



## Evoplate **Vessel**

Installation, Operating & Maintenance Instructions

# VERY IMPORTANT - Please read carefully

## Running

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# 1. Running

## 1.1 Safety Points

- During operation, the unit may have very hot or cold surfaces.
- The temperature probe is installed directly in the secondary flow. Do not remove when the system is hot, full of water or under any pressure.
- Take care when lifting. Only use the designated lifting point. Use only certified lifting equipment capable of lifting the weight. Residual water may also be present and spillage could occur.
- Never lift the Evoplate vessel by any associated pipework or pipe connections.
- Take care when handling, as some edges may be sharp.
- The equipment has danger from electricity. Do not remove covers or allow any exposed live parts. Isolate before working on the unit.
- The electrical and mechanical functionality must be considered prior to connecting any non factory fitted equipment. E.g. pumps, valves, actuators etc.
- Power supply and control signal cables **MUST** be segregated as far as is reasonably practical.
- Shielded control cables must be used.
- Local authority regulations must be followed at all times.
- Ensure all operations are carried out by suitably trained / qualified personnel.

## 1.2 Start Up

Checks	Complete (✓)
Check that electrical installation is complete.	
Check that the mechanical installation is complete.	
Check that the system has been flushed, but <b>NOT</b> through the plate pack and that there are no leaks.	
Check that any air has been eliminated from the system.	
Check that valves are opened in the required sequence.	

### 1.3 Working Principles

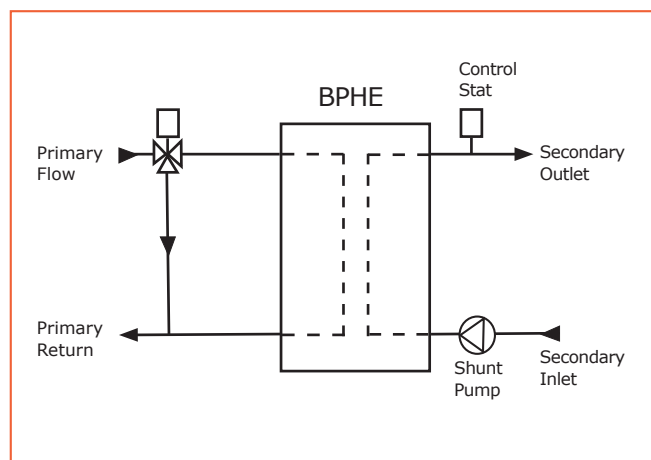
The Evoplate vessel comprises of a Brazed Plate Heat Exchanger, either a 2 port or 3 port control valve, shunt pump, temperature sensor and PID controller, all mounted on the vessel.

The motorised 2 or 3 port control valve, allows rapid adjustment of the primary heat input to match changes in secondary hot water demand.

