COMBOMAX™ Ultra 12

Electric boiler with integrated instantaneous water heater.

Power capacity 4.5 kW to 12 kW :
208/240 Volts (single phase)

INSTALLATION, USE AND CARE MANUAL

Your *COMBOMAX® 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.

THERMO 2000 INC. rev. : September 2013
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Section 1 : Technical specifications

Table 1: Boiler specifications 240* Vac/1ph (3 wires L1/L2/N):

Model	Power kW/Mbtu à 240v	Electric heating elements	Current draw à 240v	Suggested electrical cable at 240V**		Fuse size
				cu	al	
COMBOMAX ULTRA 12-4.5	4,5 / 15,3	1 x 4,5kW	19	12	10	25
COMBOMAX ULTRA 12-6	6 / 20.5	2x3kW	25	8	6	40
COMBOMAX ULTRA 12-7.5	7,5 / 25,6	1x4.5+1x3kW	31	8	6	40
COMBOMAX ULTRA 12-9	9 / 30,7	2x4,5kW	38	8	6	50
COMBOMAX ULTRA 12-12	12 / 41	2x6kW	50	6	6	70

*Can be also connected on an electrical supply at 208V/1ph giving 75% of the nominal capacity at 240V.
**Add amperage of the pump when required (5amp./1/6hp max). Local Electrical codes may require different cable gauge according to the type of installation.

Maximum operating pressure on the tank: 207kPa / 30psi
Tank temperature range : 10°C to 90°C (50°F to 190°F)

Maximum pressure domestic water: 1033kpa (150psi)
Maximum domestic hot water temperature : 82°C (180°F)

Table 2 : Dimensions:

Height : 1537mm (60-1/2'')
With : 559 mm (22'')
Depth : 625 mm (25-1/2'')
Plumbing connections :

- Fresh water inlet : 3/4"NPT F
- Domestic hot water outlet : 3/4"NPT F
- Expansion tank : 1/2"NPT M
- Heating, supply : 1'' NPT F
- Heating return : 1'' NPT F

General Safety Precautions

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.

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 COMBOMAX™ Ultra 12 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 À VÉRIFIER

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.**
- **862 kPa (125 psi) domestic hot water pressure relief valve.**
- **Tank and domestic hot water heat exchanger drain cocks.**
- **Thermo manometer (heat and pressure indicator).**
- **Automatic air vent.**
- **83 kPa (12 psi) Tank pressure regulator.**
- **Check valve with vacuum breaker.**
- **Thermostatic mixing valve on DHW**
- **Electric heating elements**
- **ULTRA SMART™ control.**

Ezpansion tank is not included. This component must be size according to the heating system.

WARNING

The COMBOMAX™ Ultra 12 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 domestic and commercial installations will include a pressure relief valve limiting the operating pressure to 207 kPa (30 psi).

This *COMBOMAX™Ultra 12* electric boiler is designed for a maximum operating temperature of 88°C (190°F). It is designed for hot water heating system only. When allowed by local regulation a 50% water and propylene-glycol blend may be used on installation with fresh water supply pressure above 240 kPa (35 psi). A particular check valve avoiding back flow to potable water may be required by local authorities.

3.2 LOCATION

The *COMBOMAX™Ultra 12* boiler should be installed in a clean, dry location. Long hot water lines should be insulated to conserve water and energy. The boiler and piping should be protected from exposure to freezing.

The *COMBOMAX™Ultra 12* boiler must be installed levelled and vertically. Adjustable legs allow for levelling and stability.

The *COMBOMAX™Ultra 12* 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. If the boiler is to be installed in a restaurant or other location where the floor is frequently cleaned, it must be elevated to provide at least 150 mm (6") clearance from the floor as per NSF International recommendations.

The room temperature must be maintained between 10C (50F) and 33°C (90°F).

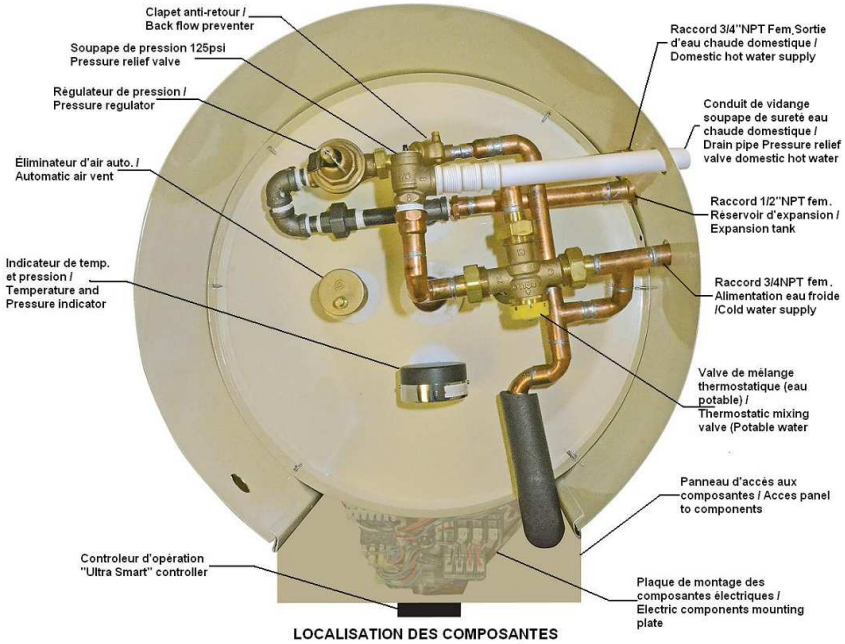
3.3 CLEARANCE

The minimum clearances required for proper inspection and servicing are as follows:

