

***APPENDIX “C”***  
***ELECTRIC BOILER***

This data and information in this appendix is provided for informational purposes only. The data and information is provided "as is" with no guarantee as to its accuracy.



**Caloritech**  
INC.

*manufacturers of electrical heating equipment for industry*

**PACKAGED HOT WATER BOILER  
TYPE VWB**

INSTALLATION, OPERATION AND  
MAINTENANCE INSTRUCTIONS  
AND SPARE PARTS LIST

Emco Wpg PO 7433919-00  
VWBF-10-72EM 600v 3ø 72kw  
S/O T01-07134A



M1242 Rev.1

**PACKAGED HOT WATER BOILER - TYPE VWB**

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS,  
AND SPARE PARTS LIST



Not exactly as shown.



For factory inquiries about this boiler  
please have available the catalog  
number, part number, shop order  
number, volts, watts and phase of the  
supplied equipment.

Toronto tel.: 905.829.4422  
(Oakville) fax.: 905.829.4430

Montreal tel.: 514.334.3720  
fax.: 514.334.6491

This information is available on the boiler  
nameplate.

Buffalo, NY tel.: 716.564.0010  
fax.: 716.564.0044

*electrical heating equipment for industry*



2767 Brighton Rd. Oakville, ON, Canada L6H 6J4



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1.0 SCOPE

This manual details the installation, operation and maintenance instructions, and spare parts list for Caloritech Packaged Hot Water Boilers type VWB.

Refer to section 6.0 for specific drawings and bills of material for related equipment supplied under this order.

Your Caloritech hot water boiler was designed and manufactured in Canada to meet all A.S.M.E. and Provincial codes and regulations. When properly operated and maintained, you can expect years of trouble free service.

Boilers up to 252 kW are CSA approved. Special CSA approval for boilers above 252 kW may be obtained at additional cost when requested on the purchase order.

Carefully follow the instructions outlined in this manual to ensure proper installation and performance of your boiler.

2.0 OPERATING PRINCIPLES AND SPECIFICATIONS

Caloritech electric hot water boilers provide safe, versatile, easy to use heat sources for low or high pressure hot water in industrial, commercial, or space heating applications.

Standard units have a design pressure of 100 PSIG (690 KPA) or 160 PSIG (1104 KPA). The pressure relief valve is set specific to the application and the setting is shown on the boiler nameplate.

Three choices of inner shell material coatings allow the VWB to meet most applications.

1. The type VWBF has an uncoated steel shell. The boiler is suitable for use in comfort heating, domestic water heating, freeze protection, process heating etc., where water purity is not an important issue.
2. The VWBC boiler has a sprayed copper inner shell lining for use in water heating applications where a higher purity water is required and a galvanized vessel is unsuitable.
3. The VWBG boiler has a dipped galvanized steel shell. Besides covering all uses of the VWBF, the boiler is also suitable for heating water in commercial water for showers and sinks, and for heating swimming pools.

2.1 Principles of Operation

2.1.1 Your VWB electric hot water boiler utilizes state of the art technology, control components, valves and accessories. Unlike most competitive products, the VWB features vertically positioned heating elements which have many advantages over horizontally positioned elements:

- a. Since the elements are removed from the top, the boiler requires less space.
- b. Vertical hot water boiler elements are less prone to scale build-up, a major cause of element failure.
- c. Boilers with vertical elements, being more compact, have faster response time than boilers requiring larger vessels.

2.1.2 The operation of an electric boiler is easily understood.

- a. A steel vessel (uncoated/coated) is fitted with tubular resistance type heating elements, inlet and outlet connections, a drain/blowdown valve(s), an air vent, a water control mechanism, a pressure relief valve, and a temperature control. These devices are configured with a series of electrical controls for automatic operation.
- b. When the boiler is switched on, an electronic level sensor first detects if a low water level condition exists.  
  
If the sensor detects a low water level condition, the heaters will not energize until water is introduced through the piping system at the boiler inlet.  
  
If a low water level condition does not exist, the sensor will activate the elements and immediately begin to heat the water.
- c. The air vent at the top of the boiler allows air to exit the boiler as it fills.  
  
If air and other gases are not eliminated from the flow circuit, they may cause failure of the heating elements and noise in the piping circuit.

2.0 OPERATING PRINCIPLE AND SPECIFICATIONS CONT'D  
2.1 Principle of Operation Cont'd

2.1.2 Cont'd

- d. In forced recirculating systems the necessary flow through the boiler is maintained by a circulation pump (optional).