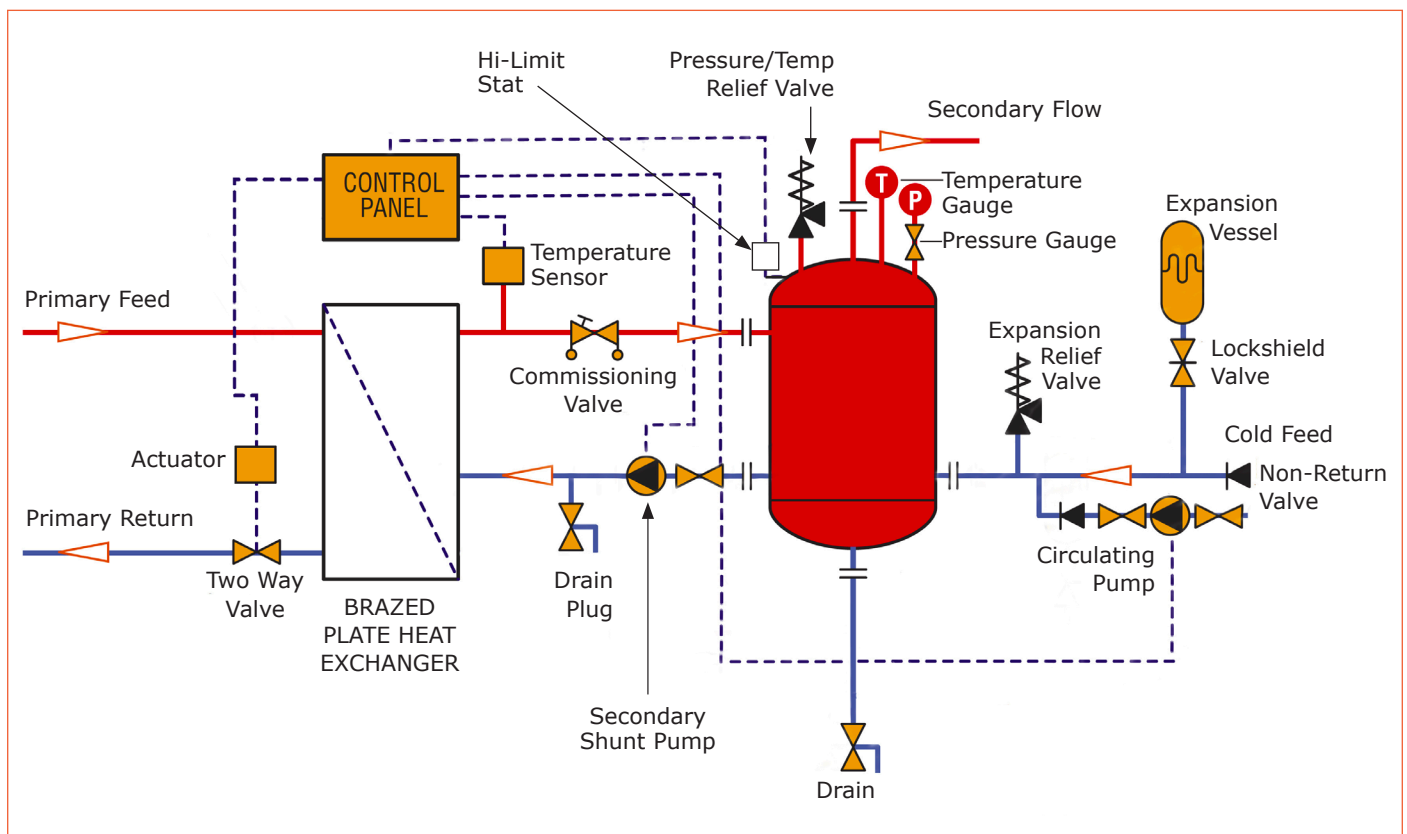
The Evoplate, Brazed Plate Heat Exchanger is supplied with no insulation and the design ensures that the outlet temperature does not fall below the set point (60°C default but can be adjusted to suit customer requirements) and consequently reduce the risk of legionnaires disease.

Providing the class of accommodation and details of the number and type of fixtures are known, Ormandy Rycroft will be pleased to recommend the optimum Evoplate size.

Typical 3-Port Evoplate System



Typical 2-Port Evoplate System



## 2. Installing

### 2.1 Installation

#### Lifting

Lifting lugs are fitted on the top of the vessel. These should be used when lifting the vessel into position. Ensure the vessel remains in a vertical position (for vertical vessels) and horizontal position (for horizontal vessels) throughout.

#### Foundations

Level foundations should be prepared for the Evoplate vessel. Uneven foundations can cause airlocks within the vessel and the vessel could be unstable when maintenance work is carried out.

The vessel should be attached to the foundations using bolts through the bolt holes on the vessel foot pads (if fitted).

#### Filling and Draining

Before filling the system, check that the drain valve is closed and all air vents are open.

Flush out the system before installing the Evoplate vessel to remove any foreign matter. Close any manual air vents and run the Breeze. Crack the vents to release air.

Tighten any bolts on the vessel prior to filling, as these may have become loose during transit. Ensure bolts are tightened diametrically and to the correct Torque. (if in doubt contact Ormandy Rycroft Engineering technical department).

When filling the vessel, ensure the vent connection on the top of the vessel is open. When the vessel is full, the vent boss should be closed and plugged. When draining the vessel, ensure the vessel is released of pressure slowly and that the vent is then open before draining commences.

**Caution: Do not fill the system too quickly, otherwise pockets of air may become trapped. Do not flush the system through the plate heat exchanger, as this could result in the plates becoming blocked or cause a loss in performance.**

#### Relief Valve

Ensure that the relief valve is fitted with a discharge pipe (on the valve outlet).

The pipe should be open at atmospheric pressure and run to a low level suitable drainage area.

#### Connections

PTFE should be used when fitting screwed connections to the vessel bosses.

When fitting flange connections, ensure mating flanges are square and that the weight of the pipework is supported by external supports and not the vessel connections.

Expansion of pipes should be considered for the application and measures put in place if necessary.

