

Resource  
Data Management

# Mercury 3 Compressor Supervisor

Commissioning/User Guide  
Revision 3.2a



PR0740-COM

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# The Mercury 3 Range

## From Resource Data Management

### Description

The Mercury Compressor Supervisor controller is a monitoring device for compressors.

The Mercury Compressor Supervisor supports PT1000 probes only

### Compatible Displays

The following displays are compatible with the Mercury Remote Display Controllers:-

Description	Part Number
Mercury Remote Display with 5m cable	PR0325
Mercury Keypress Remote Display with 5m cable	PR0326
Mercury DIN Remote Display with 5m cable	PR0327
Mercury DIN Keypress Remote Display with 5m cable	PR0328
Mercury mk2 Remote Display with 5m cable	PR0725

### Configuration

The controller gives three configuration options: - (see [set-up](#) for changing the type)

Display value	Type
1	Part Wind Controller
2	Pole Controller
3	Direct On Line

### 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, an RDM wireless mesh 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.

Description	Part Number
IP Futura (Single Mercury to IP Interface)	PR0016
RS485 Interface (Single Mercury to RS485 Interface)	PR0026
Mercury IP Switch (IP support for 10 controllers)	PR0018
Mercury IP Switch with Pressure/Humidity Inputs	PR0018-PHI
Wireless Mesh Interface (for single Mercury)	PR0730



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## Front Display Features

### Mercury Mk3

**LED's: -**

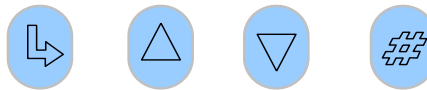
- Valve (Relay 1) 
- Fans (Relay 2) 
- Lights (Relay 3) 
- Defrost (Relay 5) 
- On-Line Status 

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

- Service 
- Alarm 
- HACCP 



**Keys**



Enter Up Down Defrost

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

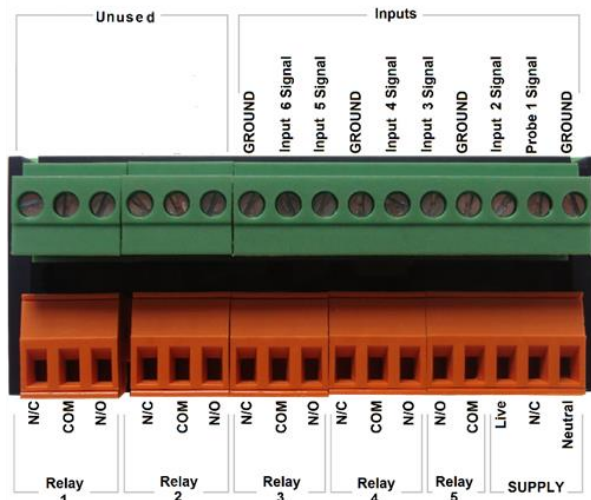
**Defrost:** Press and hold the defrost button to force a manual defrost



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

## Mercury Mk3 I/O 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. See [Input/Output](#) tables for further details on connections. Below also shows you the transducer connections available with the Mercury Mk 3 E variant.



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## Ordering Information

When ordering a Mercury Mk 3 controller the following ordering scheme can be used to purchase the desired hardware configuration.

### PR0740- X Y COM

X	Description
D	Local/ Integral Display
R	Remote Display

Y	Description
IP	Ethernet Comms
232	RS232 Comms

Example

To order a Mercury MK3 with a remote display and IP comms: **PR0740 – R IP COM**

## 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.

### Type 1 – Part Wind Controller

TYPE	Description	Plant Input (Switched Resistors)
Input 1	Temperature Probe (PT1000)	Overload
Input 2	Thermistor	Not Used
Input 3	Oil Fail ***	Alarm
Input 4	LP Safety ***	LP Control
Input 5	HP Fail ***	LP Control 2 <sup>nd</sup> stage
Input 6	Not Used	Not Used
Variable Input	Not used	
Digital 1	Not used	
Digital 2	Not used	
Relay 1	Alarm **	
Relay 2	Fans	
Relay 3	1 <sup>st</sup> Stage	
Relay 4	2 <sup>nd</sup> Stage	
Relay 5	Not Used	

\* For PT1000 probes use 820 Ohm

\*\* The alarm relay is de-energised for no alarm. Use the NC and Common for "Loop break" on alarm or use the NO and Common for "Loop make" on alarm.

