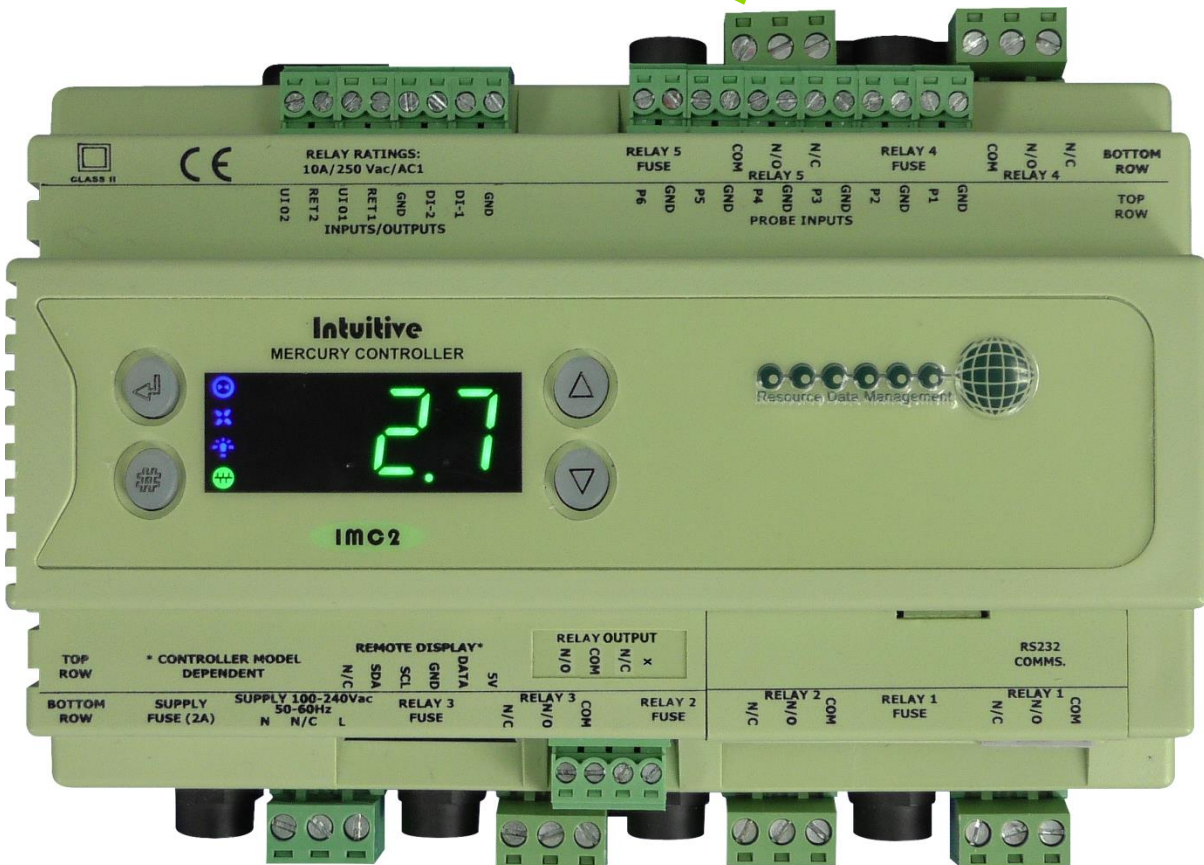




Resource
Data Management

Mercury Intuitive Two Section EEV Case Controller

Installation & User Guide
Revision 1.0a



PR07xx TSSE

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The Mercury 3 Range

From Resource Data Management

The Intuitive Mercury Two Section Single EEV controller is primarily intended for use in a refrigeration display cabinet with two evaporators with a common electronic expansion valve (EEV). The controller is fitted with a solid state relay (SSR) to control the EEV and in addition five standard mechanical relays to control defrost section 1, defrost section 2, evaporator fans, trim heaters and lights.

It will control the EEV based on the value of its temperature and pressure inputs. Temperature control is achieved by measuring the air temperature and controlling the superheat across the evaporators using the suction line probe and a pressure transducer connected locally to the controller, to a Mercury Phi Switch or an RDM Plant Controller.

It has two analogue inputs (4-20mA or 0-10V) for reading a pressure transducer along with two configurable digital inputs. The Intuitive controller has the choice of serial or built in IP communications along with either a remote or integral display option (see ordering information for more details).

The controller supports PT1000, NTC2K, 470R, 700R, 3K, 5K, 6K, NTC2K25, NTC10K or NTC10K(2) temperature probes. **Note:** probe types cannot be mixed.

