

Resource
Data Management

Mercury 3 Frequency Controller

Commissioning/User Guide
Revision 1.0g



PR0740-FQC
PR0744-FQC

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The Mercury 3 Range

From Resource Data Management

For Version MFC 1.0

The Mercury 3 Mobile Frequency controller is intended for use in a refrigerated display cabinet and has the capability to drive a variable speed compressor with optional discharge temperature monitoring to protect the compressor if a set (discharge) temperature is exceeded. The controller will vary the compressor's speed based on the average of an air on and air off temperature probes and also has outputs to control lights, fans and defrost. The lighting relay can be set to operate as an alarm relay if required. The controller also has an inbuilt defrost timer and 7-day lighting control timer which can also be used to switch the cabinet off and on at specific times, this can be a useful energy saving feature if the cabinet contains non-perishable goods (such as drinks) and can be automatically switched off at night.

There is also a hardware variant (PR0744) with relays to IEC 60079-15 standard which is specifically for use with hydrocarbon refrigerants.

The controller supports PT1000, NTC2K, 470R, 700R, 3K, 5K, 6K, NTC2K25, NTC10K T1 or NTC10K T2 temperature probes (note: probe types cannot be mixed)

Variants

Description	Part Number
Mercury MK3 Frequency Controller with Inbuilt Display, RS232 Comms	PR0740 MD 232 FQC
Mercury MK3 Frequency Controller with Inbuilt Display, IP Comms	PR0740 MD IP FQC
Mercury MK3 Frequency Controller for use with Remote Display, RS232 Comms	PR0740 MR 232 FQC
Mercury MK3 Frequency Controller for use with Remote Display, IP Comms	PR0740 MR IP FQC
Mercury MK3 Frequency Controller with Inbuilt Display, RS232 Comms Hydrocarbon Spec.	PR0744 MD 232 FQC
Mercury MK3 Frequency Controller with Inbuilt Display, IP Comms Hydrocarbon Spec.	PR0744 MD IP FQC
Mercury MK3 Frequency Controller for use with Remote Display, RS232 Comms Hydrocarbon Spec.	PR0744 MR 232 FQC
Mercury MK3 Frequency Controller for use with Remote Display, IP Comms Hydrocarbon Spec.	PR0744 MR IP FQC

Configuration

The controller gives you two configuration options: -

Display value	Mercury Mk3 Mobile
1	Integral controller (HT)
2	Integral controller (LT)

The controller is delivered pre-configured as type 1.

Compatible Network Interfaces

Mercury controllers which do not have an IP interface built in are capable of connecting to either a TCP/IP local area network, an RS485 Genus compatible network or they can be used in standalone mode with no network output. To connect to a network, you must add the correct communications module. Connecting to any of these communication modules will automatically be detected on power up and will affect the 'Net' menu set up screens available to you. **Note** controllers with built in IP will be able to communicate to any IP switch, including the rear ports of the RDM Mercury Hub.



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Description	Part Number
IP Futura (Single Mercury to IP Interface)	PR0016
IP Futura, DIN rail mounted	PR0016-DIN
IP Futura, DIN rail mounted with 2 x CAT 5 sockets	PR0016-DUALDIN
Intuitive Switch with 6 x RS232 ports, 4 x Ethernet Ports and a 4-20mA Pressure Transducer connection.	PR0758-6P4E-PHI
Intuitive Switch with 12 x RS232 ports and 4 x Ethernet Ports	PR0758-12P4E
Intuitive Switch with 12 x RS232 ports, 4 x Ethernet Ports and a 4-20mA Pressure Transducer connection.	PR0758-12P4E-PHI
Intuitive Switch with 16 x RS232 ports, 4 x Ethernet Ports and a 4-20mA Pressure Transducer connection.	PR0758-16P4E-PHI
Intuitive Switch with 16 x RS232 ports, 3 x Ethernet Ports and 1 x Fibre connection.	PR0757-16P3E-F
Intuitive Switch with 16 x RS232 ports, 3 x Ethernet Ports, 1 x Fibre connection and a 4-20mA Pressure Transducer connection.	PR0757-16P3E-F-PHI
Bluetooth RS232 Network Module	PR0630

Front Display Features

LED's: -

Cooling

(Relay 1)



Fans (Relay 2)



Lights (Relay 3)



Defrost (Relay 5)



On-Line



Off

No network attached

Flashing

Attempting to Log on to network

Steady

On-line

Service

(See Parameter

18 for setup)



Alarm



HACCP



Keys



Enter



Up



Down



Defrost

Note: Function keys illuminate when pressed, illumination is turned off 20 seconds after the key is used.

Defrost: Press and hold the defrost button to force a manual defrost

Main Display



4-character LED display, used to display temperature and status messages.

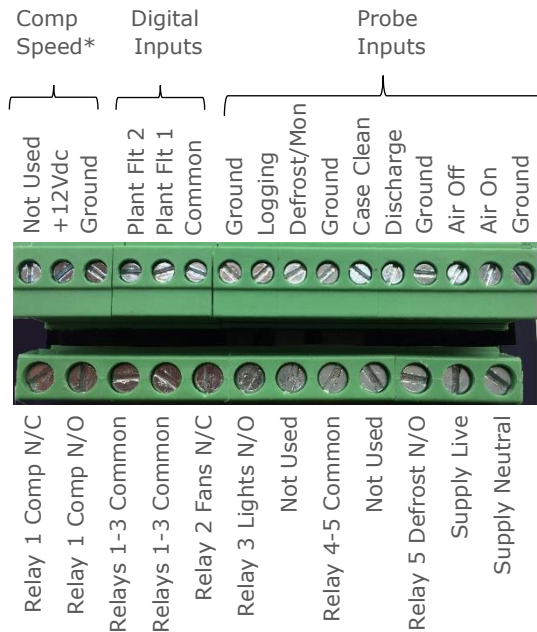


Please ensure all power is switched off before installing or maintaining this product.

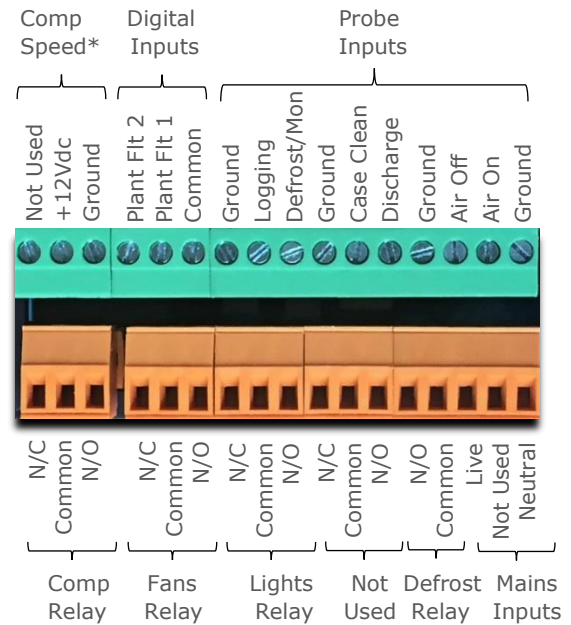
Connections

Input and Output connections are made to the back of the controller, the RS232/ Ethernet communication port is on the side. The diagram below shows the connection detail. Inputs and outputs are assigned according to the chosen configuration (default configuration is shown). See Input / Output tables below.

PR0744



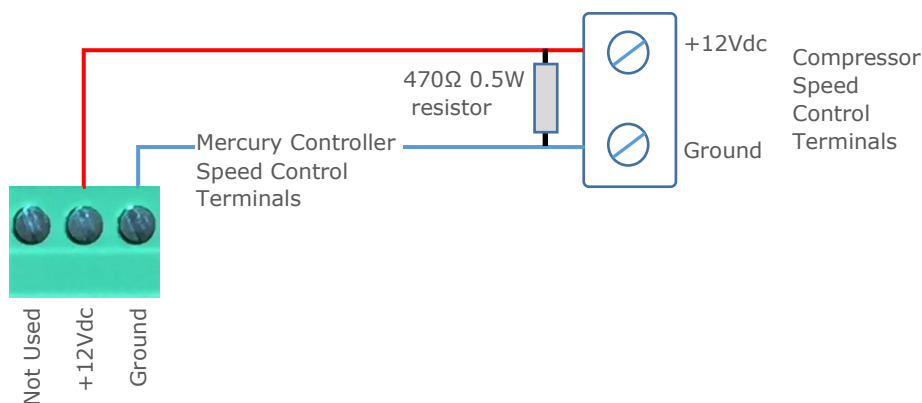
PR0740



*Compressor Speed Control Signal

Compressor speed control is carried out by means of a 12Vdc signal with a variable switching rate of between 0 to 150Hz. Typically, a signal of 60Hz will run the compressor at its minimum speed of less than 2000rpm increasing to 150Hz and a maximum speed of 4500rpm, between 60Hz and 150hz the compressor speed will vary on a linear scale. A frequency of less than 50Hz will turn the compressor off.