\*\*\* 0 volt return to activate

### Type 2 – Pole Controller

TYPE	Description	Plant Input (Switched Resistors)
Input 1	Temperature Probe (PT1000)	Overload
Input 2	Thermistor	Not Used
Input 3	Oil Fail ***	Alarm
Input 4	LP Safety ***	LP Control
Input 5	HP Fail ***	LP Control 2 <sup>nd</sup> stage
Input 6	Not Used	Not Used
Variable Input	Not used	
Digital 1	Not used	
Digital 2	Not used	
Relay 1	Alarm **	
Relay 2	Fans	
Relay 3	Low Speed	
Relay 4	High Speed	
Relay 5	Not Used	

\* For PT1000 probes use 820 Ohm

\*\* The alarm relay is de-energised for no alarm. Use the NC and Common for "Loop break" on alarm or use the NO and Common for "Loop make" on alarm.

\*\*\* 0 volt return to activate



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## Type 3 – Direct On Line

TYPE	Description	(Switched Resistors)
Input 1	Temperature Probe (PT1000)	Overload
Input 2	Thermistor (or Klixon)	Not Used
Input 3	Oil Fail ***	Alarm
Input 4	LP Safety ***	LP Control
Input 5	HP Fail ***	LP Control 2 <sup>nd</sup> stage
Input 6	Not Used	Not Used
Variable Input	Not used	
Digital 1	Not used	
Digital 2	Not used	
Relay 1	Alarm **	
Relay 2	Fans	
Relay 3	Compressor	
Relay 4	Not Used	
Relay 5	Not Used	

\* For PT1000 probes use 820 Ohm

\*\* The alarm relay is de-energised for no alarm. Use the NC and Common for "Loop break" on alarm or use the NO and Common for "Loop make" on alarm.

\*\*\* 0 volt return to activate

## Switched Resistor Values

The switched resistor functionality adds the benefit of adding further digital inputs for switches using fixed resistors. For wiring please see the '[Switched Resistor Wiring](#)' section. When a resistor is switched across the appropriate input, it signals to the Mercury to enable the switched resistor function (described for that input).

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.

## Setting up the controller

Access to the controller can be achieved by several ways;

### Serial Communications Variant

- Through the front mounted buttons of the display
- Direct access by PC into the serial comms port. This requires a software package available 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).

### Ethernet Communications Variant

- Through the front mounted buttons of the display.
- Across an IP network (Current controller IP address required).
- Through the Data Manager.



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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 (Common to all types)

Display	Option	Explained in Paragraph	Display	Option	Explained in Paragraph
IO	View Inputs / Outputs and States	<a href="#">Input / output table</a>	SoFt	View software version	
PARA	Set/View Parameters	<a href="#">Set view parameters</a>	OFSt	Probe Offset	<a href="#">Probe Offset</a>
tyPE	Set/View Controller Type	<a href="#">Set/view controller type</a>	tEst*	Test Mode	See Note Below
rtc	Set/view Clock (rtc = Real Time Clock)	<a href="#">Real Time Clock</a>	ESC	Exit Setup mode	
nEt	Set/view network configuration	<a href="#">Network Configuration</a>			

**\*Note:** When first powered up the controller will have the 'tEst' option in the menu setup. This allows the user to toggle the relays for testing purposes. Upon entering the menu, the display will show r-01 (relay 1) to r-05 (relay 5), select the desired output and toggle the value from 0 to 1 (confirm by pressing enter) to switch the selected relay.

This option is only available for 30 seconds after power up. After this time, the menu setup will return to its standard options.

## 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 the diferent 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)

- From the function menu, scroll to select 'PArA'
- 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 the setup mode and save all changes.
- Selecting dFLt will reset all parameters back to the default values for the current type of controller

## Parameter Tables

Not all parameters apply to all controller types. For example P-08 is the Superheat reference which only applies to the EEV variant of controllers (available types on the E are 3, 4, 5 & 6). This parameter will not appear if the controller is a Mechanical variant. In the following table, the type columns on the right hand side will be greyed out if that parameter does not apply to that controller type.

