system is cold is generally of 12 psi.

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.

Air bleeder
Installation of manual or automatic air vents are required to eliminate all air from the boiler and the heating distribution system.

Circulating pump
We recommend that the pump be installed at the outlet of the boiler with isolating valves as shown in figure 3.
The pump shall be selected such as to be able to supply adequate flow in relation to the heating distribution system on which it will be connected and the heating capacity of the boiler installed.
The table below will give you details on required water flow for distribution systems having to operate with a differential temperature of 10F and 20F between their inlet and outlet**.**

Model	Diff.10F usgpm	Diff. 20F usgpm	Boiler press. drop
MINI 3	**2.0**	**1.0**	**Negligible**
MINI 4.5	**3.0**	**1.5**	**Negligible**
MINI 6	**4.0**	**2.0**	**Negligible**
MINI 7.5	**5.1**	**2.5**	**Negligible**
MINI 9	**6.0**	**3.0**	**Negligible**
MINI 12	**8.0**	**4.0**	**Negligible**

Your heating wholesaler shall be in good position to recommend the appropriate model for your application.
The amperage drawn by the pump and other 120volts components shall not exceed 15 amps.

Drain valve
Installed at the lowest point of the unit, it allows the unit to be drained for the eventual replacement of a defective component.

Strainer
This component is used to collect potential sediments coming from the distribution system and more particularly from systems made of steel piping and radiators. If such sediments accumulate at the bottom of the boiler it could be harmful to the heat transfer of the elements and generate premature failures.

ELECTRICAL CONNECTIONS:

Main boiler supply
Wiring must conform to the National Electrical Code and to state or local code requirements.
The electric boiler must be electrically grounded in accordance with local codes, or, in the absence of local codes, with the National Electrical Code.
Wiring must come from a 120/240 Vac/1ph or 208Vac/1ph “L1-L2-N” circuit protected by a properly sized breaker.
Wire gage (3 wires+ground) must be properly sized. Consult the boiler rating plate to select the proper breaker and wire gage.
The main terminal block of the boiler is suitable for #14 to #2 wires.
Supply cables can be made of Aluminum or Copper and be rated for 90C (194F).
If aluminum cables are used, it shall be of an adequate size (generally bigger) to meet the National electrical code.

Electrical supply of External accessories
The total 120vac consumption of the boiler and external accessories must not exceed 5A.
The maximum electrical consumption of 24vac external accessories connected to R&C terminals must not exceed 30Va. The available voltage at the boiler transformer must not drop below 24Vac.

Thermostat(s) and pump(s) connections:

Heating systems equipped with one thermostat and one pump:

With a 18gauge cable, connect the room thermostat directly to the following boiler terminals.

Two wire thermostat: Terminals “**R**” and “**W**”

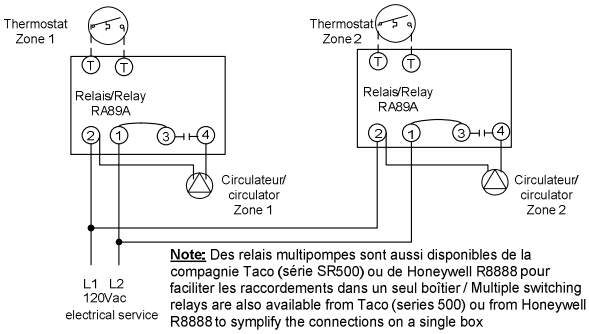
Three wire thermostat: Terminals “**C**”, “**R**” and “**W**”

Using 14 gauge wires, connect the circulating pump directly to terminals “**C**” and “**C**” (120vac)

Multiple pumps zoning applications:

Components shall be connected in such a way that when a thermostat is generating a heat demand, only the corresponding pump be operated.

To do so, you will need relays as illustrated below. Boiler terminals **CC-120** and **C-R-W** will not be used.



Note: Des relais multipompes sont aussi disponibles de la compagnie Taco (série SR500) ou de Honeywell R8888 pour faciliter les raccordements dans un seul boîtier / Multiple switching relays are also available from Taco (series 500) ou from Honeywell R8888 to symplify the connections on a single box

Zoning applications with motorized valves :

Connect the low voltage thermostat to the zone valve. Components must be wired to ensure that only the zone valve corresponding to the zone calling for heat is actuated. When a zone valve opens, it generally closes a switch that is incorporated in it. Connect each switch to the “R” & “W” terminals in the boiler.