## Screwed Pipework

Make sure that pipework is square and correctly spaced before fitting. See that the weight of the pipework is taken by external supports and not by the brazed plate connections. Allowances should be made for expansion of the pipes, either by suitable bends or flexible joints. Flanged connection bolts should be tightened in a diametrically opposite sequence and not consecutively round each flange.

## Liquid Expansion

Changes in volume with temperature must not be overlooked. The system pressure will rise dramatically if there is nowhere for water to expand. It is not advisable to use a relief valve as a means of releasing the excess water.

Vented systems expansion is via the vent pipe which discharges back into the atmospheric tank. Unvented systems require a separate expansion tank.

## Venting

Vent valves must be fitted at the highest point in the connecting pipework so that the Evoplate can be bled of air for initial operation. It is essential that the flooded can type pump motors which are commonly used for all Evoplate units are bled of air and flooded before starting. See the pump manufacturer's instructions.

## Inspection

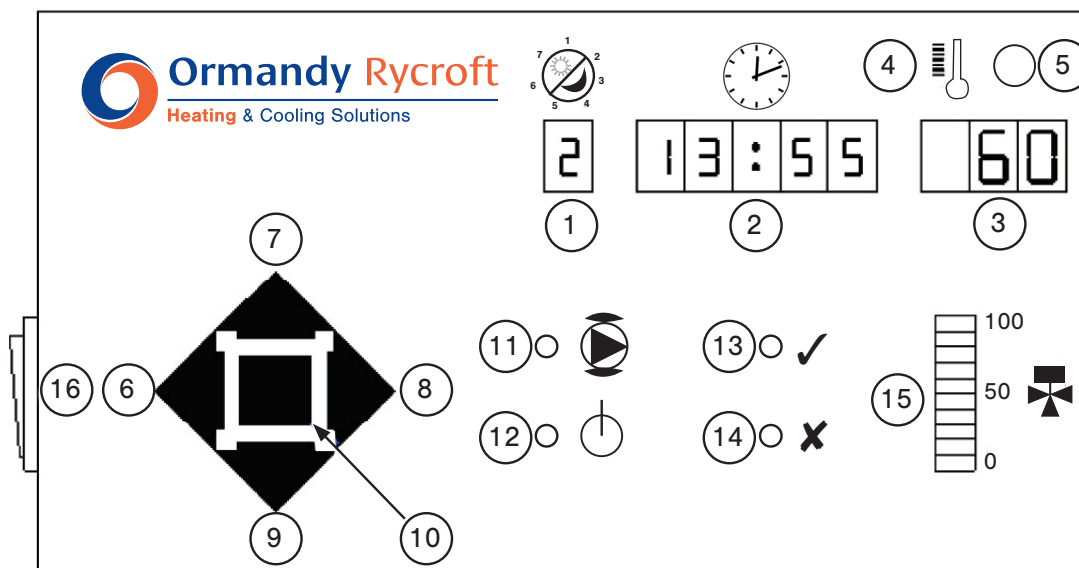
Internal inspection of the vessel should take place after the first 3 months. The inspection should involve looking for signs of corrosion or local pitting cells. If any is found, then a specialist should be consulted. If after the first inspection the vessel appears sound, then a further inspection should be made after 6 months.

Again, on satisfactory review, inspection can be limited to annually. When inspecting the internal side of the vessel, ensure that the vessel is first drained of its contents in accordance with the procedures detailed above.

Before removing the inspection cover, ensure that the cover plate is supported by the lifting lug (if fitted). Always use a new gasket when re-fitting the cover plate and tightened the bolts diametrically.