Hardware Variants

Description	Part Number
Intuitive Mercury MK3 6-5E (1 x SSR) Two Section (with Relay Board)	PR0751 TSSE 1xMR
Intuitive Mercury MK3 6-5E (1 x SSR) Two Section (IP Comms / Relay Board)	PR0751 TSSE IP 1xMR
Intuitive Mercury MK3 6-5E No Fuse (1 x SSR) Two Section (with Relay Board)	PR0751 NF TSSE 1xMR
Intuitive Mercury MK3 6-5E No Fuse (1 x SSR) Two Section (IP Comms / Relay Board)	PR0751 NF TSSE IP 1xMR
Intuitive Mercury MK3 6-5ER (1 x SSR) Two Section (with Relay Board)	PR0761 TSSE 1xMR
Intuitive Mercury MK3 6-5ER (1 x SSR) Two Section (IP Comms / Relay Board)	PR0761 TSSE IP 1xMR
Intuitive Mercury MK3 6-5ER No Fuse (1 x SSR) Two Section (with Relay Board)	PR0761 NF TSSE 1xMR
Intuitive Mercury MK3 6-5ER No Fuse (1 x SSR) Two Section (IP Comms / Relay Board)	PR0761 NF TSSE IP 1xMR

Displays and Accessories

The following optional displays and accessories are available:

Description	Part Number
Mercury DIN Remote Display with 5m cable	PR0327
Mercury DIN Key switch Remote Display with 5m cable	PR0328
Mercury mk2 Remote Display with 5m cable	PR0725
Pressure Transducer -1 to 20 bar with 1/4in NTP male fitting	PR0160
Pressure Transducer -1 to 20 bar 7/16in 20UNF(F) Schrader deflator	PR0161
Pressure Transducer -1 to 65 bar with 1/4in NTP male fitting	PR0162
Pressure Transducer -1 to 65 bar 7/16in 20UNF(F) Schrader deflator	PR0163

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 Switch.

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



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

Configuration

The controller provides two configuration options (see 'Type' menu). It will default to type 3

Display value	Controller Type
3	Two Section Controller (LT)
4	Two Section Controller (HT)

Front Display Features

LED's:

Valve



Fans



Lights



Defrost



On-Line Status



Off - No network attached

Flashing - Attempting to Log on to network

Steady - On-line

Service
(See Parameter 18 for setup)



Alarm



HACCP



Intuitive Mercury



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.



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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.

I/O	Two Section HT / LT	Alarm Action
Input 1	Air On 1 Temperature	Yes
Input 2	Air On 2 Temperature	Yes
Input 3	Air Off Temperature	Yes
Input 4	Defrost Probe 1	Yes
Input 5	Defrost Probe 2	Yes
Input 6	Suction Line Temperature	Yes
Universal In 1	Variable Input V Transducer Input (if fitted)	Yes
Universal In 2	Variable Input mA Transducer Input (if fitted)	Yes
Digital 1	Selectable; Plant 1 N/O, Plant 1 N/C, Case Switch, Temp Switch, Defrost	Conditional
Digital 2	Selectable; Plant 2 N/O, Plant 2 N/C, Case Switch, Temp Switch, Defrost.	Conditional
Relay 1	Electronic Expansion Valve (N/C)	N/A
Relay 2	Fans	N/A
Relay 3	Lights	N/A
Relay 4	Trim Heater	N/A
Relay 5	Defrost Heater 1 (N/O)	N/A
Relay 6	Defrost Heater 2 (N/O)	N/A

Transducer Input

There are two possible inputs that can be used for a pressure transducer, either using the 0-10v or 4-20mA input. Please consult the [I/O Connections](#) for wiring.

Depending on the type of transducer (0-10v or 4-20mA) the input type can be chosen using the Evap Select parameter P-17.

Ordering Information

When ordering an Intuitive Mercury Mk3 controller the following ordering scheme can be used to purchase the desired hardware configuration.

PR07X1 Y TSSE Z 1xMR

X	Description
5	Integral Display
6	Remote Display

Y	Description
Blank	Fused
NF	Non-Fused

Z	Description
IP	Ethernet Comms
232	RS232 Comms

Example

To order an Intuitive Mercury MK3 two section EEV controller with a remote display, non-fused and IP comms;

PR0761 NF TSSE IP 1xMR



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

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.

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	Input / output table	nEt	Set/view network configuration	Network Configuration
PArA	Set/View Parameters	Set view parameters	SoFt	View software version	
Unit	Probe type and Celsius/Fahrenheit option	Set View Unit	FANS	Toggle Fans Only mode	Fans Only
PrES	Set/View remote display type. Set to 1 for coldroom display	Display Type	CASE	Toggle Case Off mode	Case Off
diSP	Display whole units or decimal	Display	Ligt	Toggle Lights Only mode	Lights Only
dtyP	Display Type		OFSt	Probe Offset	Probe Offset
tyPE	Set/View Controller Type	Set/view controller type	tESt*	Test Mode	See Note Below
rtc	Set/view Clock (rtc = Real Time Clock)	Real Time Clock	ESC	Exit Setup mode	

***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.



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

Recommended set-up method

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

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

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

Time clock is now set

type. Set/view controller type

- a. From the function menu scroll to select 'type', press enter
- b. Use the up/ down buttons to scroll through case configuration types. (see [configuration table](#) on page 5)
- c. Press enter.
- d. Scroll to select "ESC"
- e. Press enter