The energy input by the pump must equal the energy loss by fluid flow through the system. Note that the energy head requirements for a closed loop system are established only by the friction through the piping, fittings, heat exchangers, and control valves. For calculation purposes, pressure drop through the boiler can be assumed to be the equivalent of 10 feet of standard inlet piping size.

The required flowrate through the system is calculated by:  $\frac{\text{Imp. Gal.}}{\text{min.}} = \frac{\text{Boiler kW's} \times 5.69}{\text{temp. rise (°F)}}$

For U.S. GPM divide the answer by 0.8327.

Flow through the boiler enters at the inlet (towards the bottom of the boiler) and exits through the outlet (towards the top of the boiler).

- e. The boiler is controlled by sensing water temperature.

An adjustable temperature controller will switch off the heaters when the set temperature is reached.

In all Caloritech hot water boilers the temperature controller is backed up by a high limit temperature controller (manual reset).

In the event that the boiler temperature overshoots the high limit setpoint, the controller will trip and de-energize all the heating circuits.

The high limit temperature controller must then be manually reset before the heaters will come back on.

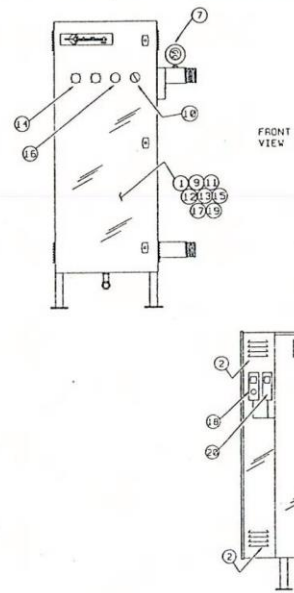
**Note: Cycling on the high limit is unacceptable. The cause of a high limit trip must be determined and rectified before resetting the limit.**

- f. All boilers are fitted with a pressure relief valve which will open if the pressure approaches a setpoint chosen to be well below the withstand pressure of the boiler and system components.
- g. Drain and/or blowdown valve(s) located at the bottom of the boiler are provided for maintenance purposes. Boilers should preferably be installed with flanged connections or unions with stop valves on the inlet and outlet to allow the boiler to be drained without draining the entire system and to simplify servicing.
- h. There will come a time (usually measured in years) when the boiler shell or piping will wear away or corrode. Periodic inspections of the vessel interior will give advanced notice of an impending problem. The local boiler inspection authority is available for guidance in these instances.

2.0 SPECIFICATIONS CONT'D

2.2 Standard Boiler Accessories

The following shows the standard boiler accessories for your VWB hot water boiler.



STANDARD BOILER ACCESSORIES

Det. No.	Description
1	Insulated ASME designed pressure vessel
2	Vented control cabinet
3	Pressure relief valve
4	Inspection and cleanout holes
5	Pressure gauge c/w isolating stopcock (not shown)
6	Air vent
7	Temperature gauge
8	Drain blowdown valve
9	Flanged heaters c/w low watt density elements
10	Control circuit on/off switch
11	Control circuit transformer (fused)
12	HRC power fusing
13	Magnetic contactors
14	Indicating pilot lights
15	Electronic low water control
16	Push to reset button for low water simulation
17	On/off staging up to 95 amps
18	Proportional temperature controller for units over 95 amps
19	Staging controller with detail no. 18
20	High temperature controller

2.3 General Specifications

Listed below is a summary of the approximate piping sizes and volumes for the various standard boiler types and sizes within this series. Minimum clearance requirements are shown in section 3.0.

STANDARD DESIGN PRESSURES ARE 100  
PSIG (690 KPA) OR 160 PSIG (1104 KPA)

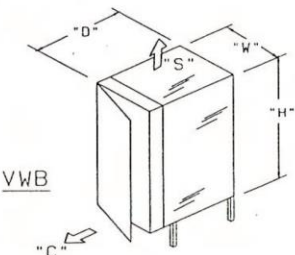


TABLE 1 - HOT WATER BOILER GENERAL SPECIFICATIONS

MODEL NO.	MAX. KW	DIMENSIONS IN (MM)					VESSEL OPENINGS (NPT)*		NORMAL WATER VOLUME IMP. GALLONS (LITRES)
		H	W†	D	C	S	INLET/OUTLET	DRAIN VALVE	
VWB-08	144	54 (1372)	20 (508)	31 (788)	20 (508)	36 (914)	2	3/4	5.3 (24)
VWB-10	202	54 (1372)	16 (406)	24 (610)	15 (381)	36 (914)	2	3/4	11.3 (51.4)
VWB-20	585	64 (1626)	26 (660)	36 (914)	26 (660)	36 (914)	4	1 1/4	46.5 (212)
VWB-30	1080	66 (1676)	38 (965)	47 (1194)	38 (965)	36 (914)	4	1 1/2	105 (478)
VWB-42	1890	90 (2286)	72 (1829)	51 1/2 (1308)	48 (1219)	36 (914)	8	1 1/2	206 (936)

