INSTALLATION INSTRUCTIONS AND HOMEOWNER'S MANUAL

ELECTRIC BOILER
MECHANICAL CONTROL

Models:
HYDRAR15-M2401M
HYDRAR18-M2401M
HYDRAR20-M2401M
HYDRAR24-M2401M
HYDRAR27-M2401M
HYDRAR29-M2401M

INSTALLER / SERVICE TECHNICIAN:

USE THE INFORMATION IN THIS MANUAL FOR THE INSTALLATION AND SERVICING AND KEEP THE DOCUMENT NEAR THE UNIT FOR FUTURE REFERENCE.

HOMEOWNER:

PLEASE KEEP THIS MANUAL NEAR THE FURNACE FOR FUTURE REFERENCE.

Caution:

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

Manufactured by:

Dettson Industries Inc.
Sherbrooke, Qc, Canada
www.dettson.com

Printed in Canada on 100% recycled paper

2019-04-23

X40246 Rev.F

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1 SAFETY

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 bodily and/or material damage.

⚠ WARNING

Hazards or unsafe practices which CAN result in death or serious bodily and /or material damage.

CAUTION

Hazards or unsafe practices which CAN result in minor bodily and /or material damage.

1.2 IMPORTANT INFORMATION

⚠ WARNING

Non-observance of the safety regulations outlined in this manual will potentially lead to consequences resulting in death, serious bodily injury and/or property damage.

⚠ WARNING

Installation and repairs performed by unqualified persons can result in hazards to them and to others. Installations must conform to local codes or, in the absence of such codes, to codes of the country having jurisdiction.
The information contained in this manual is intended for use by a qualified technician, familiar with safety procedures and who is equipped with the proper tools and test instruments.
Failure to carefully read and follow all instructions in this manual can result in death, bodily injury and/or property damage.

(a) It is the homeowner's responsibility to engage a qualified technician for the installation and subsequent servicing of this boiler;

(b) Do not store any flammable substances, such as paper or carton, near the boiler;

(c) Ask the technician installing your boiler to show and explain to you the main disconnect switch or circuit breaker;

(d) Before calling for service, be sure to have the information of section 5 of your manual close by in order to be able to provide the contractor with the required information, such as the model and serial numbers of the boiler.

IMPORTANT : All local and national code requirements governing the installation of central electric heating equipment and wiring MUST be followed. Some of the codes that may apply are:

- **CSA B214-01** Installation Code Hydronic Heating Systems
- **CSA C22.1 ou CSA C22.10** Canadian Electrical Code

Only the latest issues of these codes shall be used, and are available from:

The Canadian Standards Association
178 Rexdale Blvd.
Rexdale, Ontario M9W 1R3
www.shop.csa.ca

1.3 DANGER OF FREEZING

CAUTION

If your boiler is shut down during the cold weather season, water pipes may freeze, burst and cause serious water damage. Turn off the water supply and bleed the pipes.

If the heater is left unattended during the cold weather season, take the following precautions:

a) Close the main water valve in the house and purge the pipes if possible. Open all the faucets in the house;

b) Ask someone to frequently check the house during the cold weather season to make sure that there is sufficient heat to prevent the pipes from freezing. Tell this person to call an emergency number if required.

2 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.

2.1 HEATING WITH HOT WATER

Your HYDRA 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.

2.2 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;
- Two 1" X ¾" (15-20 kW) or 1¼" X ¾" (24-29 kW) reducers for drain valve and pressure relief valve.

2.3 POSITIONING AND CLEARANCES

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 using the included mounting brackets. First, unfold the four tabs on the back panel of the boiler. Position the top bracket and secure it to a wall. Place the boiler on the top bracket and then secure the bottom. Finally, use self-tapping screw to secure the tabs to the bracket. Ensure that the unit is well fixed on the wall utilizing the 2 mounting brackets.

The boiler can be installed in 6 possible configurations as shown in Figure 1. The arrows represent the direction of the water flow.

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

If the boiler is in an enclosure, provide a door or a removable panel in front to access the control panel. Ideally have a 24" clearance on the front for servicing.

