



Installation Instructions and Homeowner's Manual



ELECTRIC BOILER ELECTRONIC CONTROL

HYDRA COMPACT

Models:

HYDRAC03-E2401M
HYDRAC04-E2401M
HYDRAC05-E2401M
HYDRAC06-E2401M
HYDRAC07-E2401M
HYDRAC08-E2401M
HYDRAC09-E2401M
HYDRAC10-E2401M
HYDRAC11-E2401M
HYDRAC12-E2401M



Manufactured by:

Dettson Industries Inc

3400, Industrial Boulevard
Sherbrooke, Qc, Canada, J1L 1V8

www.dettson.ca



Attention
Do not tamper with the unit
or its controls. Call a
qualified service technician.

INSTALLER / SERVICE TECHNICIAN :

Use the information in this manual for the installation / servicing of the boiler and keep the document near the unit for future reference.

HOMEOWNER :

Please keep this manual near the boiler for future reference.

SECTION 1 INSTALLATION

1.1) DANGER, WARNING AND CAUTION

The words DANGER, WARNING and CAUTION are used to identify the levels of seriousness of certain hazards. It is important that you understand their meaning. You will notice these words in the manual as follows:



DANGER

Immediate hazards which **WILL** result in death or serious injury.



WARNING

Hazards or unsafe practices which **CAN** result in death or injury.

CAUTION

Hazards or unsafe practices which **CAN** result in personal injury, product or property damage.

1.2) HEATING WITH HOT WATER

Your HYDRA COMPACT electric boiler was carefully assembled and checked in our plant, so that it will deliver warmth and comfort to your home for many years to come.

This manual is intended to provide the necessary information for the installation of the unit, how it functions and explains security measures which are particular to this type of equipment.

It is essential that the persons installing, operating or adjusting the boiler carefully read this manual, in order to completely understand and be familiar with the procedures to be followed.

Any questions relative to the operation, maintenance or guarantee should be directed to the company where the equipment was purchased.

Upon completion of the installation, this manual should be placed back into its original envelope and kept near the boiler for future reference.

1.3) DELIVERY

Upon delivery of the boiler, check the nameplate to be sure that you have received the model with the correct rating and proper voltage.

The following items are supplied with the unit:

- A pressure relief valve, adjusted to 30 psi;
- A drain valve;
- An exterior probe for modulation;
- A 3/8" X 1/4" reducer to install an air vent or a plug;
- A 1/4" plug to cork the 3/8" tapped hole between the elements in the case the boiler is installed in any other position than upside.

- A 4" long nipple 1/4" NPT and a 1/4"NPT coupling if unit is installed upright position, water connections at the bottom.

1.4) INSTALLATION



WARNING

The installation of this unit must be performed by a qualified technician and it must conform to the standards and regulations in force as well as the Canadian Installation Code for Hydronic Heating Systems CSA B214-01.

1.4.1) Positioning

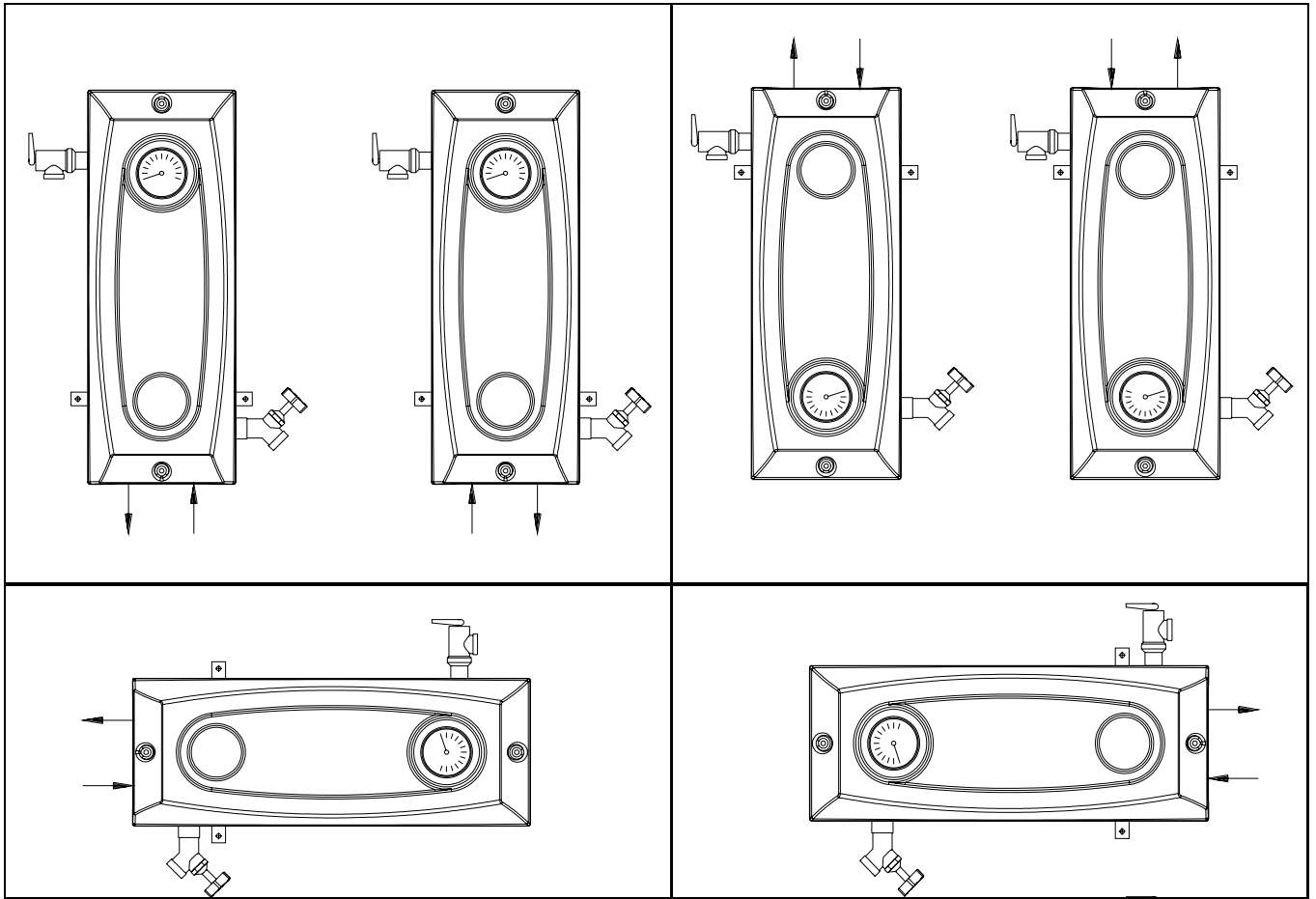
The unit must be installed in an area that is dry, non-corrosive, without excessive dust, well ventilated and where the ambient temperature does not exceed 27°C (80°F).

The boiler can be installed directly on a wall with 4 screws. 2 screws in the elements compartment and 2 screws on each side of the unit. **Ensure that the unit is well fixed on the wall utilizing the 4 points of fixation.**

The boiler can be installed in 6 possible configurations as shown in figure 2.

Ensure that it is installed level and that the clearances indicated in Table 1 are respected.