Table 4: Clearances

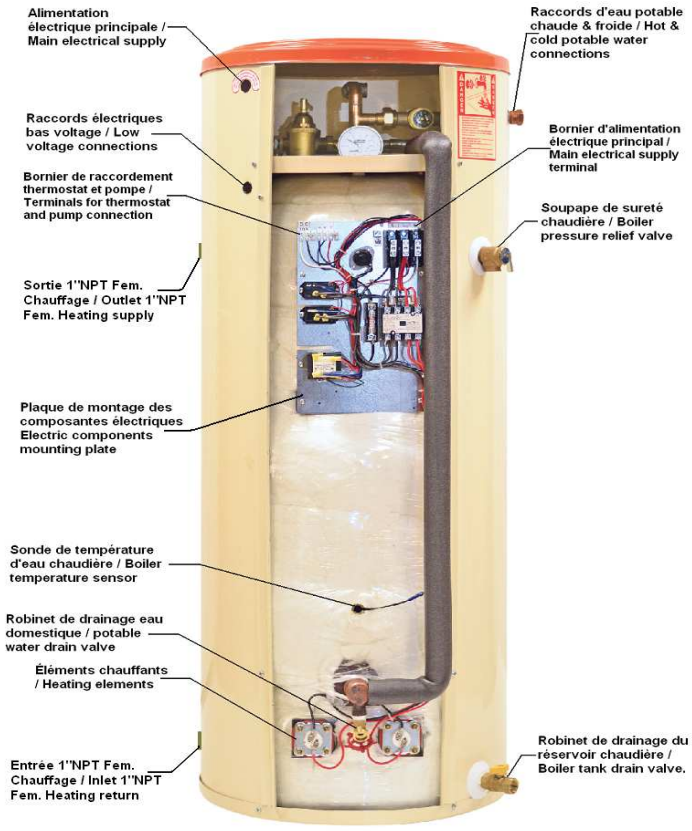
Left side	0 mm / 0"
Right side	0 mm / 0"
Top	100 mm / 4"
Front	400mm / 16"
Back	0mm / 0"

Figure 1 : Top view, components identification and their location



LOCALISATION DES COMPOSANTES
(VUE DE DESSUS COUVERCLE RETIRÉ)
LOCATION OF COMPONENTS
(TOP VIEW WITHOUT COVER)

Figure 2 : Front view, components identification and their location :



LOCALISATION DES COMPOSANTES
(Panneau d'accès retiré)
LOCATION OF COMPONENTS
(Front panel removed)

Figure 3 : Basic installation diagram for a radiant floor heating system.

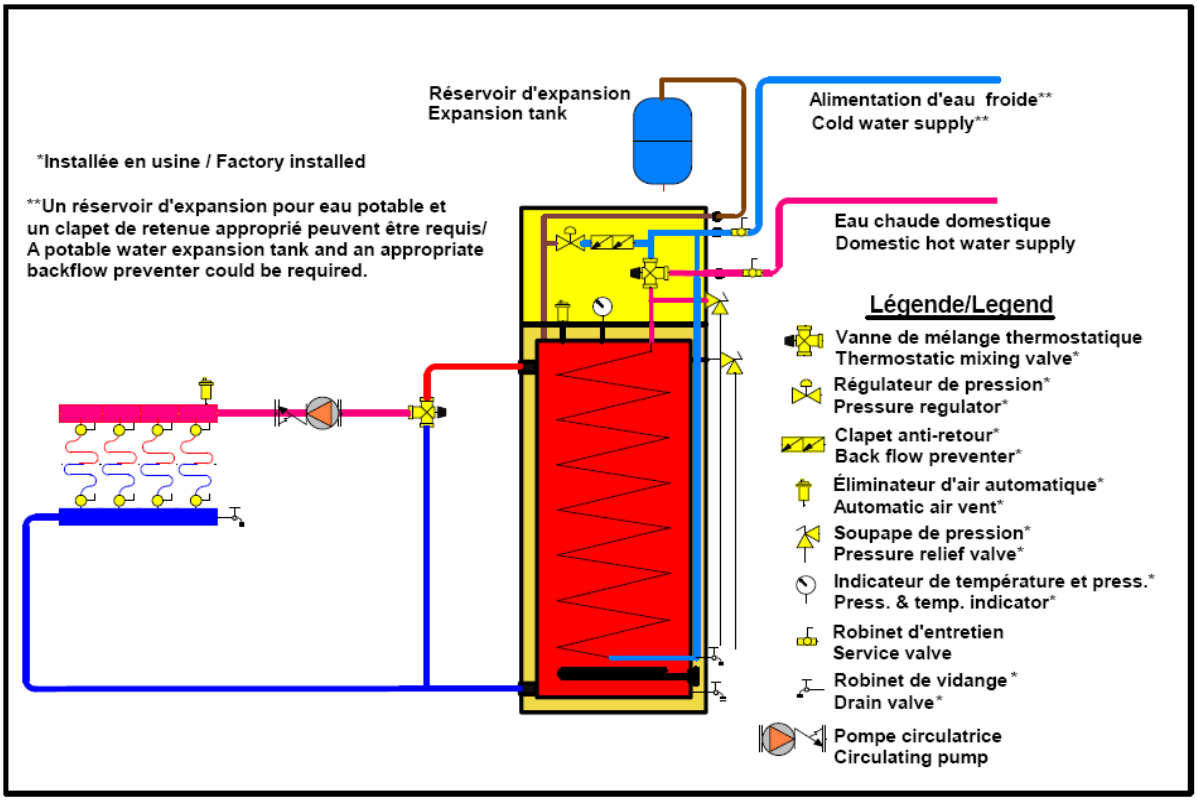
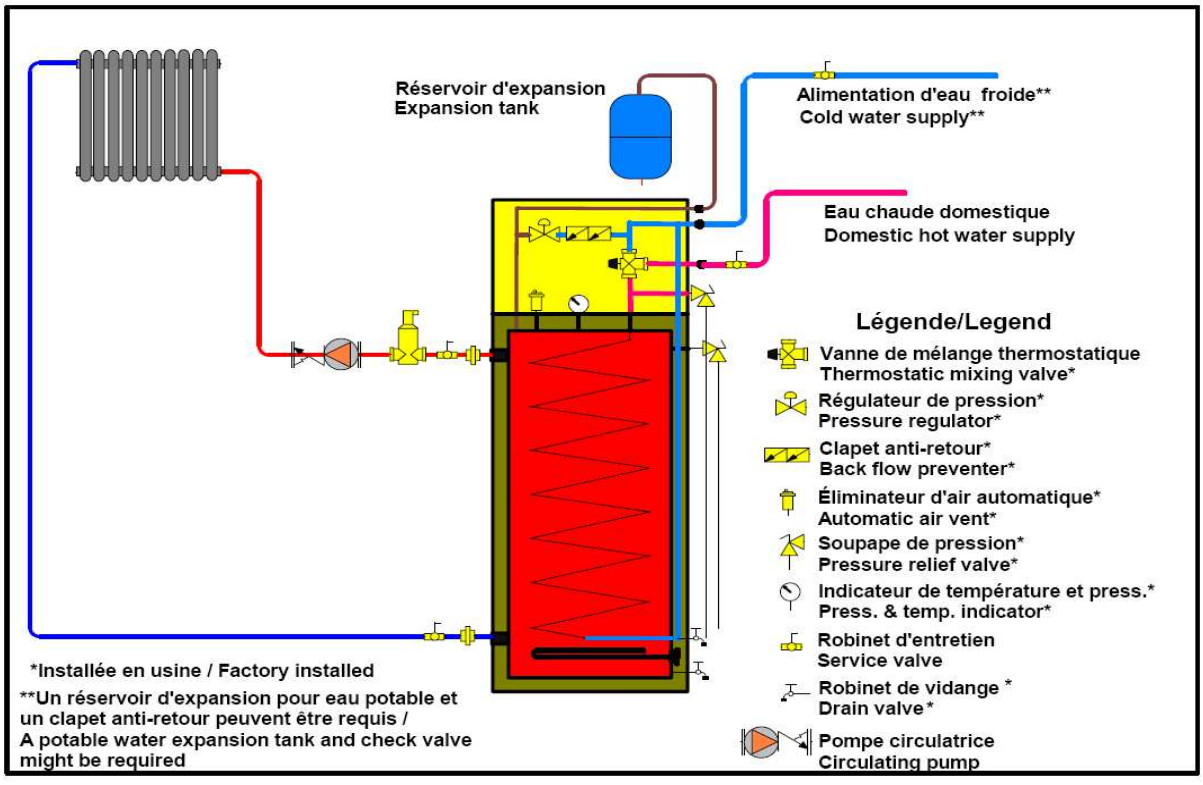