Figure 1 – Mounting Configurations

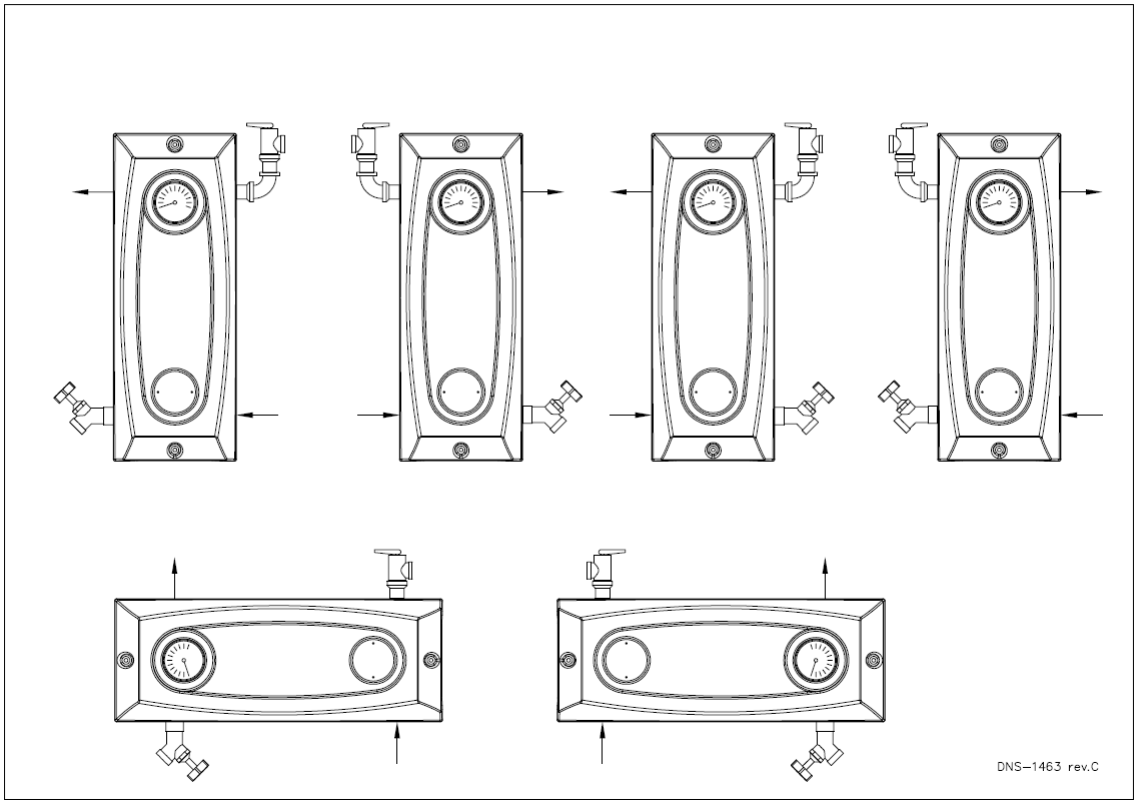


Table 1 – Minimum Clearances to Combustible Material

Location	Clearance
Top (access to elements)	13 ¼" (34 cm)
Sides	4" (10 cm)
Bottom	0
Front	0
Back	0

Table 2 – Circulating Pump Flow Rates

Model	kW	Minimal flow USGPM (L/min)	$\triangle$T = 10°F USGPM (L/min)	$\triangle$T = 20°F USGPM (L/min)
HYDRAR15-M2401M	15	5.1 (19.3)	10.2 (38.7)	5.1 (19.3)
HYDRAR18-M2401M	18	6.1 (23.2)	12.3 (46.4)	6.1 (23.2)
HYDRAR20-M2401M	20	6.8 (25.8)	13.6 (51.6)	6.8 (25.8)
HYDRAR24-M2401M	24	8.2 (30.9)	16.3 (61.9)	8.2 (30.9)
HYDRAR27-M2401M	27	9.2 (34.8)	18.4 (69.6)	9.2 (34.8)
HYDRAR29-M2401M	29	9.9 (37.4)	19.7 (74.7)	9.9 (37.4)

2.4 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 various boiler components.

The heating system should be set-up to operate at a pressure around 12 psi. The maximum operating pressure is 28 psi, but such a high pressure is abnormal and requires inspection from a service technician. The operating temperature may range from 5°C to 88°C (41°F to 190°F).

All installations must include the following items:

- 1 pressure regulator, adjusted to 12 psi, must be installed between the boiler and the main water supply in the building;
- 1 expansion tank, pre-pressurized to 12 psi and of appropriate size;
- 1 or more circulating pumps of appropriate capacity.
- 1 or more air purge valves;

⚠ WARNING

BURN HAZARD
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.

2.4.1 Circulating Pump

The circulating pump must be selected according to the heating distribution system and the heating capacity of the boiler. Table 2 shows necessary water flows according to various temperature rises. For example, a system using baseboard heaters will usually require a temperature rise of 20°F, wheras a radiant floor system will use a rise around 10°F.

2.4.2 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.

2.5 BOILER INSTALLATION

At the time of installation, the following steps should be followed. Refer to Figure 4, Figure 5 and Figure 6.

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. Install the water supply and return piping with the 1" NPT (15 to 20 kW) or 1¼" NPT (24 to 29 kW) fitting;
4. 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.
5. In order to ensure satisfactory water flow, the friction in the piping system must not exceed the capacity of the circulator;
6. After having completed all piping connections, run water through the system and purge the air. An automatic vent should be in operation.

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

2.6 ELECTRIC POWER SUPPLY

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

Electric power to the boiler must come from a 120/240V 60 Hz or 208V 60 Hz, single phase, grounded circuit, protected by an appropriately sized breaker, based on the total rating of the boiler. Refer to the boiler nameplate and the technical specifications in this manual to select the proper breaker and wire size. Normally, **3 conductors** are required. If the circulating pump has an external power source, and if no other accessory requires the 120V output from the boiler, only **2 conductors** can be used. Use cable rated at 60°C or higher.

When using 208V, change the connector's position at the primary of the transformer.

Make sure to turn off all electrical circuits when working in the appliance.

⚠ WARNING

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

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.

It is highly recommended to have a surge protector installed on the boiler.