Figure 1 : Mounting configurations



1.5) CLEARANCES

The following clearances should be provided for the servicing of the unit:

Table 1

Minimum clearances to combustible materials

LOCATION	CLEARANCE
Access side to elements	13 1/4" (34 cm)
Sides	4" (10 cm)
Bottom (water connections)	6 5/8" (17 cm)
Front*	0
Back	0

* If the boiler is in an enclosure, provide a door or a removable panel in front to access the control panel.

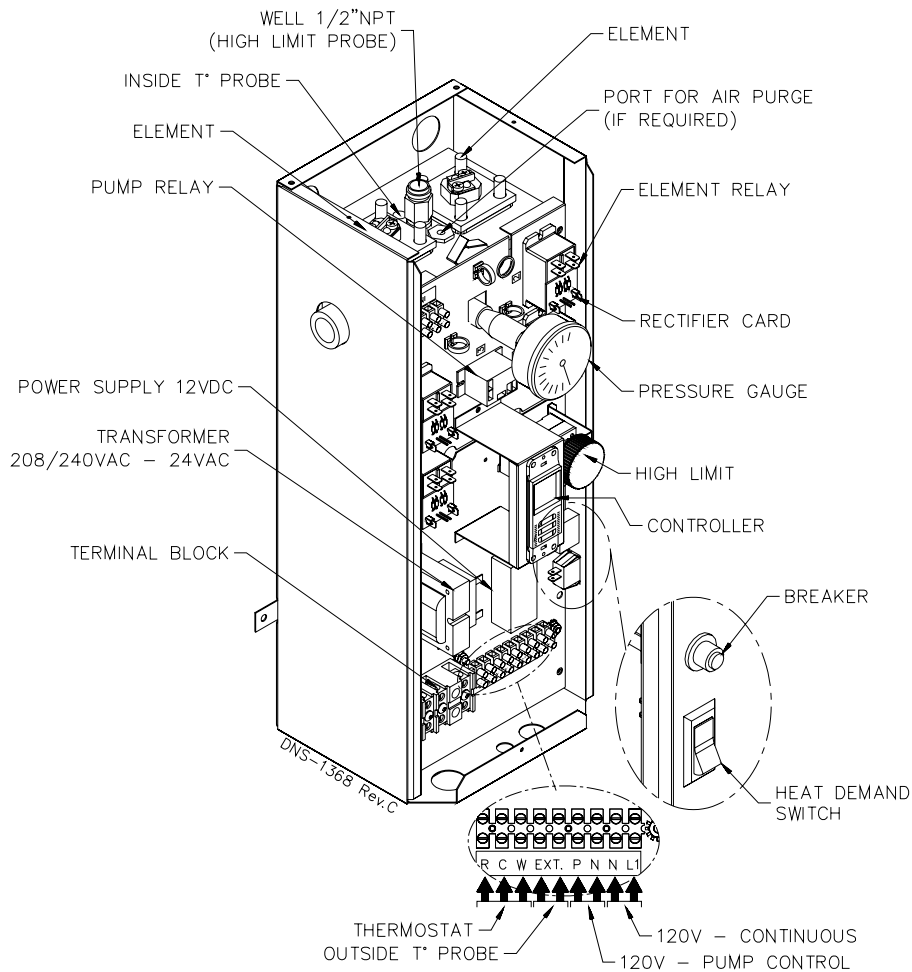
1.6) DISTRIBUTION SYSTEM

The proper functioning of your heating system is directly related to the quality of the plumbing installation. Therefore, the entire installation must be performed by qualified technicians.

See Figure 2 for the functions of the various boiler components.

The heating system must be set-up to operate at a maximum pressure of 28 psi and the operating temperature may range from 21°C to 88°C (70°F to 190°F).

Figure 2 : Boiler components



Freeze protection (when required)

WARNING

Only propylene glycol may be used in this hydronic heating system, to prevent freezing. It is recommended to add a maximum of 50% of propylene glycol mixture to ensure proper operation. Do not use automotive anti-freeze, ethylene glycol or any undiluted anti-freeze. If the above recommendations are not followed, severe personal injury, death or substantial property damage can result.

All installations must include the following items:

- a. 1 pressure regulator, adjusted to 12 psi, must be installed between the boiler and the main water supply in the building;

- b. 1 expansion tank, pre-pressurized to 12 psi and of appropriate size;
- c. 1 or more automatic air purge valves;
- d. 1 or more circulating pumps of appropriate capacity.

CAUTION

To avoid water damage and/or scalding due to relief valve operation, a discharge line must be connected to the valve outlet and run to a drainage area. The discharge line shall be installed in such a way that it will allow for the complete drainage of the valve and the discharge line.

1.7) INSTALLATION OF THE BOILER

At the time of installation, the following steps should be followed. Refer to Figure 5,6,7,8 and 9.

1. Choose an appropriate location. Mount the boiler securely on the wall, with the help of the mounting plate. Ensure that it is level and that the minimum clearances are observed;
2. Install the drain valve and the safety valve according to the mounting configuration as shown in Figure 1;
3. An air vent should be installed on the unit if installed upside position, water connections at the bottom. In such case, use

the 3/8" NPT to 1/4" NPT reducer, which is provided; In all other mounting position, cork the hole with the 1/4" plug provided.

4. Install the water supply and return piping with the 1" NPT fitting;
5. The heating supply line must include:
 - a. 1 circulator along with 2 maintenance valves;
 - b. 1 automatic pressure reducing valve adjusted to 12 psi, with a shut-off valve on the return water line;
 - c. 1 expansion tank;
 - d. 1 automatic vent.
6. The flow of water through the system must be sufficient to continuously discharge the energy generated by the boiler. If not, the High Limit protector will disconnect all the electric elements and a more or less frequent cycling mode will be established by the Safety Control (see the Technical Specifications Table);
7. In order to ensure satisfactory water flow, the friction in the piping system must not exceed the capacity of the circulator;
8. After having completed all piping connections, run water through the system and purge the air. The automatic vent should be in operation.

Note: Remove the plastic cover and check to see if the elements are watertight.

1.8) ELECTRIC POWER SUPPLY

All electrical wiring must conform to the standards and regulations in force and the Canadian Electrical Code CSA C22.1.

Electrical power to the boiler must come from a 120/240V 60 Hz or 208V 60 Hz, single phase, 3-wire, grounded circuit, protected by an appropriately sized breaker, based on the total rating of the boiler. When using 208V, change the connector's position at the primary of the transformer. Refer to the boiler nameplate and the technical specifications in this manual to select the proper breaker and wire size.



WARNING

Risk of fire.

The conductor sizing must conform to the last edition of the local or national codes.

Failure to follow this rule can result in death, bodily injury and/or property damage.

Power supply to the unit can be made using copper or aluminum wires. The wire size must be decided in accordance to unit power consumption, the over current protection type and capacity, the wire type and length, and the environment where the unit is installed. If an aluminum wire is used, other precautions (such as the use of a DE-OX inhibitor) must be taken to insure the conformity of the installation. In all cases, all the factors affecting the wire gauge must be considered and the installation codes followed.

The exterior of the unit must have an uninterrupted ground to minimize the risk of bodily harm. A ground terminal is supplied with the control box for that purpose.