Connect the circulator to terminals “C” and “C” in the boiler.is powered on a demand from any zone. The transformer used to power the zone valves must be sized for the load represented by all zone valves in the heating system.

Diagramme électrique/ Wiring diagram
Raccordement de zone valves/ Wiring for zoned valves system

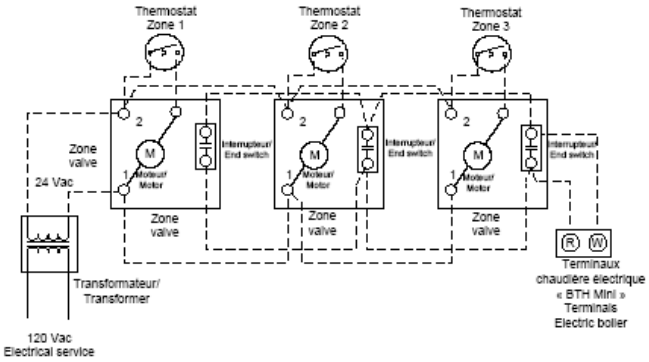


Diagramme électrique/ Wiring diagram BTH MINI 240V 3-6Kw

Rev.7/3/11

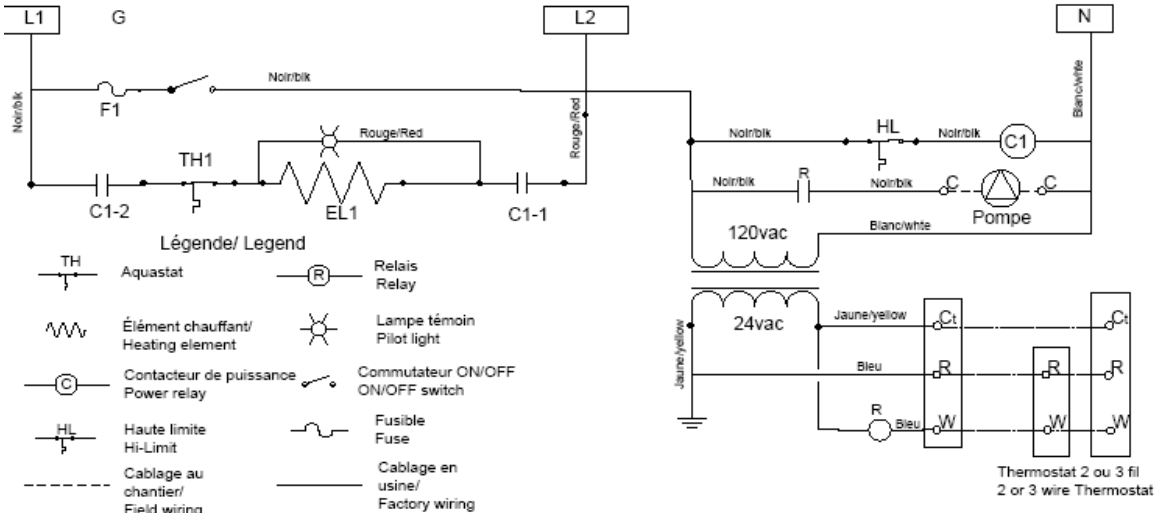


Diagramme électrique/ Wiring diagram BTH MINI 240V -7.5 & 9kW

Rev.7/3/11

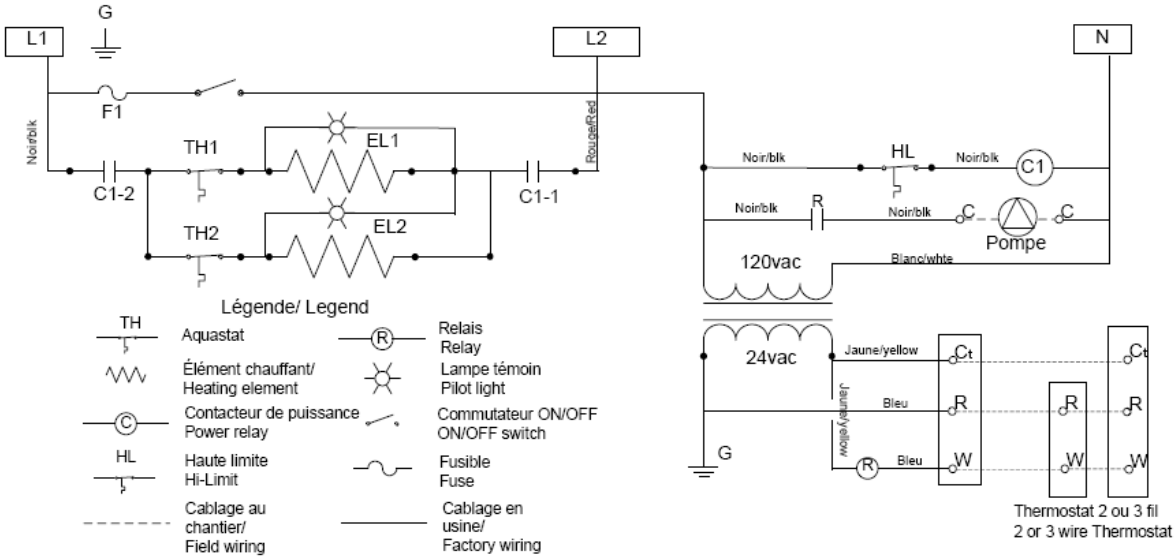
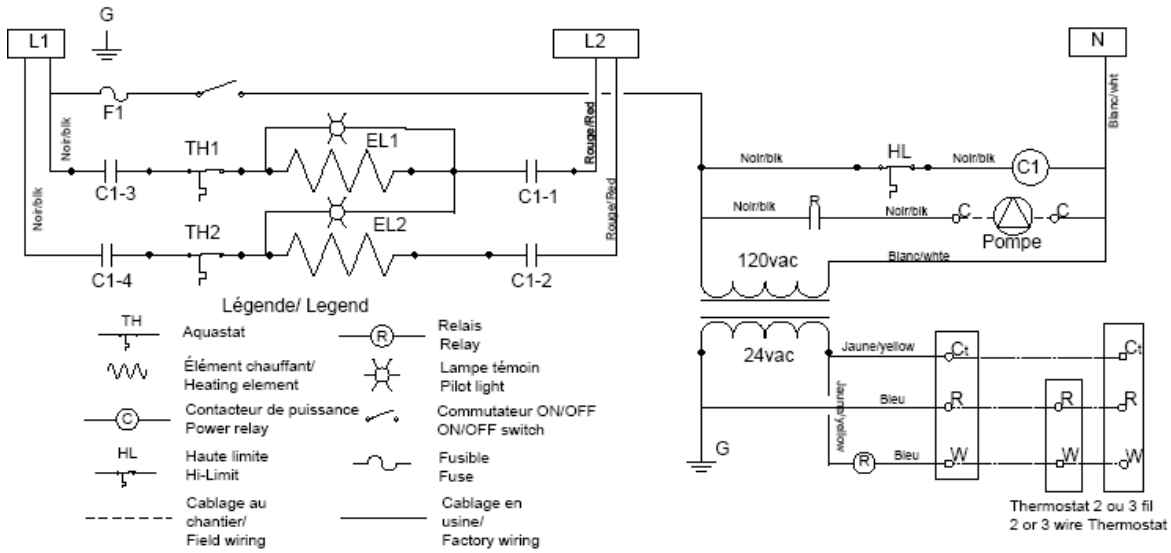


Diagramme électrique/ Wiring diagram
BTH MINI 240V - 12kW
Rev.7/3/11



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.

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 shall be around 12psi.
- ❑ Adjust the temperature control(s) to OFF.
- ❑ Turn the service switch in front of the unit to ON
- ❑ Set the thermostat ON to generate a heat demand. The pump shall start.
- ❑ Check that the water is circulating in the distribution system and that all the air is expelled.

Temperature control adjustment

Each temperature control has the function to control one heating element.

Adjust each control to the desired temperature by turning the knob of the control. The reference mark for the adjustment is a red dot located under the knob.