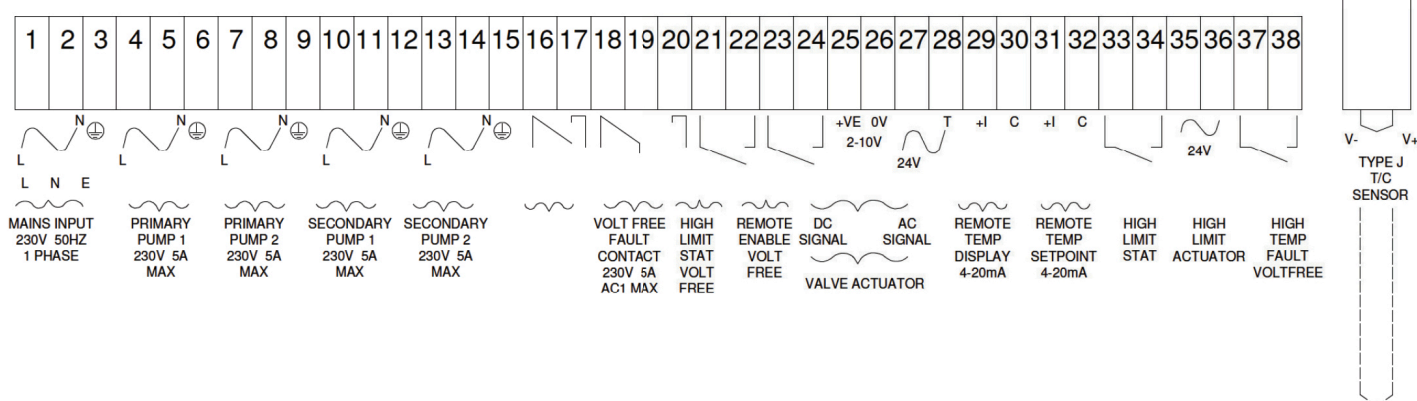
## 2.2 Operation and Set Up



- |                                    |                              |                               |
|------------------------------------|------------------------------|-------------------------------|
| 1 Day/Mode Display                 | 7 Value Increase Push Button | 13 System Healthy Indicator   |
| 2 Time/Alarm Display               | 8 Step Right Push Button     | 14 System Fault Indicator     |
| 3 Temperature/Parameter Display    | 9 Value Decrease Push Button | 15 Valve Position Bar Display |
| 4 High Temperature Alarm Indicator | 10 Mode Select Push button   | 16 On/Off switch              |
| 5 Reset Push Button                | 11 Pump Energised Indicator  |                               |
| 6 Step Left Push Button            | 12 Power On Indicator        |                               |

## Electrical Connections

### Terminal Block



The Electrical connections are located in the terminal compartment.  
A description of the terminals can be found on the inside of the terminal compartment cover.

Connect a single phase 230V, 50Hz supply to the Mains Input terminals.  
Max full load current is 16A with the majority of units being considerably less.

If the unit is to be controlled remotely, connect the remote control switch or contacts to the 'Remote Enable Terminals'. If the unit is to be controlled locally fit a link between these terminals.

**Do NOT apply voltage to the terminals of these contacts!**

Voltage free fault relay contacts are provided for Remote Fault Indication.

## Operation

The Evoplate is a self-contained unit, which controls up to two primary and two secondary pumps, together with a two/three-port valve, to provide hot water. When the system is fitted with two primary pumps they are operated on a shared duty-standby cycle with automatic changeover on pump failure.

The Evoplate can be energised by its own internal time clock function, by a remote switch or Building Management System or by a combination of the two.

Switch on via switch <sup>(16)</sup>

The front panel will illuminate. After a few seconds of self checks, the displays will settle to the **Day** <sup>(1)</sup> (Time-clock only), **Time** <sup>(2)</sup> and **Temperature** <sup>(3)</sup>. The pumps will start <sup>(11)</sup> and the valve will open <sup>(15)</sup> and the system healthy indicator <sup>(13)</sup> will illuminate.

In the majority of applications, the resulting control and running will be perfectly satisfactory. The standard temperature setting is 60°C and the unit will run continuously (24 hour operation). To change any of the default settings, see section (2.3).

### a) Remote Switch or Building Management System Control

The Evoplate will be turned on when contacts connected to the **Remote Enable terminals** are closed. This allows the user to control the time of day when hot water will be available. When the contact is open the system is turned off.

### b) Internal Time Clock Control

For this function to work the Time clock function should be turned on (see Set Up) and the **Remote Enable terminals** should be linked.

Under Time clock control the Evoplate will be turned on and off at preset times of the day. Up to two on and two off times can be programmed for each day of the week.

The system can be re-activated after it has automatically switched off by pressing the **Value Increase** <sup>(7)</sup> push button. Each press of this push button will add 30-minute increments to a total, which is shown in the Time/Alarm window. Pressing the **Value Decrease** <sup>(9)</sup> push button will subtract 30-minute increments from the total time.

The time value counts down and when the time shown has elapsed, the unit will revert to normal time clock operation.

### c) Remote Switch and Internal Time Clock Control

For this function to work, the Time clock function should be turned on (see Set Up) and a remote Control switch should be connected to the **Remote Enable terminals**.

Under Time clock control the Breeze will be automatically turned on and off at preset times of the day. Up to two on and two off times can be programmed for each day of the week. When contacts connected to the **Remote Enable terminals** are opened the Evoplate will be turned off.

