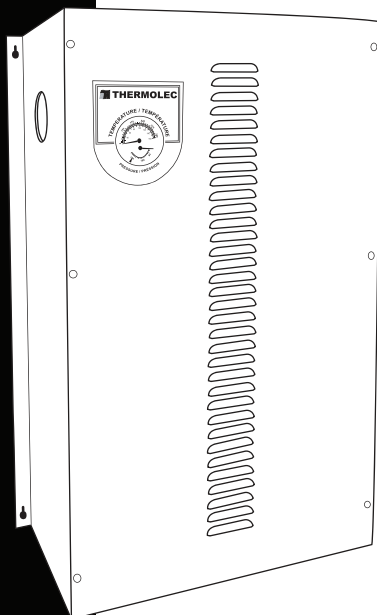
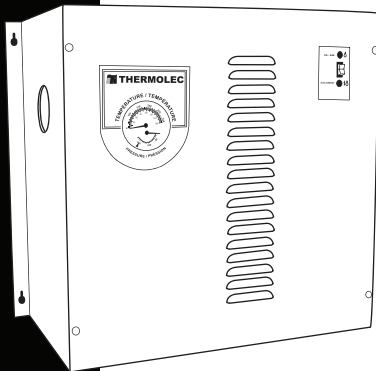
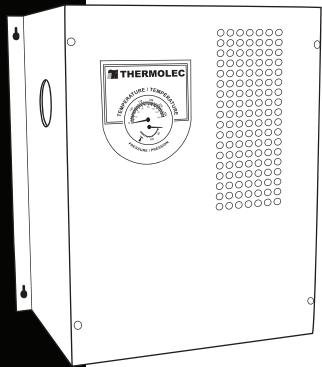


THERMOLEC



Installation Instructions for Electric Boilers (CANADA)



March 2018
VERSION 12

Installation Guidelines for Thermolec Electric Boilers Model B

1 Important

- 1.1 These instructions should be used as a general guide only. Electrical Code and local utility requirements must be followed and take precedence over these instructions.
- 1.2 Thermolec electric boilers are manufactured with quality components for maximum life, durability and minimum service. To ensure a satisfactory installation it is imperative that you read these instructions carefully before installing and operating the heating system.
Failure to do so may result in breach of warranty.

2 Unpacking

- 2.1 Inspect the unit and check whether there are missing parts.
- 2.2 Report any damage or claims to the carrier immediately.
- 2.3 For all returns to be accepted they must be authorized by the manufacturer.

3 Location and dimensions

- 3.1 These boilers are designed for wall mounting. Please see Table 1 below for overall dimensions.
Table 1 also gives the minimum clearances to combustible material as well as recommended distances for ease of service (e.g. replacement of tubular elements).

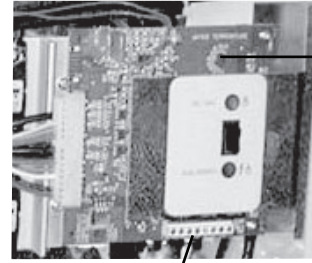
Table 1

Dimensions and Clearances									
Models	Overall dimensions			Clearances					
	Width	Height	Depth	Front	Back	Top	Right	Others	
<u>Short Models</u> up to 23 kW 1ph up to 18 kW 3ph	18"	18"	9-1/2"	36"	0"	12"	6"	12"	
<u>Long Models</u> up to 40 kW	18"	28"	9-1/2"	36"	0"	24"	6"	12"	
TMB	13"	18"	9"	36"	0"	12"	6"	12"	

- 3.2 The boiler room should be well ventilated as to maintain the temperature below 25°C (77°F).
- 3.3 The unit must be mounted level on a vertical wall with the outlet fitting on the left side of the unit.