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

2.6.1 Connecting the Circulation Pump

Connect the circulating pump on 120V connection points identified N for neutral and P for controlled 120V output in the control panel. 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.

2.6.2 Single and Multiple Zone Connections

Single Heating Zone

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

Multiple Heating Zone

Connect the contacts of the motorized valves or pump controls to R(T)-W(T) terminals inside the control panel.

See Figure 5 and Figure 6.

3 OPERATION

3.1 ADJUSTMENTS AND START-UP

CAUTION

The boiler must be filled with water and all air purged from the system, before turning on the power. If the power is turned on before the boiler is filled with water, the elements will become seriously damaged. Warranty will be void.

1. Adjust the set point of the boiler on the aquastat.
2. Turn the power on.
3. Set the thermostat at 30°C (85°F). The circulator should start as well as the electrical elements in sequence with a 8 seconds delay.
4. The circulator stays on for as long as there is a call for heat unless the pump is wired to work continuously.

3.2 MECHANICAL HIGH LIMIT

3.2.1 Mechanical High Limit Control

The mechanical limit aquastat (big black knob) must be set 30°F above the set point temperature on the electronic control.

4 MAINTENANCE

The property owner has the following responsibilities:

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

CAUTION

The boiler guarantee 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.

5 INFORMATION

Model: ..... Serial number: .....

Installation date of the electric boiler: .....

Service telephone # - Day: ..... Night: .....

Dealer name and address: .....

.....

.....

6 TECHNICAL DATA

Table 3 – Technical Specifications

Model number	Power (kW **@240V** / @208V)	Electric element #1 (kW)	Electric element #2 (kW)	Electric element #3 (kW)	Electric element #4 (kW)	Electric element #5 (kW)	Electric element #6 (kW)	Consumption (A **@240V** / @208V)	Suggested wire size (**Cu** / Al)	Suggested breaker size (A @240V)	Voltage - Frequeny - Phase	Supply - Return	Dimensions (L x P x H) in	Shipping weight (lbs)
HYDRAR15-M2401M	**15** / 11,3	5	5	5	-	-	-	**63** / 54	**6** / 4	80	**240**/208V - 60Hz - 1	1" NPT Female	8,2 x 12,4 x 21,4	65
HYDRAR18-M2401M	**18** / 13,5	4	5	4	5	-	-	**75** / 65	**4** / 2	100				
HYDRAR20-M2401M	**20** / 15,0	5	5	5	5	-	-	**83** / 72	**3** / 2	110				
HYDRAR24-M2401M	**24** / 18,0	4	5	5	5	5	-	**100** / 87	**2** / 0	125		1 1/4" NPT Female	11,2 x 12,4 x 21,4	85
HYDRAR27-M2401M	**27** / 20,3	4	4	5	4	5	5	**113** / 98	**1** / 00	150				
HYDRAR29-M2401M	**29** / 21,8	4	5	5	5	5	5	**121** / 105	**1** / 00	175				
In all cases, refer to applicable local and national codes														