When remotely enabled and the system is turned off under time clock control, it can be re-activated by pressing the **Value Increase** <sup>(7)</sup> push button. Each press of this push button will add 30-minute increments to a total, which is shown in the Time/Alarm window. Pressing the **Value Decrease** <sup>(9)</sup> push button will subtract 30-minute increments from the total time.

The time value counts down and when the time shown has elapsed, the unit will switch off and revert to normal time clock operation. However, when the system has been turned off under remote control, it cannot be re-activated by pressing the **Value Increase** <sup>(7)</sup> push button.



## Set Up

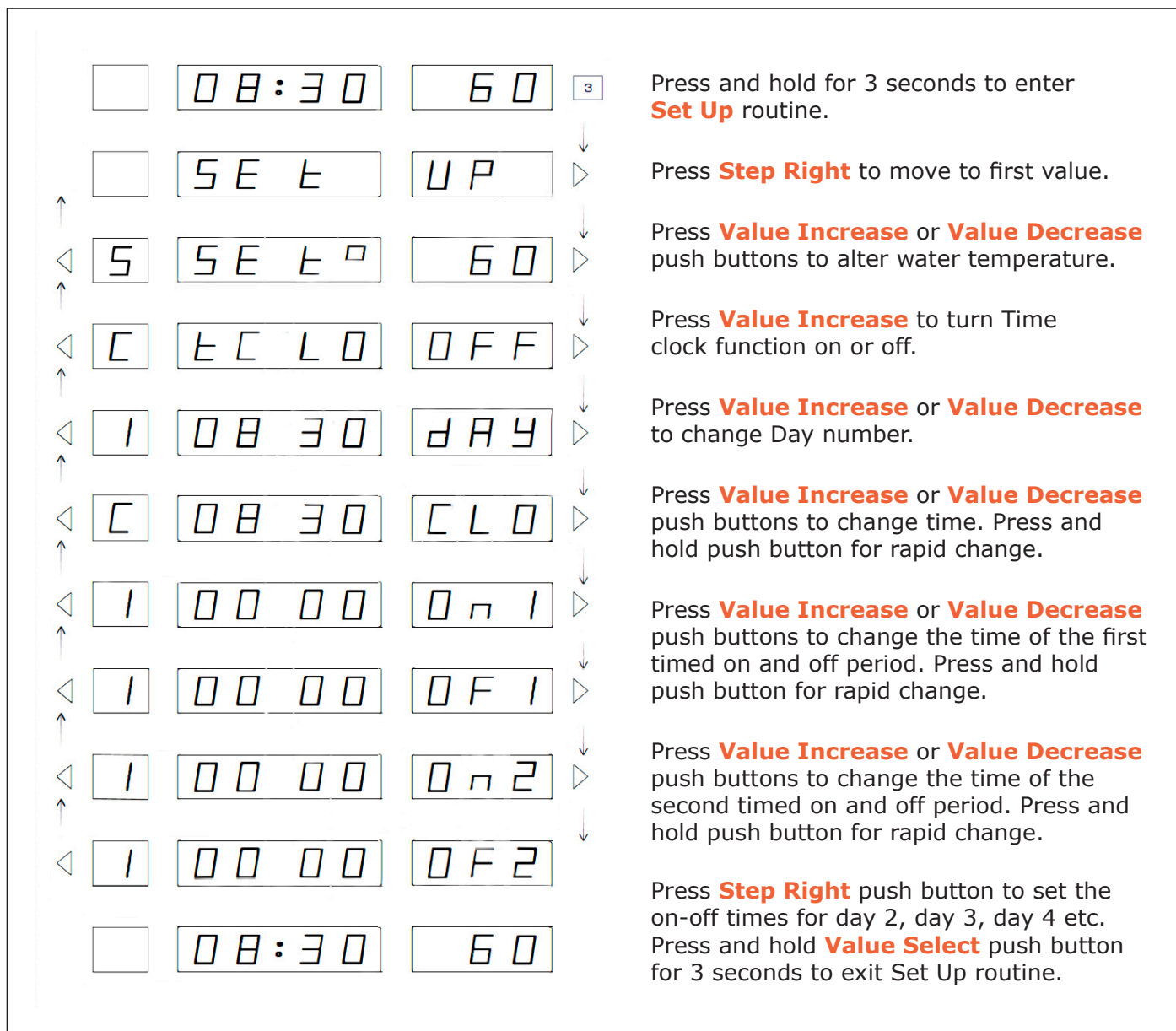
The Evoplate control unit is factory programmed with temperature and control settings that will suit most applications. However, we would recommend that the unit is commissioned to ensure correct operation and maximum efficiency. Contact our Service Department for details.