A 470Ω 0.5W resistor is supplied and is required to be fitted across the 12Vdc and Ground terminals for correct operation. If possible, this resistor should be connected at the compressor terminals rather than the controller terminals



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Input and Output Allocation Tables

The following tables indicate; on a controller type basis, the functions of the inputs and outputs. Also shown are the digital inputs that are derived by switching in a fixed value resistor across the input.

Input / Output allocation table

TYPE	Integral Case Types 1&2	Alarm Action	Plant Input (Switched Resistors)
Input 1	Air on Temperature	Yes	
Input 2	Air off Temperature	Yes	
Input 3	Compressor Discharge Temperature	Yes	Plant fault 1 or External Defrost Input **
Input 4	Case Clean Input	Yes	Case Clean Switch
Input 5	Defrost Temperature / Monitor (If fitted)	Conditional*	Plant fault 2
Input 6	Logging Probe (If fitted)	Conditional*	
Digital Input 1	Plant 1, Off Switch, Defrost, Temp Switch	Conditional	
Digital Input 2	Plant 1, Off Switch, Defrost, Temp Switch	Conditional	
Relay 1	Compressor	N/A	
Relay 2	Fans	N/A	
Relay 3	Lights/Alarm Relay	N/A	
Relay 4	Not Used	N/A	
Relay 5	Defrost	N/A	
Analogue Out	Compressor Speed control signal (12Vdc)	N/A	

* Alarm on monitor probe only if used

** Defrost type must be set to remote in parameters.

Switched Resistor Values

The controller has two digital inputs available however if more are required then two of the temperatures probe inputs can also be used as digital inputs by switching a fixed value resistor across the probe terminals. This feature can be used with or without the temperature probes connected.

For PT1000 probes use 820 Ohm switched resistors. For NTC2K, NTC2K25 and 3K probes use 590 Ohm switched resistors. For 5K and 6K use 1K Ohm switched resistors. For NTC10K probes use 2k7 Ohm switched resistors. For NTC10K (2) probes use 2k2 Ohm switched resistors. The resistors used must have a tolerance of 1% or better and the resistor must have a power rating of 0.25W. For improved accuracy whilst using switched resistors RDM recommend resistors with 0.1% accuracy are used. Note the switched resistor features will **not** function when using 470R or 700R probes. When a resistor is switched across the appropriate input it signals to the Mercury to enable the switched resistor function described for that input whilst still recording the probe temperature on the input.

Temperature range for all probe types is -49°C to +127°C for probe inputs which do not have a secondary function (switched resistors). Inputs which have a secondary function are restricted to -42°C to +60°C. If the full temperature range is required on all inputs and no switch resistor features are needed then please see Switch Resistor parameter P-19

Note: switched resistors will operate in LT (Low Temperature) and HT (High Temperature) applications using PT1000, NTC2K or NTC2K25 probe types only. For all other probe types, the switched resistor inputs will work in HT applications only.

Setting up the controller

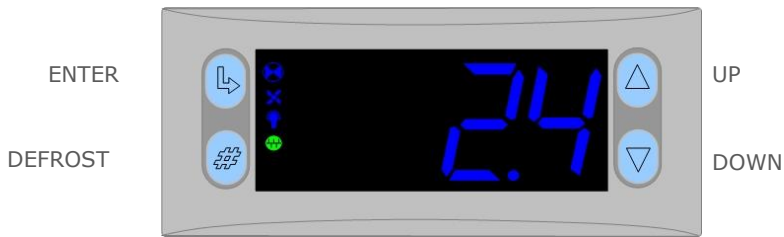
Access to the controller can be achieved several ways

- Through the front mounted buttons
- Direct access by PC into the side comms port. This requires the Communicator software package available free on the RDM website
- Through legacy front end panels on 485 networks
- Through the RDM Data Manager.
- Across an IP network. (Current controller IP address required)



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Setup through front buttons



To enter setup 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.

Setup Function Menu

Display	Option	Explained in Paragraph	Display	Option	Explained in Paragraph
IO	View Inputs / Outputs and States	Input / output table	SoFt	View software version	
PArA	Set/View Parameters	Set view parameters	FANS	Toggle Fans Only mode	Fans
Unit	Probe type and Celsius/Fahrenheit option	Set View Unit	CASE	Toggle Case Off mode	Case Off
PrES	Set/view pressure unit	Set Pressure Unit	Ligt	Toggle Lights Only mode	Lights
diSP	Display whole units or decimal	Display	OFSt	Probe Offset	Probe Offset
tyPE	Set/View Controller Type	Set/view controller type			
rtc	Set/view Clock (rtc = Real Time Clock)	Real Time Clock	ESC	Exit Setup mode	
nEt	Set/view network configuration	Network Configuration			

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)

- Use the up or down buttons to scroll through the display until the display reads "rtc"
- Press enter. The display will show "t-1". press enter again
- Scroll hours up or down (0 – 23) press enter
- Use up button to select "t-2", press enter
- Scroll minutes up or down (0 – 59) press enter
- Repeat for t - 3 (seconds 0 – 59)
- Repeat for t - 4 (days up to 31)
- Repeat for t - 5 (months up to 12)
- Repeat for t - 6 (year up to 99)
- Use up button to display "ESC", press enter to display "rtc"

Time clock is now set

type. Set/view controller type

- From the function menu scroll to select type, press enter
- Use the up/down buttons to scroll through HT/LT configuration types. (see [configuration table on page 4](#))
- Press enter.
- Scroll to select "ESC"
- Press enter

Controller type configuration is now set



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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.

Unit. Set/view temperature unit and Probe type

From the function menu scroll to select Unit

Press enter and the value will be displayed: -

Probe Types

0 for PT1000 Celsius	10 for NTC2K25 Celsius
1 for PT1000 Fahrenheit	11 for NTC2K25 Fahrenheit
2 for NTC2K Celsius	12 for 5K Celsius
3 for NTC2K Fahrenheit	13 for 5K Fahrenheit
4 for 470R Celsius	14 for 6K Celsius
5 for 470R Fahrenheit	15 for 6K Fahrenheit
6 for 700R Celsius	16 for NTC10K T1 Celsius
7 for 700R Fahrenheit	17 for NTC10K T1 Fahrenheit
8 for 3K Celsius	18 for NTC10K T2 Celsius (USA NTC10K)
9 for 3K Fahrenheit	19 for NTC10K T2 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. (Default)
1. Controller display will show temperatures as a whole number.

Pres. Set pressure units.

- 0 – Bar
- 1 - Psi



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Parameter Tables

Number	Parameter	Range °C (°F)	Step	Units	Default LT °C (°F)	Default HT °C (°F)
P-01	Cut-in Temp.	-42 to 30 (-43.6 to 86)	0.1	Deg	-20 (-4)	3.5 (38.3)
P-02	Cut In Differential	0 to 10 (0 to 18)	0.1	Deg	2.5 (4.5)	2.5 (4.5)
P-03	Control Weight	0 to 100	1	%	40	30
P-04	Display Weight	0 to 100	1	%	40	30
P-05	Alarm Weight	0 to 100	1	%	0	0
P-06	Response On	00:00 to 15:00	1		10	10
P-07	Response Off	00:00 to 15:00	1		10	10
P-08	Key-switch Mode	0 = Case Off 1 = Fans only 2 = Toggle 3 = Key Off	1		0	0
P-09	Control Probe type	0 = Use Air on Probe 1 = Use Log Probe	1		0	0
P-10	Resistor Case Off	0 = Disabled 1 = Enabled			0	0
P-11	Fans temperature mode	0 = Off 1 = Temperature 2 = Over-temperature 3 = Temp/OT	1		0	0
P-12	Fans Off Temperature	-42 to 30 (-43.6 to 86)	0.1	Deg	-10 (14)	8 (46.4)
P-13	Probe 5 Select	0 = Defrost, 1 = Monitor	1		0	0
P-14	Relay 3 Mode	0 = Lights, 1 = Alarm	1		0	0
P-15	Probe 3 Resistor function	0 = Plant fault N/O 1 = Plant Fault N/C 2 = External defrost	1		0	0
P-16	Service Interval time	0 to 128	1	KHrs	60	60
P-17	Switch Resistors	0 = Off, 1 = On			1	1
P-18	Lights Case Off	0 = Off, 1 = On, 2 = Unused			0	0
P-19	Load Shedding	0 = Off, 1 = Mode1, 2 = Mode 2	1		0	0
P-20	Digital 1 Mode	0 =Plant 1 N/O 1 =Plant 1 N/C 2 =Case Switch 3 =Temp Switch 4 =Defrost	0		0	0
P-21	Digital 2 Mode	0 =Plant 1 N/O 1 =Plant 1 N/C 2 =Case Switch 3 =Temp Switch 4 =Defrost	0		0	0
P-22	Cut In Offset	-30 to +30 (-22 to 86)	1	Deg	5	5
P-23	Probe 5 Resistor	0 =Plant 4 N/O 1 =Plant 4 N/C 2 =None			2	0
P-24	Relay 4 Mode	Relay 4 is not used on this variant. This parameter will have no effect.			0	0
P-25	Trims in Defrost	Trim heaters not available on this variant.			0	0
P-26	Trim Level	Trim heaters not available on this variant.	1	Hz	100	100
P-30	Minimum Frequency	0 to 200	1	Hz	60	60
P-31	Maximum Frequency	0 to 200	1	Hz	150	150
P-32	Start Frequency	0 to 200	1	Hz	60	60
P-33	Fail Frequency	0 to 200	1	Hz	60	60