Figure 4 : Basic installation diagram for a radiator installation



3.4 SYSTEM SETUP

Figures 1, 2, 3 and 4 indentifies 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.

3.5 HEATING WATER CIRCUIT

3.5.1 Connecting the heating water piping

The boiler heating supply and return connections are located on the left side (when facing the unit) and are 1" NPT F.

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.

Never plug the pressure relief valve to avoid creating a hazardous situation.

3.5.2 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 minimize gravity flow and heat loss during non-draw periods. Modern circulators are typically provided with spring loaded check valve that will provide adequate protection.
If the heating system uses motorized zone valves, these will provide adequate protection.

3.5.3 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.
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.

3.5.4 Operating pressure control & expansion tank

The boiler is equipped with a factory installed, pressure regulating make-up water equipped with a flow check valve. This make-up water allow filling of the boiler tank and the heating system. It will also maintain a minimal operating pressure cold pressure of 83 kPa (12 psi). When operating the COMBOMAX™ Ultra 12 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 role is to compensate for the heating system water expansion due to its rise in temperature.
The expansion tank should have a minimum capacity of 17,5l (4.6 usg). Lager expansion tank could be required base on the heating system size (wetted volume) or if the operating pressure rise above 193 kPa (28 psi).
Expansion tank is generally wall or ceiling mounted and is directly connected to the boiler tank using the ½" NPT M connection provided.

3.5.5 Automatic Air Vent

The COMBOMAX™ Ultra 12 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.

3.5.6 Heating pump

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

3.5.7 Low temperature heating (Radiant floor)

A thermostatic mixing valve or a similar device, offering the same function, must be installed on a heating system operating at less than 70°C (160°F) like radiant floor system. The thermostatic mixing valve limit the heating fluid (water) supplied to the system at a preset appropriated temperature, by mixing hot heating fluid (water) supplied by the COMBOMAX™

Ultra 12 to the relatively cold heating system fluid (water) coming back from the radiant floor (see figure 3).

3.6 DOMESTIC HOT WATER CIRCUIT

(Refer to figure 1 and 2 for component identification and location).

3.6.1 Connecting the domestic hot water piping

The COMBOMAX™ Ultra 12 boiler HOT WATER OUTLET and the COLD WATER INLET connections are clearly marked. They are located on the right side (when facing the boiler) and are of ¾" NPT F type.

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.

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

A thermometer should be installed to indicate the temperature of the water at or near the outlet of the water heater.

