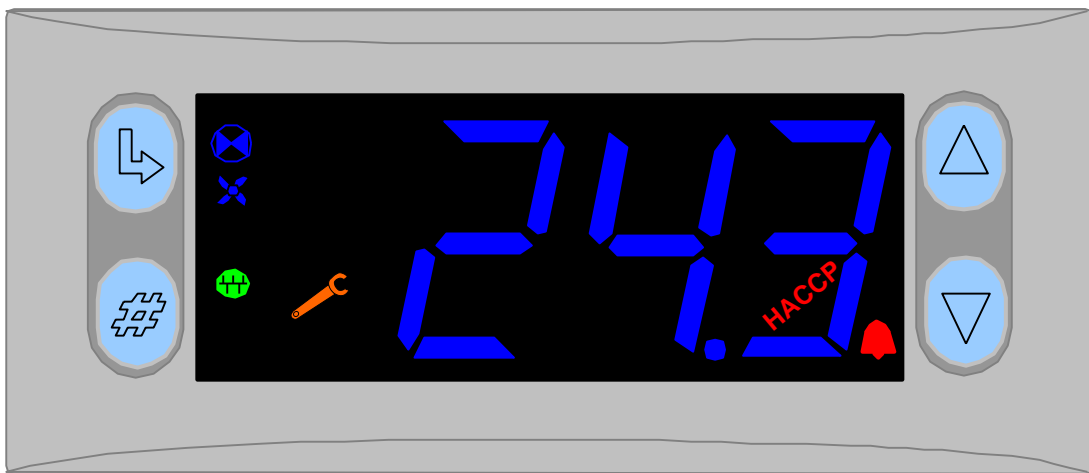


Mercury 2 Control Stat Installation Guide



**For Product: -
PR0710-STA**



Ensure that all power is switched off before installing or maintaining this product

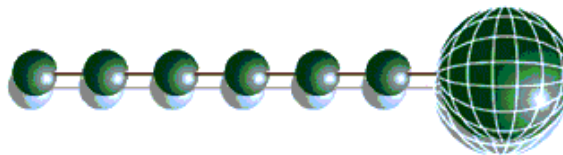


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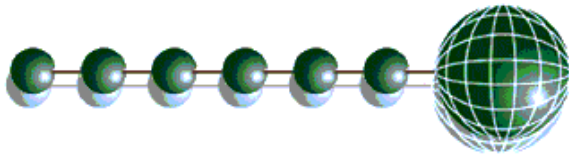
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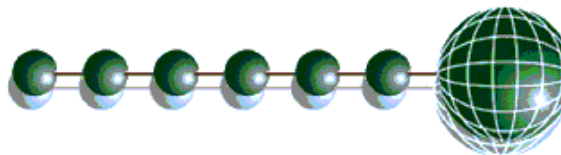
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Ensure that all power is switched off before installing or maintaining this product



The Mercury 2 Range

From Resource Data Management

This documentation refers to the Control Stat

Description

The Mercury 2 Control Stat is a multi-purpose thermostat controller that can be used in heating/cooling applications. Control can be achieved from either input 1 or 2 or by a percentage weighting of the two inputs. The remaining inputs can be configured as either override, fault or run input's. The Stat allows for two heating and two cooling differential's to be set with an optional time or temperature delay on the second stage of heating/cooling. Included in the controller is a frost detect parameter. This over-rides the timer function, when the timer is off, to begin heating should the temperature reach the frost detect value. There is a 7-day timer with two on/off times per day. Over/Under temperature alarms can be configured with an optional delay. The ability to enable any relay as an alarm relay is included as well as the option to map a relay to the status of the controller timer. The user can predefine the number fans operating at any one time or if more than one fan is configured their operation can be controlled by fuzzy logic

The Control Stat supports the following temperature probes:-

- PT1000
- NTC2k
- NTC2k25
- NTC470R
- NTC700R
- NTC3k
- NTC5k
- NTC6k
- NTC10K
- NTC10K(2) USA

Note: probe types cannot be mixed. Each probe input can be configured to have a temperature offset to compensate for long cable lengths.

Configuration

There is only one type of configuration in the Mercury 2 Control Stat.

Networks

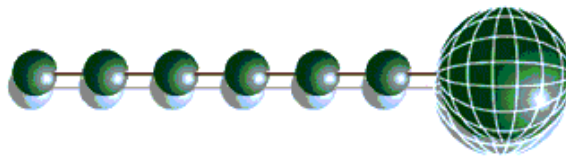
The controller is capable of connecting to a TCP/IP local area network or controlling in standalone mode with no network output.

To connect to an IP network you must add the correct communications module.

- IP Futura module (Part No PR0016)
- Mercury Hub (Part No. PR0018)



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Front Panel Features

LED's: -

Valve
(Indicates Controller Operational State)



Fans
(Selectable Relay)



Lights
(Not Used)



Defrost
(Not Used)



On-Line



- Off No network attached
- Flashing Attempting to Log on to network
- Steady On-line

Service
(Indicates additional parameter setting mode. See [Operation](#))



Alarm
(Selectable Relay)



HACCP



Keys

Enter



Up



Down



Defrost



Note: Function keys illuminate when pressed, illumination is turned off 20 seconds after the key is used. Press and hold the defrost button to force a manual defrost

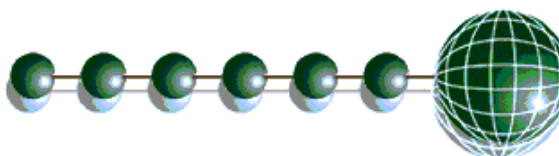
Main Display



4 character blue LED display, used to display Control Temperature and status information

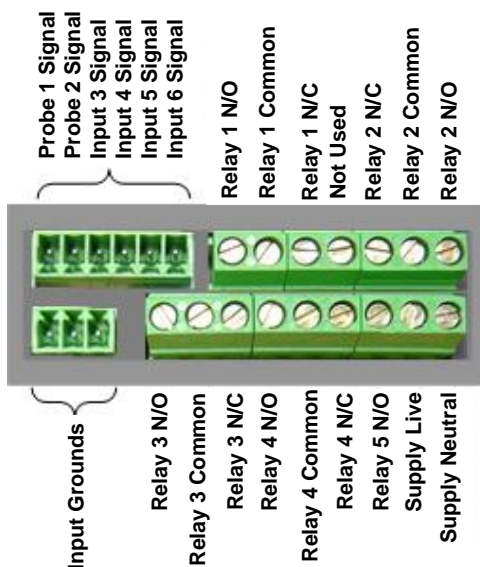


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Connections

All input/output connections are made to the rear of the controller. The communication port can be found on the side of the controller. The diagram below shows the connection detail. Inputs and outputs are assigned according to the chosen configuration. See [Specification](#) for further details on connections.



Note:

Suitable mechanical restraints on the wiring to the controller may be required; dependant on cable types, to prevent undue stress or distortion on the controller connectors.



Do not connect an earth.