In the event that wires inside the unit require replacement, these must be as same type as originals. (Copper wiring only)

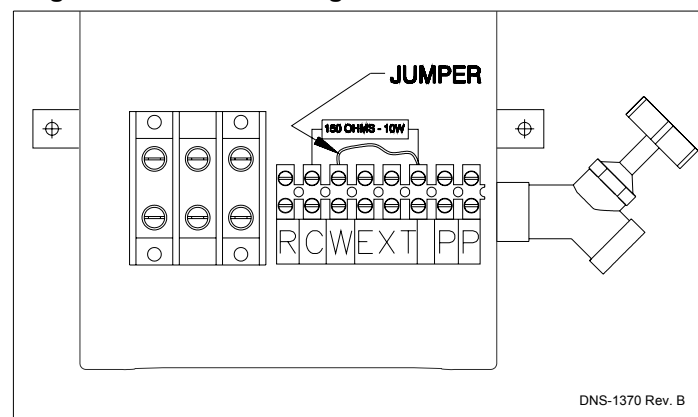
1.8.1) CONNECTING THE CIRCULATING PUMP

Connect the circulating pump on 120V connections points identified P-P in the control panel as shown in Figure 2. The electronic control is designed to operate the circulator on thermostat demand, with a heat purge delay at the end of heating cycle or continuous flow. Refer to the electronic control section to learn how to configure this function.

1.8.2) CONNECTING THE THERMOSTAT

A 150 OHMS – 10W must be installed if a power stealing thermostat is used. This resistance must be connected to C-W as shown in Figure 3:

Figure 3 : Power Stealing Thermostat Resistance



Single heating zone

Connect the low voltage thermostat to R-W terminals located inside the control panel. See Figure 4.

Multiple heating zones

Connect the contacts of the motorized valves or pump controls to R-W terminals inside the control panel. See Figure 5 and 6.

1.8.3) CONNECTING THE OUTDOOR SENSOR

Mount the sensor on an outside wall, protected from direct sunlight, so that it will accurately measure the outside temperature. Install 2 only #20 wires between the outdoor sensor and the terminals identified as S-EXT and S-EXT inside the control panel of the boiler.

SECTION 2 OPERATION

2.1) ADJUSTMENTS AND START-UP

CAUTION

The boiler must be filled with water and all air purged from the system, before turning on the power.

CAUTION

If the power is turned on before the boiler is filled with water, the elements will become seriously damaged.

1. Adjust the setpoint of the boiler on the electronic control. See control section for adjustments.
2. Turn on the power, set the thermostat at 30C (85F). The circulator; The circulator should start as well as the electrical elements in sequence with a 15 seconds delay;
3. The circulator stays on for as long as there is a call for heat except if differently configured on the electronic control.

2.2) MECHANICAL HIGH LIMIT

Mechanical High Limit Control

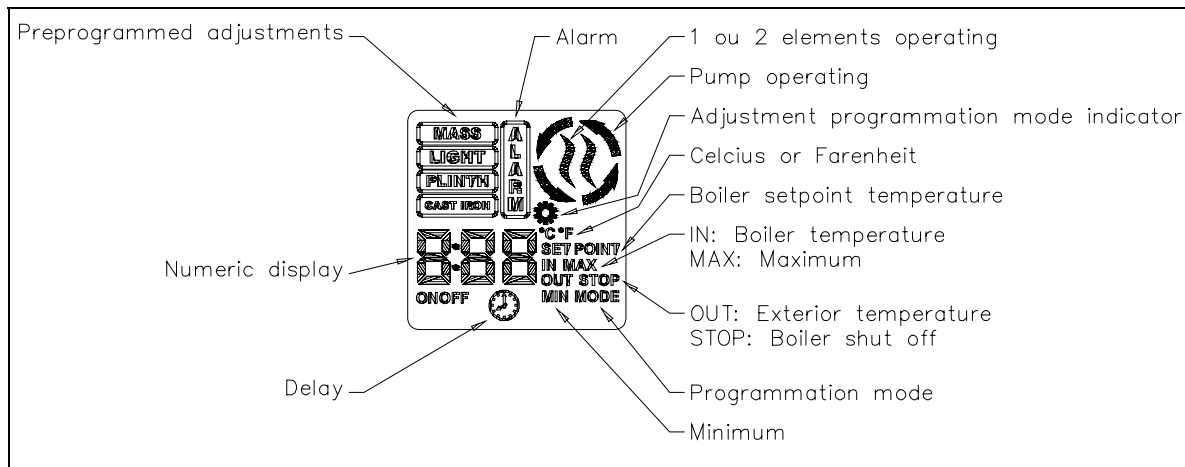
The mechanical limit aquastat must be set 20°F above the setpoint temperature on the electronic control.

2.3) ELECTRONIC CONTROL

Electronic control display

On the Figure 4, description of all possible displays on the electronic control is shown.

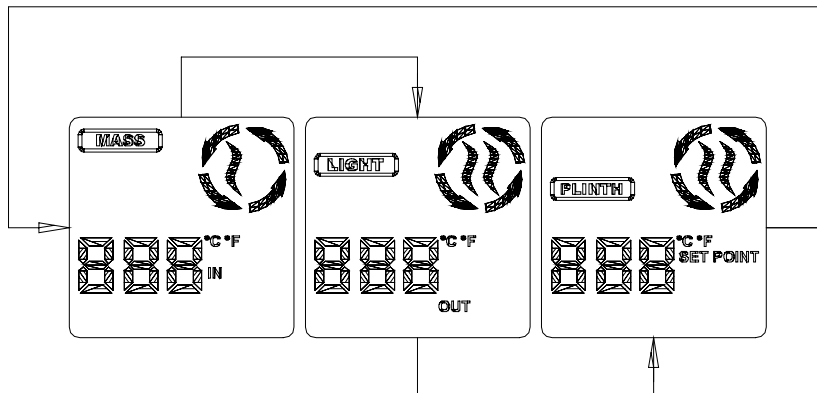
Figure 4 : Electronic control display



In normal mode, when a key is pressed, the backlight comes blue. The backlight shade off after few seconds of inactivity on key pad.

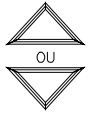
In alarm mode, the backlight flashes green and the alarm code is displayed. See alarm section for details.

In normal operation mode, the electronic control displays alternatively the boiler temperature, the exterior temperature and the target temperature.



Parameters adjustments

Keys :



Allows to scroll the options or increment / decrement values



Allows to select
Allows to enter and exit programming modes

Temperature units:

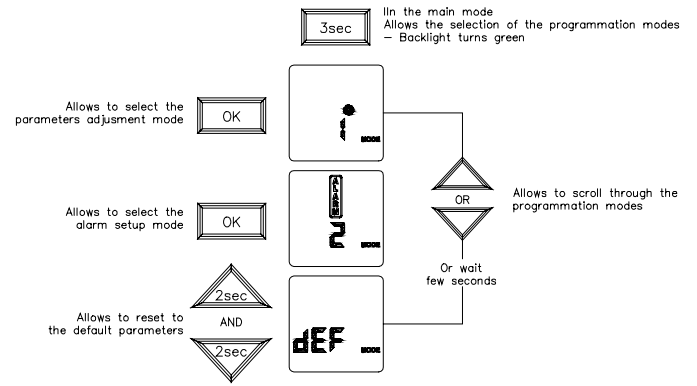


AND

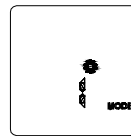
Allows to change °C and °F units in normal mode (blue)



From normal mode (blue), press OK for 3 seconds to enter the main programming mode. The backlight will change for green.