3.6.2 Expansion tank on the cold water supply line

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

Such items may create 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 pressure 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 on the cold water supply line between the *COMBOMAX™ Ultra 12* boiler unit and check valve. Contact your installing contractor, water supplier, local plumbing inspector or plumbing supply house for assistance.

3.6.3 Domestic hot water pressure relief valve

The *COMBOMAX™ Ultra 12 boiler* boiler is factory equipped with a pressure relief valve installed on the domestic hot water boiler outlet. This pressure relief valve is set at 862 kPa (125 psi). Connect both the domestic hot water (862 kPa / 125 psi) and the tank heating system (207 kPa / 30 psi) pressure relief valves downward toward safe location.
Relief valve outlet pipe diameter must not be of smaller diameter than the relief valve outlet. The oulet pipe end must be visible in order to observe any relief incident and be protected from freezing.

3.6.4 Thermostatically controlled mixing valve (included)

The *COMBOMAX™ Ultra 12 boiler* boiler is factory equipped with a thermostatically controlled mixing valve that reduce the risk of scald injury by lowering the domestic hot water temperature at the heat exchanger outlet, by mixing cold fresh water to the hot water coming out of the heat exchanger.
In order to adjust the mixing valve, hot water must be consumed.

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 responsibility to insure that the installation meets the applicable codes requirements.

On installation where a 120 Vac power is required for a heating pump and other outboard components, main power supply to the *COMBOMAX™ Ultra 12* must be a 120/240 Vac, single phase, 60 Hz using 3 conductors (L1 – L2 – N) and a ground wire..

On installation where no 120volts components such a pump need to be powered by the Combomax, 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 90°C (195°F) operation.

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 plus 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. The control would shut the circulating pump off if the tank water temperature is below the minimal set point, giving priority to the domestic hot water over building heat.

If the building heating system is made of multiple circulating pump and if the domestic hot water prioritisation function is kept, the boiler electrical panel "PP" terminals can be used as a dry contact (5 amps or 1/6 hp) to operate a relay, shutting power to the pumps when domestic hot water priority is needed.

3.7.3 Room thermostat wiring

3.7.3.1 Single heating zone

Using a two (2) leads thermostat, connect the low-voltage thermostat dry contact to the **W** and **R** terminals on the *COMBOMAX™ Ultra 12* electrical panel (**DO NOT apply current to these terminals).**

Using a three (3) leads thermostat, connect the **C, W** and **R** terminals to the boiler electric panel corresponding terminals.

3.7.3.2 Zone valve zoning

Connect the low-voltage thermostat to the zone valve. The components must wired such that, upon a heating demand from a thermostat, only the corresponding zone valve will be actuated and will in turn activate the *COMBOMAX™ Ultra 12* . Connect the zone valve dry end switch contact to the **W** and R boiler electrical panel terminals.

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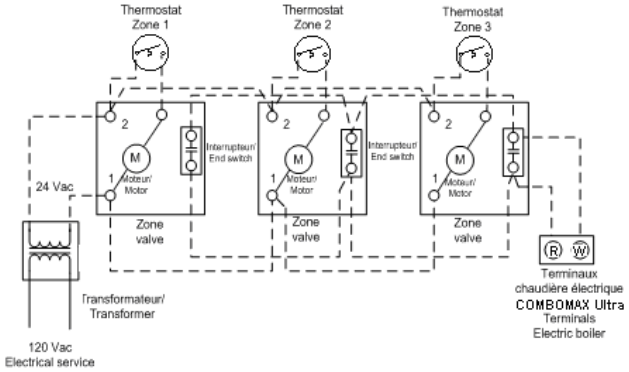


The 24 Vac power supply transformer used must be powerful enough to supply simultaneously all zone valves.