Input/Output Allocation Tables

Type 1

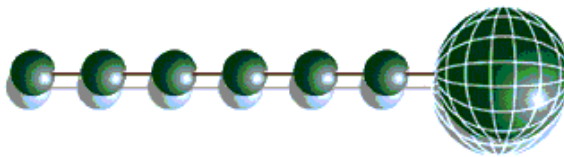
Control Stat	Description	Alarm Action	Comments
Probe 1	Probe 1	Yes	
Probe 2	Probe 2	Yes	
Input 3 *	Probe/Run/Flt/Ovr *	Yes	0V return activates
Input 4 *	Probe/Run/Flt/Ovr *	Yes	0V return activates
Input 5 *	Probe/Run/Flt/Ovr *	Yes	0V return activates
Input 6 *	Probe/Run/Flt/Ovr *	Yes	0V return activates
Relay 1	Configurable	N/A	See : Relay Contacts below
Relay 2	Configurable	N/A	See : Relay Contacts below
Relay 3	Configurable	N/A	See : Relay Contacts below
Relay 4	Configurable	N/A	See : Relay Contacts below
Relay 5	Configurable	N/A	See : Relay Contacts below

* Inputs 3 to 6 are configurable as either, a Probe, Run NO/NC, Flt NO/NC (Fault) or Ovr NO/NC (Over-ride) inputs.

The alarm relay is energised for no alarm. Use the NC and Common for “Loop make” on alarm or use the NO and Common for “Loop break” on alarm



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Relay Contacts :

Heating : Use N/O Contact
Cooling : Use N/C Contact
Fan : Use N/C Contact
Timer : Use N/C Contact

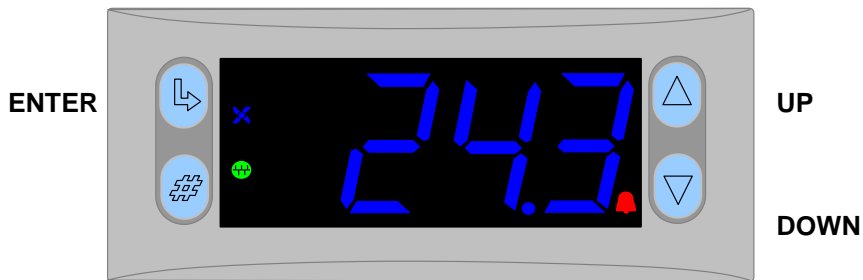
Setting up the controller

Access to the controller can be achieved several ways

- Through the front mounted buttons.
- Direct access by PC or palm top into the side comms port. This requires a software package available on the RDM website.
- Through the RDM Data Director or Data Manager.
- Or directly through to the controller via its IP address across an IP network.

Set-up Mode

Set-up through front buttons



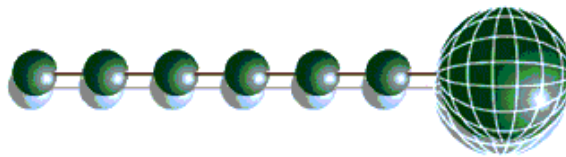
To enter set-up mode, hold the Enter and Down buttons together for approximately 3 seconds until the message “Ent” appears on the display. Now press the Enter button again to enter the function menu. IO will be displayed. Scroll up or down to go through the list.

Set-up Function Menu

Display	Option	Explained in Paragraph
IO	View Input/Output States	View Input/Output States
PArA	Set/view Parameters	Set/view parameters
Unit	Set Probe type and units (°C or °F)	Set/view units
diSP	Set/view Display Options	Display
TyPE	Set/view Controller Type	Set/view product type
rtc	Set/view Clock (rtc = Real Time Clock)	Real Time Clock
nEt	Set/view network configuration	Network Configuration
SoFt	View software version	
OFSt	Probe offset	Probe Offset
ESC	Escape back to normal operation	



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Recommended set-up method

If you are not connecting to a network and want to set up the controller through the buttons we recommend you use the following order from the function menu.

rtc. Real time clock (This will automatically synchronise on network systems)

- a. Use the up or down buttons to scroll through the display until the display reads “rtc”
- b. Press enter. The display will show “t-1”. press enter again
- c. Scroll hours up or down (0 – 23) press enter
- d. Use up button to select “t-2”, press enter
- e. Scroll minutes up or down (0 – 59) press enter
- f. Repeat for t-3 (seconds 0 – 59)
- g. Repeat for t -4 (Days up to 31)
- h. Repeat for t -5 (months up to 12)
- i. Repeat for t -6 (Year up to 99)
- j. Use up button to display “ESC”, press enter to display “rtc”

Time clock is now set

type. Set/view controller type

The controller Type is preset at the factory and cannot be changed.

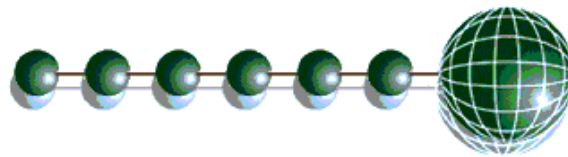
- a. From the function menu scroll to select type, press enter
- b. View type 1
- c. Press enter to return to the software menu.

PArA. Set/view parameters (This can be achieved at the network front end)

- a. From the function menu scroll to select PArA
- b. Pressing Enter while PArA is displayed will enter the parameter menu. The first parameter option will be displayed as P-01. Pressing the Up or Down button will present the other parameter options P-02, P-03 etc. See the parameter list below to find what parameter number corresponds to which actual parameter. Pressing the Enter button will show the current value of the selected parameter. Press Up or Down to modify the value and press Enter again to save the value. The parameter list number will be displayed again. Two other options are present in the parameter menu – dFLt and ESC. Selecting ESC will exit setup mode. Selecting dFLt will reset all parameters back to the default values for the current type of controller.



Ensure that all power is switched off before installing or maintaining this product



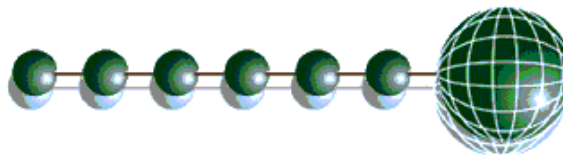
Mercury 2 Control Stat – Installation Guide

Parameter Table for Control Stat:

Number	Parameter	Range °C (°F)	Step	Units	Default
P-01	Set-point	-49 to 30°C (-56.2 to 86)	0.1	Deg	18.0
P-02	Upper Set-point limit	-49 to 30°C (-56.2 to 86)	0.1	Deg	23.0
P-03	Lower Set-point limit	-49 to 30°C (-56.2 to 86)	0.1	Deg	15.0
P-04	Heating 1 Diff (Below set-point)	0 to 20°C (0 to 36)	0.1	Deg	3.0
P-05	Heating 2 Diff (Below set-point)	0 to 20°C (0 to 36)	0.1	Deg	10.0
P-06	Cooling 1 Diff (Above set-point)	0 to 20°C (0 to 36)	0.1	Deg	3.0
P-07	Cooling 2 Diff (Above set-point)	0 to 20°C (0 to 36)	0.1	Deg	10.0
P-08	Control Weight	0 to 100	1	%	50
P-09	Display Weight	0 to 100	1	%	50
P-20	Frost Detect Enable	0 = off 1 = on	1		0
P-21	Frost Probe	0 = Probe 1 1 = Probe 2 2 = Probe 3 3 = Probe 4 4 = Probe 5 5 = Probe 6 6 = Control	1		6
P-22	Frost Detect Set-point	-49 to 30°C (-56.2 to 86)	0.1	Deg	0.0
P-23	Frost Diff (Above Frost set-point)	0 to 20°C (0 to 36)	0.1	Deg	6
P-30	Fans Mode	0 = On 1 = Follows Timer	1		0
P-31	Fans Run	0 = Off 1 = Low 2 = Medium 3 = High 4 = Auto	1		4
P-32	Fans Run-on	00:00 to 99:00	01:00	mm:ss	20:00
P-33	Fans Control	0 = Direct 1 = Indirect	1		0
P-40	Heating Stage Delay	00:00 to 99:00 00:00 = Not Used	01:00	mm:ss	05:00
P-41	Cooling Stage Delay	00:00 to 99:00 00:00 = Not Used	01:00	mm:ss	05:00
P-42	Over-ride alarm delay	00:00 to 99:00	01:00	mm:ss	05:00
P-43	OT/UT Alarm Delay	00:00 to 99:00	01:00	mm:ss	20:00
P-44	Under temperature Alarm	-98 to 128°C (-144.4 to 262.4)	0.1	Deg	0.0
P-45	Over Temperature Alarm	-98 to 128°C (-144.4 to 262.4)	0.1	Deg	25.0
P-50	Input 3	0 = Unused 1 = Probe 2 = Run NO 3 = Run NC 4 = Fault NO 5 = Fault NC 6 = Over-ride NO 7 = Over-ride NC	1		0
P-51	Input 4	0 = Unused 1 = Probe 2 = Run NO 3 = Run NC 4 = Fault NO	1		0



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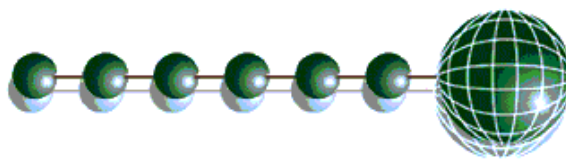


Mercury 2 Control Stat – Installation Guide

		5 = Fault NC 6 = Over-ride NO 7 = Over-ride NC			
P-52	Input 5	0 = Unused 1 = Probe 2 = Run NO 3 = Run NC 4 = Fault NO 5 = Fault NC 6 = Over-ride NO 7 = Over-ride NC	1		0
P-53	Input 6	0 = Unused 1 = Probe 2 = Run NO 3 = Run NC 4 = Fault NO 5 = Fault NC 6 = Over-ride NO 7 = Over-ride NC	1		0
P-54	Relay 1 Mode*	0 = Off 1 = Heating stage 1 2 = Heating stage 2 3 = Cooling stage 1 4 = Cooling stage 2 5 = Fan 6 = Timer 7 = Alarm	1		0
P-55	Relay 2 Mode*	0 = Off 1 = Heating stage 1 2 = Heating stage 2 3 = Cooling stage 1 4 = Cooling stage 2 5 = Fan 6 = Timer 7 = Alarm	1		0
P-56	Relay 3 Mode*	0 = Off 1 = Heating stage 1 2 = Heating stage 2 3 = Cooling stage 1 4 = Cooling stage 2 5 = Fan 6 = Timer 7 = Alarm	1		0
P-57	Relay 4 Mode*	0 = Off 1 = Heating stage 1 2 = Heating stage 2 3 = Cooling stage 1 4 = Cooling stage 2 5 = Fan 6 = Timer 7 = Alarm	1		0
P-58	Relay 5 Mode*	0 = Off 1 = Heating stage 1 2 = Heating stage 2 3 = Cooling stage 1 4 = Cooling stage 2 5 = Fan	1		0



Ensure that all power is switched off before installing or maintaining this product



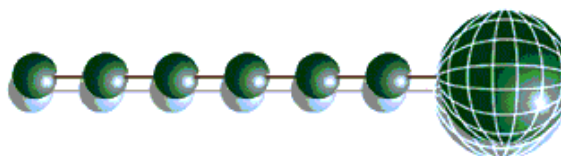
Mercury 2 Control Stat – Installation Guide

		6 = Timer 7 = Alarm			
P-70	Timer Mode	0 = Local 1 = Remote 2 = Man Off 3 = Man On	1		0
P-71	Sunday On Time 1	00:00 to 23:59	00:01	hh:mm	08:00
P-72	Sunday Off Time 1	00:00 to 23:59	00:01	hh:mm	20:00
P-73	Sunday On Time 2	00:00 to 23:59	00:01	hh:mm	08:00
P-74	Sunday Off Time 2	00:00 to 23:59	00:01	hh:mm	20:00
P-75	Monday On Time 1	00:00 to 23:59	00:01	hh:mm	08:00
P-76	Monday Off Time 1	00:00 to 23:59	00:01	hh:mm	20:00
P-77	Monday On Time 2	00:00 to 23:59	00:01	hh:mm	08:00
P-78	Monday Off Time 2	00:00 to 23:59	00:01	hh:mm	20:00
P-79	Tuesday On Time 1	00:00 to 23:59	00:01	hh:mm	08:00
P-80	Tuesday Off Time 1	00:00 to 23:59	00:01	hh:mm	20:00
P-81	Tuesday On Time 2	00:00 to 23:59	00:01	hh:mm	08:00
P-82	Tuesday Off Time 2	00:00 to 23:59	00:01	hh:mm	20:00
P-83	Wednesday On Time 1	00:00 to 23:59	00:01	hh:mm	08:00
P-84	Wednesday Off Time 1	00:00 to 23:59	00:01	hh:mm	20:00
P-85	Wednesday On Time 2	00:00 to 23:59	00:01	hh:mm	08:00
P-86	Wednesday Off Time 2	00:00 to 23:59	00:01	hh:mm	20:00
P-87	Thursday On Time 1	00:00 to 23:59	00:01	hh:mm	08:00
P-88	Thursday Off Time 1	00:00 to 23:59	00:01	hh:mm	20:00
P-89	Thursday On Time 2	00:00 to 23:59	00:01	hh:mm	08:00
P-90	Thursday Off Time 2	00:00 to 23:59	00:01	hh:mm	20:00
P-91	Friday On Time 1	00:00 to 23:59	00:01	hh:mm	08:00
P-92	Friday Off Time 1	00:00 to 23:59	00:01	hh:mm	20:00
P-93	Friday On Time 2	00:00 to 23:59	00:01	hh:mm	08:00
P-94	Friday Off Time 2	00:00 to 23:59	00:01	hh:mm	20:00
P-95	Saturday On Time 1	00:00 to 23:59	00:01	hh:mm	08:00
P-96	Saturday Off Time 1	00:00 to 23:59	00:01	hh:mm	20:00
P-97	Saturday On Time 2	00:00 to 23:59	00:01	hh:mm	08:00
P-98	Saturday Off Time 2	00:00 to 23:59	00:01	hh:mm	20:00
dFLt	Factory Defaults				

* At least one relay output must be selected as a fan before the thermostat control will operate. This is a precautionary measure to prevent the user from enabling a heater without the appropriate fan('s) being selected as in some applications this could damage the heating equipment or cause a fire hazard.