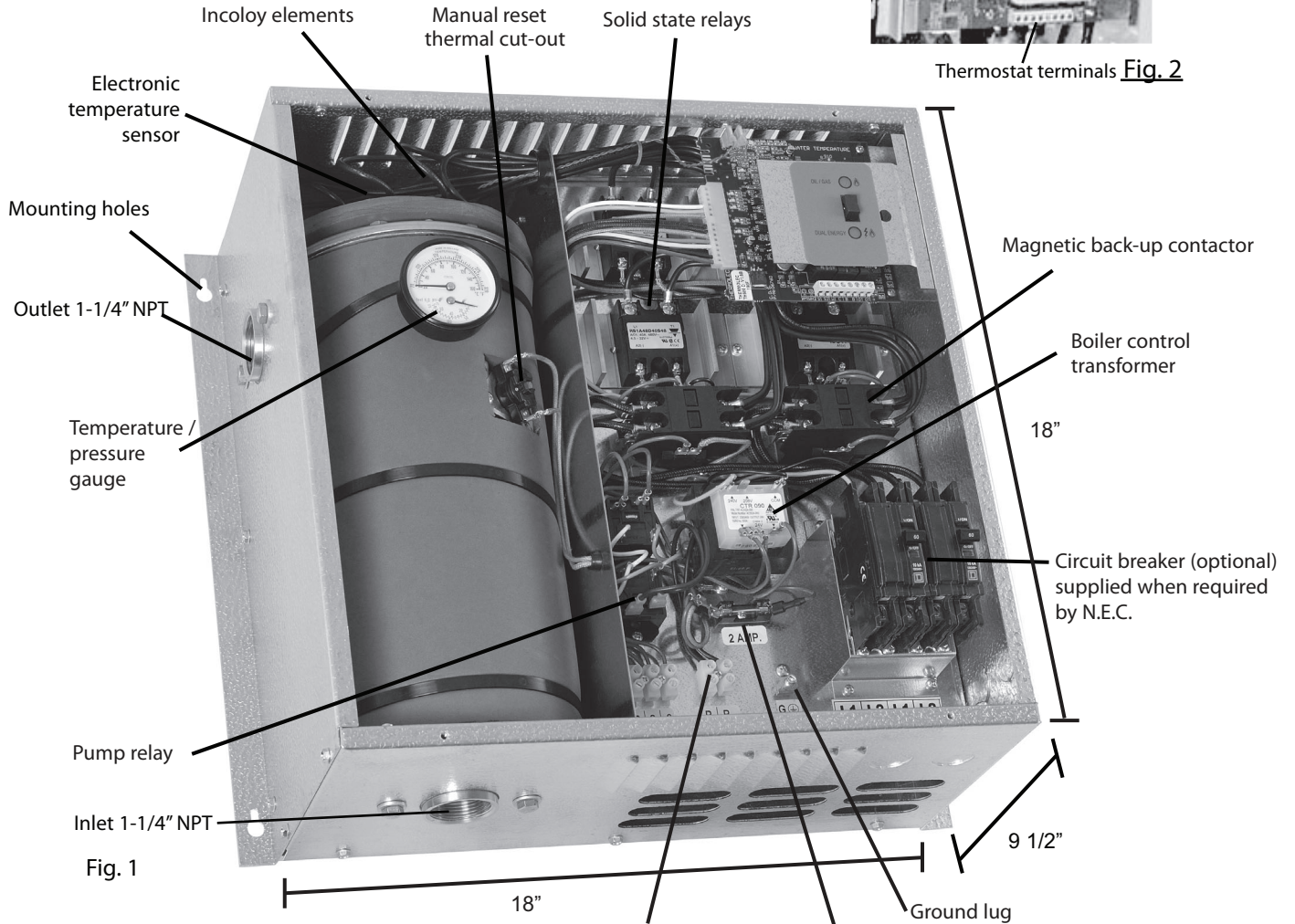
4 Components

Mono or Dual energy controller



Adjustable electronic aquastat (output temperature)

Thermostat terminals **Fig. 2**



Outdoor reset sensor **Fig. 3**

Note : The model shown here is a typical Dual-Energy boiler 23kW / 240 Volts / 1phase.

5 Standard specifications for all models

Table 2 on the following page give specifications and current for the standard models.

Table 2

Standard Model Specifications @ 240V / 1ph (Canada)							
Dual-Energy Models	B-5	B-6	B-8	B-9	B-10	B-12	B-15
kW	5	6	8	9	10	11.5	15
BTU / H	17,060	20,472	27,296	30,708	34,120	39,238	51,180
Total Amps	20.83	25.00	33.33	37.50	41.67	47.92	62.50
No. Of Power Supplies (Amps Per Breaker)	1 x 30A	1 x 30A	1 x 50A	1 x 50A	1 x 60A	1 x 60A	1 x 80A

Dual-Energy Models	B-18	B-20	B-23	B-27	B-30	B-35	B-40
kW	18	20	23	27	30	35	40
BTU / H	61,416	68,240	78,476	92,124	102,360	119,420	136,480
Total Amps	75.00	83.37	95.83	112.50	125.00	145.83	166.67
No. Of Power Supplies (Amps Per Breaker)	1 x 100A	1 x 125A	1 x 125A	2 x 80A	2 x 80A	2 x 100A	2 x 125A

TMB MONO Model Specifications @ 240V / 1ph (Canada)				
Mono Models	B-3TMB	B-6TMB	B-9TMB	B-11TMB
kW	3	6	9	11
BTU/H	10,236	20,472	30,708	37,532
Total Amps	12.5	25.0	37.5	45.8
Breaker size	1 x 20A	1 x 40A	1 x 50A	1 x 60A

Standard Model Specifications @ 3ph (Canada)						
Dual-Energy Models	B-18	B-24	B-30	B-35	B-36	B-42
kW	18	24	30	35	36	42
BTU / H	61,416	81,888	102,360	119,420	122,832	143,304
Amps @ 208V / 3ph	48.00	66.69	83.37	96.00	n/a	
Disconnect Switch	60A	100A	100A	100A		
Amps @ 600V / 3ph	17.34	23.12	28.90	n/a	34.68	40.46
Disconnect Switch	30A	30A	30A		60A	60A

NOTE: Other models, voltages and capacities available upon request. Please contact the factory.

Please use Table 3 below to select the wire size for the power supply.

Table 3

Cable Amps Capacity vs Wire Size											
Wire Size	12	10	8	6	4	3	2	1	0	00	000
Amps @ 75°C (167°F)	20	30	45	65	85	100	115	130	150	175	200
Amps @ 90°C (194°F)	20	30	45	65	85	105	120	140	155	185	210

Notes :

- 1- This table should be used as a guide only. Always select the wire size according to the local Electrical Code.
- 2- Always use wire suitable for 75°C (167°F) minimum, 300V or 600V as required.
- 3- All models with suffix "U" over 12 kW at 240V / 1ph require two feeders. Divide the total Amps by 2 to select the proper wire size.
- 4- COPPER WIRE ONLY.