All the values are adjustable so that you can customise the unit to exactly match your system.

The set up routine is entered by pressing and holding the **Mode** <sup>(10)</sup> push button for three seconds. Press the **Step Right** <sup>(8)</sup> and **Step left** <sup>(6)</sup> push buttons to move forwards and backwards through the sequence. Press the **Value Increase** <sup>(7)</sup> or **Value Decrease** <sup>(9)</sup> push buttons to alter the value shown in the display.

Press and hold the **Mode** <sup>(10)</sup> push button for 3 seconds to exit the set up routine.

Figure 1 - Set Up Sequence



The system continues to control when the controller is in the set up routine allowing adjustments to be made on the fly.

## System Faults

When a fault situation is detected, the System Fault (14) indicator will be lit and the internal Fault relay will be energised. The normal time and temperature display will be replaced by an alarm message. The messages and meanings are shown in Figure 2 below. If a system fault occurs when the controller is in the set up routine the System Fault (14) indicator will be lit, but the display will not be replaced by an alarm message. The alarm message can be viewed by leaving the Set Up routine.

Figure 2 - Alarm Messages

A	HL 1	77	First High temperature level detected.
A	HL 2	83	Second High temperature level detected - buzzer sounds and the system is automatically shut down.
A	LL	47	Low temperature detected.
A	PP 1F	60	Primary Pump No 1 failure - if two primary pumps are fitted, Primary Pump No 2 will be energised.
A	PP 2F	60	Primary Pump No 2 failure - Primary Pump No 1 will be energised.
A	SP 1F	60	Secondary Pump No 1 (shunt) failure - system is automatically shut down.
A	SP 2F	60	Secondary Pump No 2 (re-circulation) failure -system is automatically shut down.
A	TC F	---	Thermo-couple failure - the system is automatically shut down.
A	rd	60	System has been remotely disabled

The Second High temperature level alarm will automatically shut the system down and sound a warning buzzer. The buzzer can be silenced by pressing the **Reset (5)** push button. When the fault is diagnosed and corrected, the system can be re-activated by pressing the **Reset (5)** push button again.

This can only be performed when the temperatures have returned to near normal. All the other alarms will automatically reset when the problem has been corrected. Alarms constantly re-occurring could indicate that the system is incorrectly configured.

## Advanced Set Up Routine

The system is supplied with default settings, which suit most applications. The advanced set up feature allows Installers and Engineers to tailor the settings to suit particular installations. The system continues to control when the controller is in the advanced set up routine so that the results of adjustments can be seen immediately. In addition manual control of the valve position is available.

- The set up routine is entered by simultaneously pressing and holding the **Mode** <sup>(10)</sup>, **Step Left** <sup>(6)</sup> and **Value Decrease** <sup>(9)</sup>, Push buttons for three seconds.
- Press **Step Right** <sup>(8)</sup> and **Step Left** <sup>(6)</sup> buttons to move forwards and backwards through the sequence.
- Press the **Value Increase** <sup>(7)</sup> or **Value Decrease** <sup>(9)</sup> buttons to alter the value shown in the display.
- Press and hold the **Mode** <sup>(10)</sup> push button for 3 seconds to exit the set up routine.

Figure 3 - Advanced Set Up



## Night Set Back / Pasteurisation

When the DIP switch for Night set-back/Pasteurisation is set to the on position and the unit into standby. When set back/pasteurisation value (S Sb to) is set to above normal set temperature (S SET To) the controller assumes pasteurisation and raises the temperature to the set back/pasteurisation value for one hour, before returning to standby. Alternatively, when it (S Sb To) is set to below normal set temperature, the controller assumes set back and lowers the temperature to this value until normal day running begins.

## Manual Control

The Advanced Set Up routine allows engineers to position the control valve manually. This feature is active while this set up window is visible. This feature can be disabled and control restored to automatic by pressing the **Step Left** <sup>(6)</sup>, or **Step Right** <sup>(8)</sup> push buttons to display another parameter or pressing and holding the **Mode** <sup>(10)</sup>, push button to exit the advanced set up routine.

## Remote Set Point Adjustment

When a 4 - 20mA signal is connected to the remote input, the set point can be varied between 20 deg C = 4mA and 100 deg C = 20mA. It should be noted that BMS control of the unit starts as soon as the external signal of above 2mA is detected. Conversely, if the controller loses signal, or the signal drops below 2mA, it will revert back to it's own internal set point.