Diagramme électrique/ Wiring diagram

COMBOMAX ULTRA 12- 4.5kW

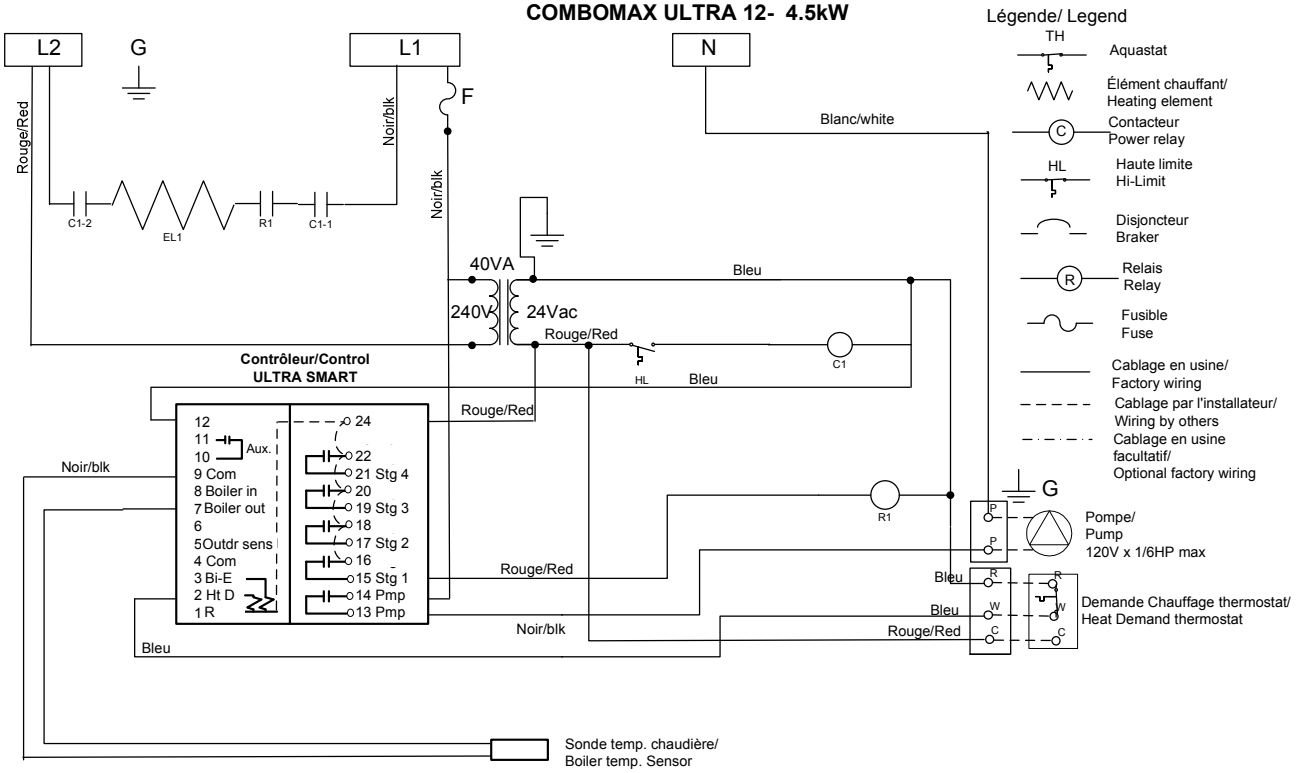


Diagramme électrique/ Wiring diagram

COMBOMAX Ultra 12- 6 à 9kW

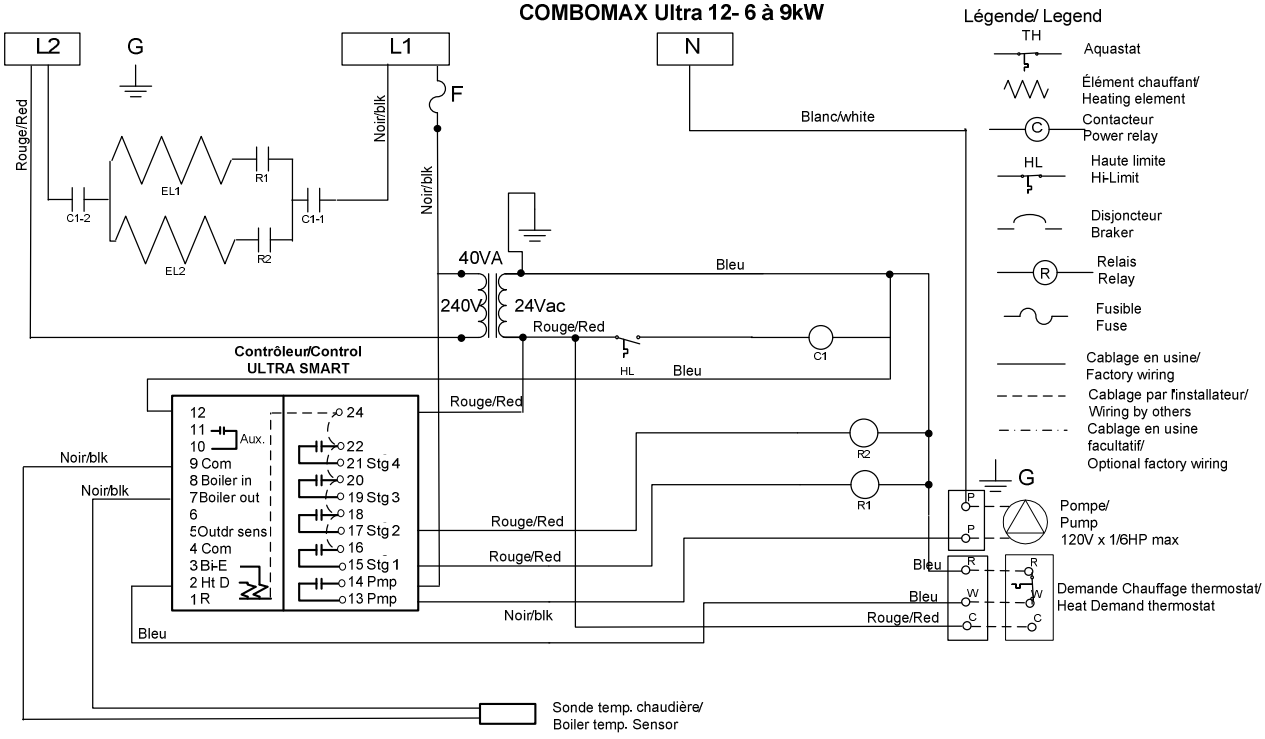
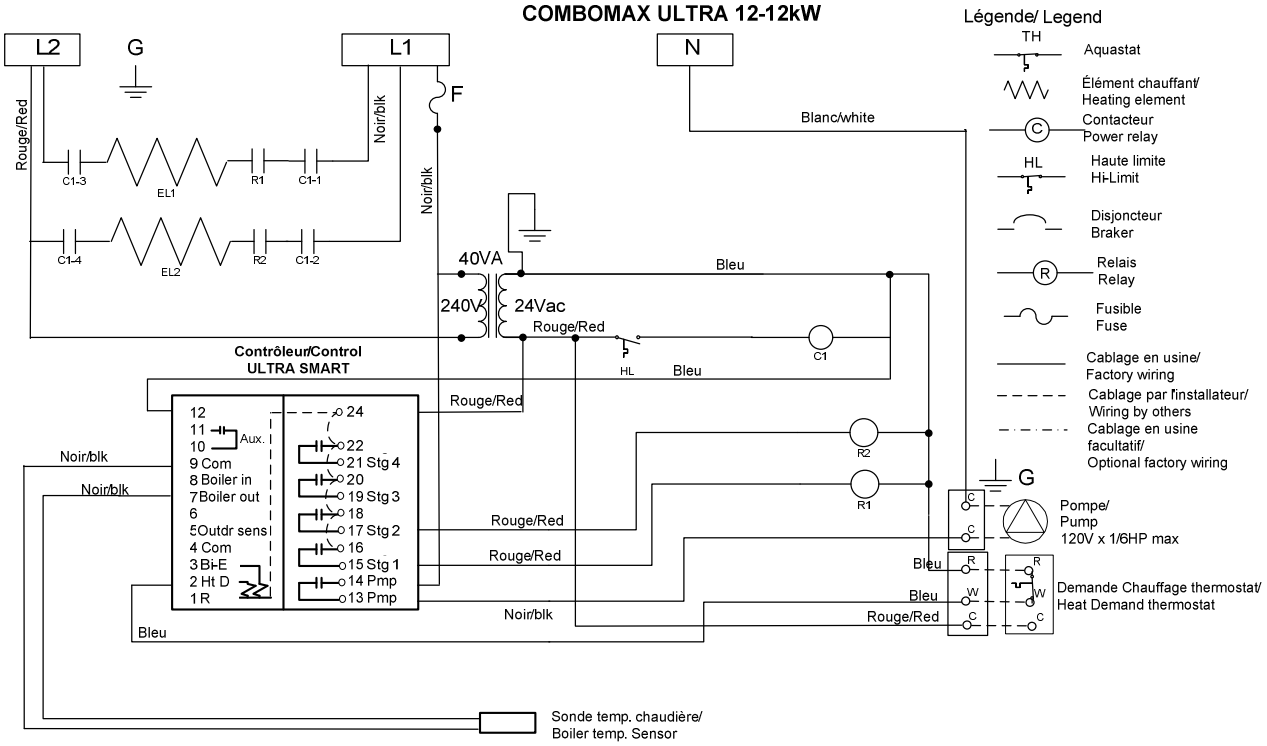