6 Water circulation and plumbing notes

- 6.1 The system is designed to operate with a maximum output temperature of 180°F or lower and a temperature rise across the unit of 20°F or lower. Please refer to Table 4 for the recommended flow rate versus the capacity of the boiler.

Table 4

Recommended Water Flow Rate vs Capacity		
Capacity (kW)	Imp. Gallons / min	US Gallons / min
3	0.9	1.1
5	1.5	2.0
6	1.7	2.0
8	2.3	2.8
9	2.6	3.1
10	2.9	3.5
11	3.2	3.9
12	3.5	4.2
15	4.4	5.3
18	5.2	6.2
20	5.8	7.0
23	6.7	8.0
25	7.3	8.8
30	8.7	10.4
35	10.2	12.2
36	10.4	12.5
40	11.6	13.9
42	12.2	14.6

- 6.2 In order to ensure an adequate flow rate :
- 6.21 Pressure loss (referred as "Head") caused by water friction in the system should not exceed the capacity of the pump.
- 6.22 Please refer to Table 5 below to find the copper pipe diameter (type L) recommended to accommodate the water flow found in Table 4 above.

Table 5

Maximum Flow Rate @ 15 psi		
Maximum Flow Rate		Pipe Diameter
Imp. Gallons / min	US Gallons / min	(Type L Copper)
3.6	4.3	3/4"
8.4	10.1	1"
14.4	17.3	1-1/4"

- 6.23 Elbows and valves will greatly add to the head loss in the system. An appropriate water flow rate must be maintained to avoid tripping of the temperature limiter. Pipes with diameters larger than specified in Table 5 will not help to increase water flow.
- 6.3 The installation must have a drain valve, an expansion tank, maintenance valves and an automatic pressure reducing fill valve set at 15 PSI (104 kPA). A "T" fitting (1-1/4" NPT) must be installed at the supply outlet of the unit. This "T" must be equipped with a reducing bushing 1-1/4" to 3/4" NPT, facing upwards, to accept a 3/4" NPT pressure relief valve. This safety valve must be installed vertically. Except for the pressure relief valve, the above plumbing supplies are not supplied with the unit. Please refer to illustrations A, B and C at the end of this manual.

6.4 The automatic pressure relief valve supplied with the boiler is required to prevent dangerous pressure build-ups in the system in case of system malfunction and may under certain conditions vent hot water. Do not install the system where water could damage rugs, furniture, etc. When piping the relief valve to a drain, check with local authority for recommended method of installation. Do not open or tamper with the relief valve. If operated frequently or used to drain or flush the system, the valve could fail to seat properly and thus leak.

Important safety notice : This safety valve is mandatory and must be installed as shown in the illustrations A, B and C at the end of this manual. The omission of the safety valve installation will create a very serious safety hazard and will void all warranties.

6.5 Automatic air vents should be installed at the highest point of the installation, ideally on all radiator units for best results or at points where air could possibly be trapped in the system.

Caution : Make sure the system has been reasonably vented before starting the unit.

7 Mechanical installation

- 7.1 Mounting brackets are located on the sides of the boiler. Depending on the size of the unit, four or six holes are provided. The unit may be attached directly to a combustible surface.
- 7.2 Use a circulator pump of appropriate capacity for the intended application. The pump should be placed as close as possible to the boiler. Ensure that the water direction is correct. An arrow indicating the circulation direction is generally visible on the pump casing.
- 7.3 Install inlet and outlet piping.
- 7.4 Install air vents, valves, the pressure relief valve supplied with the unit, expansion tank, etc.
- 7.5 When everything is finished, install the temperature / pressure gauge.

8 Electrical installation

- 8.1 Disconnect all power sources before opening the main panel and working within.
- 8.2 Read the nameplate and other markings carefully and wire strictly in accordance with the wiring diagram.
- 8.3 Wires and protective equipment must be sized according to the applicable Electrical Code.
- 8.4 Use only wires suitable for minimum 75°C (167°F).
- 8.5 Install the outdoor sensor on an exterior North wall and connect it with 18/2 wire to terminals "OT / OT" on the electronic board (TH-600 series controller).
- 8.6 On the electronic aquastat (marked "WATER TEMPERATURE"), select the **maximum** water temperature required (1-10) by the type of installation. Please see [Table 6](#) below for the temperature obtained according to the knob position. The **minimum** water temperature is reset automatically by the outdoor sensor. Please see the variation graph in [Fig 5](#).

Table 6

Water Temperature controlled by Electronic Aquastat											
Set-point		10	9	8	7	6	5	4	3	2	1
Maximum temperature	°C	88	81	75	67	58	50	45	42	39	36
	°F	190	178	167	153	137	122	113	107	102	97
Minimum temperature	°C	48	48	48	45	40	38	34	31	29	28
	°F	118	118	118	113	104	100	93	88	84	82