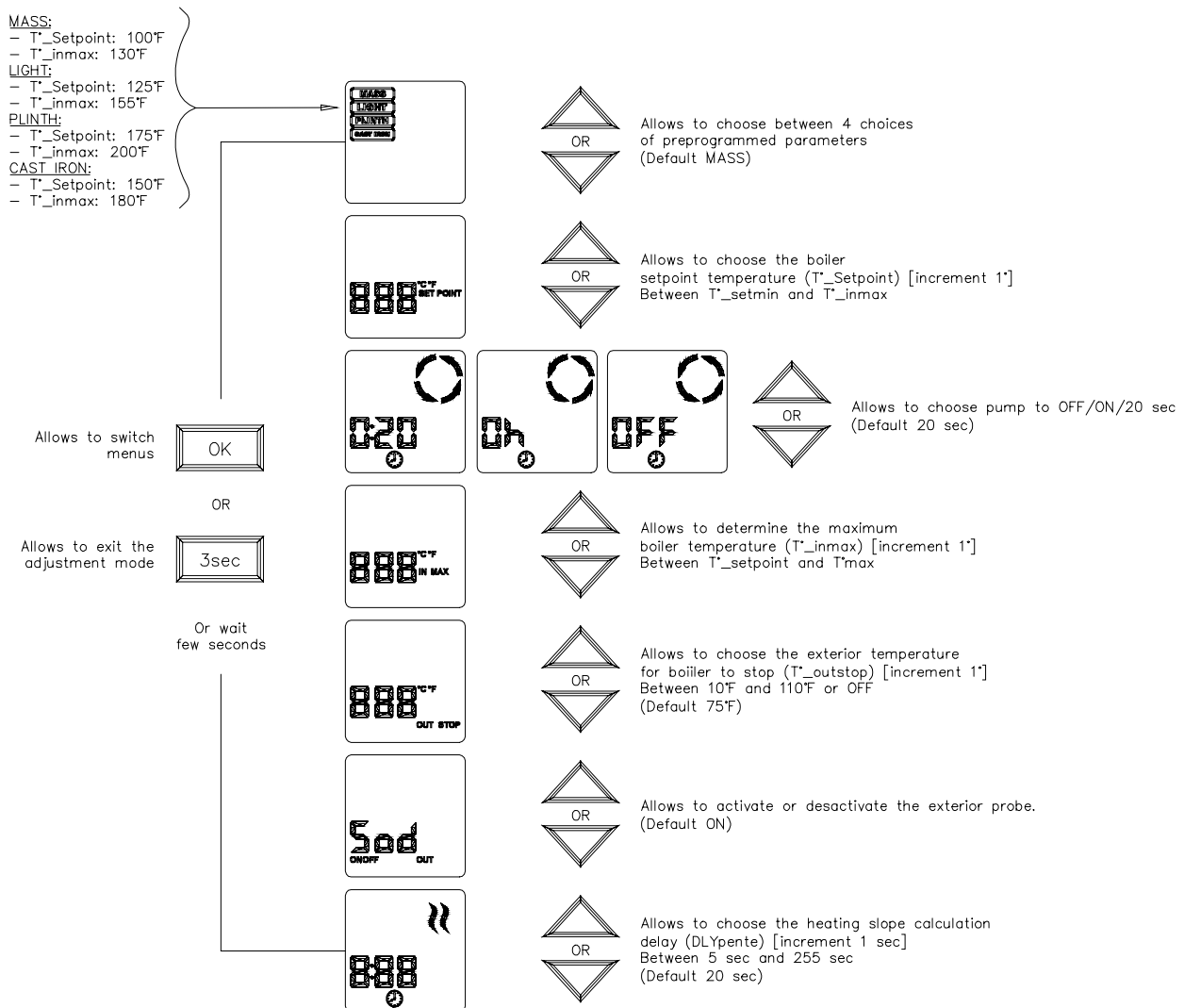


MODE 1 : PARAMETERS ADJUSTMENTS



Parameters adjustment mode

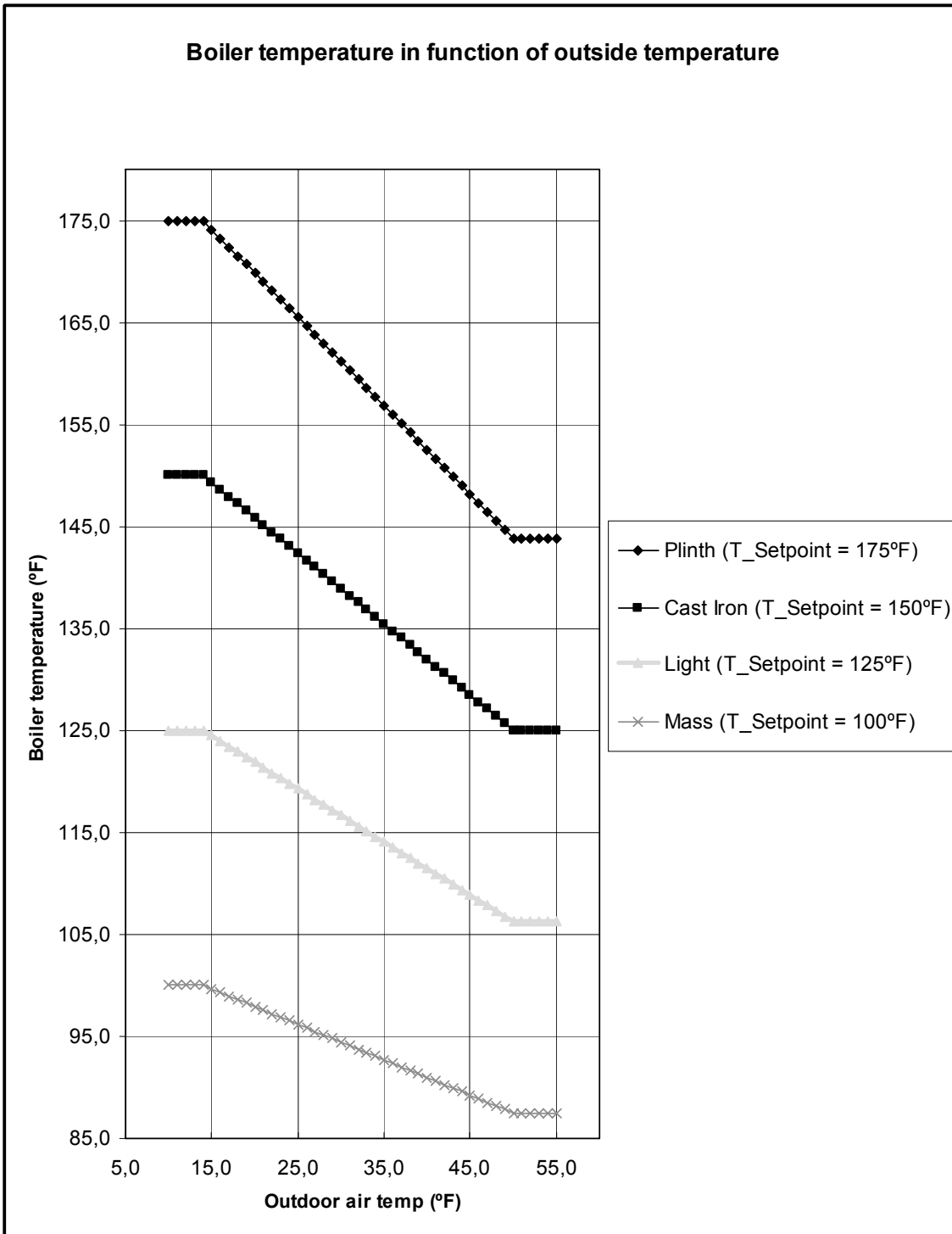
MASS:
- T_{Setpoint}: 100°F
- T_{inmax}: 130°F
LIGHT:
- T_{Setpoint}: 125°F
- T_{inmax}: 155°F
PLINTH:
- T_{Setpoint}: 175°F
- T_{inmax}: 200°F
CAST IRON:
- T_{Setpoint}: 150°F
- T_{inmax}: 180°F