Diagramme électrique/ Wiring diagram

COMBOMAX ULTRA 12-12kW



Section 4 : (Ultra Smart™) CONTROL SET UP

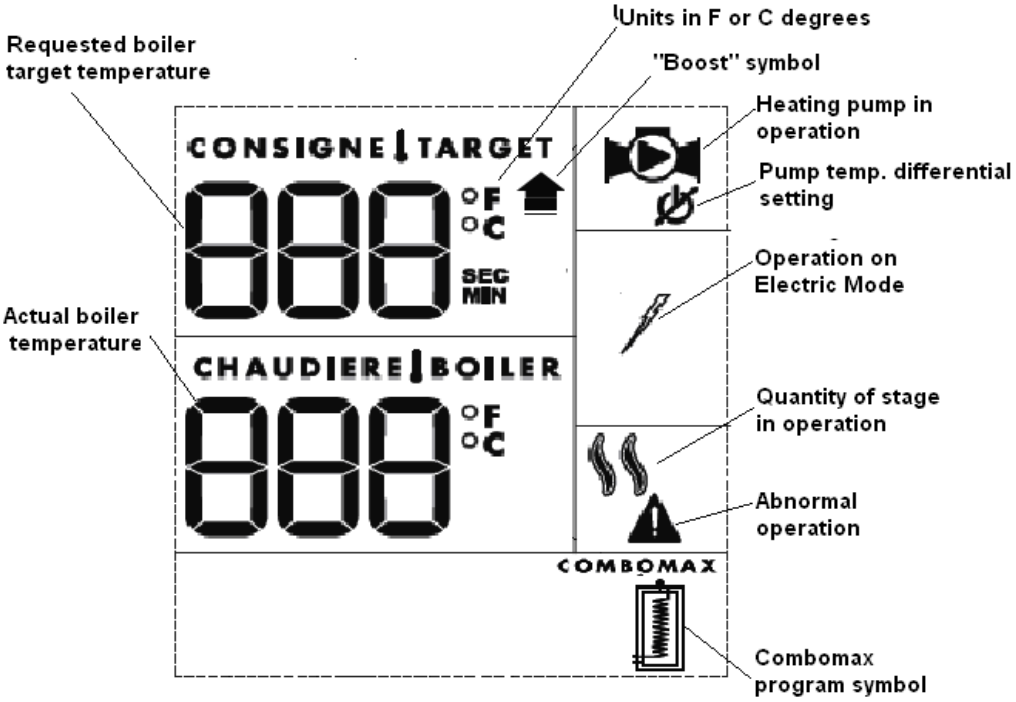
4.1 INTRODUCTION

The COMBOMAX™ Ultra 12 boiler is designed to be used in hydronic heating application where the heating fluid (water) pass through the boiler before being supplied to the heating system (parallel system). It is also design to provide domestic hot water needs to the building.

The COMBOMAX™ Ultra 12, ULTRA SMART™ control main function is to maintain the boiler water temperature between preset values by operating the heating element(s). It is also capable of directly managing one heating system circulating pump.

4.2 LIQUID CRYSTAL DISPLAY (LCD) NFORMATION

The Ultra Smart™ control LCD shows operating functions and values and allows you to adjust them



4.3 INTERFACE OPERATION

The Ultra Smart™ control access is through four (4) keys.

Key provides access to the configuration menu and is also used as an « ENTER key » to confirm the selection. The two rocking (2) keys allow items selection or value change.

The key light-up the LCD back screen. The screen will remain lighted until the key is depressed again. Depressing any other keys will light-up the LCD for a default value of 10 sec. Depressing the key will turn the LCD lighting OFF.

