Hot Water Circulation Pump Control System
Operation & Maintenance Manual

The Definition of Temperature Control

THERMAKOS

SAFETY PRECAUTIONS

THERMAKOS

Before installation, operation or maintenance of pump system, read instructions and equipment manufacturers specific instructions carefully.

System operation may cause injury. Take all necessary precautions. Wear necessary protective equipment. Refer to engineers' department. Any maintenance of pump systems must be carried out by authorised qualified personnel only.

WARNING – PUMP MAY START AT ANY TIME

In normal automatic mode, pumps may start automatically at any time. Before maintenance or any work is carried out on pumps or motors, ensure the proper isolation of motors at the relevant controller.

WARNING – SYSTEM IS PRESSURIZED

Under normal operating conditions, the pipe, pumps and components of water supply and pressure systems are pressurized. Before unbolting or dismantling any pipework or equipment, ensure water supply to the areas of maintenance is isolated and water pressure relieved.

WARNING – HOT WATER

Under normal operating conditions, the pipe, pumps and components of HWC contain hot water. Before unbolting or dismantling any pipework or equipment, ensure hot water supply to the areas of maintenance is isolated and allow time for the water in the immediate area to work on, to cool.

DANGER – HIGH VOLTAGE

Control boxes contain high voltage live wiring and terminals. Entry of control boxes is not permitted except by authorised service personnel only. Ensure controller is correctly isolated before entering.

CAUTION – EXPOSED MOVING PARTS

Keep clear of all moving parts on pumps, motors and couplings and keep area around the pump system clear at all times.

Finally take care and use common sense when working on or near the Pumpset and report all faults to the Maintenance Manager.

OVERVIEW

The controller consists of an IP55 plastic housing with a backlit display, buttons and sounder that connects to the following items.

- Mains power supply (via a GPO)
- 1 or 2 pumps (via GPO sockets on the controller)
- Building management, alarm or SCADA system
- 2 line x 16 character display and 6 buttons to show status and allow programming and manual operation,

One or two pumps are used to circulate hot water through the plumbing of some buildings so that hot water is available as soon as the tap is turned on. The pumps are only operated as needed based on:

1. The temperature of the water returning from the distribution system loop
2. The time of day and the day of the week.

CONFIGURATION MENU

The configuration menu is accessed by pressing the "UP", "OK" and "DOWN" buttons together and holding them down continuously for 3 seconds.

Within the menus the OK button will accept the current selection/value while the ESC (escape) button will cancel and/or exit from the current selection. The UP and DOWN buttons are used to select different items from a list (e.g. sub-menu selection) or modify a value.

While an UP or DOWN button is held down the opposite button can also be pressed to cause the parameter to change by a larger step value i.e. while adjusting a value with the UP button held down, simultaneously pressing the DOWN button will increase the value by a step of 10 rather than just 1, and vice versa while adjusting a value down with the DOWN button.

CONFIGURATION MENU STRUCTURE

The configuration menu has the following structure:

1. Setup Parameters
2. Setup Schedules
3. Setup Clock
4. Reset Run Hours
5. Restore Defaults
6. Manual Operation

1. Setup Parameters Menu Structure

- Number of Pumps (Default Setting: 2)
- Continuous Pump: (Default Setting:
- Heating/Cooling (Default Setting: Heat)
- Cut in Temp (Default Setting: 55)
- Dead Band Temp (Default Setting: 2.5)
- Pump Fault Delay (Default Setting: 45)
- Water Temp Alarm (Default Setting: NO)
- VFC 1 Function (Default Setting: Fail)
- VFC 2 Function (Default Setting: Fault)
- VFC 3 Function (Default Setting: Pump On)
- VFC 4 Function (Default Setting: Power On)
- VFC 5 Function (Default Setting: Temp Fault 1)
- VFC 6 Function (Default Setting: Temp Fault 2)
- Pump Swap Init (Default Setting: 60)
- Pump Swap After (Default Setting: 30)
- Temp Sensor. (Default Setting: Sensor 1 Only)
- USE MCB Inputs (Default Setting: No)

2. Setup Schedules Menu Structure

- Edit Schedules (Default Setting: All Cleared)
- Clear/Set Daily1 (Default Setting: All Cleared)
- Clear/Set Weekly (Default Setting: All Cleared)
- Clear Schedules (Default Setting: Ok)

3. Setup Clock

- Set the day of the week and the time of the day (Default Setting: As per Time)

4. Reset Run Hours

- Reset Pump 1 Hours (Default Setting: NO)
- Reset Pump 2 Hours (Default Setting: NO)

5. Restore Defaults

6. Manual Operation

OTHER OPERATOR FUNCTIONS

1. Mute Alarm

When the alarm sounder is active it will turn on and off approximately once per second – about ½ second on and ½ second off – and pressing any button will mute the alarm. The alarm sound will remain muted until a new fault condition occurs.