Number	Parameter	Range °C ( °F )	Step	Units	Default LT °C ( °F )	Type 1	Type 2	Type 3
P-01	Power On Delay	00:00 to 01:00	00:01	mm:ss	00:05	✓	✓	✓
P-02	Starts Per Hour	6 to 60	1		10	✓	✓	✓
P-03	Oil Comp Type	0 (Reciprocal), 1 (Scroll)			0	✓	✓	✓
P-04	Oil Alarm	0 (Off), 1 (On)			1	✓	✓	✓
P-05	Oil Alarm Delay	00:05 to 02:15	00:01	mm:ss	00:45	✓	✓	✓
P-06	Part Wind Delay	0.5 to 1.1	0.1	sec	0.9	✓		
P-07	Therm. Reset	0 (Manual), 1 (Auto)			0	✓	✓	
P-08	Probe Option	0 (Off), 1 (Logging),			2	✓	✓	✓
P-09	Log Probe Alm	-50 to 100	0.1	Deg	0.0	✓	✓	✓
P-10	Log Probe Diff	1 to 25	0.1	Deg	2	✓	✓	✓
P-11	Log Probe Alm Dly	00:00 to 02:00	00:01	hh:mm	00:15	✓	✓	✓
P-12	Temp Set Point	-10 to 80	0.1	Deg	0	✓	✓	✓
P-13	Temp Diff	1 to 25	0.1	Deg	10	✓	✓	✓
P-14	BST Change Over	0 (Off), 1 (On)			1	✓	✓	✓

## Relay State and functional operation

Relay 1-3 State	Function State	Wired contact	Relay 4-5 State	Function State	Wired contact
Relay 1 off	Alarm Relay = Alarm	N/C	Relay 3 off	1 <sup>st</sup> Stage/Low Speed/Comp Off	N/O
Relay 1 on	Alarm Relay = OK	N/C	Relay 3 on	1 <sup>st</sup> Stage/Low Speed/Comp On	N/O
Relay 2 off	Fans Off	N/C	Relay 4 off	2 <sup>nd</sup> Stage/High Speed Off	N/O
Relay 2 on	Fans On	N/C	Relay 4 on	2 <sup>nd</sup> Stage/High Speed On	N/O



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## 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 Wireless Mesh Interface. 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. <b>N.B.</b> this option <b>must</b> be selected to save any changes made in this menu

The **485t** option shows a value representing the network type. The possible values are:

Value	Network Type
1	Genus compatible (all versions)
2	RDM Wireless Mesh System (Wireless Mesh)

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.

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.



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## Wireless Mesh Module

When a wireless mesh module is connected to the controller the 'Net' menu will show similar options to that of the 'RS485' network. The only difference to the settings would be that the **485t** should be set for '2'. Then the same steps should be taken to that of the RS485 option to log the unit on to the wireless mesh. Note, the wireless mesh network should already be set up on the data manager. Please see the Data Manager documentation for setup instructions. Furthermore, please see documentation on the PR0730 Wireless Mesh Network Module for setup instructions.

## 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. <b>N.B.</b> this option <b>must</b> 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.

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

When  
networking  
the  
Ethernet

variant, the 'Net' menu will have the following menus:

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'.

### 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 <a href="#">network mask length</a> 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. <b>N.B.</b> this option <b>must</b> 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.



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## Viewing IO

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	Type 1	Type 2	Type 3
I-01	Temp. Probe	-49 to 60	0.1	Deg	✓	✓	✓
I-02	Therm. Winding	0 (Ok), 1 (Alarm)				✓	
I-03	Klixon	0 (Ok), 1 (Alarm)					✓
I-04	Oil Fault	0 (Ok), 1 (Alarm)			✓	✓	✓
I-05	LP Ctrl 1	0 (Off), 1 (On)			✓	✓	✓
I-06	LP Ctrl 2	0 (Off), 1 (On)				✓	
I-07	HP Alarm	0 (Ok), 1 (Alarm)			✓	✓	✓
I-08	LP Alarm	0 (Ok), 1 (Alarm)			✓	✓	✓
I-09	General Alarm	0 (Ok), 1 (Alarm)			✓	✓	✓
I-10	Overload	0 (Ok), 1 (Alarm)			✓	✓	✓
O-01	Comp Relay	0 (Off), 1 (On)					✓
O-02	Comp Lo Speed	0 (Off), 1 (On)				✓	
O-03	Comp Hi Speed	0 (Off), 1 (On)				✓	
O-04	1 <sup>st</sup> Part Wind	0 (Off), 1 (On)			✓		
O-05	2 <sup>nd</sup> Part Wind	0 (Off), 1 (On)			✓		
O-06	Fan Relay	0 (Off), 1 (On)			✓	✓	✓
O-07	Alarm Relay	0 (Off), 1 (On)			✓	✓	✓
S-01	Control State	0 (Power Up), 1 (On), 2 (Run), 3 (Asc), 4 (Alarm)			✓	✓	✓