\* INLET AND OUTLET FLANGED ABOVE 3" NPT  
† WIDTH 'W' MAY BE 8" (200 MM) MORE FOR HIGHER AMPERAGE UNITS



2.0 SPECIFICATIONS CONT'D

2.4 Other Optional Equipment

Caloritech offers the following as options for packaged hot water boiler systems. Check to see that optional equipment has been supplied as ordered.

- ☐ Inlet and outlet valves (gate)
- ☐ Auxiliary low water cutoff
- ☐ High temperature alarm
- ☐ Low temperature alarm
- ☐ Audible alarm c/w reset
- ☐ Pilot light per heating stage
- ☐ Manual OFF/AUTO switch for heating stage
- ☐ Voltmeter c/w three position selector switch
- ☐ Ammeter c/w three position selector switch
- ☐ kW hour meter
- ☐ Main power disconnect switch
- ☐ Main power automatic breaker
- ☐ Safety door interlock switch
- ☐ Proportional temperature controller (std. over 135 kW)
- ☐ Electronic progressive sequencer
- ☐ Circulating pump
- ☐ Motor starter
- ☐ Ground fault indicator
- ☐ Spare components
- ☐ Higher kW capacities
- ☐ Non-listed voltages
- ☐ Single phase
- ☐ Higher pressure rating
- ☐ Lined vessels (check factory)
- ☐ Dual energy system interface
- ☐ Indoor/outdoor temperature reset controller
- ☐ Auxiliary high temperature cutoff
- ☐ High or low pressure cutoff
- ☐ Flow switch

3.0 INSTALLATION

3.1 General

The boiler shall be installed by qualified personnel in accordance with the instructions contained in this manual. Furthermore, compliance with all local building and safety codes in your area is necessary.

3.2 Pre-Installation

3.2.1 Inspect the boiler for possible damage due to shipping and handling. Claims for shipping damage shall be placed with the carrier, and should be reported immediately to them.

If damage has been sustained during shipping that may effect the safe and reliable operation of the boiler, contact the sales office to discuss corrective action.

For factory inquiries about this boiler please have available the catalog number, part number, shop order number, volts, watts, and phase of the supplied equipment. This information is available on the boiler nameplate.

Do not return the unit unless advised, since field repair may be the preferred course of action.

Returns must include a Caloritech return authorization form available from the Caloritech sales office where the boiler was purchased.

3.2.2 Check the boiler nameplate data to ensure that it corresponds to the supply characteristics (i.e. - voltage, phase, frequency, wattage and pressure relief valve setting).

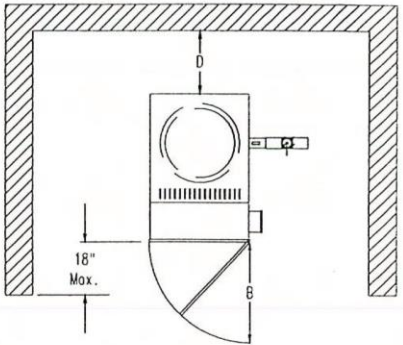
3.2.3 Consult local codes for specific requirements on the installation of the electric boiler.

3.0 INSTALLATION CONT'D

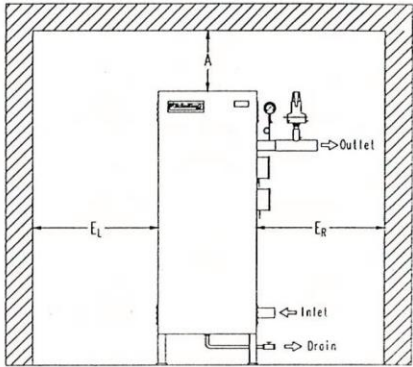
3.3 Mounting

3.3.1 The boiler must be positioned on an adequate base, preferably concrete, sufficient to support its in-service weight, and then levelled and secured in place.

3.3.2 Adequate clearance on all sides of the boiler is required for access and servicing. Please refer to the following diagram and table for minimum clearances.