Figure 2 – Boiler Components

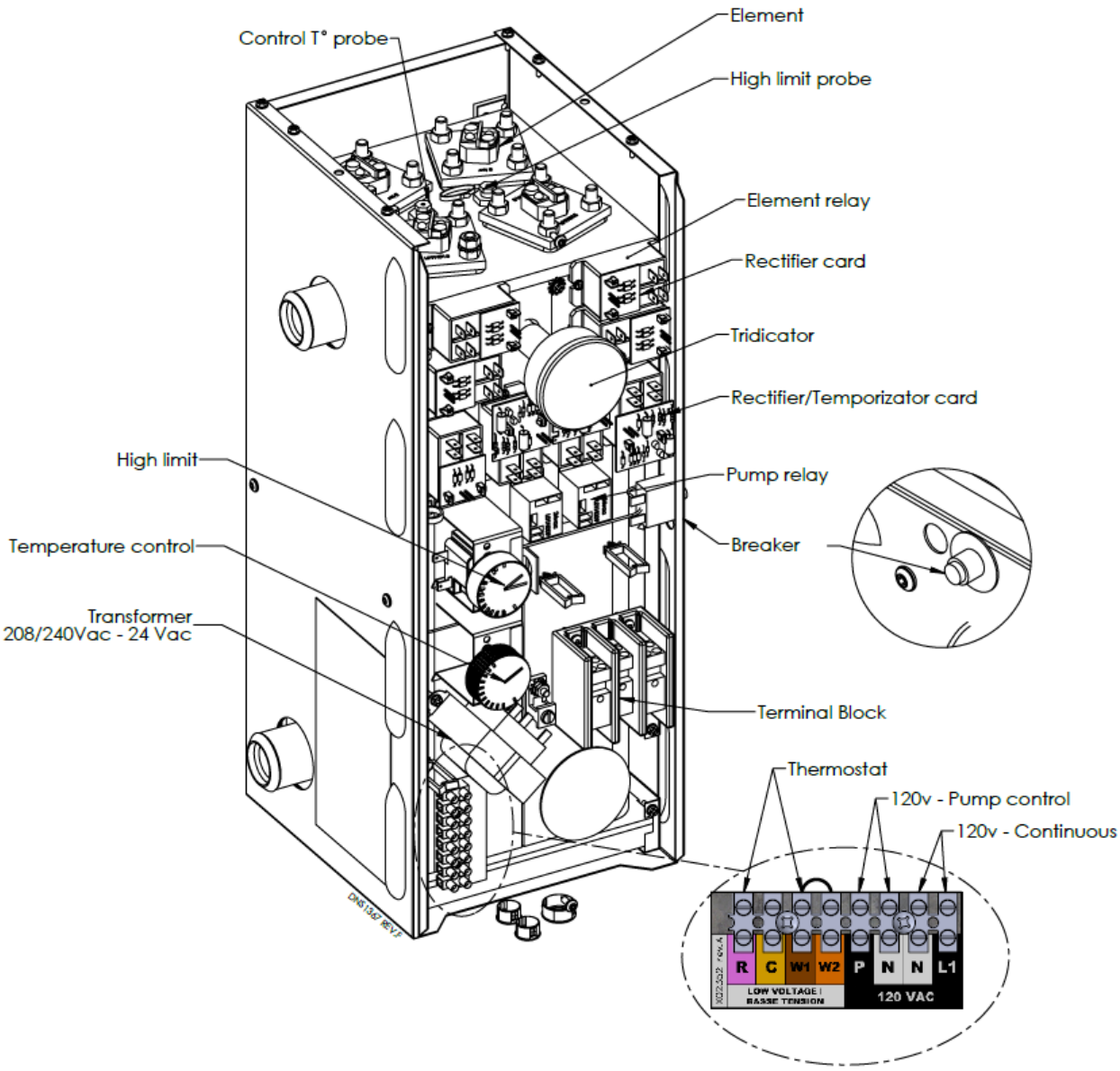
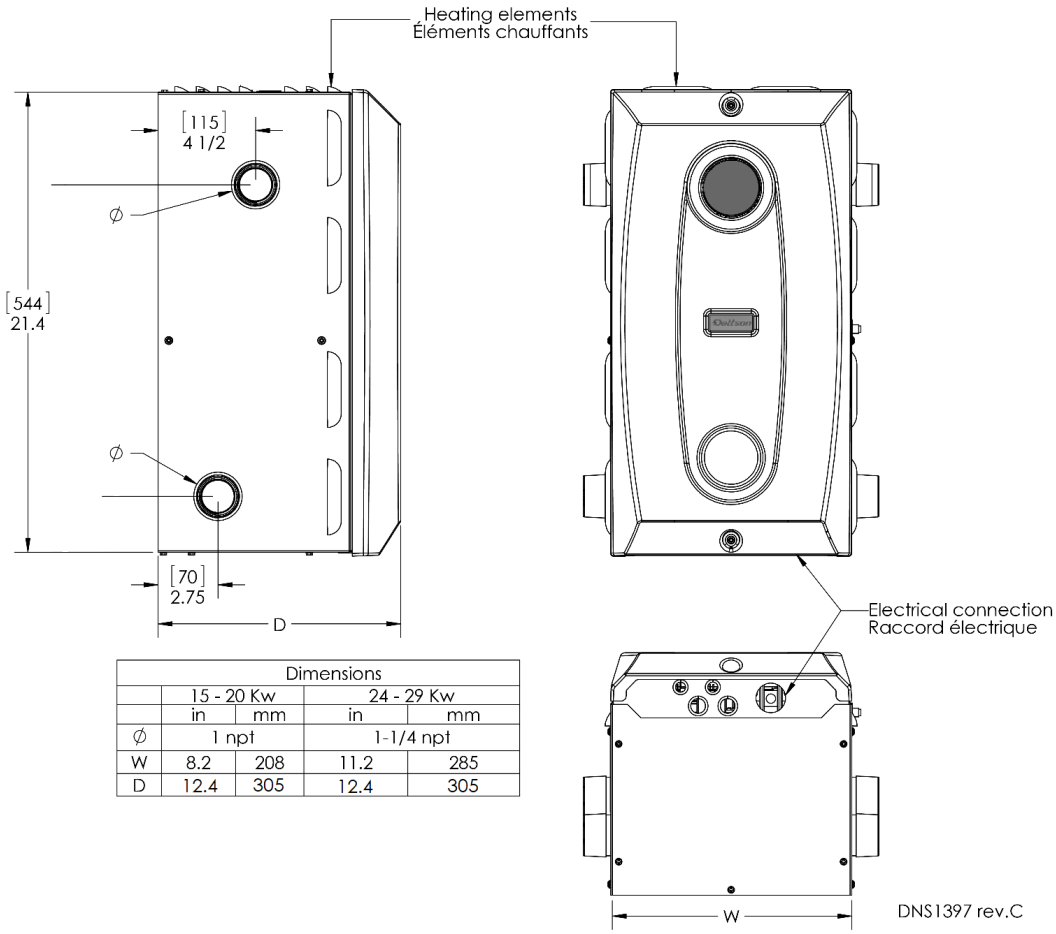


Figure 3 – Boiler Dimensions



Dimensions				
	15 - 20 Kw		24 - 29 Kw	
	in	mm	in	mm
Ø	1 npt		1-1/4 npt	
W	8.2	208	11.2	285
D	12.4	305	12.4	305

