



Breeze Plate Heat Exchanger

Operating &
Maintenance Manual

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 Ormandy Rycroft Breeze 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 NOT 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.	

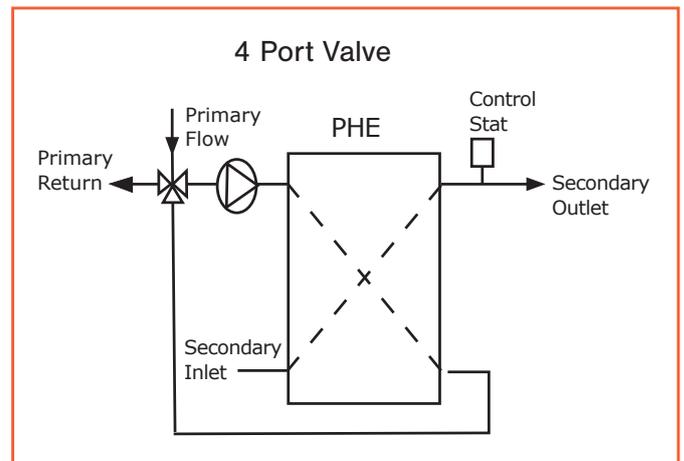
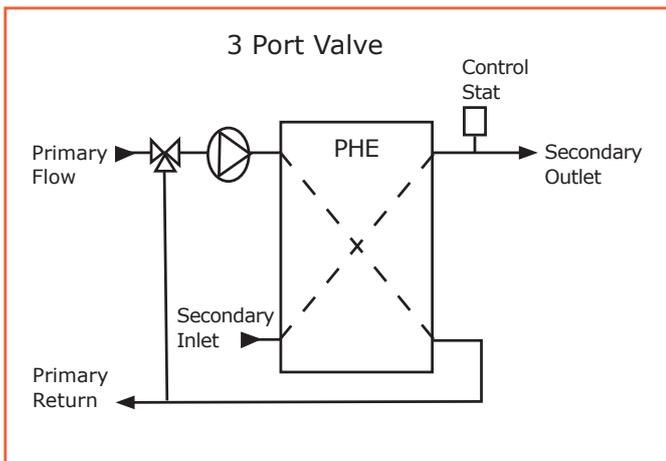
1.3 Working Principles

The Breeze comprises of a Supapac Plate Heat Exchanger, either a 3 port or 4 port control valve, primary pump, temperature sensor and PID controller, all mounted on a skid base.