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Number	Parameter	Range °C (°F)	Step	Units	Default LT °C (°F)	Default HT °C (°F)
P-34	Defrost Frequency	0 to 200	1	Hz	140	140
P-35	Start Time	0 to 3600	1	Seconds	15	15
P-36	Stop Time	0 to 3600	1	Seconds	60	60
P-37	Start Average Frequency	0 to 100	1	Hz	100	100
P-38	Anti-Short Cycle Timer	00:00 to 15:00	00:05	mm:ss	07:00	07:00
P-39	Do Discharge Stop	0 = Off, 1 = On			0	0
P-40	Discharge Stop Value	-49 to 128	0.1	Deg	55	55
P-41	Discharge Stop Diff	-42 to 30	0.1	Deg	10	10
P-42	Max Comp Run	00:00 to 99:00	01:00	mm:ss	00:00	00:00
P-50	Alarm Delay	00:00 to 99:00	01:00	mm:ss	20:00	20:00
P-51	UT Alarm	-49 to 60 (-56.2 to 140)	0.1	Deg	-30 (-22)	-2 (28.4)
P-52	OT Alarm	-49 to 60 (-56.2 to 140)	0.1	Deg	-15 (5)	5 (41)
P-53	Log Probe Type	0 (Off), 1 (Logging), 2 (Logging/Alarm)			Off	Off
P-54	Slug Log Probe	0 (Off), 1 (On)			Off	Off
P-55	Log Alarm Delay	00:00 to 99:00	01:00	mm:ss	20:00	20:00
P-56	Log UT Alarm	-49 to 60 (-56.2 to 140)	0.1	Deg	-35 (-31)	-1 (30.2)
P-57	Log OT Alarm	-49 to 60 (-56.2 to 140)	0.1	Deg	-12 (10.4)	6 (42.8)
P-58	Monitor OT Alarm	-49 to 60 (-56.2 to 140)	0.1	Deg	20 (68)	20 (68)
P-59	Probe 2 Alarm	0 = Off, 1 = On			1	1
P-70	Defrost Mode	0 (Local), 1 (Remote), 2 (External)			Local	Local
P-71	Defrost Start	00:00 to 23:59	00:01	hh:mm	01:00	01:00
P-72	Defrosts per Day	0 to 8	1		6	6
P-73	No Defrost Time	0 to 25	1	hours	12	12
P-74	Def Terminate Temp.	-42 to 30 (-43.6 to 86)	0.1	Deg	14 (57.2)	10 (50)
P-75	Def Min Time	00:00 to 99:00	01:00	mm:ss	05:00	05:00
P-76	Def Max Time	00:00 to 99:00	01:00	mm:ss	30:00	30:00
P-77	Drain Down	00:00 to 24:00	00:15	mm:ss	01:30	00:30
P-78	Recovery Time	00:00 to 99:00	01:00	mm:ss	30:00	30:00
P-79	Pump Down Time	00:00 to 99:00	01:00	mm:ss	00:00	00:00
P-80	Fan Delay mode	0 = Time 1 = Temp	1		0	0
P-81	Fan Delay Time	00:00 to 99:00	01:00	mm:ss	00:00	00:00
P-82	Fan Delay Temp	-42 to 30 (-43.6 to 86)	0.1	Deg	-20 (-4)	0.0 (32)
P-83	Fans In Defrost	0 (Off), 1 (On)			On	On
P-84	Defrost Type	0 = Elec. 1 = Gas. 2 = Elec CIn			0	0
P-85	Defrost Hold	0 (Off), 1 (On)			Off	Off
P-86	Defrost Skip	0 (Off), 1 (On)			Off	Off
P-87	Defrost Skip Time	00:00 to 99:00	01:00	mm:ss	12:00	12:00
P-100	Lights Mode	0 (Local), 1 (Remote), 2 (Man Off), 3(Man On)			Local	Local
P-101	Sun Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-102	Sun Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-103	Mon Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-104	Mon Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-105	Tue Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-106	Tue Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-107	Wed Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00



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Number	Parameter	Range °C (°F)	Step	Units	Default LT °C (°F)	Default HT °C (°F)
P-108	Wed Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-109	Thu Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-110	Thu Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-111	Fri Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-112	Fri Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-113	Sat Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-114	Sat Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
dFLt	Restore defaults					

Parameter Descriptions

Number	Parameter	Description
P-01	Cut-in Temp	Temperature at which the compressor will switch on.
P-02	Diff	Differential temperature below the cut-in temperature, the compressor switches off when below this temperature
P-03	Control Weight	Percentage of the Air-On temperature that is used to calculate the control temp. The remaining percentage will be used on the Air-Off temperature Example, P-03 set to 30% Control temp = 30% Air-on + 70% Air-off
P-04	Display Weight	As above only applied to the display temperature
P-05	Alarm Weight	Percentage of the Air-On temperature that is used to calculate the over temperature alarm.
P-06	Response On	The rate at which the compressor speed will increase in relation to control temperature with 1 being the slowest response and 30 being the fastest.
P-07	Response Off	The rate at which the compressor speed will decrease in relation to control temperature with 1 being the slowest response and 30 being the fastest.
P-08	Key-switch Mode	Allows the keys switch to be: - <ul style="list-style-type: none"> ➤ Single turn for case off (Case off mode) ➤ Single turn for Fans only (Fans Mode) ➤ Single turn for case off, double turn for fans only (Toggle mode)
P-09	Control Probe type	Switches between using the air-on probe and the Logging probe. Note the control and display temperature will still be a derivative of the weighted Average of the control probe + Air-off probe
P-10	Resistor Case Off	Turns on/off the switched resistor case off function
P-11	Fans temperature mode	Allows the user to set the fans to turn off when: - <ul style="list-style-type: none"> ➤ A pre-determined temperature is reached (P12) ➤ When an over-temperature alarm is present ➤ When either P12 is reached or an OT alarm is present
P-12	Fans Off Temperature	Temperature for the above (P11) operation. Note the defrost termination probe is the source of the temperature reading used in this feature. If the defrost termination probe isn't fitted then the air off probe will be used.
P-13	Probe 5 Select	This input can be used as a defrost termination probe (default) or as a monitor probe with an OT alarm level.
P-14	Relay 3 mode	This changes the function of relay 3 from Lights (default) to an alarm relay. 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.
P-15	Probe 3 Resistor	Selects whether the switched resistor invokes either a Plant fault or an External Defrost.
P-16	Service Interval Time (Run Hours)	Time (in 1000 x hours) before the service icon (Spanner icon) comes on. The Run Hours timer increments based on the number of hours the controller has been powered up and running. Reset the spanner icon to off by changing this parameter to 0 and then back to the desired service interval. This process also resets the Run Hours value to 0. To view the current Run Time value, refer to the I/O list.
P-17	Switch Resistors	Enables switched resistors to be used for Plant Faults, External Defrosts, Case Clean. See: Switched Resistor Values
P-18	Lights Case Off	Used to place the controller into Case Off when its lighting timer is in the off state. When the lighting timer is in the on state the controller follows its normal control operation. This feature is disabled if the set point (P-01) is below 6°C. Please note that when the



Please ensure all power is switched off before installing or maintaining this product.