4.4 COMBOMAX MODE OPERATION

The Ultra Smart™ control manages both the heating element(s) and circulation pump. It tries to maintain the boiler tank temperature around the target temperature shown on the display. When the tank temperature decrease under the target temperature, the heating element(s) is turned ON and modulate trying to maintain the target temperature. On units equipped with two (2) heating elements, the heating elements will be used in sequence in order to insure equal aging.Heating stages are indicated on the LCD by the darkening of the icon.

On an heat demand, the control will turn the circulating pump ON if the tank water temperature is high enough to satisfy the domestic hot water demands. The following symbol will appear on the upper right of the display. (see next section on domestic hot water prioritisation). The controller will stop the circulating pump once the space heat demand is satisfied or if the boiler temperature drops too much (see section 4.5)

4.5 DOMESTIC HOT WATER DEMAND PRIORITISATION.

The Ultra Smart™ control can manage both heat and domestic hot water demand. It's program prioritize domestic hot water production over building heating in case of low tank water temperature. The control accomplished this operation by turning the heating circuit circulation pump OFF until the tank water temperature return to normal.

The value of the tank temperature decrease under the established target temperature shown on the display is adjustable on the configuration menu of the control.

This function has minimal impact on the building temperature since typically domestic hot water demands are of short enough duration that the building temperature will not be affected.

4.6 CONTROL SET-UP

Since every application presents different heating and domestic hot water needs, it is important to properly set-up the COMBOMAX™ Ultra 12 for the application in order to maximise its performances.

In order to set-up the COMBOMAX™ Ultra 12 control, the installation technician has to access the Ultra Smart™ control configuration menu in pressing on the for 2 sec. until the first menu is displayed.

Selecting the function or the value to adjust is by using the rocking keys . Pressing the key confirm your selection an brings you to the next menu.

Table 1 below shows the menus that will appear.

If keys are not depressed for more than 15 sec. the controller will register the last changes and returns to normal operation display. Scrolling to the end of the menus will also return the LCD to normal operation display.

In case of power failure, function set-up are saved and restored with when electrical power is returned.

Table 1

ITEM	DESCRIPTION	CHOICE	DEFAULT
°F °C	Select user preferred units.	F^0 or C^0	F^0
CONSIGNE TARGET 175 °F	If required, change the preset target temperature of the controller to the value required to adequately heat the building and supply all the domestic hot water needs of the user. Tank water temperature target set point. temperature is factory set at 80°C (175°F). Increasing the tank water temperature will increase the amount of energy available for supplying heating and domestic hot water demand.	65C° to 88°C (150°F to 190°F)	80°C (175°F)
	Select the tank temperature drop required to stop the space heating pump during space heating demands. Once the tank temperature will have dropped by the selected value, the circulating pump will be turn OFF momentarily until the tank water temperature is return to normal.	0FF, 3°C to 20°C (5°F to 40°F) differential	5°C (10°F)

NOTE : Once operating values have been set, the controller will save them and return to normal operation display. The user can change the tank water temperature set point without accessing the configuration menu (see section 4.7)

4.7 USER ADJUSTED TANK TEMPERATURE SET POINT.

The tank temperature set point can be adjusted without accessing the configuration menu or changing the installer original set-up.

By using the rocking keys - +.

Depressing one of the keys will cause a flashing "0" to be displayed. This zero indicates that the "user" differential value is zero. By using the - + "+" or "-" keys, the user can input a temperature differential between the installer set point and the actual operation set point. The maximum user differential is ± 5°C (10°F).

The new user differential value will be display, flashing for 5 sec. before the LCD return to normal operation display.

Once completed, the new user differential value will be display in a flashing mode every time the rocking keys - + are depressed.

Section 5 : OPERATION

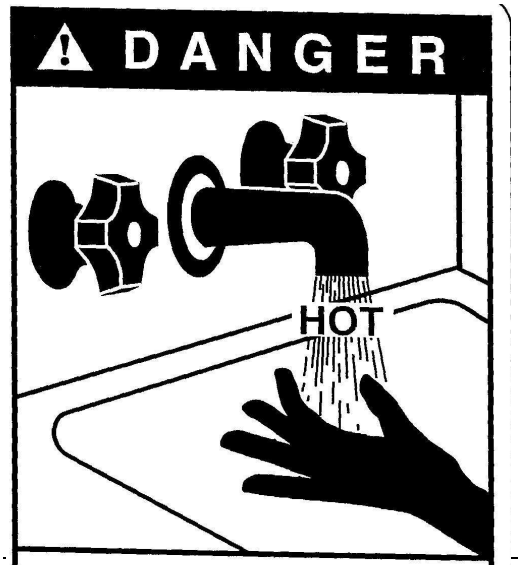
5.1 SAFETY PRECAUTIONS

Before operating the *COMBOMAX Ultra 12* 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 water heater 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.

To meet building heating and domestic hot water needs, the controller on this boiler is adjustable up to 88°C (190°F) and regulate the temperature of tank. However, domestic hot water is not controlled by this controller but by the thermostatic mixing valve located in the upper section of the unit (see fig.1). Domestic hot water temperatures over 52°C (125°F) can cause severe burns instantly or death from scalds. 50°C (120°F) is the recommended starting point for setting the control to supply general-purpose hot water.

Safety and energy conservation are factors to be considered when setting the operating temperature of the tank and domestic hot water. The most energy efficient operation will result when the temperature setting is the lowest that satisfies both requirements.

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 TO SCALDING VS TEMPERATURE RELATIONSHIP	
Temperature	Time to scalding
50°C (120°F)	Over 5 minutes
52°C (125°F)	1-1/2 to 2 minutes
54°C (130°F)	About 30 seconds
57°C (135°F)	About 10 seconds
60°C (140°F)	Less than 5 seconds
63°C (145°F)	Less than 3 seconds
66°C (150°F)	About 1-1/2 second
68°C (155°F)	About 1 second

With kind permission from the Shriners Burn Institute

The thermostatic controlled mixing valve should be adjusted by opening a domestic hot water tap, measuring the water temperature with a thermometer and by adjusting the thermostatically control mixing valve accordingly.