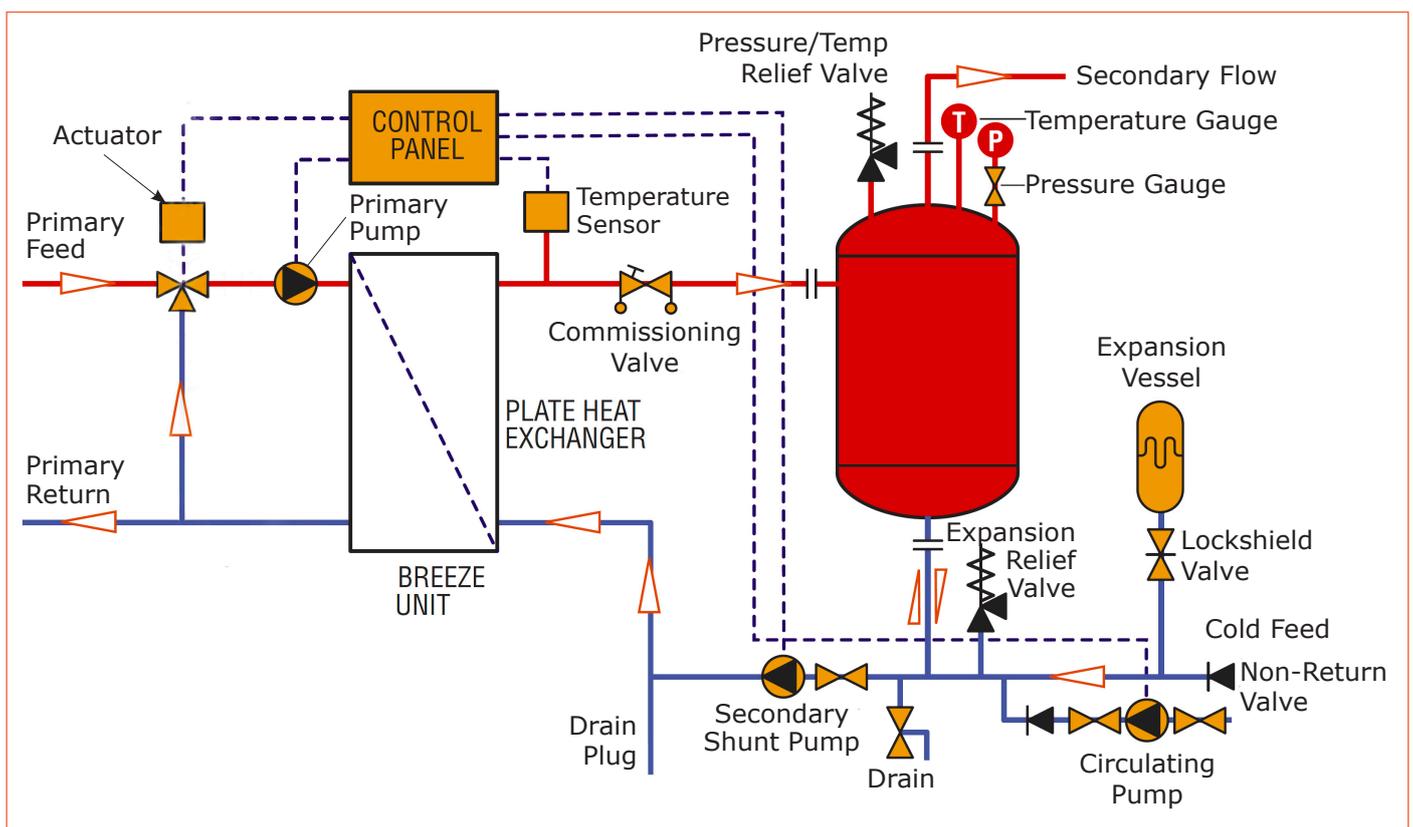
Motorised 3 or 4 port control valves, allow rapid adjustment of the primary heat input to match changes in secondary hot water demand.

The Breeze is supplied without 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 reduces 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 size of the Breeze.



With buffer vessel to form a semi-instantaneous water heater



2. Installing

2.1 Installation

Foundations

The Ormandy Rycroft Breeze should be mounted on prepared foundations that are level.

Lifting

One lifting point is provided on the top of the Breeze control panel bracket. Avoid the use of chains as the links may cause damage.

Caution: Never lift or move the Breeze-Plate by its pipework or pipe connections.

Pipework

Make sure that the pipework flanges are square and correctly spaced before bolting up. Ensure that the weight of the pipework is taken by external supports and not by the Ormandy Rycroft Breeze plate connection. Allowances should be made for expansion of the pipes, either by suitable bends or flexible joints. Tighten flange bolts in a diametrically opposite sequence and not consecutively round each flange.

Connections

The threaded connection may be sealed with PTFE tape. Flanged connections should be sealed with a suitable gasket and sealing agent.

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 Ormandy Rycroft Breeze can be bled of air prior to operating. It is also **essential** that the flooded can type pump motors, which are commonly used for most Ormandy Rycroft Breeze units are also bled of air before use.