Number	Parameter	Description
		<p>controller is in case off all alarms are inhibited and all outputs are turned off. Therefore care must be taken when enabling this parameter.</p> <ul style="list-style-type: none"> ➤ Off – Feature is not used and only the controller lights relay follows the lighting timer status. ➤ On – Feature is in use and controller will be in Case Off whenever the lights timer is in the off state. ➤ Unused – This selection has no effect and should not be used. Please select from either Off or On. This feature operates in either Local, using controller RTC, or Remote, using Data Manager GP timer channel, lighting applications.
P-19	Load Shedding	<ul style="list-style-type: none"> ➤ Off – Feature is not used ➤ Mode 1 – Case goes to “CO2 Load Shedding Case Off Mode” ➤ Mode 2 – Goes to Case Clean Mode <p>See: Load Shedding</p>
P-20	Digital Input 1 Mode	Selects the operation of digital input 1, this can be set to Plant fault 1 N/O or N/C, Case Off Switch, Temperature Range Switch or Defrost Initiation Input.
P-21	Digital Input 2 Mode	Selects the operation of digital input 2, this can be set to Plant fault 2 N/O or N/C, Case Off Switch, Temperature Range Switch or Defrost Initiation Input.
P-22	Cut In Offset	The value added to the Cut-In Setpoint, OT and UT alarm thresholds when a temperature offset is applied. This can be done from a digital input set to ‘Temp Switch’ or via a Data Manager TDB command.
P-23	Probe 5 Resistor	Selects whether the switched resistor invokes either a Plant fault 4 N/O or N/C.
P-24	Relay 4 Mode	Relay 4 is not used in this variant; this parameter will have no effect.
P-30	Minimum Frequency	This is the frequency value that relates to the minimum speed of the compressor, typically this will be 50-60Hz, below this frequency the compressor will stop.
P-31	Maximum Frequency	This is the frequency that relates to the maximum speed of the compressor, typically this will be 150Hz.
P-32	Start Frequency	When there is a cooling demand and the compressor is required to start the compressor will start running at the start frequency for the length of the start time (P-35)
P-33	Fail Frequency	If the air on and air off control probes both fail then the compressor will run at this frequency.
P-34	Defrost Frequency	If hot gas defrost is used then the compressor will run at this frequency during the defrost and recovery periods.
P-35	Start Time	On compressor start up the compressor will run at the start frequency (P-32) for this period of time.
P-36	Stop Time	When the compressor is required to stop it will operate at the Minimum Frequency value for this period of time before stopping.
P-37	Start Average Frequency	After the start time has expired the compressor will initially run at the previous average operating frequency. This parameter allows this average value to be reduced. As an example, if the previous average operating frequency was 100Hz and the Start Average Frequency parameter was set to 75% then the compressor will initially run at 75Hz.
P-38	Anti-Short Cycle Timer	This limits the time between successive compressor starts. The timer starts counting when the compressor starts not when the compressor stops.
P-39	Do Discharge Stop	Enables or disables the high discharge temperature compressor stop feature.
P-40	Discharge Stop Value	This is the temperature at which the compressor will stop due to high discharge.
P-41	Discharge Stop Diff	Once the Discharge Stop temperature has been exceeded the compressor will not restart until the discharge temperature has dropped below the Discharge Stop temperature by the diff value.
P-42	Max Comp Run	This limits the running time of any compressor, once the compressor has exceeded this time period it will be switched off for the period of the Anti-Short Cycle time (P-38). Set this value to 00:00 if the Max Comp Run limit is not required.
P-50	Alarm Delay	Delay for the over and under-temperature alarms.
P-51	UT Alarm	Under temperature alarm set point. This alarm uses the control temperature.
P-52	OT Alarm	Over temperature alarm set point. This alarm uses the air-off temperature.
P-53	Log Probe Type	Allows the user to set the logging probe mode: - <ul style="list-style-type: none"> ➤ Off ➤ Logging with no alarms ➤ Logging with alarms
P-54	Slug Log Probe	Applies a damping factor. This can be used to make an air probe have the same temperature response as a slugged probe to simulate food core temperature.



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Number	Parameter	Description
P-55	Log Alarm Delay	Delay for the Logging probe over and under-temperature alarms.
P-56	Log UT Alarm	Logging probe under temperature alarm set point.
P-57	Log OT Alarm	Logging probe over temperature alarm set point.
P-58	Monitor OT Alarm	Monitor probe over temperature alarm set point.
P-59	Probe 2 Alarm	Allows user to disable Probe 2 alarms if probe is not fitted.
P-70	Defrost Mode	Allows the user to set the defrost mode: - <ul style="list-style-type: none"> ➤ Local (Uses the internal parameters P-41 and P-42) ➤ Remote (Requires a defrost schedule in the front end) ➤ External (uses a switched resistor in input 3). When this signal is present a defrost is initiated. <p>Note: - If the external defrost signal is not removed then the controller will defrost according to the "No Defrost" time and a missed defrost alarm will be generated. See P-29 for external defrost signal setup.</p>
P-71	Defrost Start	When defrost mode is set to "Local", this is the start time for the 1 st defrost
P-72	Defrosts per Day	When defrost mode is set to "Local", this is the number of defrosts per day equally spaced from the start time.
P-73	No Defrost Time	If the controller misses a defrost command for any reason, a defrost will initiate after this time has elapsed from the last defrost. Normally set to 2 hours over the normal defrost interval period.
P-74	Def Terminate	The defrost will terminate (defrost control relay off) when the temperature of the defrost termination probe reaches this value, if a defrost probe is not fitted then the air off program will be used.
P-75	Def Min Time	Minimum time that a defrost will use (Defrost can't terminate until this time has elapsed. If termination temperature is reached during this period, the defrost control relay is turned off but the controller will not start refrigerating until the end of the defrost min period)
P-76	Def Max Time	Maximum time period allowed for defrosting if termination temperature is not reached.
P-77	Drain Down	A period after defrost max to allow the draining of any surplus water
P-78	Recovery Time	The compressor(s) is switched on at the start of this period to allow the temperature to recover to the normal operating point. This period also inhibits the OT alarm. Note that if the air-off temperature is still above the OT alarm setpoint when this period expires, an immediate OT alarm occurs; there is not a further alarm delay.
P-79	Pump Down Time	Time period before the defrost min period to allow for a pump down
P-80	Fan Delay mode	This parameter allows the fans start after a drain-down period to be delayed, either by time (P-81) or when the temperature point (P-74) is reached. This parameter uses the same probe strategy as the defrost terminate.
P-81	Fan Delay Time	Time after a drain-down period before the fans start if P-80 is set to time
P-82	Fan Delay Temp	Temperature at which the fans start after a drain-down period when P-80 is set to temperature.
P-83	Fans In Defrost	Allows the user to set the fans on or off in defrost. Note if the fans are set to on in defrost, they will go off for the drain-down period and then follow the P-86 rules.
P-84	Defrost Type	Electric – Defrost heater will go off during defrost min. period, if defrost termination is achieved, and will stay off. Electric CIn – Defrost heater will go off during defrost min. period if defrost termination is achieved but will then cycle on and off around the termination temperature setpoint until the end of the defrost min. period. Gas - If gas is selected, the compressor is kept running for the duration of the defrost cycle.
P-85	Defrost Hold	Turns the defrost hold feature on and off. When switched on, the controller can be held in defrost until a remote command from the front end starts the recovery process.
P-86	Defrost Skip	Allows user to enable/disable defrost skip. This feature allows the controller to skip defrosts. If the current defrost terminates on temperature, then the controller will skip the next scheduled defrost providing the previous defrost terminated before the defrost skip time (P-87). Operates only when the controller is set to local defrost scheduling.
P-87	Defrost Skip Time	Time factor used in defrost skip. The previous defrost has to terminate before this value expires to allow the controller to skip a defrost.
P-100	Lights Mode	Allows the user to set the lights mode: - <ul style="list-style-type: none"> ➤ Always off ➤ Always on ➤ Use a local schedule P-101 to P-114)



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Number	Parameter	Description
		➤ Use a remote schedule (Set up in the system front end)
P-101	Sun Lights On	When P-60 is set to Local, Sunday on time
P-102	Sun Lights Off	When P-60 is set to Local, Sunday off time
P-103	Mon Lights On	When P-60 is set to Local, Monday on time
P-104	Mon Lights Off	When P-60 is set to Local, Monday off time
P-105	Tue Lights On	When P-60 is set to Local, Tuesday on time
P-106	Tue Lights Off	When P-60 is set to Local, Tuesday off time
P-107	Wed Lights On	When P-60 is set to Local, Wednesday on time
P-108	Wed Lights Off	When P-60 is set to Local, Wednesday off time
P-109	Thu Lights On	When P-60 is set to Local, Thursday on time
P-110	Thu Lights Off	When P-60 is set to Local, Thursday off time
P-111	Fri Lights On	When P-60 is set to Local, Friday on time
P-112	Fri Lights Off	When P-60 is set to Local, Friday off time
P-113	Sat Lights On	When P-60 is set to Local, Saturday on time
P-114	Sat Lights Off	When P-60 is set to Local, Saturday off time
dFLt	Restore default values	Restores all of the parameters to their default values.