## DIP Switch Settings

The physical configuration of the system and the Night Set-back function are programmed into the controller by setting the position of eight switches. Switches are located on the display printed circuit board. To change the position of these switches:

- 1) Isolate the mains supply to the controller.
- 2) Open the hinged door.
- 3) Remove the four black fixing screws and slide the control facia out of the enclosure taking care not to pull the connecting cable.
- 4) Turn the facia over. DIP switches are located on the bottom edge of the circuit board.
- 5) Change the switch positions as required (see table below).
- 6) Replace facia, close hinged door and switch on the mains supply.

The following table shows the switch controls. (**Bold** positions are factory default values).

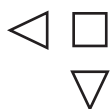
1	2	3	4	5	6	7	8	Function
On								No Operation
<b>Off</b>								No Operation
	On							No Operation
	<b>Off</b>							No Operation
		On						Fault Relay Operates During Remote Disable
		<b>Off</b>						Fault Relay, No Operation During Remote Disable
			On					Valve Output 2-10V
			<b>Off</b>					Valve Output 0-10V
				<b>Off</b>				Night Setback OFF
				On				Night Setback ON
					Off	Off		No Secondary Pumps Fitted
					Off	<b>On</b>		1 Secondary Pump Fitted (SHUNT)
					<b>On</b>	Off		1 Secondary Pump Fitted (RECIRC)
							<b>Off</b>	1 Primary Pump Fitted
							On	2 Primary Pumps Fitted

Factory Default Settings



**Set Up:**

Alternative setting record (Date)		.....	.....	.....
Set Point	= 60	.....	.....	.....
Time Clock	= Off	.....	.....	.....
Day (Set)	= 1 = Mon 7 = Sunday			
Clock (Set)	= Time			
Day 1 ON 1	= 0000	.....	.....	.....
Day 1 OFF 1	= 0000	.....	.....	.....
Day 1 ON 2	= 0000	.....	.....	.....
Day 1 OFF 2	= 0000	.....	.....	.....
Day 2 ON 1	= 0000	.....	.....	.....
Day 2 OFF 1	= 0000	.....	.....	.....
Day 2 ON 2	= 0000	.....	.....	.....
Day 2 OFF 2	= 0000	.....	.....	.....
Day 3 ON 1	= 0000	.....	.....	.....
Day 3 OFF 1	= 0000	.....	.....	.....
Day 3 ON 2	= 0000	.....	.....	.....
Day 3 OFF 2	= 0000	.....	.....	.....
Day 4 ON 1	= 0000	.....	.....	.....
Day 4 OFF 1	= 0000	.....	.....	.....
Day 4 ON 2	= 0000	.....	.....	.....
Day 4 OFF 2	= 0000	.....	.....	.....
Day 5 ON 1	= 0000	.....	.....	.....
Day 5 OFF 1	= 0000	.....	.....	.....
Day 5 ON 2	= 0000	.....	.....	.....
Day 5 OFF 2	= 0000	.....	.....	.....
Day 6 ON 1	= 0000	.....	.....	.....
Day 6 OFF 1	= 0000	.....	.....	.....
Day 6 ON 2	= 0000	.....	.....	.....
Day 6 OFF 2	= 0000	.....	.....	.....
Day 7 ON 1	= 0000	.....	.....	.....
Day 7 OFF 1	= 0000	.....	.....	.....
Day 7 ON 2	= 0000	.....	.....	.....
Day 7 OFF 2	= 0000	.....	.....	.....



**Set Set:**

Alternative setting record (Date)

		.....	.....	.....
Proportional Band	= 60%	.....	.....	.....
Integral Time	= 4 mins	.....	.....	.....
Derivative Time	= Off	.....	.....	.....
High Limit	= 78°C	.....	.....	.....
Low Temperature Warning	= 35°C	.....	.....	.....
High Temperature Limit Time Delay	= 1 min	.....	.....	.....
Low Temperature Limit Time Delay	= 1 min	.....	.....	.....

Manual Valve Operation	=00%		(Not presetting)	
Primary Pump Overrun Time	= 5 mins	.....	.....	.....
Primary Pump Overrun Temperature	= 40°C	.....	.....	.....
Secondary Pump Overrun Time	= 5 mins	.....	.....	.....
Secondary Pump Overrun Temperature	= 40°C	.....	.....	.....
Night Set-back/Pasteurisation Temperature	= 68°C	.....	.....	.....
Primary Pump Duty Changeover Time	= 9 hrs	.....	.....	.....