Ensure that all power is switched off before installing or maintaining this product

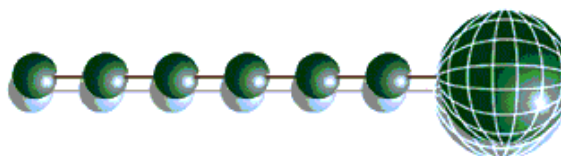


Parameter Description

Number	Parameter	Description
P-01	Set-point	Thermostat target temperature. Point at which heating 1 or cooling 1 will switch off.
P-02	Upper Set-point limit	Maximum upper temperature limit the user can adjust the setpoint too via the quick key feature on the controller display. (Using the up and down button)
P-03	Lower Set-point limit	Maximum lower temperature limit the user can adjust the setpoint range via the quick key feature on the controller display. (Using the up and down button)
P-04	Heating 1 Diff (Below set-point)	Differential temperature below the set-point temperature. The first heating stage switches on when this temperature is reached.
P-05	Heating 2 Diff (Below set-point)	Differential temperature below the set-point temperature. The second heating stage switches on when this temperature is reached.
P-06	Cooling 1 Diff (Above set-point)	Differential temperature above the set-point temperature. The first cooling stage switches on when this temperature is reached.
P-07	Cooling 2 Diff (Above set-point)	Differential temperature below the set-point temperature. The second cooling stage switches on when this temperature is reached.
P-08	Control Weight	Percentage of Probe 1 temperature that is used to calculate the control temp. The remaining percentage will be used on Probe 2 temperature Example, P-08 set to 30% Control temp = 30% Probe 1 + 70% Probe 2
P-09	Display Weight	As above only applied to the display temperature
P-20	Frost Detect Enable	Enables the frost detect feature.
P-21	Frost Probe	Allows user to define the source of the temperature used with frost detect.
P-22	Frost Detect Set-point	Set-point at which the heating element will switch on when the temperature drops below the frost detect setpoint, providing the feature has been enabled.
P-23	Frost Diff (Above Frost set-point)	Differential temperature above the set-point temperature. The heating element switches off when above this temperature
P-30	Fans Mode	<ul style="list-style-type: none"> ➤ Always on where the fans are never turned off. ➤ Follows timer on/off status. When the fans are in the off period the thermostat operation is disabled. Note the parameter "Fans Run-on" will have an effect on the fans status.
P-31	Fans Run	<p>Determines fan operation:</p> <ul style="list-style-type: none"> ➤ Off ➤ Low ➤ Medium ➤ High ➤ Auto <p>If three relays are selected as fans then when set to low 1 fan would be on, medium equals 2 fans on and high would turn on all three fans. If set to auto, the software fuzzy logic will allocate the best speed for the control temperature. If set to "Off" then this will stop the fans and thermostat operation.</p>
P-32	Fans Run-on	The period of time for which the fans remain on after the timer/thermostat has been turned off.
P-33	Fans Control	<ul style="list-style-type: none"> ➤ Direct - ➤ Indirect -
P-40	Heating Stage Delay	Time delay before heating stage 2 is turned on once below the setpoint. Please note the heating stage is turned on when either the delay time expires or the temperature drops below heating 2 diff setpoint whichever occurs first.
P-41	Cooling Stage Delay	Time delay before cooling stage 2 is turned on once above the setpoint. Please note the cooling stage is turned on when either the delay time expires or the temperature rises above cooling 2 diff setpoint whichever occurs first.
P-42	Over-ride alarm delay	When an over-ride is initiated an alarm is generated. A delay can be added before signalling the alarm.



Ensure that all power is switched off before installing or maintaining this product

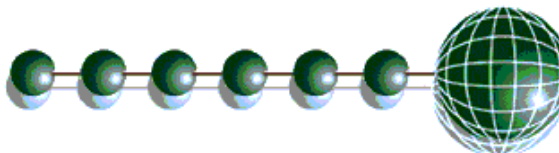


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P-43	OT/UT Alarm Delay	Delay applied before an alarm is signalled for an over/under temperature alarm.
P-44	Under temperature Alarm	Under temperature alarm set point. This alarm uses the control temperature.
P-45	Over Temperature Alarm	Over temperature alarm set point. This alarm uses the control temperature
P-50	Input 3	<ul style="list-style-type: none"> ➤ Unused – Input has no function. ➤ Probe - Used for monitoring purposes or as frost probe. This configuration has no alarm function. ➤ Run NO (Normally Open) – Thermostat requires run signal before it will operate. ➤ Run NC (Normally Closed) - Thermostat requires run signal before it will operate. ➤ Fault NO (Normally Open) – Generate an alarm to indicate a fault. ➤ Fault NC (Normally Closed) - Generate an alarm to indicate a fault. ➤ Over-ride NO ➤ Over-ride NC
P-51	Input 4	As above.
P-52	Input 5	As above.
P-53	Input 6	As above.
P-54	Relay 1 Mode	<ul style="list-style-type: none"> ➤ Off – Relay has no operation ➤ Heating stage 1 – Operates in relation to heating diff 1 and the controller set-point. ➤ Heating stage 2 - Operates in relation to heating diff 2 and the controller set-point. ➤ Cooling stage 1 - Operates in relation to cooling diff 1 and the controller set-point. ➤ Cooling stage 2 - Operates in relation to cooling diff 2 and the controller set-point. ➤ Fan – Operation dependant on parameter “Fans Mode”, “Run on” and “Fans Run”. ➤ Timer – Relay operation follows the timer on/off status. ➤ Alarm – When enabled the alarm relay is energised for no alarm. When an alarm condition occurs the relay will de-energise. Please see Alarm Relay Action table for conditions.
P-55	Relay 2 Mode	As above.
P-56	Relay 3 Mode	As above.
P-57	Relay 4 Mode	As above.
P-58	Relay 5 Mode	As above.
P-70	Timer Mode	<ul style="list-style-type: none"> ➤ Use a local schedule following the controller RTC (P-71 to P-98) ➤ Use a remote schedule (Set up in the system front end) ➤ Always Off ➤ Always On
P-71	Sunday On Time 1	When P-70 is set to Local, Sunday on time 1
P-72	Sunday Off Time 1	When P-70 is set to Local, Sunday off time 1
P-73	Sunday On Time 2	When P-70 is set to Local, Sunday on time 2
P-74	Sunday Off Time 2	When P-70 is set to Local, Sunday off time 2
P-75	Monday On Time 1	When P-70 is set to Local, Monday on time 1
P-76	Monday Off Time 1	When P-70 is set to Local, Monday off time 1
P-77	Monday On Time 2	When P-70 is set to Local, Monday on time 2
P-78	Monday Off Time 2	When P-70 is set to Local, Monday off time 2
P-79	Tuesday On Time 1	When P-70 is set to Local, Tuesday on time 1
P-80	Tuesday Off Time 1	When P-70 is set to Local, Tuesday off time 1
P-81	Tuesday On Time 2	When P-70 is set to Local, Tuesday on time 2
P-82	Tuesday Off Time 2	When P-70 is set to Local, Tuesday off time 2