Cat. No.	Minimum Clearances				
	A	B	D	EL	ER
VWB-08	30"	16"	24"	24"	24"
VWB-10	36"	22"	24"	24"	24"
VWB-20	36"	32"	24"	24"	24"
VWB-30	48"	38"	30"	24"	30"
VWB-42	48"	38"	30"	24"	30"



3.4 Plumbing

Refer to drawings in paragraph 6.1 for size and location of water inlet, outlet and other relevant openings. Ensure that all plumbing connections are made according to local regulations and applicable codes.

3.4.1 Inlet and Outlet

For single boiler installations, stop valves are normally required on the inlet and outlet connections of the boiler to allow the boiler to be drained and cleaned without having to drain the entire system.

When the boiler is located above the rest of the system, these valves may not be required. However, they are recommended.

For multiple boiler installations in a single system, stop valves are always required at the inlet and outlet piping connections.

**For connection:** Pipe the system return piping to the boiler inlet (toward the bottom) and the system inlet piping to the boiler outlet (toward the top). **Never reverse the two.**

3.4.2 Make-up Water

Make-up water may be introduced into the boiler through the return piping system. The make-up water piping requires a check valve and a stop valve.

A fill valve may be utilized to control minimum system pressure.

**For connection:** Pipe the make-up water piping, through a check valve, then a stop valve at the system return piping.

3.0 INSTALLATION CONT'D  
3.4 Plumbing Cont'd

3.4.4 Pressure Relief Valve

The boiler is equipped with a pressure relief valve to prevent the boiler from exceeding the maximum allowable working pressure.

**For connection:** Pipe the outlet from the pressure relief valve to a suitable drain away from other equipment, aisleways or personnel. Note that you must not reduce the piping size from the pressure relief valve, nor can you install other valves or plugs in this plumbing.

Discharge pipes should be short and straight as possible. A union may be installed near the valve outlet, and an elbow may be installed downstream from the union.

3.4.5 Blowdown Piping

When the boiler pressure exceeds 15 PSIG (103 KPA) or 65°C (149°F) most jurisdictions prohibit the blow-off from the boiler from being directly discharged into the sewer system. However, in all cases, you must check with local authorities to ensure compliance with local regulations prior to the connection of any blowdown piping to any sewer system.

**For connection:** Pipe the blowdown valve(s) to the inlet of a blowdown tank or a suitable drain (as appropriate).

3.4.6 Circulation Pumps

If a circulation pump (optional) was not supplied with your boiler, select a pump whose energy head exceeds the calculated energy head for the system at the design flowrate. Flowrate can be adjusted down with a globe valve.

**For connection:** Pipe the inlet and outlet of the circulation pump to the piping system. Ensure that the pump outlet is on the boiler inlet side of the piping system. Pipe the globe valve in parallel with the pump to allow throttling of the flowrate.

3.4.7 Expansion Tanks

Some closed systems require an expansion tank which is available as an option.

3.4.8 Drain and Shut-off

All low points in the piping system should be equipped with drains. Provisions should be made for separate shut-off and drain valves on individual equipment so that the entire system does not have to be drained for service of a particular item.

3.4.9 Air Control and Venting

High points in the piping system should be vented with automatic or manual air vents.

3.4.10 Provisions for Dismantling

Utilization of unions on the inlet and outlet piping connections may simplify future service requirements.

3.4.11 Insulation

To conserve energy and protect personnel hot piping loops should be insulated after testing for leaks.

3.0 INSTALLATION CONT'D

3.5 Electrical

The heater must be wired by qualified personnel in strict compliance with all codes and regulations.

Your Caloritech packaged hot water boiler is factory pre-wired. Refer to the wiring diagram included in paragraph 6.1. Field electrical connections are to be made as indicated on this drawing.

3.5.1 Power Supply

With the boiler "on-off" switch in the "off" position and the main electrical supply open, connect the power feed lines from a fused disconnect or breaker to the terminals marked L1, L2, and L3 of the boiler disconnect, breaker, or power splitter, whichever is supplied. See paragraph 6.1 for schematic diagram.

3.5.2 Grounding

The boiler must be properly grounded. Attach a suitable ground wire to the ground connection point in the control cabinet.

4.0 START-UP AND OPERATION

The following procedures should be performed in sequence to eliminate problems on start-up.

4.1 Start-up

It is presumed that all electrical wiring and plumbing has been checked prior to this start-up procedure.