2. Clear Faults

Pressing and holding the ESC button for 2 seconds will clear all non-permanent faults that The Controller has registered. Note that the RTC battery fault can only be cleared by setting the clock time.

3. Cancel Pump Swap Delay

When both pumps exhibit fault conditions in succession the Pump Swap Delay is invoked – i.e. a 30 minute delay before the pumps are swapped. When this delay is in effect pressing any button will cancel the delay and The Controller will immediately swap pumps.

4. Timed Manual Pump Run

- A pump can be run manually for 3 minutes by pressing and holding either the Left button (for Pump 1) or the Right Button (for Pump 2) while The Controller is in Running (including Continuous) or Stopped mode. In Tines Manual Pump Run mode the display will appear as follows:
  Mo 01:23 >PUMPS
  P1 02:59 T:55.5
  The bottom row displays which pump is running (P1 or P2), the remaining run time as minutes; seconds and the water temperature.

5. Pump Hour Meters

The Controller maintains a separate run-time hour meter for each pump. The hour meters can be viewed by pressing and holding down the DOWN button for 4.5 seconds. The hour meter display appears as follows:

Pump 1: 01234.5h

Pump 2: 32767.0h

The hour meter for Pump2 will only be displayed if The Controller is configured for 2 pumps.

Upon installation of The Controller or whenever a pump is changed the corresponding hour meter(s) should be reset to zero via the Configuration menu.

FAULTS & ALARMS

An alarm is indicated by flashing the LCD backlight and a sounder. One of the buttons doubles as a mute switch when the sounder is operating. The backlight will continue to flash until the fault is cleared. It is also possible to manually clear all faults by holding down a button.

Fault	Cleared By
Pump Fault	Manually or automatically if pump operates with current consumption above the threshold.
Invalid Step	Setup corrected
Temperature Fault	User or temperature reaches Cut In + Dead Band temperature
Time Lost	Time set
Feed Temp Fault	User or automatically when temperature probe 2 reaches feed temperature

SPECIFICATION

Description	Parameter
Dedicated Power Outlets	2
Dimensions	170W x 145H x 85D (mm)
Cut In Temperature	40 to 99.5 °C
Pump Fault Delay	1-120 °C
Dead Band	1-20 °C
Volt Free Outputs	6
Mains Input Voltage 1	190V to 260V AC. 49 to 62Hz. Suitable for 220VAC and 240VAC supplies.
Mains Input Voltage 2	90 to 130VAC. 49 to 62Hx. Suitable for 110VAC supplies.
Power Rating	840W Max, (300W recommended @ 3.15A fuse). Including one pump operating
Internal Fuse Rating	3.1 5A semi delay
Pump Current Threshold	40mA
IP Rating	IP55

VOLT FREE CONTACTS OUTPUT

The controller provides six volt free contacts on 8 screw terminals. The function of each line is described in the table below. All outputs can be set to have an alternate function.

	VFC 1/2/3/4/5/6
Alternate Function 1	**Power On** (VFC 4 Default)
Alternate Function 2	**Fail** (VFC 1 Default)
Alternate Function 3	**Normal**
Alternate Function 4	**Fault or Fail**
Alternate Function 5	**Fault** (VFC 2 Default)
Alternate Function 6	**Pump Fault**
Alternate Function 7	**Pump 1 On**
Alternate Function 8	**Pump 1 Fault**
Alternate Function 9	**Pump On** (VFC 3 Default)
Alternate Function 10	**Pump 2 On**
Alternate Function 11	**Pump 2 Fault**
Alternate Function 12	**Temp Fault 1&2**
Alternate Function 13	**Temp Fault 1or2**
Alternate Function 14	**Temp Fault 1** (VFC 5 Default)
Alternate Function 15	**Temp Fault 2** (VFC 6 Default)
Alternate Function 16	**Feed Temp Fault**
Alternate Function 17	**Feed Water On**

When there is no power to the controller or the controller is not configured (or lost its settings) the outputs will remain off. If the first output is set to the alternate function so it is "On" when the status is "Normal" then monitoring system can identify faults such as power failure to the controller.