The heating slope calculation delay parameter allows modifying the variation of the boiler temperature against the target temperature. Shorter is this delay, better the boiler temperature will be against the target temperature. By cons, the heating cycles will be shorter and

numerous which will impair the relays lifetime. Depending installation conditions, it is recommended to keep this delay higher as possible keeping the comfort in avoiding excessive ambient temperature variations.

MODULATION IN FONCTION OF THE EXTERIOR TEMPERATURE



ALARMS

Description	Boiler reaction	Correction	Causes possibles
 <p>Boiler temperature reach the maximum boiler temperature according to the application.</p>	<p>If the boiler temperature exceeds the maximum boiler temperature, the electronic control shuts the electrical supply to the elements and start the pump.</p>	<p>Reset by pressing OK. The electronic control comes back to normal heating operation. If the alarm occurs again, call a qualified technician.</p>	<ul style="list-style-type: none"> – Defect boiler probe or faulty connection – Defect electronic control
 <p>The boiler temperature cannot reach the setpoint after the programmed delay.</p>	<p>None</p>	<p>Return to normal mode (blue) when setpoint temperature is reached or when heating demand is cancelled.</p>	<ul style="list-style-type: none"> – Cold start of the system. – Defect element – Boiler power too low – Defect boiler probe or faulty connection
 <p>Boiler probe error.</p>	<p>Boiler shuts off. Elements and pump off.</p>	<p>Reset by pressing OK. If the alarm occurs again, call a qualified technician.</p>	<ul style="list-style-type: none"> – Defect boiler probe or faulty connection
 <p>Exterior probe error</p>	<p>None The modulation by the exterior temperature will not operate.</p>	<p>Return to normal heating mode when the probe is repaired.</p>	<ul style="list-style-type: none"> – Defect exterior probe or faulty connection

DNS-1364

SECTION 3 MAINTENANCE

The property owner has the following responsibilities:

- a. To maintain the area around the boiler clean at all times and free from combustible and highly flammable material;
- b. To ensure that the ambient air at the boiler is not excessively dusty or humid;
- c. To have all water leaks repaired in the system as they arise.
- d. To ensure that the ambient temperature in the area where the unit is installed does not exceed 27°C (80°F).

CAUTION

The boiler guaranty may be invalidated if: water leaks in the system are not repaired; the boiler is used as a source of domestic hot water or a significant amount of new water or air is introduced into the system.

It is recommended that the boiler be purged annually, in order to eliminate sediment and sludge that may have accumulated at the bottom of the boiler and covered the heating elements.

Procedure:

1. Let the boiler cool down;
2. Close the maintenance valves, which are installed at the water inlet and outlet of the boiler. N.B.: It is not recommended to drain the water from the heating pipe system;
3. Hook-up a garden hose to the drain valve and place it close to a floor drain;
4. Open the purge valve until the water comes out clean and clear;
5. Close the valve.

It is recommended to perform a visual inspection of the boiler electrical compartment annually, during the heating season. The items to check are the water tightness of the elements, signs of overheating of the electrical components and the wiring. Corrective measures must be undertaken as required, as soon as possible.

Defective components should always be replaced with the Original Equipment Manufacturer's parts.

SECTION 4 INFORMATION

Model: _____ Serial number: _____

Installation date of the electric boiler: _____

Service telephone # – Day: _____ Night: _____

Dealer name and address: _____

SECTION 5 TECHNICAL DATA

Table 2
Hydra Compact – Technical specifications

POWER (kW@208V)		Volts - Hertz - Phase	Electric element #1 (Kw)	Electric element #2 (Kw)	Consumption (Amp)	Circuit Amperage (wire sizing)	GENERAL INFORMATIONS	Supply - Return	Minimum water flow USG/min	Overall Dimensions (width x deep x height)	Shipping weight
POWER (kW@240V)											
2.25	3	208 / 240 - 60 - 1	3	-	9.4 / 12.5	12 / 15.6		1" NPT female	0.81 / 1.08 1.08 / 1.44 1.35 / 1.81 1.63 / 2.17 1.90 / 2.53 2.17 / 2.89 2.44 / 3.25 2.71 / 3.61 2.98 / 3.97 3.25 / 4.33	8 3/16" X 8 7/16" X 21 3/4"	44 lb (20 kg)
3	4		4	-	12.5 / 16.7	15.6 / 20.9					
3.75	5		5	-	15.6 / 20.8	19.5 / 26					
4.5	6		3	3	18.8 / 25.0	23.5 / 31.3					
5.25	7		4	3	21.9 / 29.2	27.4 / 36.5					
6	8		4	4	25 / 33.3	31.3 / 41.6					
6.75	9		5	4	28.2 / 37.5	35.3 / 46.9					
7.5	10		5	5	31.3 / 41.7	39.1 / 52.1					
8.25	11		6	5	34.4 / 45.8	43 / 57.3					
9	12		6	6	37.6 / 50.0	47 / 62.5					

In all cases, refer to applicable local and national codes.