By pressing the **reset** <sup>(5)</sup> and **mode** <sup>(10)</sup> buttons simultaneously for a few seconds, the time clock settings will be returned to the factory default settings.

By pressing the **reset** <sup>(5)</sup> and **decrease** <sup>(9)</sup> buttons, the control and alarm parameters will be returned to the factory default settings.



## 3. Health

### 3.1 Maintenance

Where possible, a detailed inspection of the Evoplate should be made after the first six months. This will provide an insight into future requirements for efficient maintenance. If the Breeze is cleaned and there is no sign of corrosion, it can be safely assumed an annual inspection will be sufficient for future servicing. All electrical connections should be checked and tightened if necessary.

**Caution:**- Maintenance should only be performed by qualified personnel only. Electrical work should be carried out by a qualified electrician in strict conformance to the latest requirements.

In order to maintain the Breeze unit, you will require as a minimum the following tool kit:

- Set of Metric allen Keys up to M16
- Set of Metric spanners
- Set of Screwdrivers
- A pipe wrench to suit a maximum 50mm nominal pipe size.
- M16 friction ratchet and M16 deep ring spanner (CP-B25 to CP-B250)

#### **Controller**

The controller is run via an EPROM that stores all the changes to the time programmes and other data. After the first six months, all connections in the panel should be checked and tightened if necessary.

#### **Temperature Thermocouple**

Ensure that the Thermocouple connections are satisfactory. Refer to the manufacturer's instructions.

#### **Control Valve and Actuator**

Check that the valve will open and close by using the manual facility on the controller. Electrical connection should be checked at the actuator. The linkage should also be tightened to ensure good mechanical contact. Refer to the manufacturer's instructions.

#### **Hi-Limit / Control Valve and Actuator**

In addition to the above, check that the valve opens and closes by turning the power on and off. Electrical connection should be checked at the actuator. The linkage should also be tightened to ensure good mechanical contact. Refer to the manufacturer's instructions.

#### **Primary Pump**

Ensure that the pump is on the correct speed setting and that wiring is secure at all terminals.

#### **Plate Heat Exchanger**

A series of contoured plates with ports form a plate pack with flow channels. The hot water flows down alternate channels, while the cold water flows up alternate channels. This creates 100% counter flow.

### 3.2 Service

Ormandy Rycroft Engineering offers a full and comprehensive range of service and support. This encompasses the maintenance, commissioning and repair of general water heating equipment, including heat exchangers, boilers, pressurisation units, booster sets and calorifiers.

**Contact our Sales Department - [sales@ormandygroup.com](mailto:sales@ormandygroup.com)**

### 3.3 Spares

All Breeze component parts are available as replacement/spare items. Please quote as much information as possible to allow the supply of the correct part(s). Serial number, photos etc.

**Contact our Spares Department - [spares@ormandygroup.com](mailto:spares@ormandygroup.com)**

## 4. Information

### 4.1 Specification

#### Power Supply Requirements

Voltage: 230 Volts, 50Hz.

Nominal current: Maximum 16Amps (Pump and Duty dependant).

#### Inputs

Temperature probe: Type J thermocouple (Grounded) via a 12 bit A/D converter (minimum 0.1 °C resolution). Display range: 0 - 250°C

#### Volt Free Contacts

To enable from remote source (Time-clock, SCADA,BMS, boiler controls etc)

For connection of a supplementary high limit contact or thermostat as a second alarm.

Primary Pump(s) fault contact/s.

#### Signal

Remote set point adjustment. 4-20mA Scaled 20°C - 100°C.

#### Outputs

##### Pump Supply

- Two primary pumps (1 Duty, 1 Standby) single phase 230v 5A Maximum.
- Two secondary pumps (1 circulation, 1 shunt ) single phase 230v 5A Maximum.

##### Valve actuator supply

- 24 v.a.c 20 VA Max
- Control signal 2 - 10v / 0 - 10.d.c 0.1mA, Max.
- The effective control setting range 0 - 85°C.

#### Volt Free Contacts

Changeover fault contact for remote alarm on fault, to SCADA, BMS, Annunciator etc.

#### Signal

Remote indication of process variable. 4 - 20mA scaled 0° - 100°C.

**\*NOTE: The volt free contact terminals must not have voltage applied to them.**



Duncombe Road,  
Bradford, England BD8 9TB.

Telephone: +44 (0) 1274 490911. Email: [sales@ormandygroup.com](mailto:sales@ormandygroup.com)

[www.ormandygroup.com](http://www.ormandygroup.com)