Relay State and functional operation

Relay 1-3 State	Function State	Wired contact
Relay 1 off	Compressor on	N/C
Relay 1 on	Compressor off	N/C
Relay 2 off	Fans on	N/C
Relay 2 on	Fans off	N/C
Relay 3 off	Lights off	N/O
Relay 3 on	Lights on	N/O

Relay 4-5 State	Function State	Wired contact
Relay 3 off	Alarm Relay = Alarm	N/O
Relay 3 on	Alarm Relay = OK	N/O
Relay 4 off	Not Used	N/A
Relay 4 on	Not Used	N/A
Relay 5 off	Defrost off	N/O
Relay 5 on	Defrost on	N/O

Relay and screen states during defrost

State:	Pump Down	Defrost Min	Defrost Max	Drain Down	Fan Delay	Recovery
Screen:	DEF	DEF	DEF	DEF	DEF	REC
Def LED:	On	On	On	Off	Off	Off
Relay 1 Compressor (Defrost set to gas)	Off	On	On	Off	On	On
Relay 1 Compressor (Defrost set to electric)	Off	Off	Off	Off	On	On
Relay 1 Compressor (Defrost set to elec/cln)	Off	Off	Off	Off	On	On
Relay 2 Fans (On in Defrost)	On	On	On	On	Off	On
Relay 2 Fans (Off in Defrost)	Off	Off	Off	Off	Off	On
Relay 3 Lights relay (Timer channel On)	On	On	On	On	On	On
Relay 4 Not Used						
Relay 4 Not Used						
Relay 5 Defrost Relay	Off	Off/Cycles *	On	Off	Off	Off

*The defrost relay will cycle around the termination setpoint during defrost min if defrost type is set to elec/cln, otherwise it will be off.

Defrost Type (P-84)

If P-91 is set to gas, the compressor is switched on for the duration of the defrost cycle.



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Defrost Termination

Defrost termination will be when the temperature parameter "def terminate" has been reached on the "defrost termination" probe. If the "defrost termination" probe is not fitted then the air off probe will be used.

Fan Delay after Defrost

The fans will come back on when: -

- The fan delay time has elapsed if the "fan delay mode" is set to time
- Or If the fan delay mode is set to "temp", the fans will come on when the defrost termination probe reaches the fan delay set point, or on the time parameter, whichever occurs first.

If the "defrost termination" probe is not fitted, the fans will come on when the air off probe reaches the control set point (If fans are selected as "on during defrost")

Network Configuration – RS232 comms

The final section to setup is the network address. In all instances, this must be done before the controller is connected to the site network.

When logging a Mercury 3 with an RS232 interface onto a network you must first connect the controller to a communications module, this is either a 485 Legacy, IP Futura, Mercury Switch or Bluetooth network module. For Mercury 3's with the IP interface please refer to the [Network Configuration – IP comms](#) section for details of networking.

RS485 Legacy module

Using RS485, 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).

Connecting an RS485 legacy Module to the controller will govern which set-up screens are made available in the 'Net' menu. The module will support the "Genus" protocol only. Using RS485 will show the below;

Display	Option
485t	485 Network Type
485A	485 Address/ Name
gAdd	Show underlying network address assigned to controller
rLog	Re-log the controller back onto the network
ClrA	Clear the address/name from the controller
ESC	Exit network menu. N.B. this option must be selected to save any changes made in this menu

The **485t** option shows a value representing the network type, this should be left to default value 1:

Value	Network Type
1	Genus compatible (all versions)
2	Not Used

Ensure option '1' is selected (for RS485).

The **485A** option shows a value representing the name of the controller in a Genus compatible network. For example, if the value shown in 485A is shown as "05-6". The controller would try to log onto a Genus compatible network using the name 'RC05-6'.

The **gAdd** option displays (in hexadecimal format) the underlying network address assigned to the controller when it was logged onto the network. Note: this is automatically assigned by the Data Manager.



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The **rLog** option allows the controller to be logged back onto the network with its current name. The 'rLog' message will flash, waiting for confirmation. To confirm, press the Enter button to execute the command, Up or Down buttons to cancel.

The **ClrA** option will clear out the network address and name in the controller. The 'ClrA' message will flash for confirmation. Press the Enter button to execute the command, Up or Down buttons to cancel.

Fast Network Address Reset

To enter this mode, hold the Enter, Up and Down buttons together for approximately 3 seconds until the message ClrA appears on the display. ClrA is the first option in the menu consisting of the following options:

Display	Option
ClrA	Clear the address/name from the controller
ESC	Exit Setup mode

Pressing the Enter button to select the ClrA option will cause the 'ClrA' message to flash for confirmation, if the network type is set to Genus compatible. Press the Enter button to execute the command, Up or Down buttons to cancel. If the network type is not set to Genus compatible then the ClrA message will not flash and the ESC option can be used to exit the menu.

IP Futura module

In an IP system there are two options;

- IP-L
- IP-r

IP-L allows you to fix a static 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 a generic Internet browser.

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

IP-L

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

- From the function menu you can now select '**nEt**'.
- Press enter and the display will show "IP-L", press enter once more.
- You can now set the IP network settings by 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 controller should then be powered on to connect to the network.

- From the function menu you can now select '**nEt**'
- Press enter and the display will show "IP-r", press enter once more.
- You can now view (only) the address given by the DHCP server



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Network Mask Length

To ease setup, a single network mask length value is used. If the address has been specified with a network mask value in dotted IP format e.g., 255.255.255.0 then the table below gives the conversion:

Mask	Length	Mask	Length	Mask	Length
		255.255.254.0	23	255.254.0.0	15
255.255.255.252	30	255.255.252.0	22	255.252.0.0	14
255.255.255.248	29	255.255.248.0	21	255.248.0.0	13
255.255.255.240	28	255.255.240.0	20	255.240.0.0	12
255.255.255.224	27	255.255.224.0	19	255.224.0.0	11
255.255.255.192	26	255.255.192.0	18	255.192.0.0	10
255.255.255.128	25	255.255.128.0	17	255.128.0.0	09
255.255.255.0	24	255.255.0.0	16	255.0.0.0	08

Mercury Switch

The method of logging on the Mercury 3 (RS232 comms) will be similar to that of the IP Futura however 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.

Network Configuration – IP comms

Mercury 3 controllers with the IP interface as standard does not require any communications module and will already communicate on the IP network protocol.

When networking the Ethernet variant, the 'Net' menu will have the following menus;

Display	Option
IP-L / IP-r	Read/ Write Static IP address / Read Only DHCP IP address
Id	The 3-digit network address
AtyP	IP-r / IP-L selection
ESC	Exit Menu

Similar to the IP Futura / switch setup IP-L allows you to fix a static IP address into the controller and IP-r allows you to give each controller on the system a unique network number (using the Id).

- To firstly select between IP-L and IP-r navigate to 'AtyP'.

IP-r

Once IP-r is selected the controller must be given a unique 3 digit 'network address' that no other device on the network has (note if logging on to a Data Manager, this will be the device ID). Once the ID has been set connect the controller to the IP network for it then to be given an IP address by the DHCP server. To view the IP address given, within the Net menu, navigate to 'IP-r'.



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IP-L

If IP-L has been selected from the 'AtyP' menu the IP address must be given to the controller by navigating to 'IP-L' within 'Net'. The following menu's will be available;

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 (see the network mask length table above)
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

Once the IP address has been entered, the controller can be connected to the IP network.

Bluetooth Network module

Connecting a Bluetooth Network Module to the controller will update the screens available under the 'Net' menu. They are detailed below;

Display	Option
485t	1: 485 Genus Network (See RS485 module/ Intuitive Internal RS485 Network card) 2: Bluetooth
485A	Bluetooth device name. As it will appear on DMTouch's device list (RC00-0 – RC99-9)
nI d	Select Bluetooth Network ID (0 – 3)
gAdd	Shows underlying network address assigned to controller
rLog	Re-log the controller back onto the network
ClrA	Clear the address/ name from the controller
ESC	Exit network menu. Note: this option must be selected to save any changes made in this menu.

- Ensure the 485t is set to '2' (Bluetooth)
- Provide a unique device alias under the 485A menu (e.g., 01-5)
- Select the Network ID. Please see the Bluetooth wireless mesh setup guide for more details.
- Press the 'ESC' to save

The green network LED will flash to show it is attempting to log on and go solid when connected.



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Viewing

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

From the function menu, select "I/O", press enter. You can now scroll through the IO table as set out below. Inputs and outputs that do not apply to a particular controller type will be greyed out.