Figure 5 : Boiler Dimensions

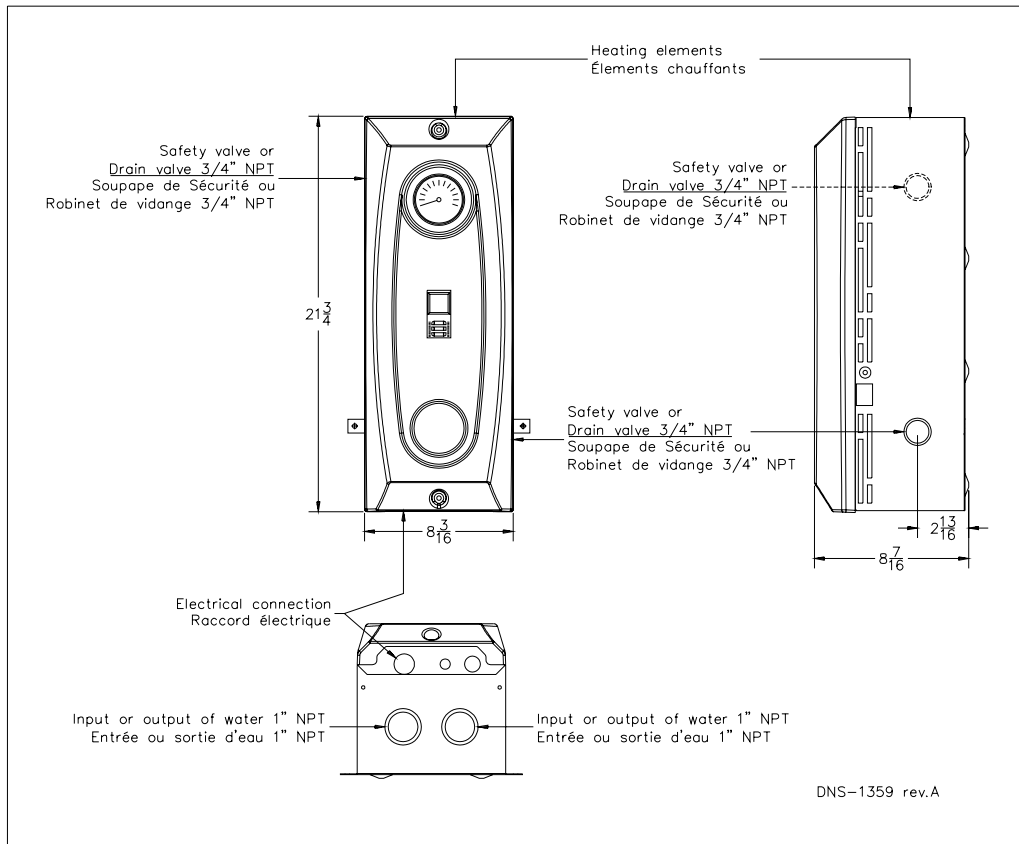


Figure 6 : Typical Diagram of a Single Zone Installation

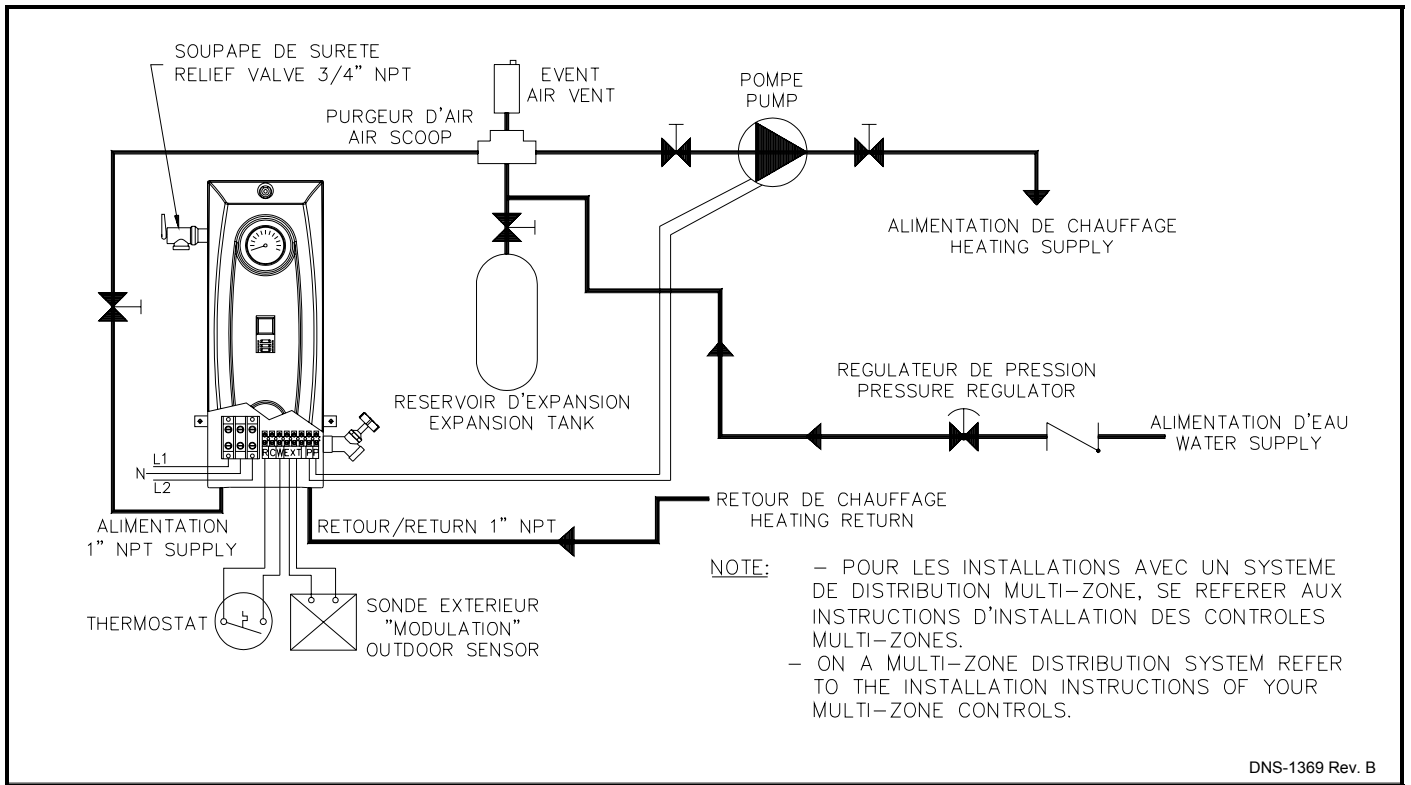


Figure 7 : Multizone Diagram with more than one Circulator