Ensure that all power is switched off before installing or maintaining this product



Mercury 2 Control Stat – Installation Guide

P-83	Wednesday On Time 1	When P-70 is set to Local, Wednesday on time 1
P-84	Wednesday Off Time 1	When P-70 is set to Local, Wednesday off time 1
P-85	Wednesday On Time 2	When P-70 is set to Local, Wednesday on time 2
P-86	Wednesday Off Time 2	When P-70 is set to Local, Wednesday off time 2
P-87	Thursday On Time 1	When P-70 is set to Local, Thursday on time 1
P-88	Thursday Off Time 1	When P-70 is set to Local, Thursday off time 1
P-89	Thursday On Time 2	When P-70 is set to Local, Thursday on time 2
P-90	Thursday Off Time 2	When P-70 is set to Local, Thursday off time 2
P-91	Friday On Time 1	When P-70 is set to Local, Friday on time 1
P-92	Friday Off Time 1	When P-70 is set to Local, Friday off time 1
P-93	Friday On Time 2	When P-70 is set to Local, Friday on time 2
P-94	Friday Off Time 2	When P-70 is set to Local, Friday off time 2
P-95	Saturday On Time 1	When P-70 is set to Local, Saturday on time 1
P-96	Saturday Off Time 1	When P-70 is set to Local, Saturday off time 1
P-97	Saturday On Time 2	When P-70 is set to Local, Saturday on time 2
P-98	Saturday Off Time 2	When P-70 is set to Local, Saturday off time 2
dFLt	Factory Defaults	Restores all of the parameters to their default values

Unit. Set/view temperature unit and Probe type

From the function menu scroll to select Unit

Press enter and the value will be displayed: -

- 0 for PT1000 Celsius
- 1 for PT1000 Fahrenheit
- 2 for NTC2K Celsius
- 3 for NTC2K Fahrenheit
- 4 for 470R Celsius
- 5 for 470R Fahrenheit
- 6 for 700R Celsius
- 7 for 700R Fahrenheit
- 8 for 3K Celsius
- 9 for 3K Fahrenheit
- 10 for NTC2K25 Celsius
- 11 for NTC2K25 Fahrenheit
- 12 for 5K Celsius
- 13 for 5K Fahrenheit
- 14 for 6K Celsius
- 15 for 6K Fahrenheit
- 16 for NTC10K Celsius
- 17 for NTC10K Fahrenheit
- 18 for NTC10K(2) Celsius (USA NTC10K)
- 19 for NTC10K(2) Fahrenheit (USA NTC10K)

Use the up or down keys to select the units and press enter. This function is now complete

Display

From the function menu scroll to and select diSP.

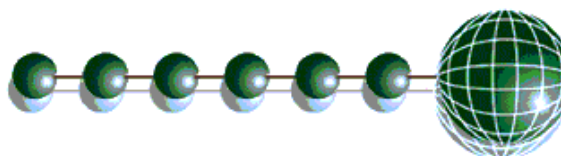
Press enter and one of the following values will be shown: -

- 0 controller display will show the whole number and tenths value of a temperature reading.
- 1 controller display will show temperatures as a whole number.

Display defaults to 0.



Ensure that all power is switched off before installing or maintaining this product



Network Configuration

The final section to set-up is the network address. In all instances, this must be done before the controller is plugged into the site network. The controllers have an auto-initialise function, which will automatically log the device onto the site network. If the wrong address has been entered onto the network, you will have to reset the controller address by setting the address to 00-0, and then re-enter the correct address. (You may have to deregister the wrong address from the home system as well).

To set the controller onto a network you must first connect the controller to a communications module. This is either a: -

- IP Futura, or a
- Mercury Hub

IP Futura module

In an IP system there are two options

- IP-L
- IP-r

IP-L allows you to fix an IP address into the controller, which you would use when you are connecting the controllers onto a customer's local area network. This would allow the customer to view each controller using Internet Explorer

IP-r allows you to give each controller on the system a unique number. This number is then allocated a dynamic IP address by the system DHCP server (such as the RDM Data Director)

IP-L

To configure the communication module for IP-L, set all three rotary switches to zero. The module should then be connected to the controller.

1. nEt. From the function menu you can now select nEt
 - Press enter and the display will show "IP-L", press enter
 - You can now set the address using the table below

Display	Option
IP-1	IP Address byte 1
IP-2	IP Address byte 2
IP-3	IP Address byte 3
IP-4	IP Address byte 4
nL	Network Mask Length
gt-1	Gateway Address byte 1
gt-2	Gateway Address byte 2
gt-3	Gateway Address byte 3
gt-4	Gateway Address byte 4
ESC	Exit network menu. N.B. this option must be selected to save any changes made in this menu

IP-r

To configure the communication module for IP-r, set the three rotary switches to give each controller a unique identifier. The module should then be connected to the controller and the network.

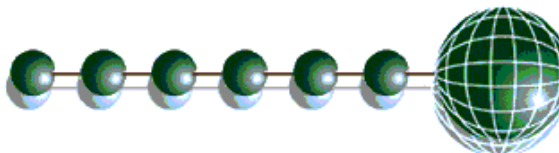
The green network LED on the controller will flash until it has been logged on to the network. The Green network LED will remain permanently on while it is on-line.

Mercury Switch

Please refer to the Mercury Switch user guide, which can be obtained from the RDM website, for information regarding connecting a controller to a network.



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Normal Operation

During normal operation, the controller will show the display temperature, if there are no alarms. If there is a current alarm then an alarm message will be shown on the display. If the fans are operating the fans symbol will be lit. If the Control Stat is on a network and on-line, the green network LED will be on.



Faults

If a fault is detected, the Control Stat will indicate the fault on the display and the red alarm LED will come on

Network

The Network green LED flashes if the controller goes off-line or loses its given address.

Probe Offset

Each probe can be offset by up to ± 10 °C to compensate for long cable runs.

Set Point

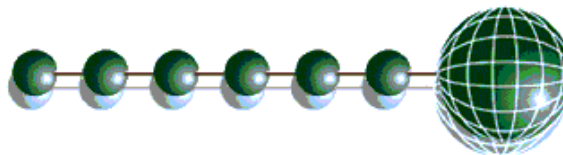
Shows the current operating setpoint of the thermostat. If for example the setpoint has been adjusted via the controller display (up & down button press). Set point can be viewed from a front-end via the values page or Communicator software or from the controller IO.