Electronic Aquastat

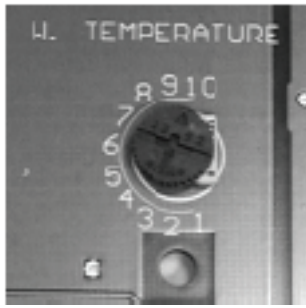


Fig. 4

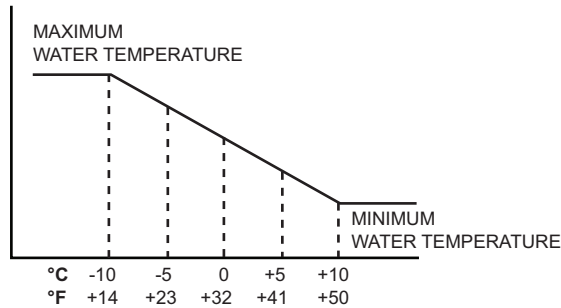


Fig. 5

- 8.7 The outdoor sensor will :
- Maintain the selected **maximum** water temperature when the outdoor temperature is at -10°C ($+14^{\circ}\text{F}$) or colder.
 - Automatically and proportionally** compensate by varying the water temperature between the maximum and minimum when the outdoor temperature is between -10°C ($+14^{\circ}\text{F}$) and $+10^{\circ}\text{C}$ ($+50^{\circ}\text{F}$).
 - Maintain the **minimum** water temperature when the outdoor temperature is between $+10^{\circ}\text{C}$ ($+50^{\circ}\text{F}$) and $+20^{\circ}\text{C}$ ($+68^{\circ}\text{F}$).
 - Prevent boiler operation above $+20^{\circ}\text{C}$ ($+68^{\circ}\text{F}$).
- NOTE** : If you choose not to use the outdoor sensor, don't connect it to the "OT / OT" terminals nor jumper these terminals. You will not use this feature and the water will simply be maintained at the maximum selected temperature.
- 8.8 Connect the thermostat or the zone valve end switch wires to "C" and "W1" terminals on the electronic board.
- 8.9 **Circulating Pump Control.** The "P / P" terminals are connected to dry contacts of a relay (capacity up to 1 HP) and are used to start the pump. This relay is switched **ON** with the first heating step and **OFF** after the last one. A separate 120V / 1Ø service must be provided from the electrical panel to the boiler for the pump. For Mono-Energy Boilers, refer to the wiring diagram. See the diagram for dual-energy as the pump must also run when another source of heat is selected.
Follow the extra steps dedicated to a dual-energy installation in the start-up sequence.
- 8.10 Set the room thermostat heat anticipator (when available) to **0.2** Amperes.
- 8.11 If the system is used with Load Management control, connect the Utility signal to "S1 / S2" terminals. A closed contact enables the boiler, an open contact disables the boiler.
- 8.12 The installation is now ready for start-up procedure and testing.

9 Start-up procedure and test sequence

Double check the following carefully :

- All wiring and plumbing is complete.
- Pipes have been cleaned, the system has been flushed and filled again.
- Without powering the entire unit, install a jumper between the "P / P" terminals and switch the pump breaker **ON** as to let the pump run alone. Verify that the pump is running freely and check for leaks. During this test, a lot of bubbles will travel through the system and air will be eliminated by the automatic vents. You can accelerate the process by purging the radiators manually. Shut off the pump breaker at the panel, then remove the jumper between the "P / P" terminals.
- The pressure in the system has been stabilized at approximately 15 PSI (104 kPa).
- The entire system is now almost free of air.
- The room thermostat anticipator (when available) has been set at **0.2** Amperes.
- Switch the boiler breaker **ON** at the main panel.

- 9.8 Set the thermostat above the room temperature. The system should start.
- 9.9 Make sure the pump starts running as soon as the system starts.
- 9.10 Heating stages will be switched **ON** in sequence at 30 second intervals, confirmed by green lights on the left hand side of the PC board on the **TH600** or by red lights on the **TH22**.
- 9.11 Wait for two minutes and measure the current drawn by the boiler and compare it with the one shown on the nameplate.
- 9.12 When the required maximum water temperature selected on the aquastat (**0-10**) or controlled by the outdoor sensor is reached, the electronic controller will modulate the boiler capacity to maintain the water temperature, as long as the demand for heating is not satisfied. The bottom green light flashes continuously on the **TH600** or one of the red lights on the **TH22** to indicate that the boiler is maintaining the setpoint. When the room thermostat is satisfied, the heating stages will come **OFF** in sequence at 5 second intervals.
- 9.13 Set the room thermostat to the desired set point.
- 9.14 The boiler is now ready and functional.

Extra test steps for "Dual-Energy" installation.

- 9.15 Disconnect the room thermostat wires from the existing boiler and connect them to "**C**" and "**W1**" terminals on the electronic board of the electric boiler.
- 9.16 Connect two (2) wires from "**B / B**" control terminals of the electronic board to the thermostat terminals of the existing boiler.
- 9.17 Terminals "**S1 / S2**" on the electronic board should receive the utility **Dual-Energy Signal** wires.
- 9.18 Connect the pump terminals "**P / P**" in parallel to the existing thermostatic pump control as to allow the operation of the pump in any of the "**Dual-Energy**" modes selected.