Filling

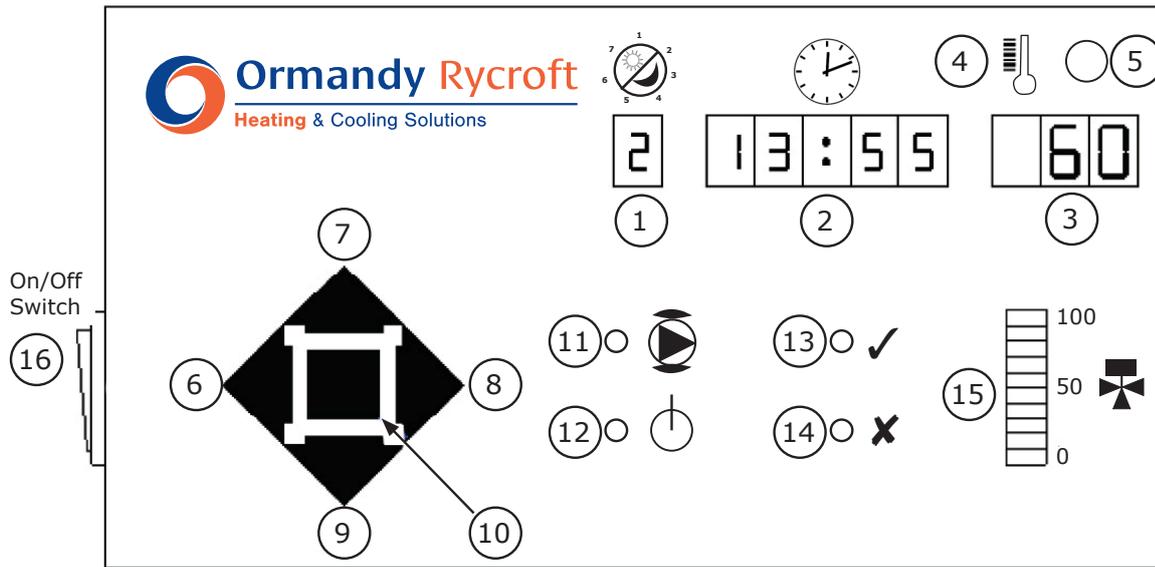
Before filling the system, check that the drain valve is closed and all air vents are open.

Flush out the system before installing the Ormandy Rycroft Breeze-Plate to remove any foreign matter. Close any manual air vents and run the Breeze. Crack the vents to release air.

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.

2.2 Operation and Set Up

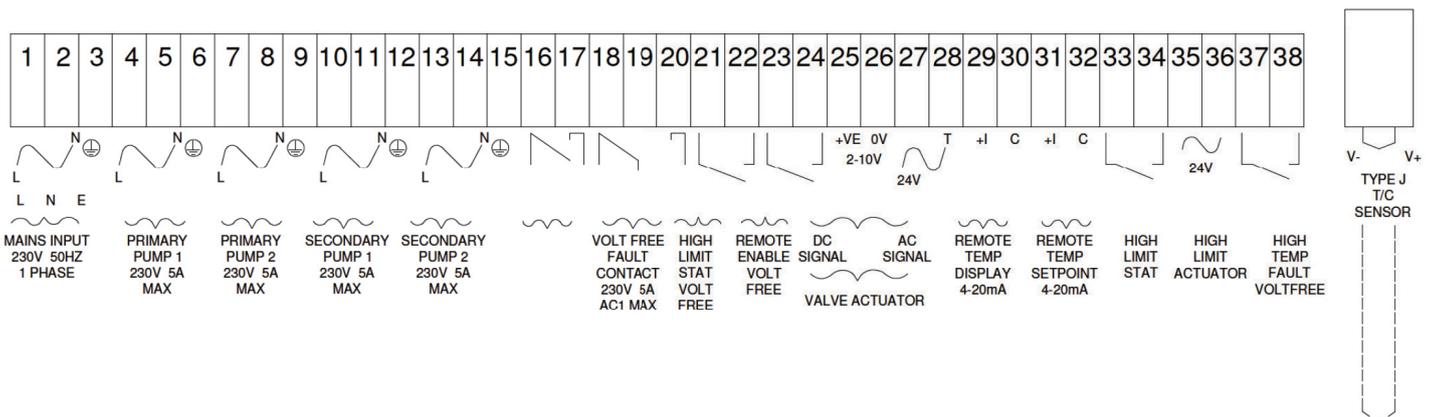
Key to Ormandy Rycroft Breeze controls and indicators.