Valve Symbol

The valve symbol on the controller display indicates the current operational status of the controller. If “Fans Mode” is set to “Timed”, and the symbol is present, then it implies that the timer is in the off period and therefore there will be no fan/thermostat operation. When the valve symbol is off then the timer is in the on period and the fan/thermostat will follow its normal control strategy. If “Fans Mode” is set to “On” then the valve symbol will be permanently off and the fans/thermostat control strategy will operate continuously.

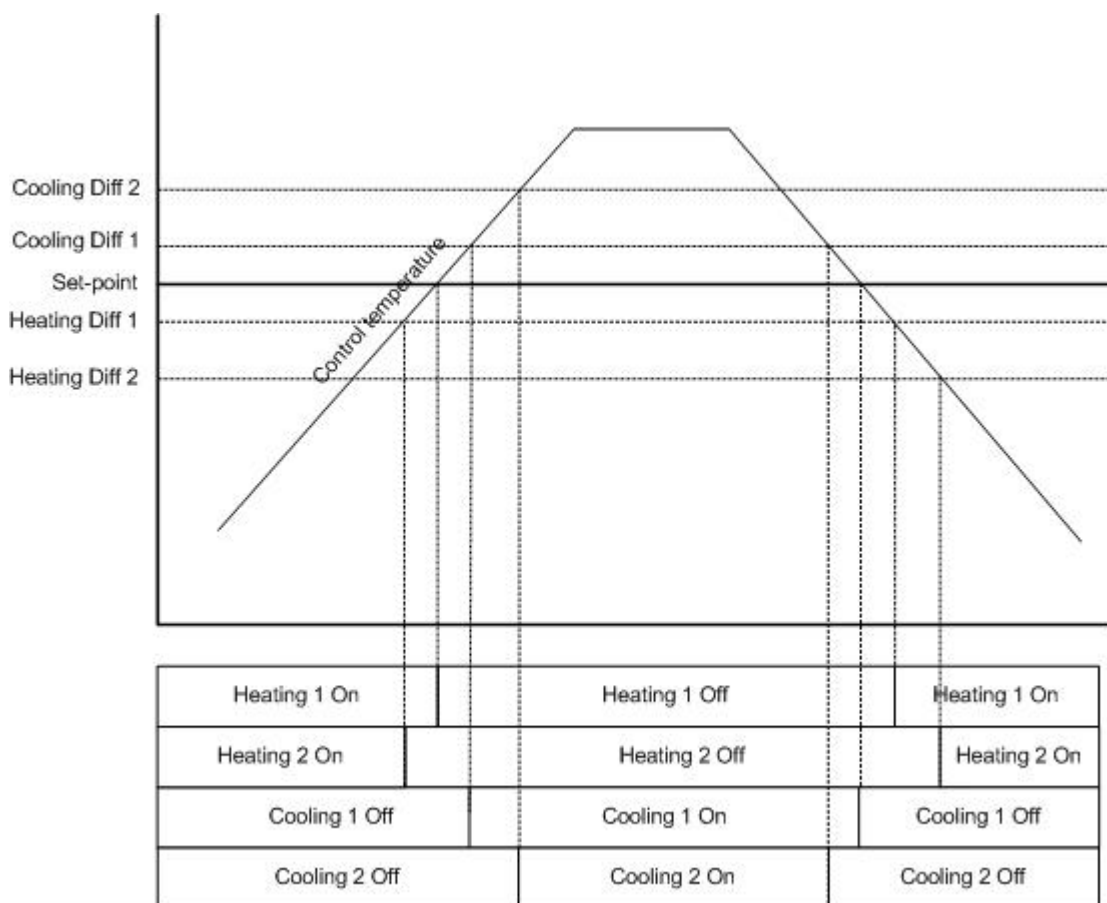


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Operation

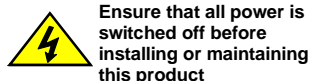
See the control temperature graph below

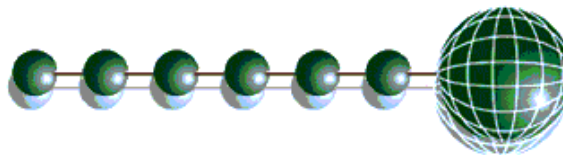


The thermostat will operate to the above graph during the on times of the timer (either local or remote). It is possible to turn the timer permanently on therefore the thermostat would run continuously. With the timer configured for local operation, set both on times 1 & 2 to 00:00 and both off times 1 & 2 to 23:59 on the desired days. With an input selected as either Run N/C (normally closed) or Run N/O (normally open) the thermostat would require a run signal before it will operate. If no input is configured then the run feature is disabled. Heating and cooling stage 2 can be configured to come on at a pre-determined temperature or after a time delay.

During normal operation, the up and down keys can be used to adjust the current operating setpoint, limited by the upper and lower set-point settings. Press and hold both the up and down keys until the service icon, the spanner symbol, is displayed. The value shown on the screen is the current temperature setpoint, use the up or down button to adjust the setpoint. Hit the enter button when complete to save and exit. Note this will not change the parameter "Set Point" it will only allow the user to change the current operating setpoint. Once adjusted the stat will continue to control to this setpoint until the controller is either power cycled or the process is followed to adjust the operating setpoint back to the previous setpoint. If the current control setpoint has been adjusted via this process and the parameter "Set Point" is then adjusted then the offset will still remain and is added/subtracted to the new setpoint. E.g. Parameter "Set Point" is set to 16. The above process is used to adjust the operating setpoint to 18. The parameter "Set Point" is now changed to 17. The operating setpoint will now be 19 (set point 17 + 2 offset through up/down buttons).

The controller has 2 probe inputs that can be used together (weighted) to form the control temperature, or the controller can be configured to use 1 probe only. Setting control weight to 100% would use only probe 1. 0% would use only probe 2 for control. 50% would use an average of probe's 1&2.





Mercury 2 Control Stat – Installation Guide

The fan(s) will run continuously when the controller is operational, even if the temperature is in the dead zone where no cooling or heating relays are on. When more than 1 fan has been selected as outputs, the fans can be set to Low, medium, high or Auto. If set to auto, the software fuzzy logic will allocate the best speed for the control temperature. On the low, medium or high setting, these can be cycled by pressing and holding the controller # key. When the spanner icon appears on the display the current fans mode will be shown.

Pressing the up If fans mode is set to remote, a GP timer channel must be set up for the fans to run. Note, if the fans go off, the cooling and heating functions will also be turned off. A fans run-on function is available to keep the fans running for a pre-determined period after the off command has been received.

During the heating cycle, heating stage 1 will come on, then heating stage 2 will come on after a delay period or if the temperature reaches the set point (parameter: - Heating Stage 2 delay)

The alarm relay will come during any alarms or faults.

The over-ride input will do the following: -

If the thermostat timer is on, it will disable the thermostat function until the next timer on time.

If the thermostat timer is off, it will turn the thermostat function on until the next timer off time.

An over-ride off delay can be set to give a delay from the over-ride input to the actual off.

If Frost detect has been enabled, irrespective of the controllers other settings, if the temperature falls below the frost set-point, the controller starts heating up to the frost diff point, where the heating relay(s) will go off.