- ❑ One control (any of the two) shall be set at the maximum temperature required by the heating system

The table below gives a good indication of the temperature value generally required for different applications.

Application	Baseboards	Cast Iron radiators	Warm floor in concrete	Warm floorr between joists
Temp. F	**180 F**	**155 °F**	**115 °F**	**140 °F**

- ❑ Set the value of the second control (Model of 9 to 12kW only) at approximately 5F below the setting of the first control.

The indicating lamp(s) on front of the unit shall come ON as you increase the temperature of the control(s).

On initial start up it may take a considerable amount of time before the water reaches the desired temperature

Further adjustments may be necessary as you use your boiler and space heating system.

Inspection

- ❑ Measure the amperage 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 increase the outlet temperature . Heating elements shall stop at a temperature slightly higher than the selected value on the controls
- ❑ Lower the adjustment of the room thermostat(s) The pump shall stop but the element(s) will stay on if the temperature of the water is under the setting temp. of the control(s).
- ❑ Check the pressure reading at the gauge on the unit. It shall not be higher than 28psi when the distribution system will get to its maximum operating temperature.

N.B.: This boiler is designed to be maintained hot and consequently always ready to receive a demand for heat all over the heating season. It will then be normal to occasionally see an indicating lamp in operation for a few seconds even if there is no call for heat. It will also be normal to occasionally see the temperature value at the boiler gauge higher than the normal values. This temperature will get back to normal at the next heat demand.

MAINTENANCE

INTRODUCTION

Properly maintained, your boiler 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 are subject to eventual failure that requires
service. Failure to use the correct procedures or parts in these circumstances may make the unit unsafe or reduce the life of the boiler.
The owner should have the following inspection and maintenance procedures performed:

At all time

An immediate inspection shall be made if:

- An odor of melted plastic or overheating material is detected
- A leak coming from the unit or the heating system is observed

If a leak is detected at the outlet of the safety relief valve, it could be related to a problem with components installed on your heating distribution system. A quick correction is then required.
Do not plug the outlet of this valve if a dripping condition occurs.

Twice a year:

- Check for the proper operation of the automatic air purger(s) and eliminate air from the radiators.

Annually:

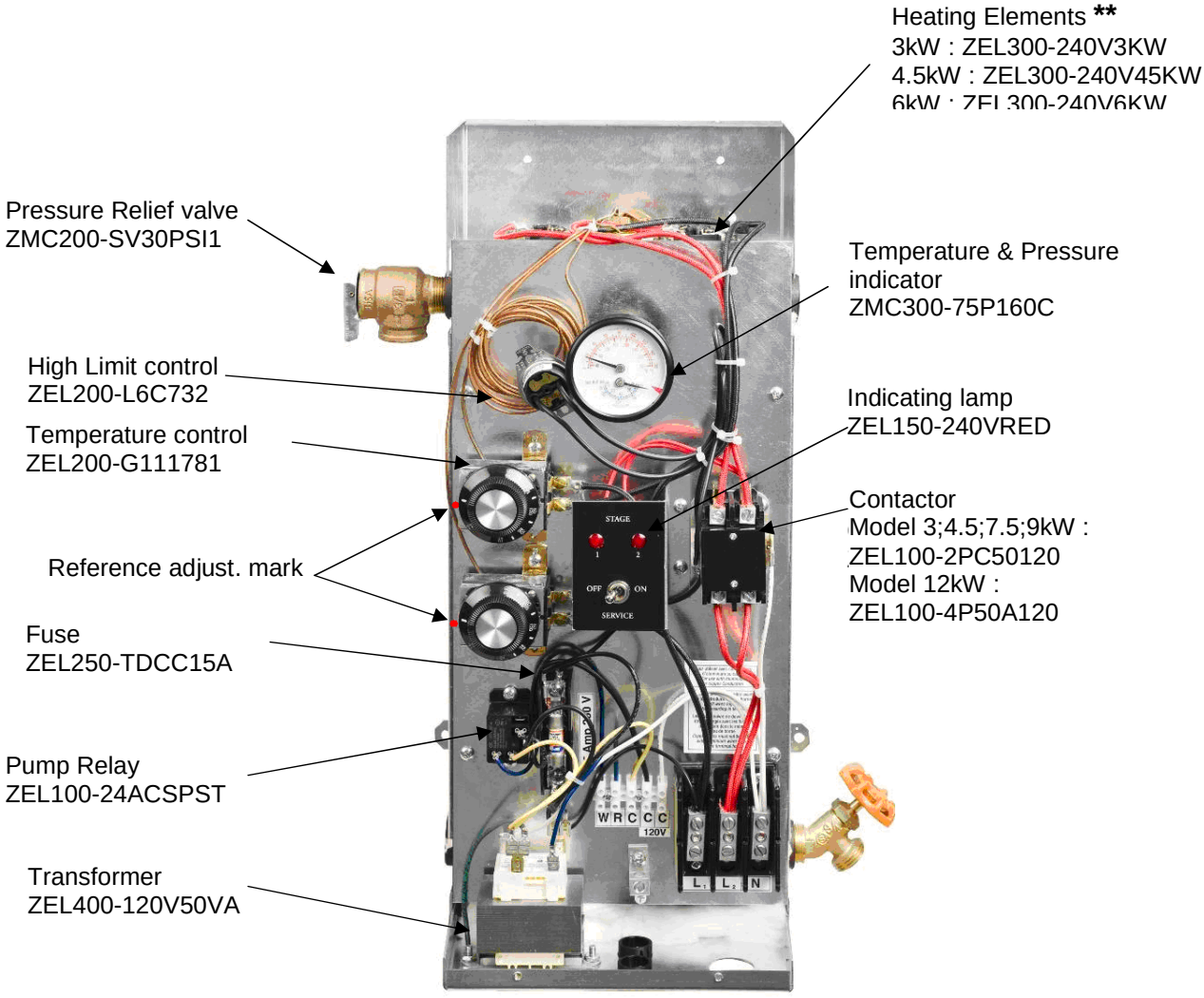
- It is recommended that a visual inspection be made on the electrical compartments of the boiler to check the stanchness of the gasket on the element flange an also check for any
- overheating signs of the components and wires. Required corrections shall be made as soon as possible.
  Parts used for replacement shall be the same as the original equipment.