## Display Messages

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

Display Message	System status	Display Message	System status
PUP	Power Up State	TH2	Thermistor Fault
On	On State	OL	Over Load
RUn	Run State	LP	Low Pressure
ASC	Anti Short Cycle State	HP	High Pressure
gEn	General Fault	OIL	Oil Fault
TH1	Klixon Fault	TP	Over Temperature 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 # (index)	Alarm text	Type # (index)
General Fault	20	Klixon Fault	6
Temperature Probe Fault	6	Thermistor Winding Fault	17
Over Temperature Fault	4	Oil Fault	18
Low Pressure Fault	9	Overload Fault	16
High Pressure Fault	8	Power Up	7

## 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.



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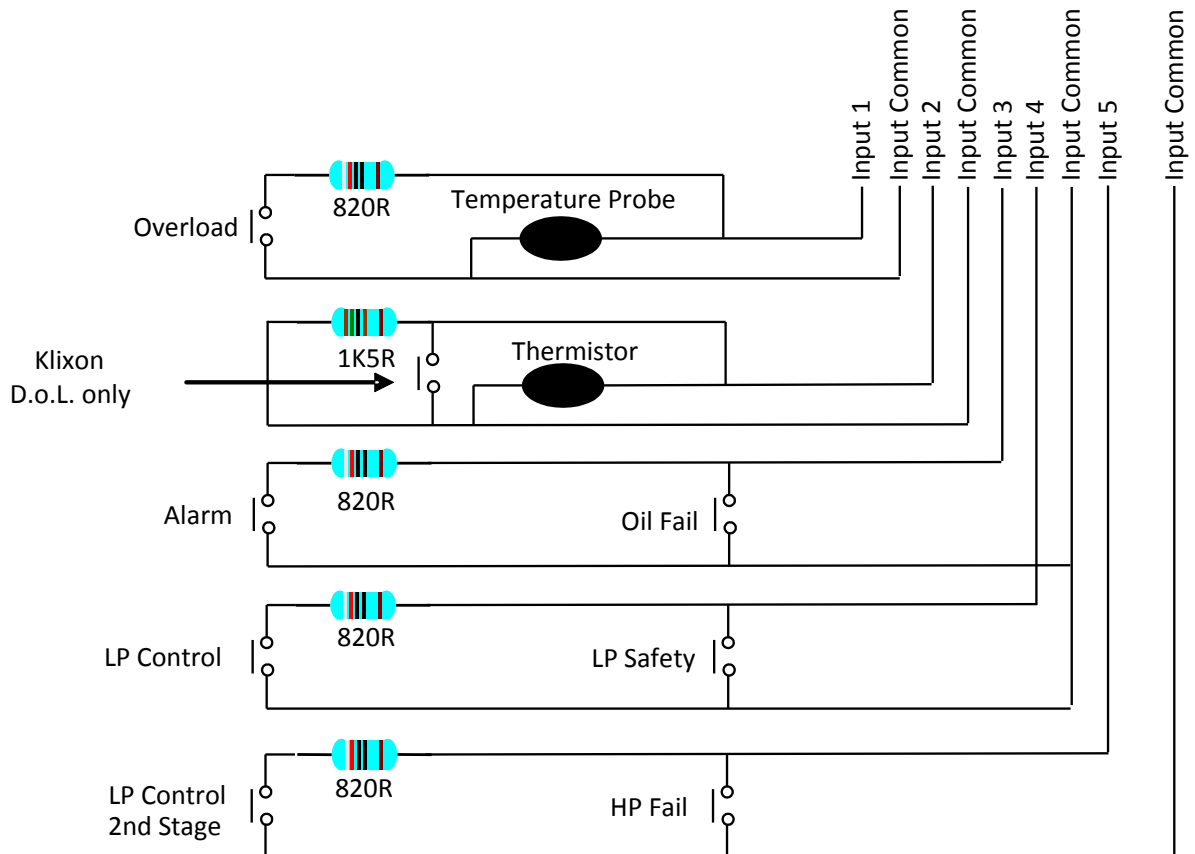
## Specification