Note: - At least one relay output must be selected as a fan before the thermostat control will operate. This is a precautionary measure to prevent the user from enabling a heater without the appropriate fan('s) being selected as in some applications this could damage the heating equipment.

Relay Actions

Relays configured for "Heating" are energised for on, relays configured for "Cooling" or "Fan" are de-energised for on. (Therefore do not use Relay 5 for cooling or fan operation, as only the N/O is available.)

Alarm Relay Action

The alarm relay has its' common, NO and NC contacts available for use.

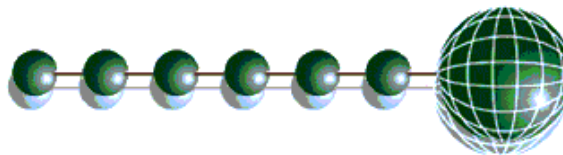
This relay will normally be energised (no alarm) and be de-energised when an alarm occurs (after the alarm delay time-out)

The table below shows the Alarm relay action

State	Alarm Delay	Alarm Relay
Probe Fault	Fixed 10 Seconds	✓
Run Signal	Fixed 10 Seconds	✓
Under temperature	Variable (parameter)	✓
Over temperature	Variable (parameter)	✓
General Fault	Variable (parameter)	✓
Over-ride	Variable (parameter)	✓



Ensure that all power is switched off before installing or maintaining this product



Viewing

Apart from setting up the controller, you can also view the status of the inputs and outputs.

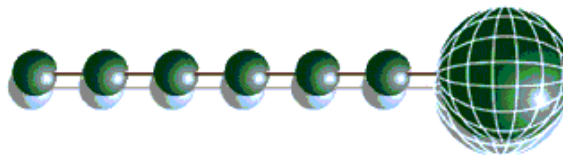
1. IO. View Inputs / Outputs and States
 - a. From the function menu, select “IO”, press enter
 - b. You can now scroll through the IO tables as set out below. The tables you view will depend on the controller type configuration.

Input/Output table for Control Thermostat

Number	IO	Range	Step	Units
I-01	Control temp	-98 to 128 °C	0.1	Deg
I-02	Display temp	-98 to 128 °C	0.1	Deg
I-10	Probe 1	-98 to 128 °C	0.1	Deg
I-11	Probe 2	-98 to 128 °C	0.1	Deg
I-12	Probe 3	-98 to 128 °C	0.1	Deg
I-13	Probe 4	-98 to 128 °C	0.1	Deg
I-14	Probe 5	-98 to 128 °C	0.1	Deg
I-15	Probe 6	-98 to 128 °C	0.1	Deg
I-20	Run Signal	0 (Off), 1 (On), 2 (Unused)		
I-21	Fault Signal	0 (Alarm), 1 (Ok), 2 (Unused)		
I-22	Over-ride	0 (Off), 1 (On), 2 (Unused)		
O-01	Relay 1	0 (Off), 1 (On)		
O-02	Relay 2	0 (Off), 1 (On)		
O-03	Relay 3	0 (Off), 1 (On)		
O-04	Relay 4	0 (Off), 1 (On)		
O-05	Relay 5	0 (Off), 1 (On)		
O-06	Timer	0 (Off), 1 (On)		
O-07	Set Point	-49 to 30 °C	0.1	Deg
O-08	Frost Probe	-49 to 30 °C	0.1	Deg
S-01	Control State	0 (Stabilise) 1 (Normal) 2 (OT Alarm) 3 (UT Alarm) 5 (PrbFail)		



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Display Messages

The following messages can appear on the Mercury display.

Display	System status
Ot	Over Temperature Alarm
Ut	Under Temperature Alarm
AL	Control State in Alarm
Ft	Control Fault
Prb	Probe Fault

Network Alarms

The table below shows the text and associated type number that is sent to the system "front end". The type number is normally used to provide different alarm actions.

Alarm text	Type
Over-ride Alarm	16
Over Temperature	4
Under Temperature	5
Control Probe	6
Fault Signal	6
Run Signal	3

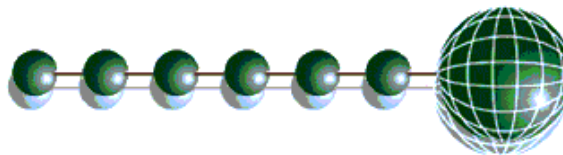
GP Timer Set-up

It is possible to set the Control Stat timer for remote operation (P70 = 1). A GP Timer must be set up to control the timer on/off period. For GP Timer set up please refer to the Data Manager user guide found on the RDM website. The following settings should be followed: -

- Output Type – This should be set to "General".
- Output Mask – This should match the "Controller Name".
- Output Channel – Set this to "5". This will allow the GP Timer to control the state of the controller timer.



Ensure that all power is switched off before installing or maintaining this product



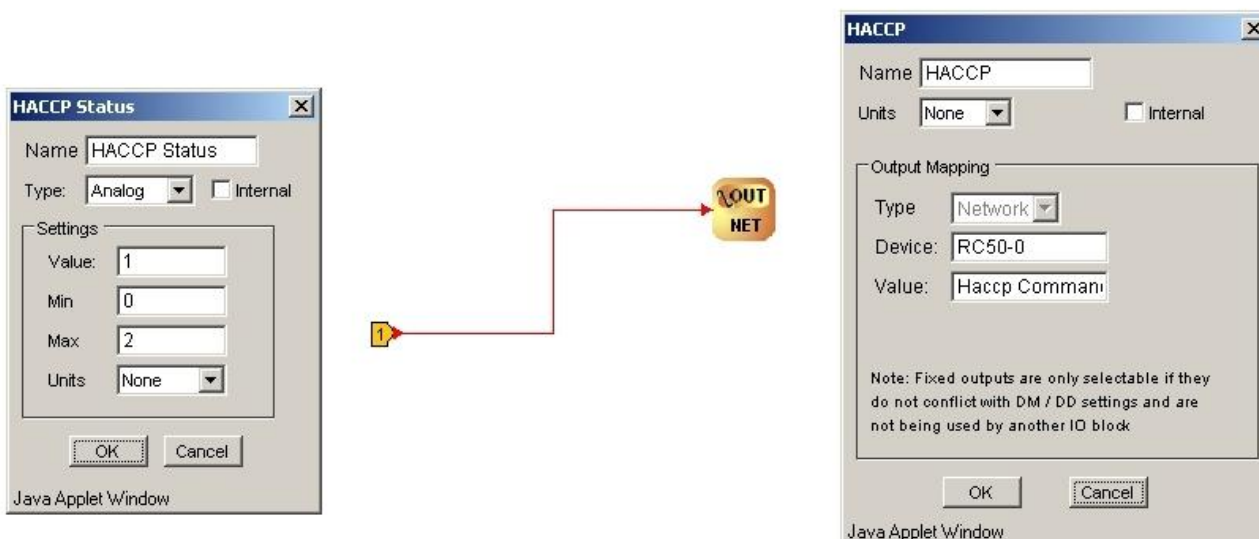
Remote Commands

The following commands can be used by a Data Builder program: -

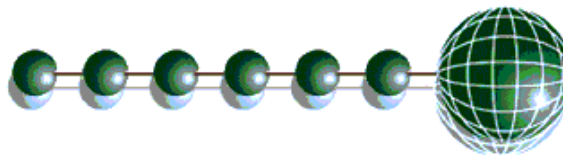
Command	Value to send	Description	Conditions;
Haccp Command	0	HACCP LED OFF	
	1	HACCP LED On	
	2	HACCP LED Flashes	
Button Command	0	Buttons backlights Off	
	1	Buttons backlights On	
	2	Buttons Backlights Flash	

Use an “Analogue Out” block configured to the controller name and in the value field type in the command you require. Use a “Setting block” as the input to the “Analogue Out” block to send the Value.