10 Test sequence for "Dual-Energy" systems

- 10.1 A "**Dual-Energy**" boiler is supplied with a three-position mode selector switch. Because of differences in regional regulations, the electronic board has been factory set so as to allow the activation of the electric mode depending on the unit destination. In the "**Mazout / Oil**" position the thermostat will call upon the gas or oil boiler or furnace to maintain the house temperature at the desired level. The "**Dual-Energy**" mode gives automatic control to the outdoor sensor or alternate switching signals from the local utility for "**Dual-Energy**" control. When the "**Dual-Energy**" contacts are closed, the "**Electric**" mode is selected. When these contacts are open, the "**Mazout / Oil**" mode is selected. If the "**Electric**" mode is manually selected the controller allows only the electric mode operation. A green pilot light indicates the mode that has been selected.
- 10.2 The positions of the manual selector are :

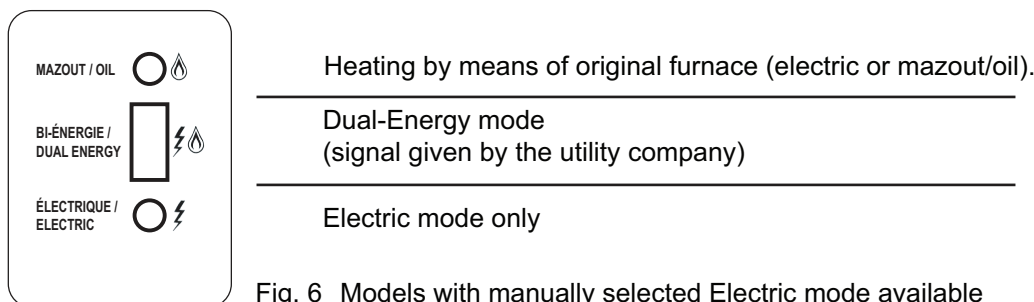





Fig. 6 Models with manually selected Electric mode available

- 10.3 Simulate a heating demand by setting the thermostat higher than the room temperature.
- 10.4 Switch the mode selector to position  and check that the burner responds to the thermostat demand.
- 10.5 Switch the mode selector to the "**Dual-Energy**" position . Install a jumper between terminals "**S1 / S2**"; the electric mode is automatically selected. The pump will start and the heating stages will be switched **ON** in sequence at 5 second intervals. Measure the current drawn by the boiler and compare it with the one shown on the nameplate. If you remove the jumper from terminals "**S1 / S2**", the system should switch back to the "**Mazout / Oil**" mode. Switch the mode selector to the "**Electric**" position . The controller allows only electric heating even if the contact "**S1 / S2**" is open.
- 10.6 Switch the mode selector to the desired position and set the room thermostat to the desired temperature.
- 10.7 Your boiler is now ready and functional.

11 Installation examples

- 11.1 **Installation A** shows a Thermolec electric boiler in a Full-Electric Configuration.
- 11.2 **Installation B** shows a Thermolec electric boiler in a Dual-Energy-Series Configuration.
Water is always passing through both boilers even if only one heat source is selected at a time.
- 11.3 **Installation C** shows a Thermolec electric boiler in a Dual-Energy-Parallel Configuration.
Water is forced only through the selected heat source by means of a motorized valve.

12 Position and electric values of heating elements

Standard values of heating elements at 240 Volts are 3kW, 5kW, 5.75kW, 8.75kW et 10 kW. Please refer to the following sketches and tables to find the position and test value in ohms of each element. Please ensure you disconnect the element completely before you make the resistance reading.

13 Replacement of heating elements

Heating elements nuts and cover bolts have been factory torqued with a calibrated tool. Please make sure you have a torque driver and the proper sockets handy before you open the boiler tank.

Elements nuts should be torqued at :

14.6 Newton-meter (Nm) or equivalent

Please ensure you use the double wrench method (i.e. an open key inside of the tank to hold the element hexagon flange firmly and the torque wrench outside). Don't let the element turn while tightening.

Cover hex bolts should be torqued at :

7.8 Newton-meter (Nm) or equivalent

Please make sure to tighten all nuts by hand first, then tighten them as per fig. 8 and finally apply the proper torque with the torque wrench. Resist the feeling that the bolts could get torqued more (even if possible) because that action would simply squash the silicone gasket to the point where it would eventually lose all its resiliency and sealing properties.

Keep in mind that an equal torque is far more important.