4.1.1 Make sure that the hot water boiler valves and switches are in the following positions:

• Water outlet	-	Open
• Water Inlet(s)	-	Open
• Drain valve(s)	-	Closed
• Blowdown valve(s)	-	Closed
• Water make-up/feed water	-	Open
• Circulation pump	-	Off
• Main power	-	Off
• Service loop isolating valves	-	Open

4.1.2 Allow the boiler and system to completely fill and vent.

4.1.3 Adjust the temperature controller to its lowest setting, by turning the dial on the front of the control.

4.1.4 Make sure that the electrical control panel door is closed.

4.1.5 Ensure that the system (external to the boiler) is fully prepared for operation and that personnel are aware that the system is being started up.

4.1.6 Start the circulation pump (if included\*). Adjust the flowrate through the system to the desired flowrate using the globe valve piped in parallel with the circulation pump.

\*some sidearm systems do not require a pump.

4.1.7 Check the system piping for leaks.

4.1.8 The presence of air in the system is indicated by noise in the piping circuit. Any air should be vented before proceeding with the start-up. Air venting procedures may require repeating.

4.0 START-UP AND OPERATION CONT'D

4.1 Start-up Cont'd

4.1.9 Move the boiler "on-off" switch to the "on" position.

The green power light should be illuminated and the heating elements should energize provided that the low water level switch is not tripped.

If the red "low level" light is on, then the level sensor is detecting a low water level condition, and will not energize the elements. When the boiler fills, the light should shut off and the elements will energize.

4.1.10 Simulate a low water condition by depressing the "push-to-test" button.

You should hear the boiler contactors switch open and the red "low level light" should illuminate.

The noise (caused by the contactors switching open) indicates that the elements have been turned off and the light indicates the control is working.

4.1.11 Set the temperature controller (by turning the dial on the front of the controller) to the desired temperature setting.

Note that the temperature control should be set lower than the high limit controller setting. The high limit controller is set to prevent exceeding the maximum allowable temperature as shown on the boiler nameplate.

4.1.12 Set the temperature differential (by removing the controller cover and turning the small dial on the side) to the minimum setting. Note that fine tuning of the temperature control may be required for your specific application.

4.1.13 The pointers on the pressure/temperature gauge (at the outlet of the boiler) should begin to rise until the temperature reaches the setpoint of the temperature controller. At this point the controller will de-energize the heaters.

4.1.14 Do a final check for leaks and functionality of the boiler and system.

4.1.15 The system should now be operational.

4.1.16 It is not normally necessary to pre-boil water to clean the heating elements or the interior of the vessel. They have already been semi-cleaned prior to installation and there is no excessive grease or oil inside the boiler.

However, if super-clean conditions make pre-boiling necessary, ensure that the detergents used are not harmful to brass, copper, silver, steel or stainless steel and that they are rinsed from the boiler prior to system start-up.

4.2 Operation

4.2.1 If a proper maintenance schedule is followed, all that is required is to turn the boiler on for it to function normally.

Before restarting the boiler repeat 4.1 as required.

4.2.2 Although the boiler can operate safely unattended, it is best to shut the boiler down when it is not required over evenings, weekends or other prolonged periods. This will save energy.

4.2.3 Water treatment may be necessary in some hard water areas since excessive scale buildup on internal boiler components will result in heating element failure and costly repairs. Refer to paragraph 5.4 for a discussion on this subject.

5.0 MAINTENANCE

Caloritech hot water boilers, when properly maintained, will provide many years of trouble free service. Actual life and ongoing maintenance costs will be governed by the application. To establish a good preventative maintenance program we recommend that the operator(s) follow these maintenance procedures.

5.1 Blowdown

Blowdown is an essential part of boiler maintenance. A regularly followed blowdown schedule will add years to the life of your boiler.

The blowdown schedule should be based on the mineral content of the water and whether the boiler is used in a closed or open system. For softer water conditions, or for closed systems, weekly blowdown may be sufficient. In open systems, with hard water conditions, daily blowdown is recommended.

Water treatment does not eliminate the need for blowdown.

5.2 Manual Blowdown Procedure

5.2.1 De-energize the boiler.

5.2.2 Close the water inlet valve.

5.2.3 Open the main drain blowdown valve.

5.2.4 Allow the boiler to drain for 2 minutes then close the valve.

5.2.5 Open the water inlet valve.

5.2.6 Restore the boiler "on-off" switch to the "on" position.

5.3 Electrical Verification

Caution: To avoid risk of electrical shock open the power supply to the boiler prior to and during electrical servicing.

5.3.1 All electrical connections in the power circuit should be inspected and re-tightened periodically.

5.3.2 Every four months the following verifications are to be made.

- Check the operation of the low water cutoff control by using the "push-to-test" button. When depressed, all energized heating circuits should immediately go off until the button is released.
- Remove, clean and reinstall all controller electrodes. If more than one electrode is supplied, to ensure that the wires are re-connected to the correct terminals, we recommend that the first electrode be removed, cleaned and reinstalled; then the second and then the third.
- Check all fuses for continuity.
- Visually inspect all conductors and contactors for signs of overheating.
- Ensure that all electrical connections are tight.