Figure 4 – Typical Diagram of a Single Zone Installation

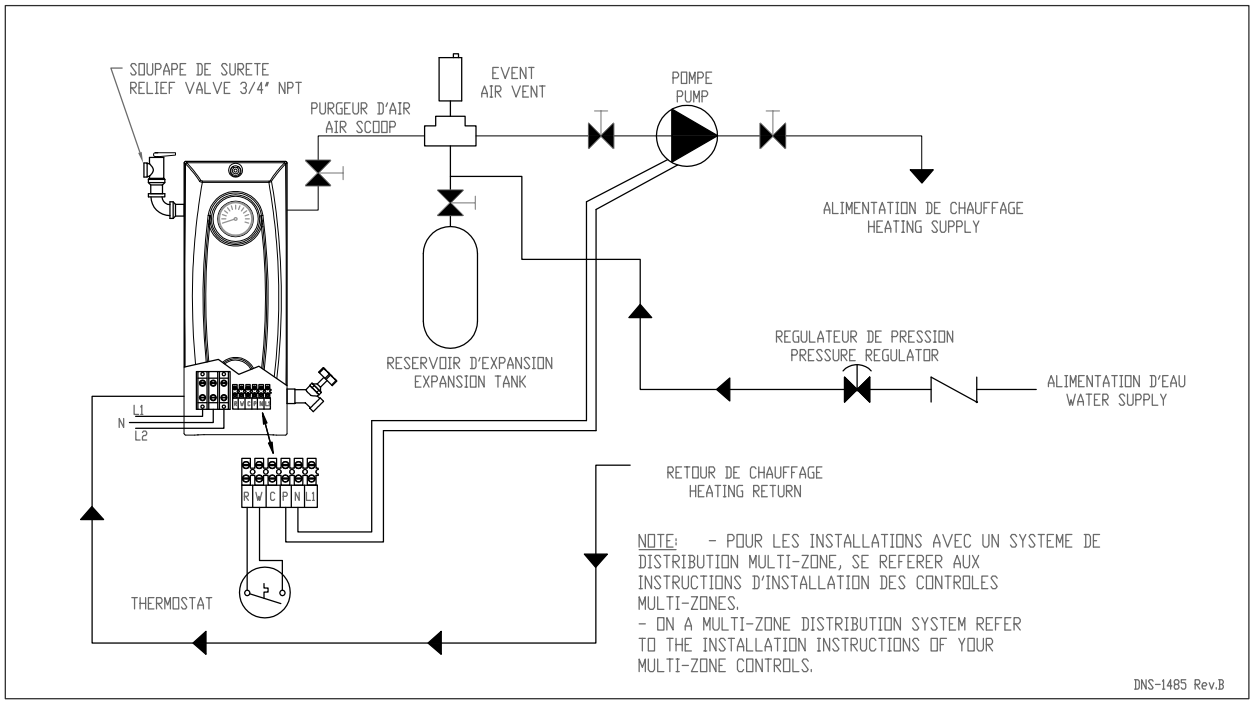


Figure 5 – Multi-zone Diagram with more than one Circulator

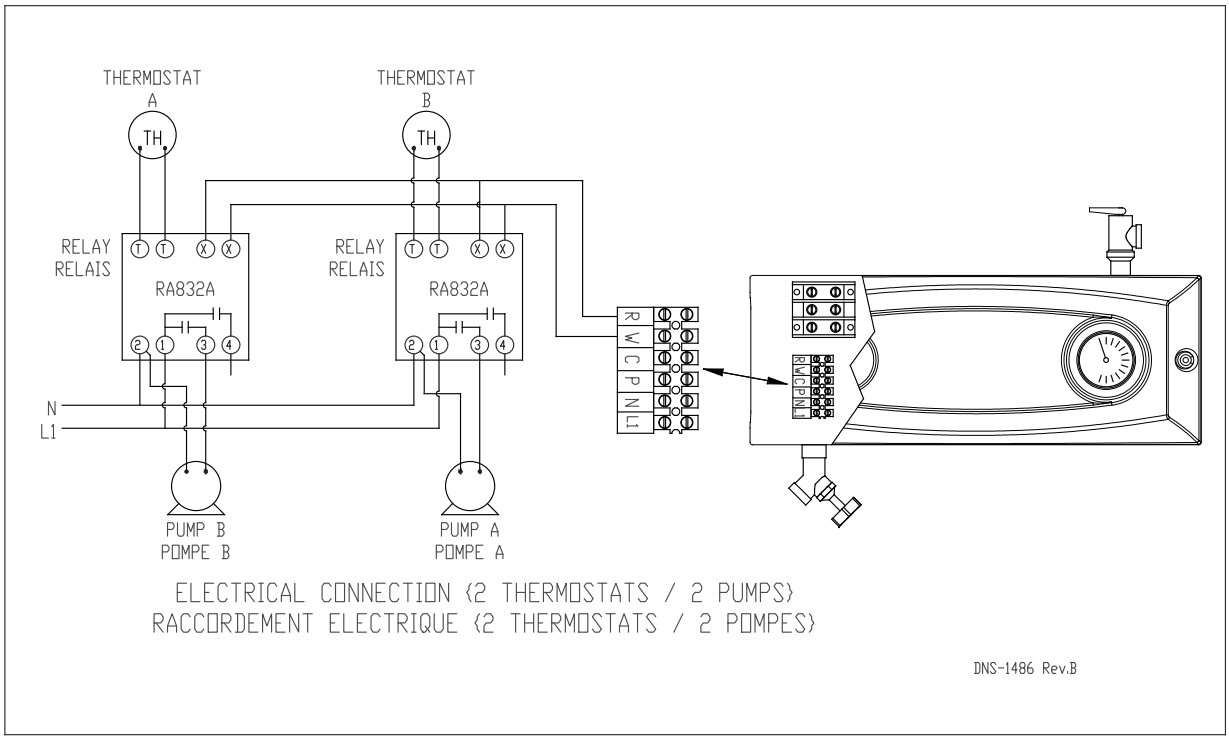


Figure 6 – Multi-zone Diagram with Motorized Valves

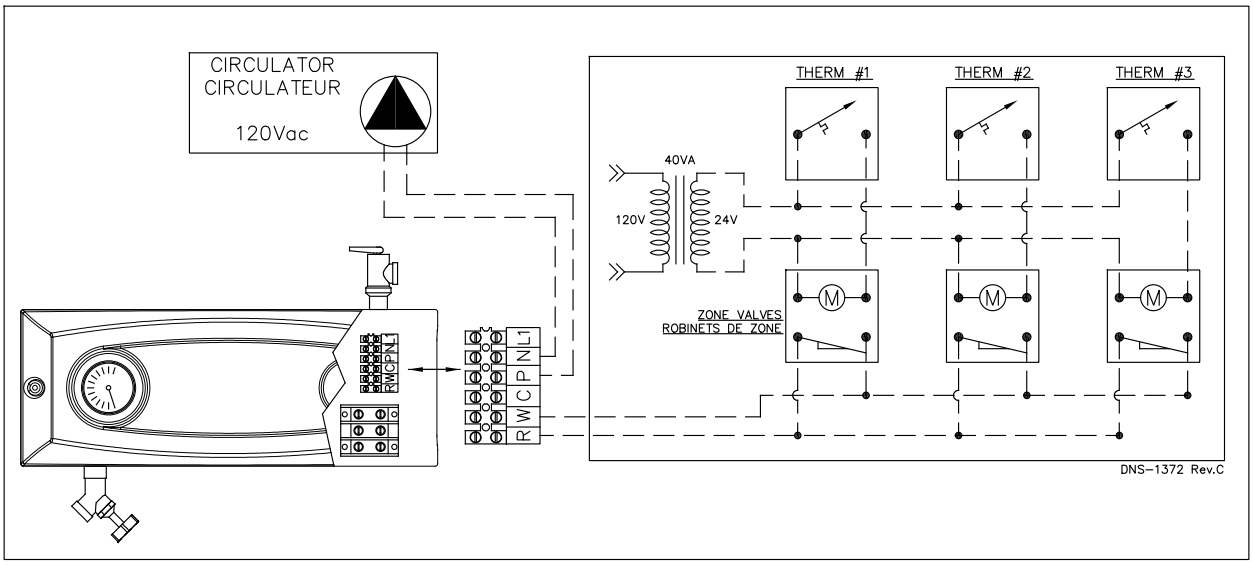


Figure 7 – Electrical Diagram 4 elements