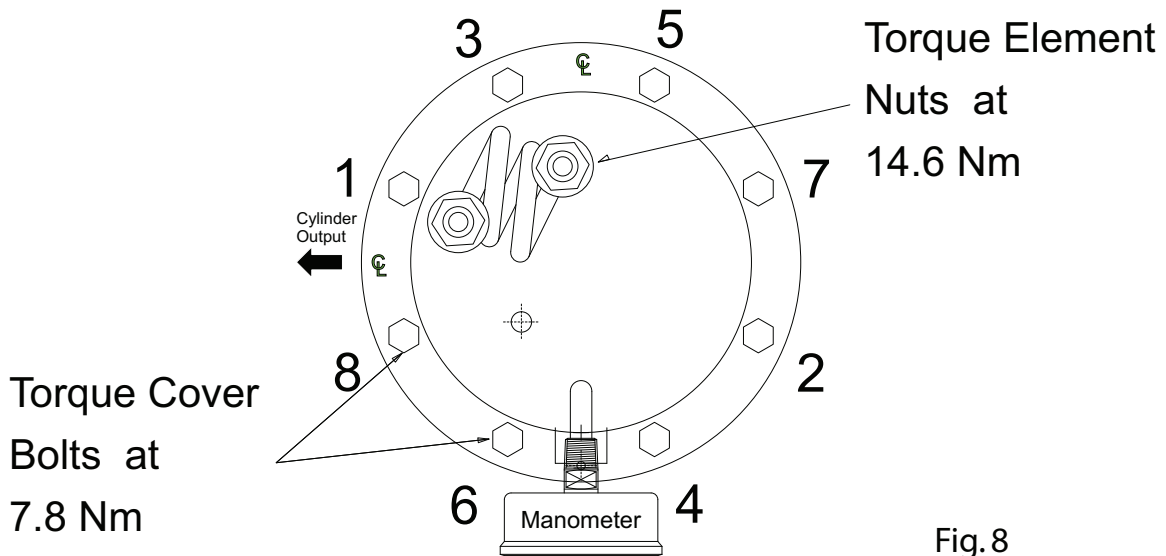


Fig.8

14 Warranty

Thermolec Ltd. warrants against defects in materials in the heat generator casing of its boiler and the heating elements for ten (**10**) years and all other components for two (**2**) years after date of shipment from its factory.

Any claim under this warranty shall be considered only if the product has been installed and operated in accordance with Thermolec's written instructions.

Any misuse of the system or any repair by persons other than those authorized by Thermolec, carried out without its written consent, voids this warranty.

Thermolec's responsibility shall be limited in any case to the replacement or repair, in its factory or in the field, by its own personnel or by others chosen by Thermolec, at its option, of such boiler or parts thereof, as shall prove to be defective within the warranty period.

Thermolec Ltd. will not be held responsible for accidental or consequential damages, nor for delays, nor for damages caused by the replacement of the said defective boiler.

Electric Boiler Warranty Registration Form

Name : _____

Address : _____

City : _____ Province / State : _____

Postal / Zip Code : _____ Telephone : _____

Model No : _____ Serial No : _____

Installer Name : _____ Telephone : _____

Date Installed : _____

Comments / Suggestions :

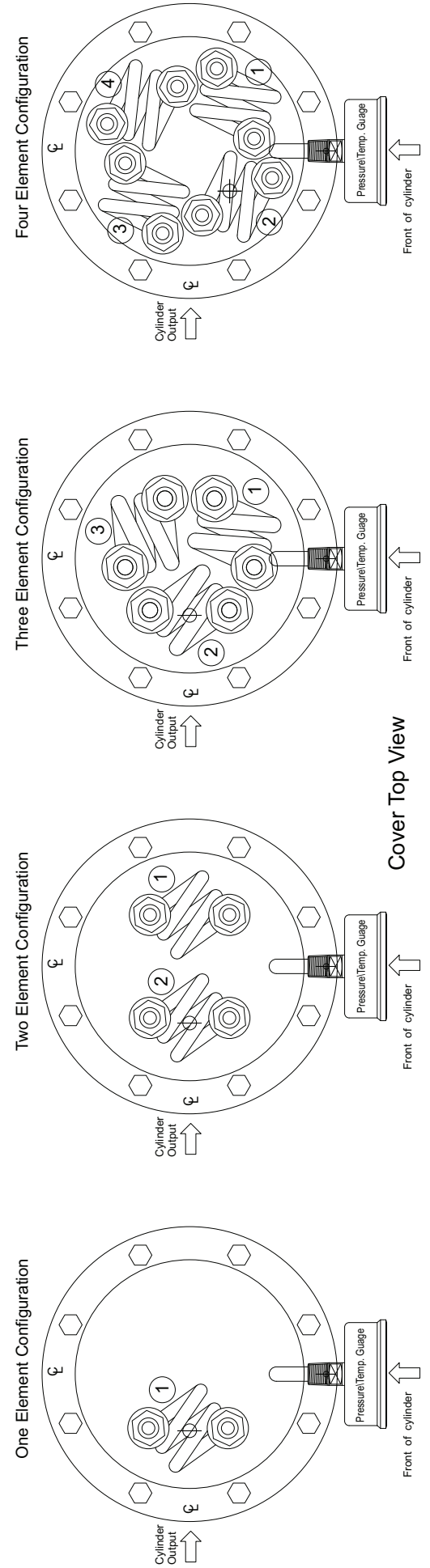
Please send this registration form to

**Thermolec Ltd.
Warranty Registration
2060 Lucien-Thimens St.
Ville St-Laurent, Montreal
Quebec, Canada
H4R 1L1**

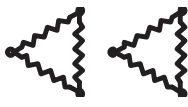
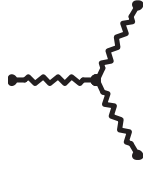
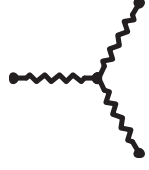
Or fax it to (514) 336-3270