DANGER

There is a hot water scald potential if the thermostatically controlled mixing valve for reducing point-of-use water temperature is damaged, not properly working removed or by-passed.

5.2 FILLING THE WATER HEATER TANK

⚠ WARNING

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

Make sure the drain valve of the tank is closed.
Open the cold water valve supplying the boiler.
Bleed the air from the tank by opening the pressure relief valve located on top the water heater tank while you are filling the tank.
Once the reservoir is filled, close the pressure relief valve. Tank pressure should stabilise at a value of approximately 83kPa (12psi).
Open the boiler service valve to the heating system. (If the heating system use motorized zone valves, these valves must be manually open. With the motorized valve open, start the circulating pump, check for leaks and repair as required.
Bleeds air from the tank and from the heating zone(s).

5.3 FILLING THE DOMESTIC WATER HEATER HEAT EXCHAGER

There is a heat exchanger located in the water heater tank that separate the thermal mass fluid (water) and the domestic hot water. This heat exchanger containing potable water must be filled.
Make sure that the heat exchanger drain cock is turn off.
Open the nearest domestic hot water tap as well as any control valve on the water heater outlet (the copper tube at the top of the water heater).
The cold water supply to the boiler shall be Open.
Close the domestic hot water tap as soon as water flows out of it. Fix any leaks
One must open every hot water domestic hot water tap in succession, in order to evacuate air from the distribution system.

5.4 BOILER CONTROLLER SETTING

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 all requirements.

However, a tank water temperature of 70°C (160°F) as a starting point , is recommended to insure a good supply of domestic hot water.
It may be necessary to rise the tank water temperature up to 88°C (190°F) in order to supply to the domestic hot water demand or when the unit is installed on space heating systems requiring higher operating temperature.

Adjust tank water temperature differential to allow priority on domestic hot water supply. A value ranging from 5°C to 10°C (10°F to 20°F) is generally adequate.

5.5 START UP PROCEDURE

1. Fill tank and heat exchanger as described in sections 5.2 and 5.3.
2. Adjust temperature levels as described in section 5.4
3. Adjust building room thermostat(s) above ambient temperature.
4. Turn ON the boiler main electric supply breaker.
5. The boiler main contactor should close with an audible snap sound, and all elements should turn on in sequence.
6. Tank temperature should gradually increase. Several hours may be required according to the power capacity of the Combomax and the type of heating system to reach the tank water temperature target.
7. The circulating pump(s) will start once the tank water temperature will reach the tank water target temperature minus the programmed pump differential temperature.
8. If the heating system is of the radiant floor or low temperature type, adjust the heating system mixing valve to the proper temperature.
9 Lower the setting of the room thermostat, the heating pump should stop but not the heating elements which will stop only when the boiler temperature will reach the target temperature.

9. As the tank water temperature reaches its target temperature, the heating elements will be turned off in succession.

5.6 THERMOSTATICALLY CONTROLLED MIXING VALVE SETTING

A thermostatically controlled mixing valve automatically regulates the mix of very hot and cold water as required, providing safe domestic hot water under variable conditions.

To adjust the mixing valve setting, carefully open a hot water tap. Protect yourself against the scalding. Measure the hot water temperature with a thermometer. Mixing valve adjustment is achieved by turning the mixing valve knob clockwise to reduce the domestic water temperature, contraclockwise to raise the domestic water temperature

Unless local regulation requires otherwise, a 50°C (120°F) is considered the best temperature to reduce heat loss through the plumbing and prevent scalding for young kid and senior citizen. Generally residential dishwasher are provided with their own water heating element and don't required hotter water.
Raising the domestic hot water outlet temperature will not provide more domestic hot water. In order to provide more domestic hot water, the amount of energy in the water heater tank need to be increase, this is achieved by increasing the water tank temperature (maximum 88°C /190°).

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 component 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.

6.2 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. Immediate attention and repair by a qualified technician are required. NEVER CLOSE OR PLUG A PRESSURE RELIEF VALVE.

6.3 EVERY 6 MONTHS

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

6.4 YEARLY INSPECTION

⚠ DANGER

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

- ❑ Visual inspection of the water heater electrical cabinet. Checks 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 the domestic hot water thermostatic mixing valve proper operation by measuring domestic water temperature at a domestic hot water tap with a thermometer.
- ❑ 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 introduce oxygen diluted in the fresh water. This oxygen will cause corrosion of the tank internal surfaces, damaged the reservoir and void the warranty.
- ❑ If repair is required, it should be accomplish as soon as possible, by a qualified technician and using genuine replacement parts.

▲ WARNING

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.

COMBOMAX™ Ultra 12 LIMITED WARRANTY

Warranty Coverage for Residential Installation.

Thermo 2000 Inc. hereby warrants to the original residential purchaser that the COMBOMAX™ Ultra 12 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) COMBOMAX ™ Ultra 12 tank and exchanger 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. hereby warrants to the original residential purchaser that the COMBOMAX ™ Ultra 12 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 **COMBOMAX™ Ultra 12** *components & parts*

All other COMBOMAX ™ Ultra 12 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 COMBOMAX tank and boiler water acidity is lower than pH 6.5 or higher than pH 8.5; or
J) The COMBOMAX 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 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 COMBOMAX ™ Ultra 12 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: COMBOMAX model and serial number, copy of the original sales receipt and owner's identification certificate.