5.0 MAINTENANCE CONT'D

5.4 Mechanical Verification

5.4.1 Scale Buildup

Even with regular blowdown, boiler systems involving the heating of large volumes of water may result in a significant amount of solids being deposited within the shell and on the heating elements. Regularly inspect the heating elements through the manhole or hand-hole. Maintenance frequency will depend on water conditions, operating conditions and water treatment used.

5.4.2 Heavy scale buildup on the heating elements results in higher sheath running temperatures resulting in lower heater life and premature failure. This type of failure is not covered under your warranty. Ensure that the following procedure is completed after the first month of operation and as required thereafter.

- a. If on inspection, the heating elements are heavily scaled (1/16" or more buildup), all elements require removal and cleaning. Refer to paragraph 5.5.
- b. Make sure the safety valve is in good working order.

5.5 Cleaning Procedures for Heavy Scale Buildup

5.5.1 Mechanical

- Power off the boiler by opening the main disconnect.
- Remove the flange heaters from the boiler. Note that the heater gaskets may not be reusable and replacement gaskets should be on hand. Remember to mark the electrical wire connections and nozzle location for each heater.
- Remove scale by scraping with a wire brush, a dull metal blade, or by light sandblasting. If sandblasting, take care not to damage the element sheath since normal wall thickness is .030" to .035" (0.8 mm)
- Reinstall the heaters, preferably after fitting with new gaskets. Ensure that all plumbing connections are water tight.
- Reconnect the main power and restart the boiler.
- Check once more for leaks when the boiler is up to pressure and temperature, and correct if necessary.

5.5.2 Chemical

Due to regional variations in water content, Caloritech cannot recommend the type of chemical cleaner to be used to descale the heater elements. Consult a specialist in boiler water treatment for any questions on this subject.

Typically chemical removal of scale would proceed as follows:

- Power off the boiler by disconnecting the power at the mains.
- Add approved descaling solution to cover the elements. This can be done by removing a small flange at the top of the boiler or a heater if no spare openings are left.
- Allow the heater elements to soak until scale is loosened from the element sheath.
- Neutralize the descaling solution with an appropriate solution.
- Drain the boiler
- Flush the boiler with fresh clean water at least five times.
- Just after the boiler is restarted, a full blowdown procedure is recommended.

Note: If chemical removal of scale is required, ensure that the descaling solution used is not harmful to the boiler materials as listed in article 4.1.16. Also ensure that the chemicals are properly rinsed from all components.

6.0 DRAWINGS AND LITERATURE

6.1 Drawings

The following mechanical and electrical drawings have been included in this manual:

- ☐ Boiler Assembly
- ☐ Electrical Schematic

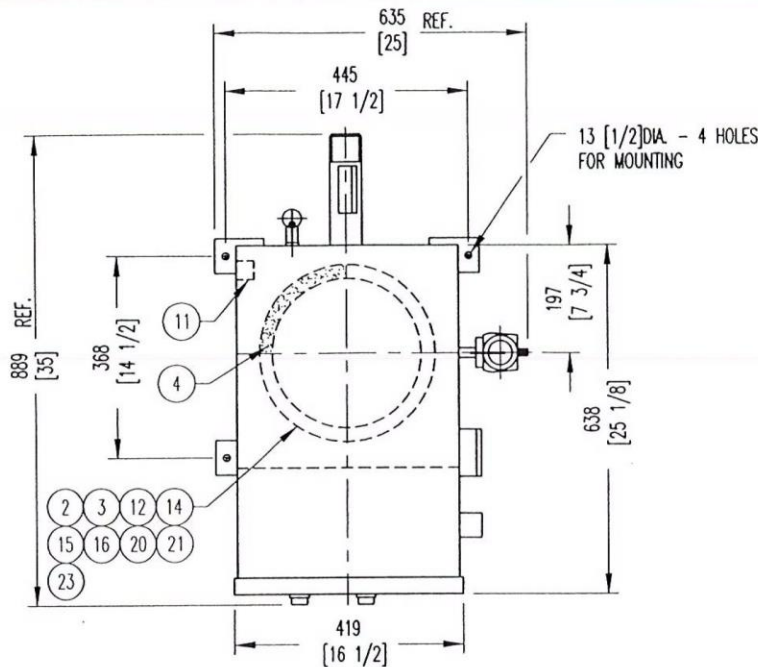
6.2 Literature

The following manufacturers' literature, as required, may be included with this manual.