See Example below, which turns on the HACCP LED.



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Specification

General

Power requirements:

Supply Voltage Range:	100 - 240 Vac \pm 10%
Supply Frequency:	50 - 60 Hz
Maximum supply current:	5.2 Amps (when relay 5 is fully loaded)
Typical supply current:	<1 Amp
Operating temperature range:	+5°C to +50°C
Operating Humidity:	80% maximum
Storage temperature range:	-20°C to +65°C
Environmental:	Indoor use at altitudes up to 2000m, Pollution Degree 1, Installation Category II. Voltage fluctuations not to exceed \pm 10% of nominal voltage
Size:	78mm (W) x 36mm (H) x 110mm (D)
Approx Weight:	170 Grams
Safety:	EN61010
EMC:	EN61326; 1997 +Amdt. A1; 1998
Ventilation:	There is no requirement for forced cooling ventilation
Class 2 Insulation:	No protective Earth is required and none should be fitted.

The host equipment must provide a suitable external over-current protection device such as: -

Fuse:	6.3A 240 Vac Antisurge (T) HRC conforming to IEC 60127
Or MCB:	6A, 240 VAC Type C conforming to BS EN 60898

The host equipment must provide adequate protection against contact to hazardous live parts.

Relays

Max current relay 1:	6A (non inductive) $\text{COS}\phi=0.4$ 2A (inductive load) 200,000 operations
Max Voltage relay 1:	250Vac, 30V dc
Exclusive common	
Max current relay 2:	6A (non inductive) $\text{COS}\phi=0.4$ 2A (inductive load) 200,000 operations
Max Voltage relay 2:	250Vac, 30V dc
Exclusive common	
Max current relay 3:	6A (non inductive) $\text{COS}\phi=0.4$ 2A (inductive load) 200,000 operations
Max Voltage relay 3:	250Vac, 30V dc
Exclusive common	
Max current relay 4:	6A (non inductive) $\text{COS}\phi=0.4$ 2A (inductive load) 200,000 operations
Max Voltage relay 4:	250Vac, 30V dc
Exclusive common	
Max current relay 5:	3A (non inductive) $\text{COS}\phi=0.4$ 2A (inductive load) 200,000 operations
Max Voltage relay 5:	250Vac (Internal supply)
Common connected to Supply Live	

For compliance with the LVD, relays 3, 4 and 5 commons must be at the same potential as the supply voltage.

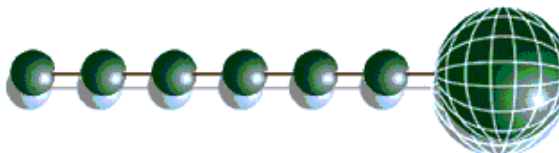


Warning:

Relay 5 output has hazardous voltages (Supply input voltage potential).



Ensure that all power is switched off before installing or maintaining this product

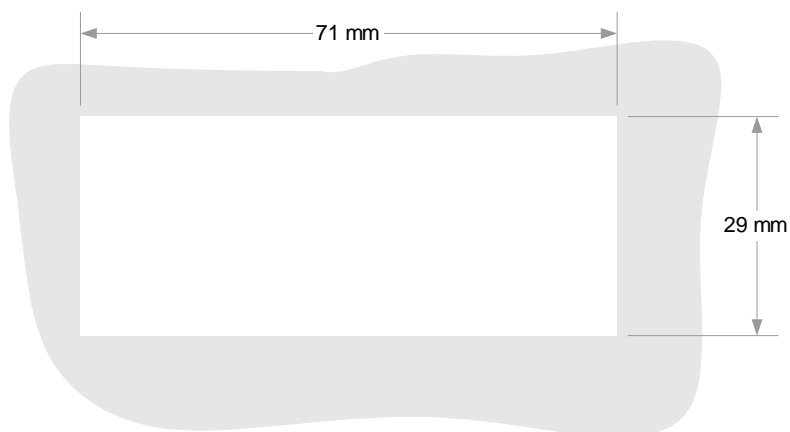


Mercury 2 Control Stat – Installation Guide

Comms: RS232 with flow control

Installation:

Panel Cut-out:



The Mercury 2 fascia is 78mm x 36mm and is central around the cut-out.

Fixing:

The controller is fixed by sliding the 2 plastic retaining clips up to rear of the panel. These clips have a ratchet action and can be removed by holding in the clip sides and sliding back.

Clearances:

Space required behind the panel: 120mm + space for cable bends

Space required behind the panel on the right hand side (looking from the front): 30mm + bend radius for a Cat5 patch lead

Space required behind the panel on the left hand side (looking from the front): 20mm

There is no requirement for forced cooling ventilation

Fuse:

The host equipment must provide a suitable external over-current protection device such as: -

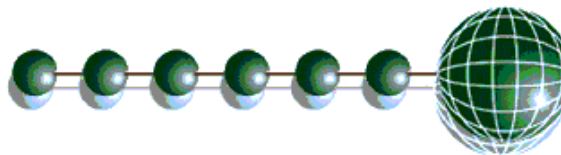
Fuse: 6.3A 240 Vac Antisurge (T) HRC conforming to IEC 60127
Or MCB: 6A, 240 VAC Type C conforming to BS EN 60898

Cleaning:

Do not wet the controller when cleaning. Clean the front by wiping with slightly dampened lint free cloth.



Ensure that all power is switched off before installing or maintaining this product



Please note: The specifications of the product detailed on this set up guide may change without notice. RDM Ltd shall not be liable for errors or for incidental or consequential damages, directly or indirectly, in connection with the furnishing, performance or misuse of this product or document.

Revision History

Revision	Date	Changes	Comments
1.0	11/04/2008	1 st Issue	
1.2	05/06/2008	<ul style="list-style-type: none">Relays operation changed so that if configured for heating they energise for on.Document and software revision harmonised	
1.3	24/03/2009	NTC10K (2) USA Probes added	
1.4	18/09/2009	Technical specification amended	
1.4A	29/12/2009	Technical specification amended	
1.5	21/01/2010	Timer "Man On" and "Man Off" added to Parameter P-70 Changes apply to software version 1.5	
1.6	10/08/2010	Input/Output allocation table amended Fan operation amended (New parameter P-33) Changes apply to software version 1.6	



Ensure that all power is switched off before installing or maintaining this product