- | | | |
|------------------------------------|------------------------------|-------------------------------|
| 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. The maximum 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 these terminals!

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

Operation

The Breeze is a self-contained unit, which controls up to two primary and two secondary pumps together with a 3 or 4-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.

Switch on via switch ⁽¹⁶⁾

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

The standard temperature setting is 60°C and the unit will run continuously. (24 hour operation).

To change any of the default settings, refer to Figure 3

The Breeze-Plate 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.

a) Remote Switch or Building Management System Control

The Breeze 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 Breeze 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** ⁽⁷⁾ 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** ⁽⁹⁾ 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 Breeze-Plate will be turned off.

When remotely enabled and the system has turned off under time clock control, it can be re-activated by pressing the **Value Increase** ⁽⁷⁾ 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** ⁽⁹⁾ 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** ⁽⁷⁾ push button.

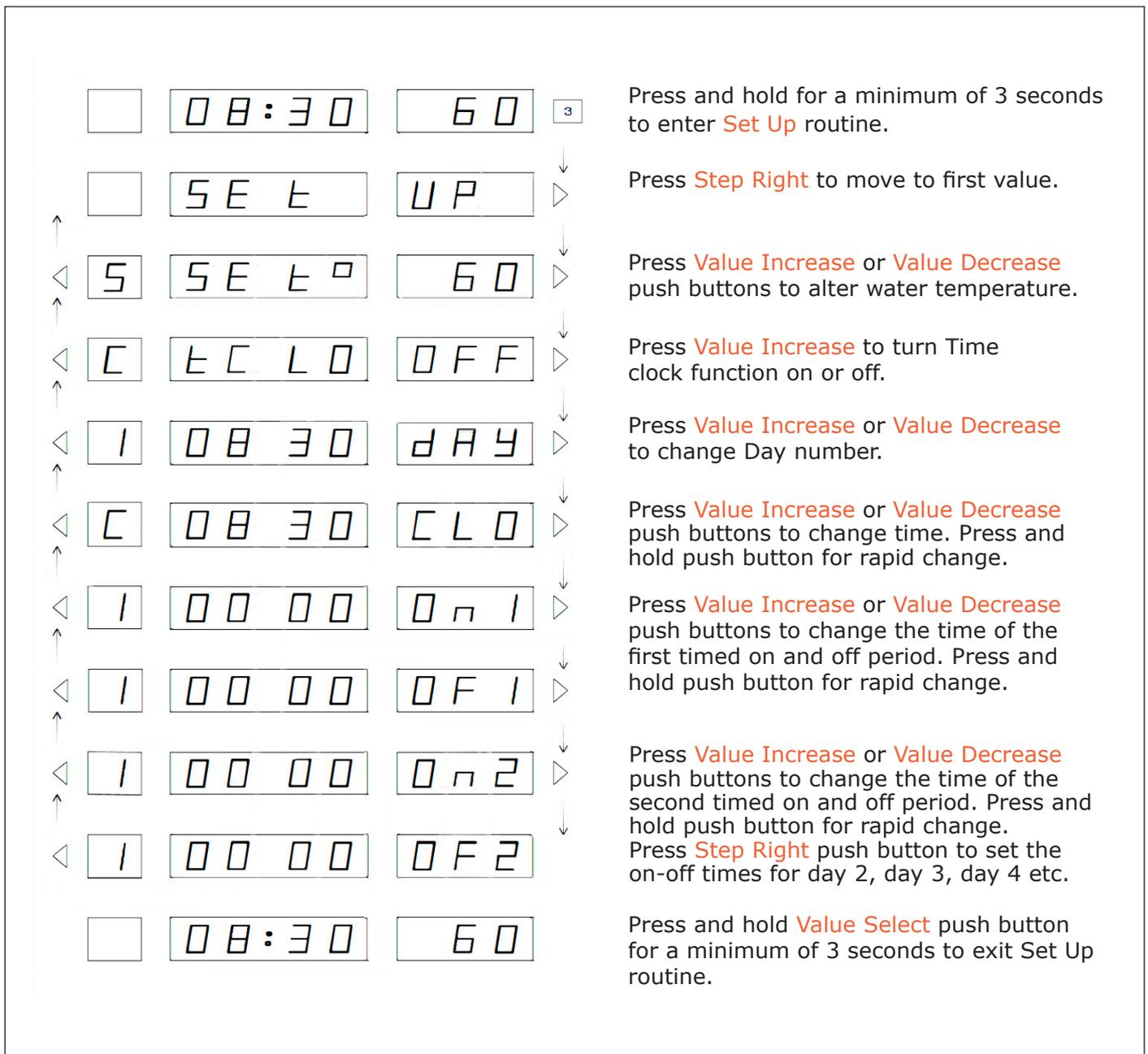
Set Up

The Breeze 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** ⁽¹⁰⁾ push button for three seconds. Press the **Step Right** ⁽⁸⁾ and **Step left** ⁽⁶⁾ push buttons to move forwards and backwards through the sequence. Press the **Value Increase** ⁽⁷⁾ or **Value Decrease** ⁽⁹⁾ push buttons to alter the value shown in the display. Press and hold the **Mode** ⁽¹⁰⁾ 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 has been 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 has been 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 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** (10), **Step Left** (6) and **Value Decrease** (9), Push buttons for a minimum of three seconds. Press the **Step Right** (8) and **Step Left** (6) push buttons to move forwards and backwards through the sequence. Press the **Value Increase** (7) or **Value Decrease** (9) push buttons to alter the value shown in the display. Press and hold the **Mode** (10) push button for 3 seconds to exit the set up routine.