Input / Output Table

Number	IO	Range* °C (°F)	Step	Units
I-01	Control Temp.	-42 to 60 (-43.6 to 140)	0.1	Deg
I-02	Display temp	-42 to 60 (-43.6 to 140)	0.1	Deg
I-03	Air on Probe	-49 to 60 (-56.2 to 140)	0.1	Deg
I-04	Air off Probe	-49 to 60 (-56.2 to 140)	0.1	Deg
I-05	Comp Discharge Probe	-42 to 60 (-43.6 to 140)	0.1	Deg
I-06	Defrost Probe	-49 to 60 (-56.2 to 140)	0.1	Deg
I-07	Logging Probe	-49 to 60 (-56.2 to 140)	0.1	Deg
I-08	Alarm Temp	-49 to 60 (-56.2 to 140)	0.1	Deg
I-09	Plant Fault 1	0 (OK), 1 (Alarm)		
I-10	Plant Fault 2	0 (OK), 1 (Alarm)		
I-11	Plant Fault 3	0 (OK), 1 (Alarm)		
I-12	Plant Fault 4	0 (OK), 1 (Alarm)		
I-13	Case Clean	0 (Off), 1 (On)		
I-14	Monitor Probe	-49 to 60 (-56.2 to 140)	0.1	Deg
I-15	External Defrost	0 (Off), 1 (On)		
I-16	Load Shedding	0 (Off), 1 (On)		
I-17	Not Used		1	%
O-01	Compressor	0 (Off), 1 (On)		
O-02	Compressor Frequency	0 to 200Hz	1	Hz
O-03	Defrost Control	0 (Off), 1 (On)		
O-04	Lights	0 (Off), 1 (On)		
O-05	Not Used	0 (Off), 1 (On)		
O-06	Case Fans	0 (Off), 1 (On)		
O-07	Last Def. Time	00:00 to 23:59		hh:mm
O-08	Last Def. Length	00:00 to 03:00		hh:mm
O-09	Last Def. Ctrl Temp.	-42 to 60 (-43.6 to 140)	0.1	Deg
O-10	Last Def. Type	0 (None), 1 (Internal), 2 (External), 3 (Network), 4 (Display), 5 (Timed), 6 (Forced), 7 (Skipped)		
O-11	Setpoint Offset	-30 to +30	0.1	Deg
O-12	Not Used		00:01	min:ss
O-15	Alarm Relay	0 (Unused), 1 (OK), 2 (Alarm)		
O-17	Run Time	0 to 128	1	K Hrs
S-01	Control State	0 (Stabilise), 1 (Normal), 2 (Defrost Min), 3 (Defrost Max), 4 (Drain Down), 5 (Fan Delay), 6 (Recovery), 7 (OT Alarm), 8 (UT Alarm), 9 (Fans Only), 10 (Lights Only), 11 (Case Off), 12 (Pump Down), 13 (Defrost Hold), 14 (Load Shed)		

* Range is dependent on probe type

Maximum and Minimum Control Temperature

To view the maximum or minimum Control Temperature the controller has reached since last power off/on press and hold the Up and Down Buttons together for 3 seconds. The display will show "diSP", press the Up Button to view the maximum Control Temperature the controller has reached or press the Down Button to view the minimum Control Temperature the controller has reached.

Display will revert back to normal operation if the Enter Button is pressed or after 1 minute of no button presses. The top bar of the left-hand segment will be lit when the maximum temperature is being displayed.



Please ensure all power is switched off before installing or maintaining this product.

The bottom bar of the left-hand segment will be lit when the minimum temperature is being displayed. Resetting the controller will clear out these values.

Messages

The following alarms and messages can appear on the Mercury display.

Display Message	System status
Ft	Control Fault
Prb1	Probe 1 Fault
Prb2	Probe 2 Fault
Prb3	Probe 3 Fault
Prb4	Probe 4 Fault
Prb5	Probe 5 Fault
Prb6	Probe 6 Fault
rEC	Control State in Recovery
dEF	Control Sate in Defrost

Display Message	System status
FanS ONLY	Controller in Fans Only
LitS ONLY	Controller in Lights Only
CASE OFF	Controller in Case Off
Ot	Over Temperature Alarm
Ut	Under Temperature Alarm
PLnt	Plant Fault
LgOt	Log Probe Over Temperature
LgUt	Log Probe Under Temperature
AL	Control State in Alarm

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 # (index)
Missed defrost	15
Plant Fault 1	3
Case over temperature	4
Case under temperature	5
Probe 1,2,3,4,5 or 6 Faulty	6
Product over temperature	8
Product under temperature	9

Alarm text	Type # (index)
Plant Fault 2	3
Monitor Probe OT	12
Case Off	29
Load Shedding	7
Compressor A stop	3
Compressor B stop	3

Modifying controller states

During normal operation you can change the following states from the function menu

Fans Only "FanS"

Selecting the Fans Only option will put the controller into the Fans Only state if the current state is not Fans Only. If the current state is Fans Only then the controller will change to the Normal state. Selecting this option will exit the setup menu automatically. The display will show "FanS OnLy"

If a remote display with key switch is being used, this function can be invoked by turning the key switch to the fans only position (90 degrees clockwise) with parameter P85 set to "fans"

Case Off "CASE"

Selecting the Case Off option will put the controller into the Case Off state if the current state is not Case Off. If the current state is Case Off then the controller will change to the Normal state. Selecting this option will exit the setup menu automatically. The display will show "CASE OFF". An alarm is generated, fixed delay of 1 minute, when the controller is placed into the Case Off state.

If a remote display with key switch is being used, this function can be invoked by turning the key switch to the case-off position. (Clockwise 90 degrees) with parameter P85 set to "case".



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Lights Only “Ligt”

Selecting the Lights Only option will put the controller into the Lights Only state if the current state is not Lights Only. If the current state is Lights Only then the controller will change to the Normal state. Selecting this option will exit the setup menu automatically. The display will show “LitS OnLy”

Note. When lights are being used in “Remote” mode with a timing channel: -

If the controller goes offline, the lights are turned ON after a delay of 5 minutes. The lights will stay on until the controller comes back on-line where they will revert to the state of the timing channel being used.

Probe Offset

This feature allows each probe value to be modified by an “offset”. Offset values are from -10°C (-18°F) to +10°C (+18°F) and on a channel basis. Example C1 = Probe 1.

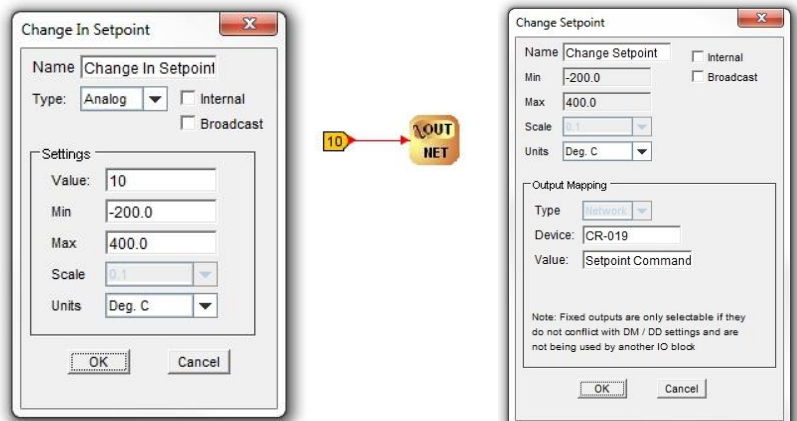
Remote Commands

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

Command	Value to send	Description	Conditions
Defrost Command	1	Initiates a defrost cycle	Defrost mode: remote
Defrost Command	3	Terminates the defrost	Defrost mode: remote Defrost hold: On Defrost min state complete
Setpoint Command	+/-18	Is added to or subtracted from the setpoint	
Case Off Command	5 0	Sets the controller to Case Off Restores the controller from Case Off to Normal	
Haccp Command	0 1 2	HACCP LED OFF HACCP LED On HACCP LED Flashes	
Button Command	0 1 2	Buttons backlights Off Buttons backlights On Buttons Backlights Flash	

Use an “Analogue Out” block configured to the controller’s 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 on the right, which increases the setpoint by 10 degrees.



Please ensure all power is switched off before installing or maintaining this product.

Appendix 1: Webpage Appearance

It is possible to view the controller across an IP connection using one of the methods outlined in the [Network Configuration](#) section

The following screens are samples of how values and settings appear when viewed through a PC/Laptop connection.

Mobile Controller (LT)

Mercury3a Mobile 1.0

Time 08:50:10 23/07/20

Current Status	
Control temp.	2.2 °C
Control State	OT Alarm

Current Alarms	
Case over temperature	08:38:49 23/07/20

The user has a choice of entering the following pages: - **Inputs & Outputs, Parameters, Alarms, Logs & Configure.**

Inputs & Outputs

Inputs & Outputs

Inputs		Outputs		States	
Control temp.	2.2 °C	Compressor	On	Control State	OT Alarm
Display temp.	2.2 °C	Compressor Freq	150 Hz		
Air on Probe	4.0 °C	Defrost Control	Off		
Air off Probe	1.1 °C	Lights	On		
Comp Disch	-1.4 °C	Trim/Remote	Off		
Defrost Probe	N/A °C	Case Fans	On		
Logging Probe	N/A °C	Last Def. Time	00:00 hh:mm		
Alarm temp.	1.1 °C	Last Def. Length	00:00 hh:mm		
Plant Fault 1	OK	Last Def. Temp.	0.0 °C		
Plant Fault 2	OK	Last Def. Type	None		
Plant Fault 3	OK	Setpoint Offset	N/A °C		
Plant Fault 4	OK	Trim Off Period	00:00 mm:ss		
Case Clean	Off	Alm Relay	Unused		
Monitor Probe	N/A °C	Run Time	1 K Hrs		
Ext Defrost	Off				
Load Shed	Off				
Hub Trim Level	N/A %				

This is view only screen and shows the states of the inputs and outputs.