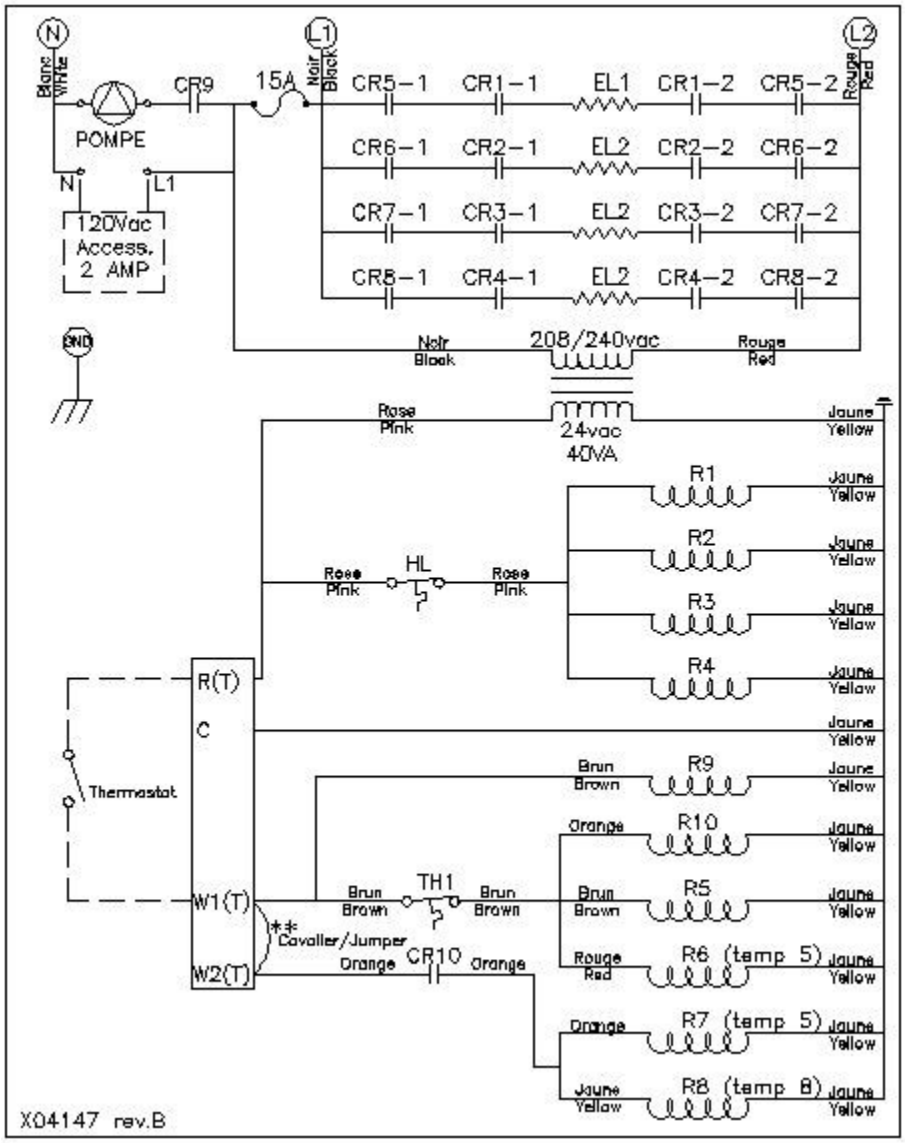


Figure 8 – Electrical Diagram 6 elements

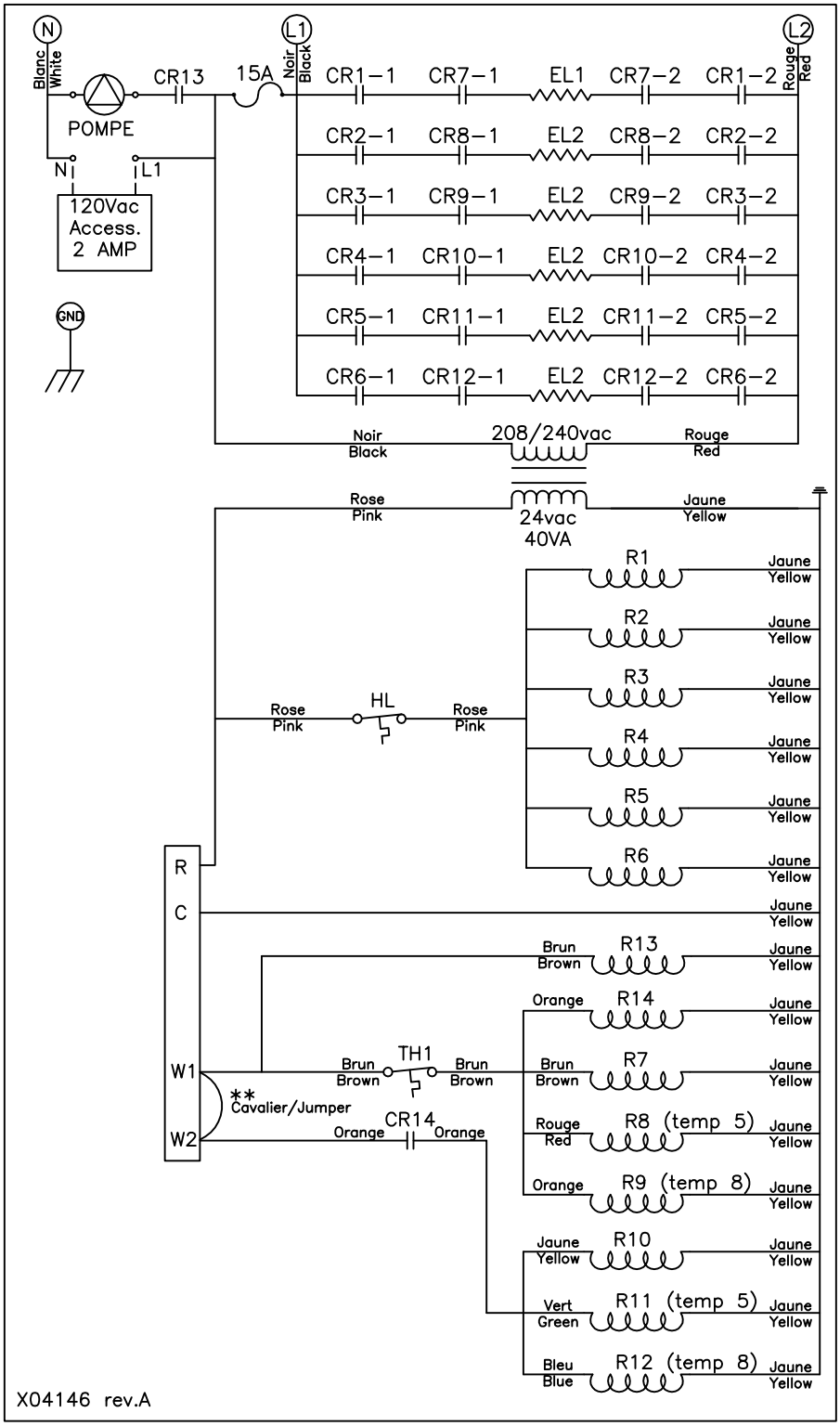


Figure 9 – Exploded View

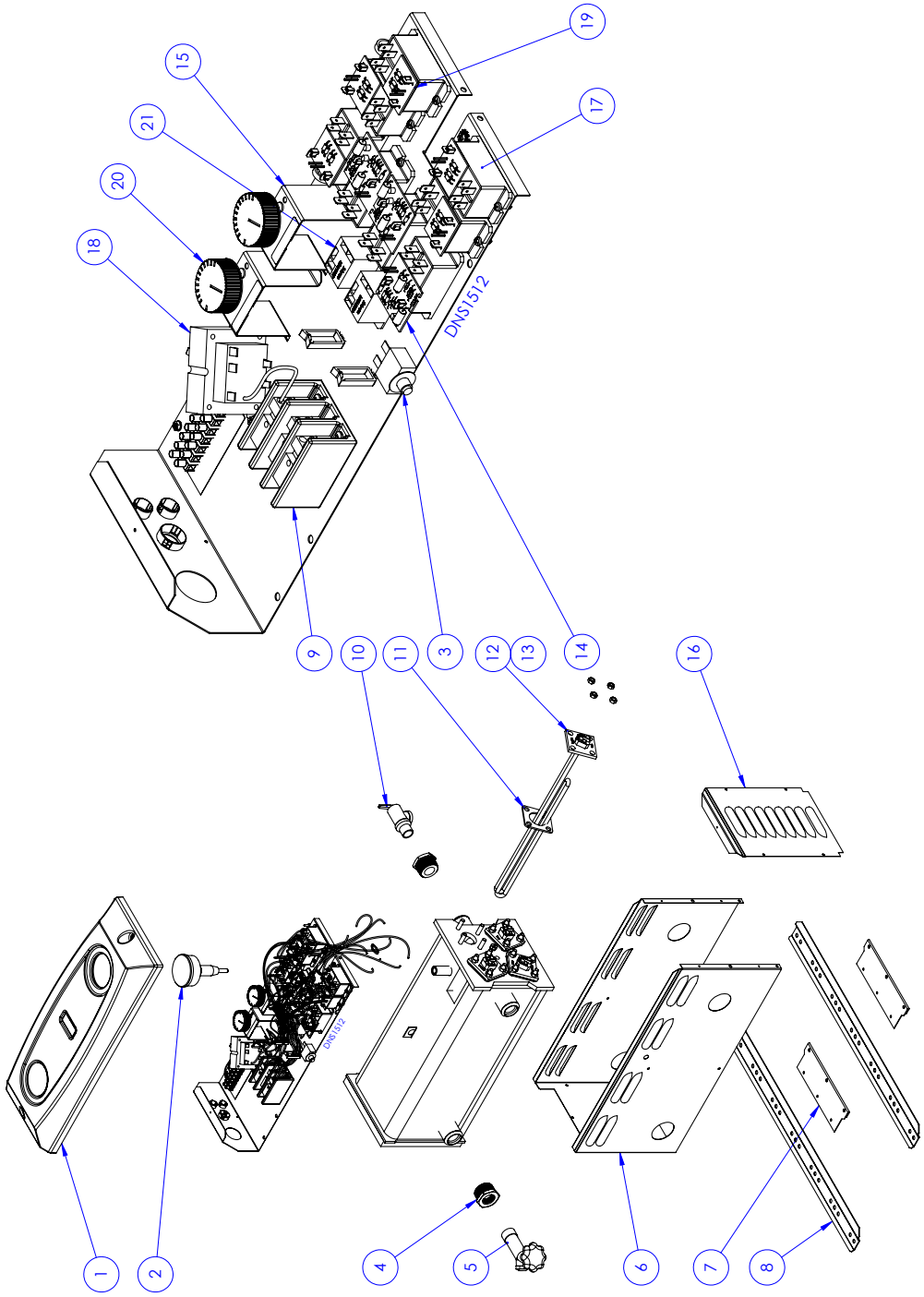


Table 4 – Parts list

#	15-20 kW	24-29 kW	Description	Note
1	B04460	B04447	Cover assembly	Cover, cosmetic and wiring diagram
2	R02L006		Tridicator	
3	L01J001		Breaker 15A	
4	G08F005	G08F010	Reducer 3/4	
5	G11Z002		Drain faucet 3/4m	
6	B04481	B04495	Jacket	
7	B04201		Machine bracket	
8	B03952		Wall bracket	
9	L99G006		Terminal block	
10	G11F025		Relief valve 30# 3/4m x 3/4f	
11	B03970		Sealing gasket	
12	B04237-02		Kit element 4kW	Element and gasket
13	B04237-03		Kit element 5kW	Element and gasket
14	R99G007		Rectifier / Temporisator	
15	B04184		Aquastat assembly (High limit)	
16	B04485	B04500	End plate	
17	L01H030		Relay DPST 22VDC	
18	L01F010		Transformer 208/240V - 24V	
19	R99G006		Rectifier	
20	B04184-01		Aquastat assembly (Control)	
21	L01H009		Relay 24VAC	

7 NOTES