Figure 3 - Advanced Set Up



Night Set Back / Pasteurisation

When the **DIP switch** (column 5 in the table below) for Night set-back/Pasteurisation is set to the on position and the unit is put into standby via the time-clock. When the pasteurisation value (S SB TO) is set to above the normal set temperature (S SET TO), the controller will assume pasteurisation and will raise the temperature to the pasteurisation value for one hour, before returning to standby, until the next scheduled on period.

Alternatively, when the set back value is set to below the normal set value, the controller will assume set back and will lower the temperature to this value until the next scheduled period.

Manual Control

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

(See page 4 for key to number references).

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 at the rate of 5 degrees per milliamp.

It should be noted that the external control signal assumes control as soon as the milliamp level rises above 2mA. Consequently, if the controller loses this signal, it reverts back to it's own internal set point.

DIP Switch Settings

The physical configuration of the system and the Night Set-back / pasteurisation functions are programmed into the controller by setting the position of eight switches. The 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 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).

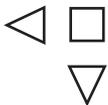
1	2	3	4	5	6	7	8	Function
On								No Operation
Off								No Operation
	On							No Operation
	Off							No Operation
		On						Fault Relay Operates During Remote Disable
		Off						Fault Relay, No Operation During Remote Disable
			On					Valve Output 2-10V
			Off					Valve Output 0-10V
				Off				Night Setback OFF
				On				Night Setback ON
					Off	Off		No Secondary Pumps Fitted
					Off	On		1 Secondary Pump Fitted (SHUNT)
					On	Off		1 Secondary Pump Fitted (RECIRC)
							Off	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** ⁽⁵⁾ and **mode** ⁽¹⁰⁾ buttons simultaneously for a few seconds, the time clock settings will be returned to the factory default settings.

By pressing the **reset** ⁽⁵⁾ and **decrease** ⁽⁹⁾ 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 Breeze 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

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

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.**



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