Mercury Mk3 Controller PR0740 MOB	
Power Requirements	
Supply Voltage Range	100 – 240 Vac ±10%
Supply Frequency	50 – 60 Hz
Typical supply current	<1 Amp
General	
Operating temperature range	10°C to 60°C (14°F to 140°F)
Storage temperature range	-20°C to 65°C (-4°F to 149°F)
Environmental	Indoor use at altitudes up to 2000m, pollution degree 2, installation category II. Voltage fluctuations not to exceed ±10% of nominal voltage.
Size	78mm (W) x 36mm (H) x 110mm (D)
Approx. Weight	177 grams
Safety	EN61010
EMC	EN61326:2013
Ventilation	There is no requirement for forced cooling ventilation
Class 2 Insulation	<b>No</b> protective Earth is required and <b>none</b> 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	
Relay 1 - 4	
Max current	6A Resistive (CosØ = 1) 2A Inductive ( CosØ = 0.4)
Max voltage	250Vac, 30V dc
Relay 5	
Max current	3A (non inductive), COSφ=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	
Inputs	
Probe Input resistance	3.01K Ohms
Probe Input type	Selectable. See: <a href="#">Units</a>
Comms	
Serial Variant	RS232 with flow control
Ethernet Variant	IP comms



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

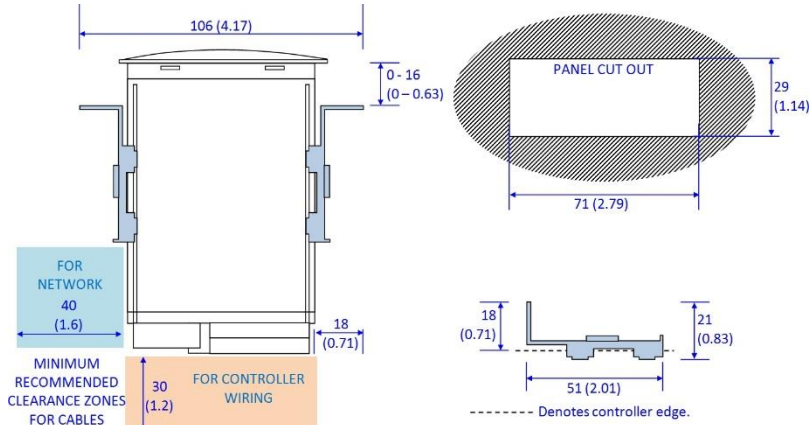
## Switched Resistor Example Wiring



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

## Installation & Dimensions

### Panel Cut-out and Clearances

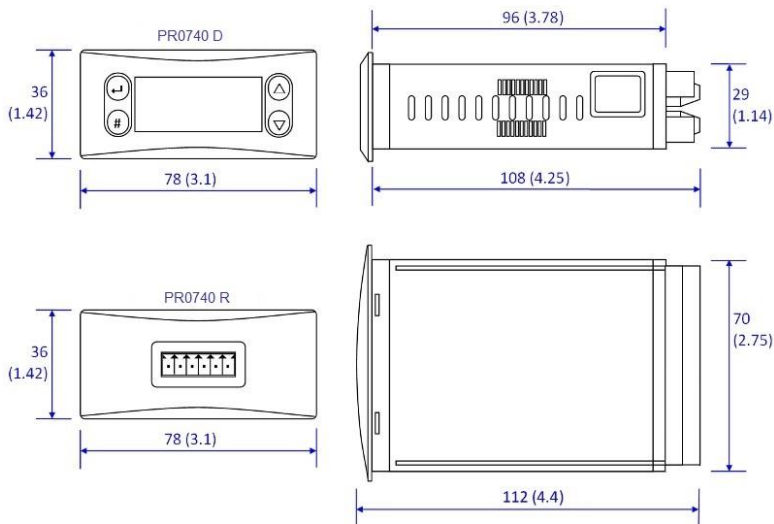


### Fixing

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



### Cleaning

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



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

## Disclaimer

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## Revision History

Revision	Date	Changes
3.0	01/03/2015	Introduction of Mercury 3
3.0a	06/03/2017	New Documentation Format.
3.0b	17/05/2017	Operating temperature amended.
3.1	04/10/2018	New hardware release
3.1a	02/04/2019	I/O table updated.
3.2	24/05/2019	Part Wind relay update.
3.2a	31/05/2019	I/O table updated.



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