Elements Position, Electric Data and Part

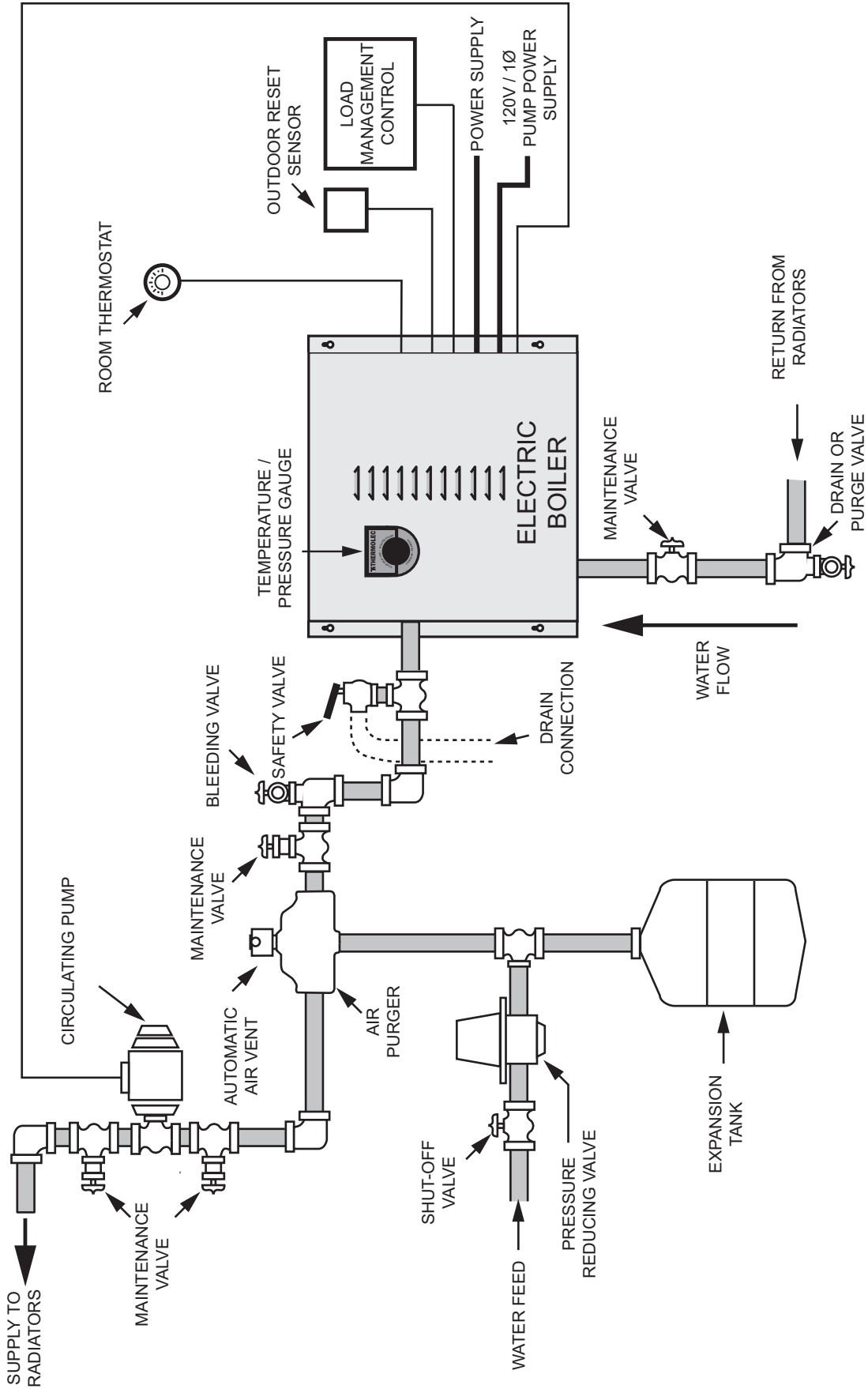
Height	Volts / Phases	Total KW	Position 1			Position 2			Position 3			Position 4							
			Watts	Ohms	Part #	Watts	Ohms	Part #	Watts	Ohms	Part #	Watts	Ohms	Part #					
13" Cylinder	240/1	3.00	3000	19.2	CBLR065														
		5.00	5000	11.5	CBLR055														
		6.00	5750	10.0	CBLR060														
		8.00	5000	11.5	CBLR055	3000	19.2	CBLR065											
		9.00	5750	10.0	CBLR060	3000	19.2	CBLR065											
		10.00	5000	11.5	CBLR055	5000	11.5	CBLR055											
		12.00	5750	10.0	CBLR060	5750	10.0	CBLR060											
		15.00	5000	11.5	CBLR055	5000	11.5	CBLR055	5000	11.5	CBLR055								
		18.00	5000	11.5	CBLR055	5000	11.5	CBLR055	5000	11.5	CBLR055	5000	11.5	CBLR055	3000	19.2	CBLR065		
		20.00	5000	11.5	CBLR055	5000	11.5	CBLR055	5000	11.5	CBLR055	5000	11.5	CBLR055	5000	11.5	CBLR055		
23.00	5750	10.0	CBLR060	5750	10.0	CBLR060	5750	10.0	CBLR060	5750	10.0	CBLR060	5750	10.0	CBLR060				
23" Cylinder	240/1	27.00	8750	6.6	CBLR058	8750	6.6	CBLR058	5000	11.5	CBLR055	5000	11.5	CBLR055	5000	11.5	CBLR055		
		30.00	10000	5.8	CBLR059	10000	5.8	CBLR059	5000	11.5	CBLR055	5000	11.5	CBLR055	5000	11.5	CBLR055		
		35.00	8750	6.6	CBLR058	8750	6.6	CBLR058	8750	6.6	CBLR058	8750	6.6	CBLR058	8750	6.6	CBLR058		
		40.00	10000	5.8	CBLR059	10000	5.8	CBLR059	10000	5.8	CBLR059	10000	5.8	CBLR059	10000	5.8	CBLR059		
TMB 13" Cylinder	240/1	3.00	3000	19.2	CBLR065														
		6.00	3000	19.2	CBLR065	3000	19.2	CBLR065											
		9.00	3000	19.2	CBLR065	3000	19.2	CBLR065	3000	19.2	CBLR065	3000	19.2	CBLR065					
		11.00	3000	19.2	CBLR065	3000	19.2	CBLR065	3000	19.2	CBLR065	3000	19.2	CBLR065					