⚠ WARNING

Make sure that the power on the unit has been turn off before opening the electrical compartments of the boiler.

- Close required isolating valves and clean the strainer located on the heating return piping.
- Open the boiler drain valve to eliminate deposits that could have settle at the bottom of the boiler. Stop when water gets clear. If there is no flow or a very small flow, it could be due to a large accumulation of deposits at the bottom
- of the unit. If so, close the isolating valves at the inlet and outlet of the boiler, remove heating element(s) and clean the inside of the tank with a strong jet of water

REPLACEMENT PARTS



****When replacing an heating element, insure that its orientation is identical as the original**

MINI BTH LIMITED WARRANTY

Warranty Coverage for Residential Installation.

Thermo 2000 Inc. hereby warrants to the original residential purchaser that the MINI BTH tank 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) MINI BTH tank is to be use 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. warrants to the original purchaser that the MINI BTH tank installed in a commercial setting for fifteen (15) years.

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 MINI BTH *components & parts*

All other MINI BTH 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:

1. Defects or malfunctions resulting from installation, repair, maintenance and/or usage that are not done in conformity with the manufacturer's installation manual; or
2. Defects or malfunctions resulting from installation, maintenance, or repair that are not done in accordance with regulations in force; or
3. 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
4. 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
5. Installation in which liquid circulating in the tank does not remain in closed circuit or installation in which piping is leaking; or
6. A polybutylene pipe or radiant panel installation without an oxygen absorption barrier is used; or
7. 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
8. Your home contains any type of water softener system and the unit is not installed and maintained in accordance with the manufacturer specifications; or
9. The MINI BTH unit is being subject to non authorized modifications; or
10. Defects or malfunction resulting of storing or handling done elsewhere than Thermo 2000's manufacturing plant; or
11. Units on which the serial number is removed or obliterated.

Limitations.

Thermo 2000 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 MINI BTH 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: MINI BTH model and serial number, copy of the original sales receipt and owner's identification certificate.

THERMO 2000 INC.

500, 9e Avenue, Richmond (Qc) Canada J0B 2H0
Phone: (819) 826-5613 Fax: (819) 826-6370
www.thermo2000.com