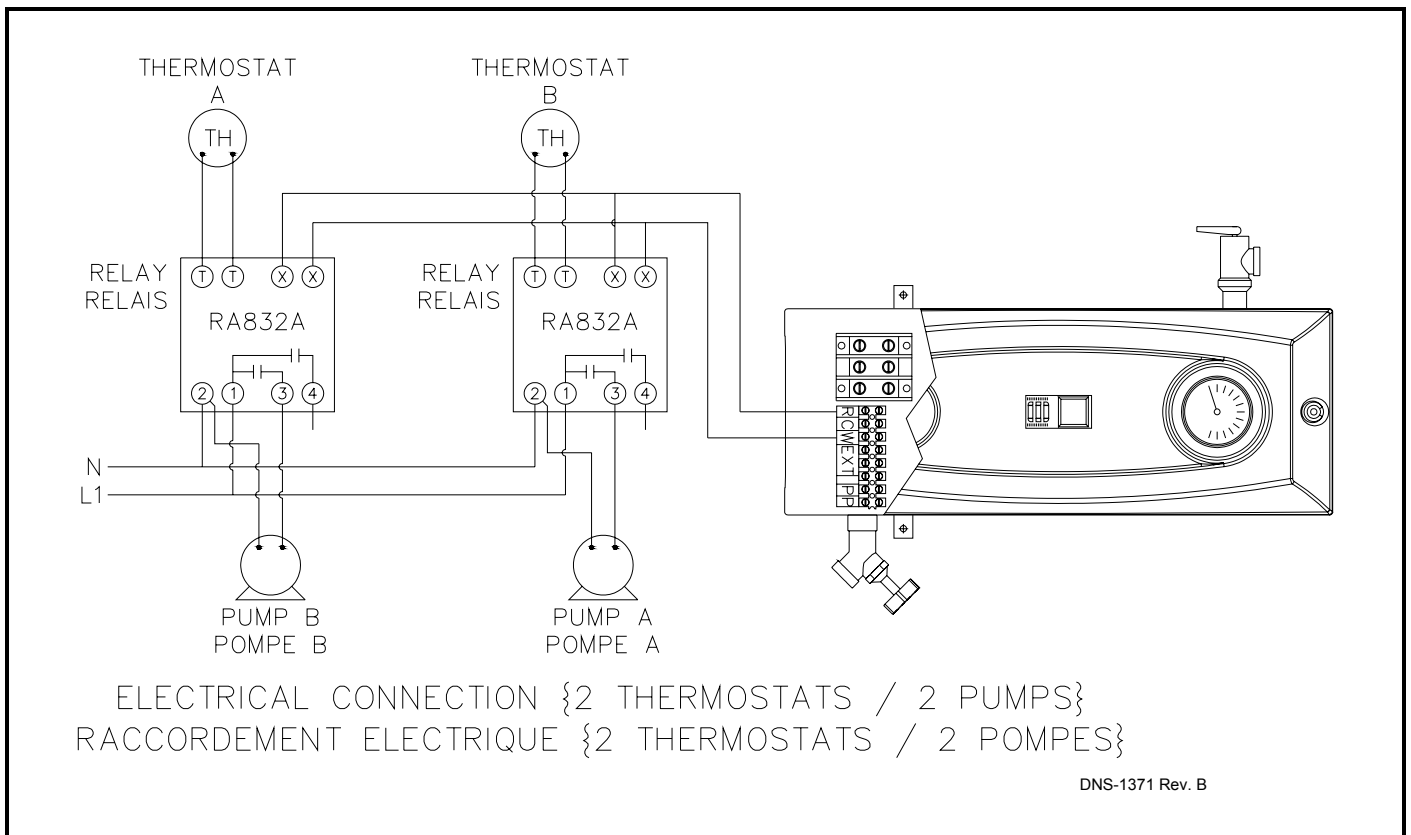


Figure 8 : Multizone diagram with Motorized Valves

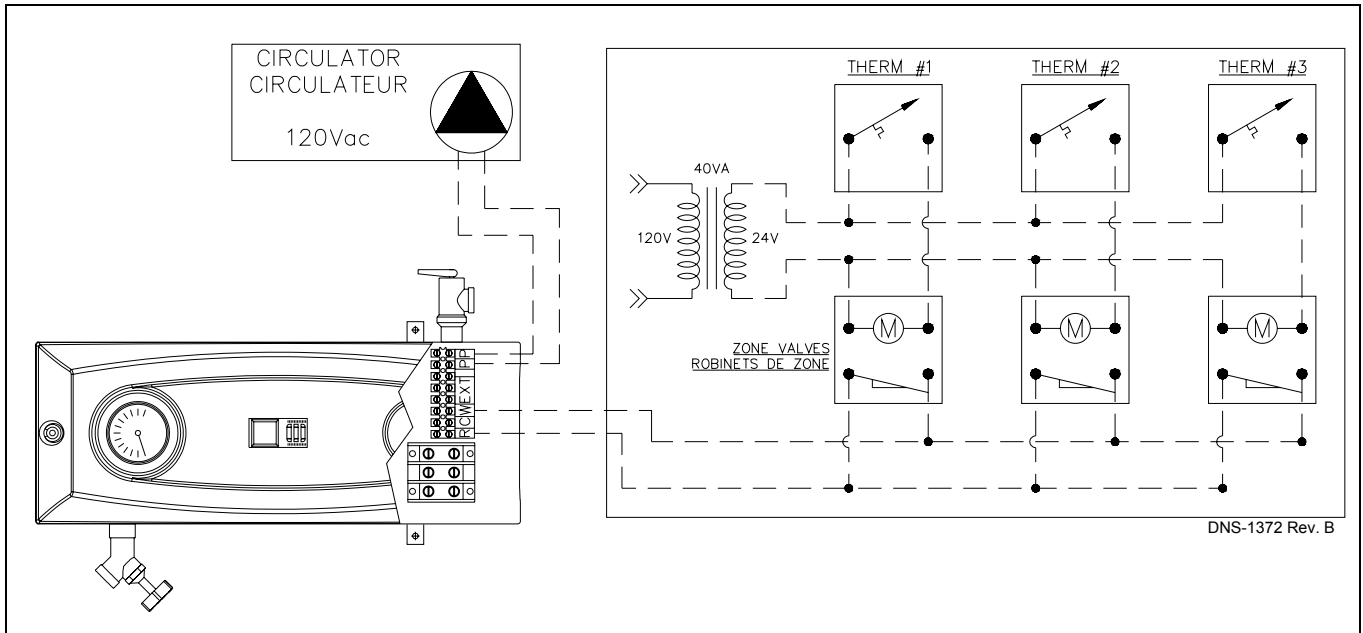
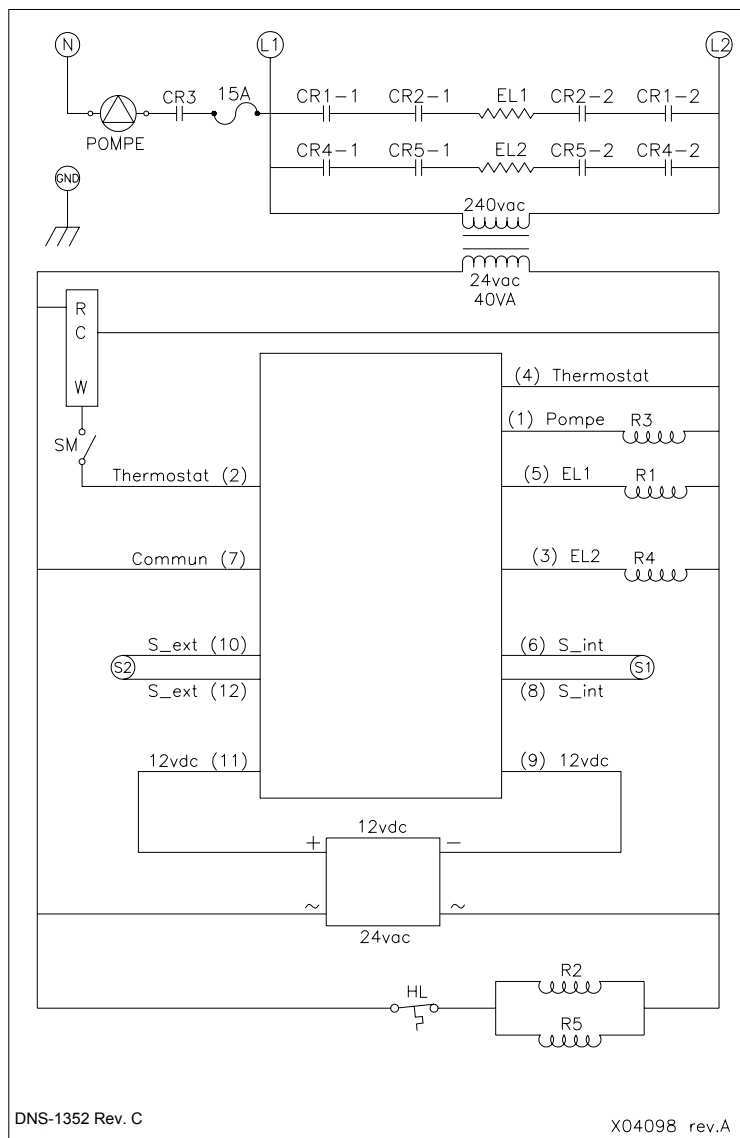
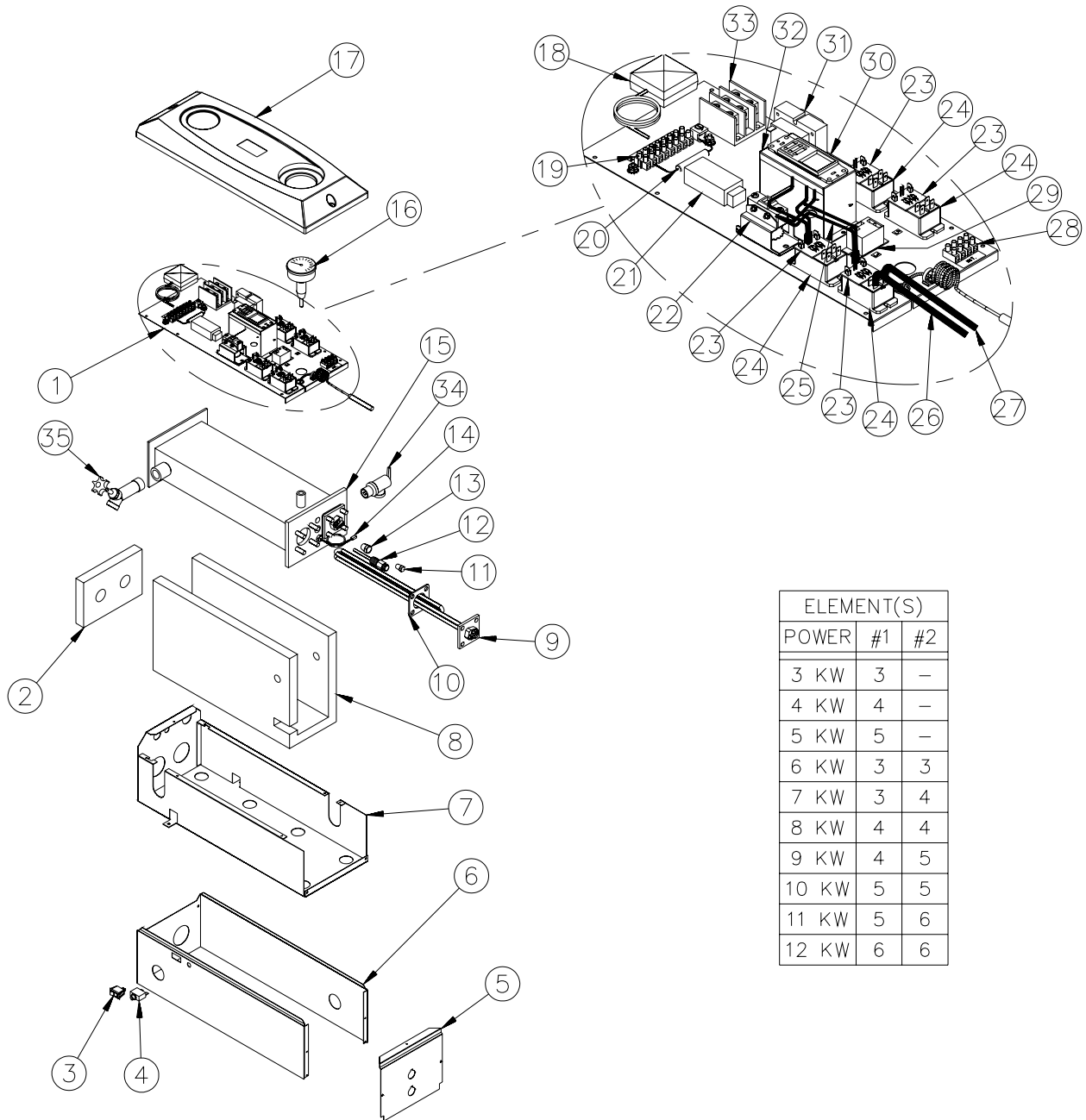