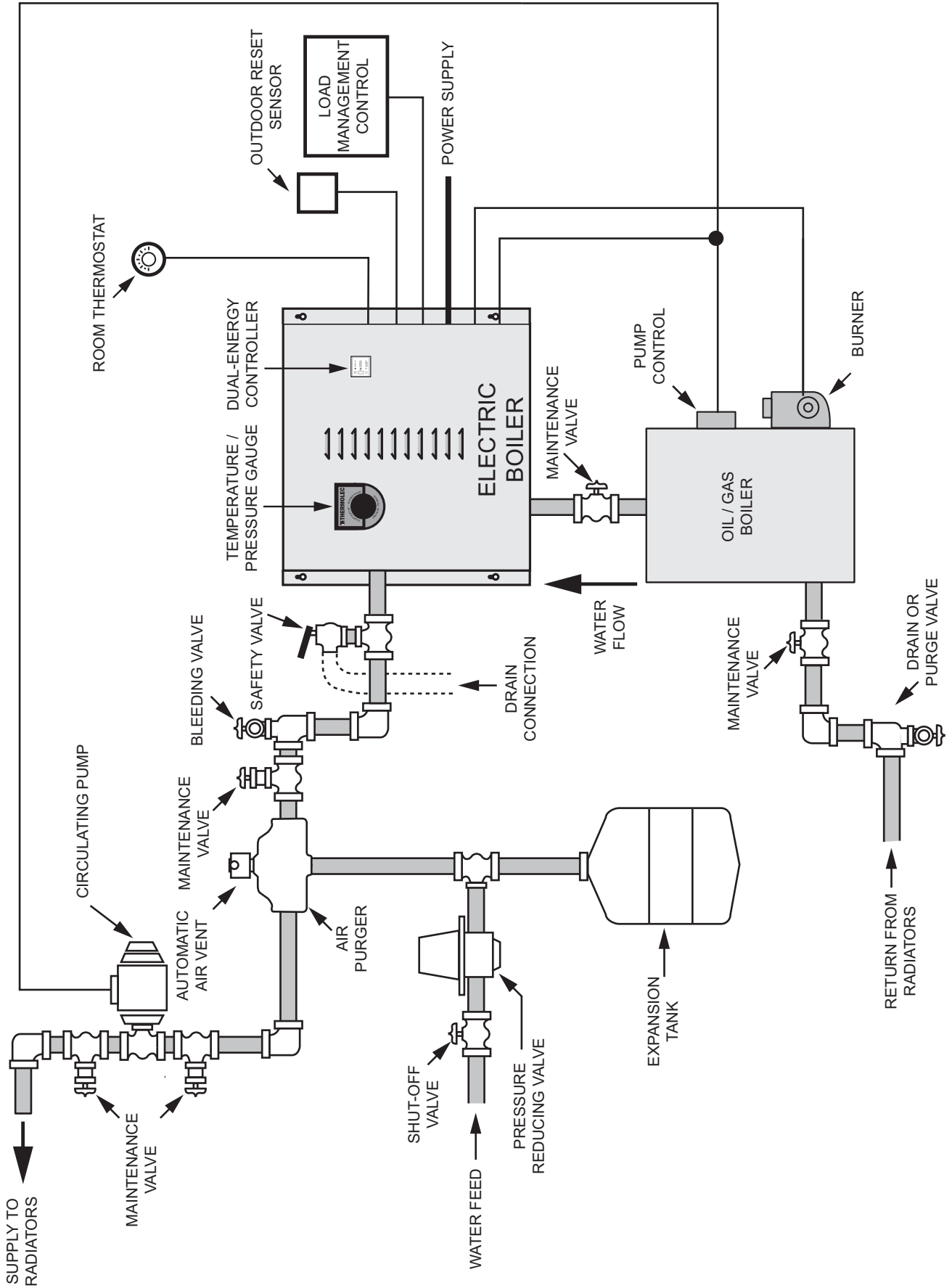
Elements Position, Electric Data and Part

Height	Volts / Phases	Total KW	Volt / element	# élém.	Position 1, 2, 3			Configuration
					Watts	Ohms	Part #	
13" Cyl.	208/3	18.00	208	6	3000	14.4	CBLR051	
		24.00			4000	10.8	CBLR052	
		30.00			5000	8.7	CBLR053	
		36.00			5750	7.5	CBLR054	
23" Cyl.	480/3	18.00	277	3	6000	12.8	CBLR056	
		24.00			8000	9.6	CBLR061	
		30.00			10000	7.7	CBLR062	
		35.00			11600	6.6	CBLR063	
		40.00			13300	5.8	CBLR064	
13" Cyl.	600/3	18.00	347	3	6000	20.1	CBLR057	
		24.00			8000	15.1	CBLR066	
		30.00			10000	12.0	CBLR067	
		36.00			12000	10.0	CBLR068	
		42.00			14000	8.6	CBLR069	

ALL-ELECTRIC INSTALLATION (Illustration A)



DUAL-ENERGY SERIES INSTALLATION (Illustration B)



DUAL-ENERGY PARALLEL INSTALLATION (Illustration C)