Please ensure all power is switched off before installing or maintaining this product.

Parameters

Set Parameters

Use Set Parameters button to save changes before changing section

Parameter Name	Low	High	Default	Value	Units
Cut-in temp	-42.0	30.0	-20.0	<input type="text" value="-20.0"/>	°C
Cut-in diff.	0.0	10.0	2.5	<input type="text" value="2.5"/>	°C
Control weight	0	100	40	<input type="text" value="40"/>	%
Display weight	0	100	40	<input type="text" value="40"/>	%
Alarm weight	0	100	0	<input type="text" value="0"/>	%
Response On	1	30	10	<input type="text" value="10"/>	
Response Off	1	30	10	<input type="text" value="10"/>	
Key Switch				<input type="button" value="KeyOff"/> ▾	
Ctrl Probe Type				<input type="button" value="Air Probe"/> ▾	
Resistor Case Off				<input type="button" value="Off"/> ▾	
Fans Temp Mode				<input type="button" value="Off"/> ▾	
Fans Off Temp	-42.0	30.0	-10.0	<input type="text" value="-10.0"/>	°C
Probe 5 Select				<input type="button" value="Defrost"/> ▾	
Relay 3 Mode				<input type="button" value="Lights"/> ▾	
Probe 3 Resistor				<input type="button" value="Plnt3 NO"/> ▾	
Service Time	0	128	60	<input type="text" value="60"/>	K Hrs
Switch Resistors				<input type="button" value="On"/> ▾	
Lights CaseOff				<input type="button" value="Unused"/> ▾	
Load Shedding				<input type="button" value="Off"/> ▾	
Digital 1 Mode				<input type="button" value="Plnt1 NO"/> ▾	
Digital 2 Mode				<input type="button" value="Plnt2 NO"/> ▾	
Cut-in Offset	-30.0	30.0	5.0	<input type="text" value="5.0"/>	°C
Probe 5 Resistor				<input type="button" value="Plnt4 NO"/> ▾	
Relay 4 Mode				<input type="button" value="Trim Htr"/> ▾	
Trim In Defrost				<input type="button" value="Off"/> ▾	
Trim Level	0	100	100	<input type="text" value="100"/>	%

This is a view only screen and shows the parameter settings.

Alarms

Alarms

Reason	Occurred	Cleared
Case over temperature	08:38:49 23/07/20	

This is a view only screen showing the alarm log.



Please ensure all power is switched off before installing or maintaining this product.

Logs

Logs

<<< << < > >> >>>

	08:58:50 23/07/20	08:58:55 23/07/20	08:59:00 23/07/20	08:59:05 23/07/20	08:59:10 23/07/20	08:59:15 23/07/20	08:59:20 23/07/20	08:59:25 23/07/20
Control temp.	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Display temp.	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Air on Probe	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Air off Probe	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Comp Disch	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4
Defrost Probe	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Logging Probe	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alarm temp.	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Plant Fault 1	OK	OK	OK	OK	OK	OK	OK	OK
Plant Fault 2	OK	OK	OK	OK	OK	OK	OK	OK
Compressor	On	On	On	On	On	On	On	On
Compressor Freq	150	150	150	150	150	150	150	150
Defrost Control	Off	Off	Off	Off	Off	Off	Off	Off

This is a view only screen showing the device's log.

Configure

Alternatively, click on the **Configure** button to access the setup menu.

Note: login credentials required to access Configure menu are as follows;

Username: 'service'
Password: '1234'

Configure

Time

Parameters

Controller Type

Temperature Units

Pressure Units

Display Units

Remote Defrost

Name

Logging

Asset Information

Probe Offsets

This screen allows the user to configure the controller and set-up the following: - Time, Parameters, Controller Type, Temperature Units, Pressure Units, Display Units, Remote Defrost, Name, Logging, Asset Information and Probe Offsets.



Please ensure all power is switched off before installing or maintaining this product.

Time

Time

Enter time:

Enter the time and date in the format displayed and press "Set Time" to update the controller. A screen showing the set time will be displayed, and then revert to the initial (Home) screen.

Parameters

Set Parameters

Use Set Parameters button to save changes before changing section

Parameter Name	Low	High	Default	Value	Units
Cut-in temp	-42.0	30.0	-20.0	<input type="text" value="-20.0"/>	°C
Cut-in diff.	0.0	10.0	2.5	<input type="text" value="2.5"/>	°C
Control weight	0	100	40	<input type="text" value="40"/>	%
Display weight	0	100	40	<input type="text" value="40"/>	%
Alarm weight	0	100	0	<input type="text" value="0"/>	%
Response On	1	30	10	<input type="text" value="10"/>	
Response Off	1	30	10	<input type="text" value="10"/>	
Key Switch				<input type="button" value="KeyOff"/> ▾	
Ctrl Probe Type				<input type="button" value="Air Probe"/> ▾	
Resistor Case Off				<input type="button" value="Off"/> ▾	
Fans Temp Mode				<input type="button" value="Off"/> ▾	
Fans Off Temp	-42.0	30.0	-10.0	<input type="text" value="-10.0"/>	°C
Probe 5 Select				<input type="button" value="Defrost"/> ▾	
Relay 3 Mode				<input type="button" value="Lights"/> ▾	
Probe 3 Resistor				<input type="button" value="Plnt3 NO"/> ▾	
Service Time	0	128	60	<input type="text" value="60"/>	K Hrs
Switch Resistors				<input type="button" value="On"/> ▾	
Lights CaseOff				<input type="button" value="Unused"/> ▾	
Load Shedding				<input type="button" value="Off"/> ▾	
Digital 1 Mode				<input type="button" value="Plnt1 NO"/> ▾	
Digital 2 Mode				<input type="button" value="Plnt2 NO"/> ▾	
Cut-in Offset	-30.0	30.0	5.0	<input type="text" value="5.0"/>	°C
Probe 5 Resistor				<input type="button" value="Plnt4 NO"/> ▾	
Relay 4 Mode				<input type="button" value="Trim Htr"/> ▾	
Trim In Defrost				<input type="button" value="Off"/> ▾	
Trim Level	0	100	100	<input type="text" value="100"/>	%

This screen allows the parameters to be changed. Once the values are changed, the "Set Parameter" button must be clicked to set the parameters into the controller.

A screen will show the number of parameters and the number changed, then revert back to the home screen.



Please ensure all power is switched off before installing or maintaining this product.

Controller Type

Controller Type

Mobile Controller (LT) ▼

Set Type

This screen allows for the controller type to be changed.

Temperature Units

Temperature Units

PT1000 °C ▼

Set Units

This screen allows the user to set the probe type for the controller and if it's in degrees Centigrade or Fahrenheit.

Pressure Units

Pressure Units

bar ▼

Set Units

This screen allows the user to set the pressure units displayed to Bar or PSI.

Display Units

Display Units

Decimal ▼

Set Display Units

This screen allows the user to set if the display on the controller will display only whole numbers (Whole) or whole numbers and tenths (Decimal).

Remote Defrost

Force Remote Defrost

Remote Defrost

This screen allows the user to send a remote defrost to the controller (note: defrost mode must be set to local).



Please ensure all power is switched off before installing or maintaining this product.

Name

Name

Enter Name:

This screen allows the user to give the controller a name. Type in a name of your choice (upper or lower case alpha-numeric) up to 32 characters. Click "Set Name" to load into the controller. A screen will show the name has been set and then revert back to the home screen. (The Home screen will also now show the controller's name).