Figure 9 : Electrical Diagram



SECTION 6 REPLACEMENT PARTS

Figure 10 : Exploded Vue



ELEMENT(S)		
POWER	#1	#2
3 KW	3	—
4 KW	4	—
5 KW	5	—
6 KW	3	3
7 KW	3	4
8 KW	4	4
9 KW	4	5
10 KW	5	5
11 KW	5	6
12 KW	6	6

B50120 Rev. D

Table 3
Parts list

ITEM	PART #	DESCRIPTION	COMMENTS
1	B03996	ELECTRICAL PANEL	Panel only
2	B04004	EXIT/ENTRIES PLATE INSULATION	
3	L07F016	SWITCH	
4	L01J001	BREAKER	
5	B03998	END PLATE	
6	B03995	JACKET	
7	B03994	CABINET	
8	B04003	INSULATION CONTOUR	
9A	L99H013	ELEMENT 3KW	
9B	L99H014	ELEMENT 4KW	
9C	L99H015	ELEMENT 5KW	
9D	L99H016	ELEMENT 6KW	
10	B03970	SEALING GASKET ELEMENT	
11	G06F006	PLUG 1/4"NPT	
12	R02J001	WELL 1/2"NPT	
13	G08I002	REDUCTION BUSHING 3/8" - 1/4"	
14	R02Z008	INDOOR SENSOR	
15	B03977-01	BOILER ASSEMBLY (1 ELEMENT)	Boiler only
15	B03977-02	BOILER ASSEMBLY (2 ELEMENTS)	Boiler only
16	R02L007	PRESSURE GAUGE 1/4"NPT	
17	B03984-02	COVER ASSEMBLY	Cover, cosmetic and wiring diagram included
18	A20015	OUTDOOR SENSOR	
19	B04000-03	TERMINAL (2X8 POSITIONS)	
20	L01M001	150 OHMS-10W RESISTOR	
21	L01F013	TRANSFORMER 24VAC-12VDC	
22	B04184	AQUASTAT ASSEMBLY	Support and complet aquastat included - High Limit
23	R99G006	RECTIFIER CONTROL	
24	L01H030	RELAY SPDT 22VDC	
25	B04001	CONTROL ELECTRICAL KIT	
26	A20009-04	BLACK WIRE ELEMENT	
27	A20009-05	RED WIRE ELEMENT	
28	B04000-01	TERMIAL (2X4 POSITIONS)	
29	L01H009	RELAY SPDT 24VAC	
30	R99G012	CONTROL CHU	
31	L01F010	TRANSFORMER 208/240/24	
32	B03997	CONTROL BRAQUET	
33	L99F005	TERMINAL BLOCK	
34	G11F012	RELIEF VALVE 3/4"	
35	G11Z002	DRAIN FAUCET 3/4"	
36	G03F001	COPPLING 1/4" NPT	
37	G01G001	NIPPLE STANDARD 1/4" NPT X 4"	B50120 Rev. D