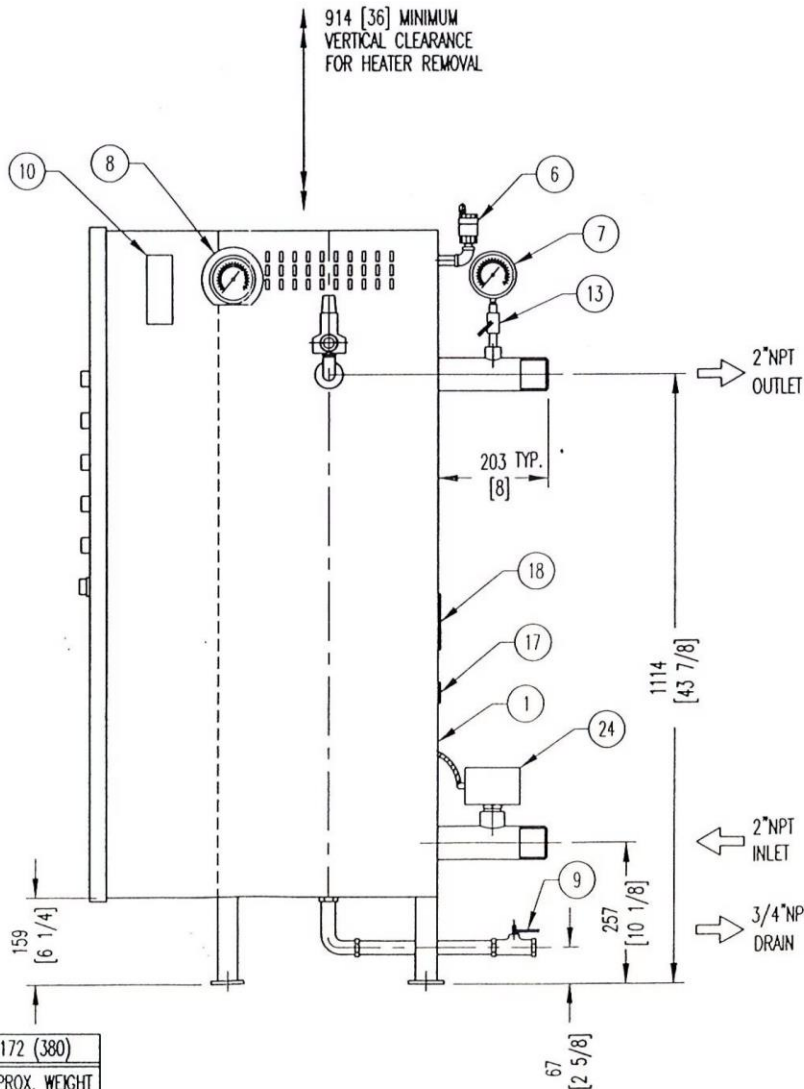
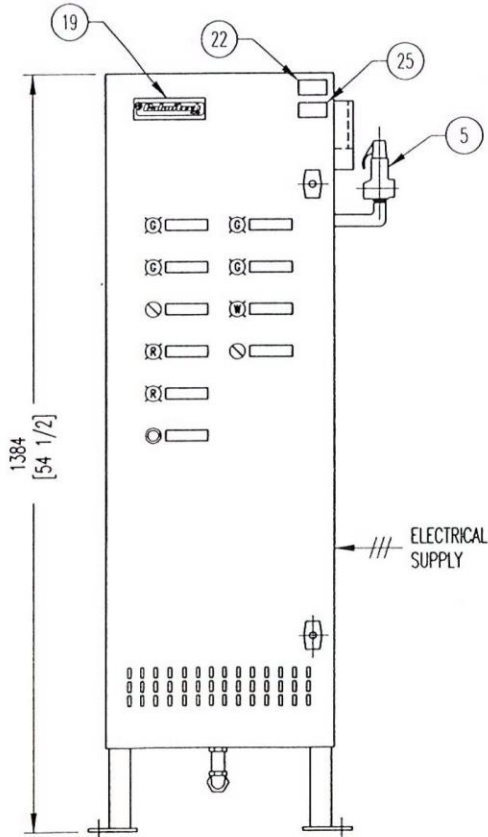
- ☐ T678B Dual bulb two stage temperature controller - Honeywell
- ☐ T475A Outdoor reset control - Honeywell
- ☐ R26 Electronic proportional sequencer and Addendum - Johnson Controls
- ☐ L4008A,B,E,I; L6008A,G,H Aquastat® controllers - Honeywell
- ☐ T775A,B,C,D Remote temperature controller and Addendum - Honeywell
- ☐ T675A,B; T687A temperature controllers - Honeywell
- ☐ T991A Proportional temperature controller - Honeywell
- ☐ T991B Proportional temperature controller - Honeywell
- ☐ F61 Series standard flow rate switch - Johnson Controls
- ☐ B71289-02 Thermostat - SPST - Caloritech
- ☐ B71290-02 Thermostat - SPST - Caloritech