Logging

Logging

Set 1		Set 2	
Log Interval	5s ▼	Log Interval	None ▼
Control temp.	<input checked="" type="checkbox"/>	Control temp.	<input type="checkbox"/>
Display temp.	<input checked="" type="checkbox"/>	Display temp.	<input type="checkbox"/>
Air on Probe	<input checked="" type="checkbox"/>	Air on Probe	<input type="checkbox"/>
Air off Probe	<input checked="" type="checkbox"/>	Air off Probe	<input type="checkbox"/>
Comp Disch	<input checked="" type="checkbox"/>	Comp Disch	<input type="checkbox"/>
Defrost Probe	<input checked="" type="checkbox"/>	Defrost Probe	<input type="checkbox"/>
Logging Probe	<input checked="" type="checkbox"/>	Logging Probe	<input type="checkbox"/>
Alarm temp.	<input checked="" type="checkbox"/>	Alarm temp.	<input type="checkbox"/>
Plant Fault 1	<input checked="" type="checkbox"/>	Plant Fault 1	<input type="checkbox"/>
Plant Fault 2	<input checked="" type="checkbox"/>	Plant Fault 2	<input type="checkbox"/>
Compressor	<input checked="" type="checkbox"/>	Compressor	<input type="checkbox"/>
Compressor Freq	<input checked="" type="checkbox"/>	Compressor Freq	<input type="checkbox"/>
Defrost Control	<input checked="" type="checkbox"/>	Defrost Control	<input type="checkbox"/>
Lights	<input type="checkbox"/>	Lights	<input type="checkbox"/>
Trim/Remote	<input type="checkbox"/>	Trim/Remote	<input type="checkbox"/>
Case Fans	<input type="checkbox"/>	Case Fans	<input type="checkbox"/>

This screen allows the user to set the logging features. There are two sets so that values can have different log intervals.

Set the interval required on set1 and set 2, tick the required values to be logged, then click "Set Values" to load into the controller.

A screen will display "Log configuration set" then revert back to the home page.



Please ensure all power is switched off before installing or maintaining this product.

Asset Information

Asset Information

Controller		Equipment Manufacturer	
Model	<input type="text"/>	Manufacturer	<input type="text"/>
Serial No	<input type="text"/>	Model	<input type="text"/>
Date	<input type="text"/>	Serial No	<input type="text"/>
		Date	<input type="text"/>

Installed Fixture		Refurbished Fixture	
Asset	<input type="text"/>	Refurb By	<input type="text"/>
Installer	<input type="text"/>	Re-Asset	<input type="text"/>
Date	<input type="text"/>	Installer	<input type="text"/>
		Date	<input type="text"/>

This screen allows the user to set asset information into the controller.

Caution: This is a once only operation.

Click "Set Information" and follow the on-screen instructions to set up your asset information.

Probe Offsets

Probe Offsets

Probe	Low	High	Value	Units
1	-10	10	<input type="text" value="7.0"/>	°C
2	-10	10	<input type="text" value="4.0"/>	°C
3	-10	10	<input type="text" value="2.0"/>	°C
4	-10	10	<input type="text" value="4.0"/>	°C
5	-10	10	<input type="text" value="0.0"/>	°C
6	-10	10	<input type="text" value="0.0"/>	°C

This screen allows the user to set a probe offset between to any of the six probes connected to the controller.



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Specification

Mercury Mk3 Controller PR0740/744 MFC	
Power Requirements	
Supply Voltage Range	100 – 240 Vac \pm 10%
Supply Frequency	50 – 60 Hz
Typical supply current	<1 Amp
General	
Operating temperature range	-10°C to 55°C (14°F to 131°F)
Storage temperature range	-20°C to 65°C (-4°F to 149°F)
Environmental	Indoor use at altitudes up to 2000m (6525 ft), pollution degree 2, installation category II. Voltage fluctuations not to exceed \pm 10% of nominal voltage.
Size	78mm (W) x 36mm (H) x 110mm (D) (3.1"(W) x 1.42"(H) x 4.3"(D))
Approx. Weight	177 grams (6.02 oz)
Safety	EN60730
EMC	EN61326:2013
Ventilation	There is no requirement for forced cooling ventilation
Class 2 Insulation	No protective Earth is required and none should be fitted
Supply Fuse	The host equipment must provide a suitable external over-current protection device such as: - Fuse: 2A 240 Vac Anti-surge (T) HRC conforming to IEC 60127
Or MCB	2A, 240 VAC Type C conforming to BS EN 60898
Relay Specification	
Relays 1 – 4	
Max current	PR0740 Only 6A Resistive (Cos ϕ = 1) 2A Inductive (Cos ϕ = 0.4)
Max current	PR0744 Only 5A Resistive (Cos ϕ = 1) 2A Inductive (Cos ϕ = 0.4) Derated from 5A to 3A linearly from 35°C to 55°C Conforms to EN60079-0 and EN60069-15
Max voltage	250Vac, 30V dc
Relay 5	
Max current	3A (non inductive), COS ϕ =0.4 2A (inductive load) 200,000 operations
Max voltage	250Vac
For compliance with the LVD, all relay commons must be at the same potential as the supply voltage	
Compressor Speed Control Output	
Voltage	12Vdc
Frequency	0 to 200Hz
Inputs	
Probe Input resistance	3.01K Ohms (for PTC or NTC type probes)
Probe Input type	Selectable. See: Units
Digital Inputs	Volt Free
Comms	
Serial Variant	RS232 with flow control
Ethernet Variant	IP comms



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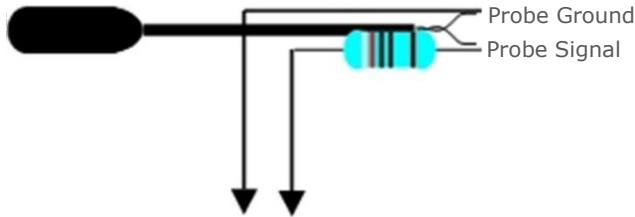
Inputs

Input resistance: 3.01K Ohms (for PTC or NTC type probes)
 Input type: Selectable. See: [Units](#)

Comms: RS232 with flow control

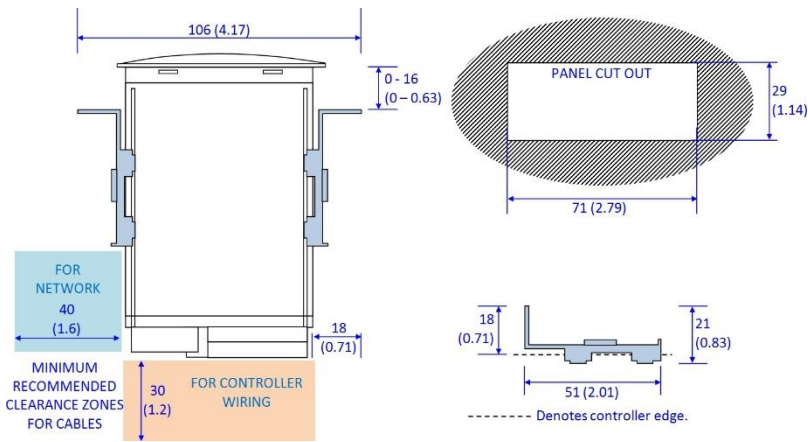
Switched Resistor Example Wiring

Example of resistor fitted on a probe input. Connect to remote switch or relay



Installation & Dimensions

Panel Cut-out and Clearances

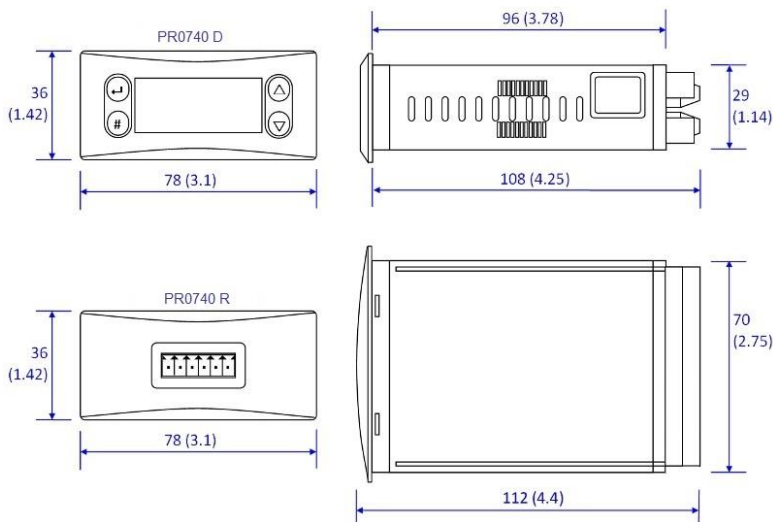


Fixing

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.

There is no requirement for forced cooling ventilation

Dimensions



Please ensure all power is switched off before installing or maintaining this product.

Cleaning

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

Disclaimer

The specifications of the product detailed in this document may change without notice. RDM Ltd shall not be liable for errors or omissions, 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
1.0	15/07/2020	First Issue.
1.0a	16/06/2022	Relay 2 Fans and Relay 5 Defrost Corrected.
1.0b	27/06/2022	PR0744 Variant Added, Probe 5 Defrost/Monitor corrected.
1.0c	02/08/2022	Relay 4 operation removed.
1.0d	11/10/2022	Bluetooth options added. Part numbers updated.
1.0e	08/12/2022	Plant fault connections 1 & 2 corrected.
1.0f	12/09/2023	IO Table corrected to show probe 4 as Case Clean and Probe 5 Defrost/Monitor
1.0g	22/09/2023	Relay table corrected to show relay 3 connection as N/O



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