NO.	REVISION	DATE	BY/ PAR
1	TEMPERATURE CONTROLLER (DET.10) RESET RATIO AND PART NO. ADDED.	NOV.20/01	QJE



- NOTES:
- 1 DESIGNED AND BUILT IN ACCORDANCE WITH ASME CODE SECT. IV, 1998 EDITION AND 2000 ADDENDA c/w CRN FOR MANITOBA.
  - 2 HYDROSTATIC TEST OF BOILER ASSEMBLY: 207kPaG (30PSIG)
  - 3 ELECTRODE LENGTH (E1): 32 [1 1/4]
  - 4 TEMPERATURE CONTROLLER (DET.10) RESET RATIO 1.0 TO 1.0.
  - 5 ALL DIMENSIONS IN MILLIMETERS [INCHES IN BRACKETS].



25	CAUTION LABEL	TWO SOURCES OF SUPPLY	TSK3308-01	1
24	FLOW SWITCH		F61KB-11	1
23	FLANGE, BLIND 1/4"THK.		A10540-01	3
22	CAUTION LABEL		C10090-43	1
21	IMMERSION WELL FOR DET.10		112622AA	1
20	IMMERSION WELL FOR DET.8		7-362	1
19	NAMEPLATE, LOGO		A10180-02	1
18	NAMEPLATE, CSA		A10158-04	1
17	LABEL		C10263-06	1
16	BOLT, 5/16-18UNC x 3/4"LG		SA-193 B7	36
15	GASKET		B10153-02	9
14	ELECTRODE & BRASS ROD		3B1A	1
13	STOPCOCK 1/4"NPT 600LB WOG, BALL		FIG.171N	1
12	IMMERSION WELL FOR DET.11		A71291-01	1
11	HIGH TEMP. CONT. 233°F	AUTO RESET	B71289-02	1
10	TEMPERATURE CONTROLLER		T991B 1003	1
9	DRAIN VALVE 3/4"NPT 600LB WOG, BALL		FIG.171N	1
8	TEMPERATURE GAUGE (30-240°F)		3 1/2"DIA. PX7	1
7	PRESSURE GAUGE (0-60PSI)		3 1/2"DIA. Q236	1
6	AIR VENT (1/4")		FV-4M1	1
5	SAFETY VALVE SET: 30PSIG		FIG.174A 3/4"x3/4"	1
4	INSULATION (2")		F.S.K. FIBERGLASS	AS REQ'D
3	HEATER 600V, 3#, 12kW		CX110063-05W	6
2	VESSEL 10"DIA. 160MAWP		D12950-02	1
1	SHEET METAL		D12992-01 TO 10	1
DET	DESCRIPTION	PART NO.	QTY	QTY

BILL OF MATERIAL / LISTE DE MATERIEL			
TITLE: HOT WATER BOILER			
VWBF-10-72EM 600/3/60 72kW			
NO:	B14843	SHEET 1	1
REF:	EMCO SUPPLY LTD. P.O. NO: 7433919-00		REV.
S.O:	T01-07134A	TOLERANCE UNLESS NOTED OTHERWISE	
SCALE:	NTS	± ANGULAR	± DECIMAL
ECHELLE:	NTS	± 1/4" FRACT.	± 6mm METRIC
DRAWN BY:	J.A.	OCT.19/01	
CHECKED BY:	T.X.	OCT.19/01	
APPROVED BY:	S.D.K.	OCT.19/01	
DIST:	G	DATE	



01	VWBF-10-72EM	600	3	60	72	3	50	WATER/GLYCOL	82 (180)	121 (250)	103 (15)	1103 (160)	172 (380)
M	CATALOG NO.	VOLTS	PH	Hz	KW	NO.OF STAGES	W/IN <sup>2</sup>	FLUID	FLOW RATE	OPERATING TEMPERATURE °C (°F)	DESIGN PRESSURE kPaG (PSIG)	DESIGN	APPROX. WEIGHT KG (LB)