Controller type configuration is now set

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.
- c. 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.
- d. Pressing the Enter button will show the current value of the selected parameter.
- e. Press Up or Down to modify the value and press Enter again to save the value.
- f. The parameter list number will be displayed again.
- g. Two other options are present in the parameter menu – dFLt and ESC. Selecting ESC will exit the setup mode and save all changes.
- h. 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, and 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 Celsius
7 for 700R Fahrenheit	17 for NTC10K Fahrenheit
8 for 3K Celsius	18 for NTC10K(2) Celsius (USA NTC10K)
9 for 3K Fahrenheit	19 for NTC10K(2) Fahrenheit (USA NTC10K)

Use the up or down keys to select the units and press enter.

This function is now complete



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

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.

Display Type

From the function menu scroll to and select 'dtyP'.
Press enter and one of the following values will be shown: -

0. Controller uses a standard Mercury remote display or DIN display (Default)
1. Controller uses a coldroom display.

Parameter Tables

Not all parameters apply to all controller types. For example P-80 is the Door Alarm Delay which only applies to the types 5 & 6. This parameter will not appear if the controller is set to types 3 or 4 (Case controller). 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)	Default HT °C(°F)
P-01	Cut-in Temp.	-42 to 30 (-43.6 to 86)	0.1	Deg	-20 (-4)	0.0 (32)
P-02	Diff.	0 to 10 (0 to 18)	0.1	Deg	2 (3.6)	1.5 (2.7)
P-03	Control Weight	0 to 100	1	%	50	50
P-04	Display Weight	0 to 101	1	%	50	50
P-05	Alarm Weight	0 to 100	1	%	0	0
P-08	Superheat Ref	0 to 12 (7.2 to 21.6)	0.1	Deg	6 (10.8)	6 (10.8)
P-09	Response On	1 to 30	1	-	10	10
P-10	Response Off	1 to 30	1	-	10	10
P-11	Control Type	0 = EEV 1 = EET 2 = EEV/EET	1	-	0	0
P-51	EEV Min Opening	0 - 100	1	%	10	10
P-52	Superheat Problem	0 to 12 (0 to 21.6)	0.1	Deg	0	0
P-53	EEV Problem Opening	0 - 100	1	%	10	10
P-54	EEV Problem Time	00:00 to 99:00	01:00	mm:ss	03:00	03:00
P-56	EEV Start Opening	0 - 100	1	%	10	50
P-55	Ave Valve Opening	0 - 100	1	%	100	50
P-57	Div Value	0 - 100	1	%	50	50
P-12	Trim Mode	0 = Trim Local 1 = Trim Hub	0	-	0	0
P-13	Trim in Defrost	0 = Off 1 = On		-	0	0
P-14	Trim Level	0 to 100	1	%	100	100
P-85	Key-switch Mode	0 = Case Off 1 = Fans only 2 = toggle 3 = Key Switch Off	1	-	0	3
P-92	Fans temperature mode	0 = Off 1 = Temperature 2 = Over Temperature	1	-	0	0



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

		3 = Temp/ OT				
P-93	Fans Off Temperature	-42 to 30 (-43.6 to 86)	0.1	Deg	-10 (14)	8 (46.4)
P-17	Evap. Select	0 = Rem1 1 = Rem2 2 = Rem3 3 = Trans V 4 = Trans mA 5 = Cust V 6 = Cust mA	1	-	0	0
P-97	Control Fail Valve Level	0 to 100	0.1	%	0	0
P-18	Service Time	0 to 128	1	KHrs	60	60
P-98	Lights Case Off	0 = Off 1 = On 2 = Unused		-	0	0
P-99	Load Shedding	0 = Off 1 = Mode 1 2 = Mode 2	-	-	0	0
P-100 / P-101	Digital Input 1 Mode / Digital Input 2 Mode	0 = Plant 1/2 N/O 1 = Plant 1/2 N/C 2 = Case Switch 3 = Temp Switch 4 = Defrost	1	-	0	0
P-102	Cut In Offset	-30 to 30	0.1	-	5.0	5.0
P-103	Evap Cust Off	0.0 to 20.0	0.1	-	0.0	0.0
P-104	Evap Cust High	0.0 to 20.0	0.1	-	0.0	0.0
P-20	Alarm Delay	00:00 to 99:00	01:00	mm:ss	20:00	20:00
P-21	UT Alarm	-49 to 128 (-56.2 to 262.4)	0.1	Deg	-30 (-22)	-2 (28.4)
P-22	OT Alarm	-49 to 128 (-56.2 to 262.4)	0.1	Deg	-15 (5)	5 (41)
P-40	Defrost Mode	0 = Local 1 = Remote 2 = External		-	Local	Local
P-41	Defrost Start	00:00 to 23:59	00:01	hh:mm	01:00	01:00
P-42	Defrosts per Day	0 to 8	1		6	6
P-43	No Defrost Time	0 to 180	1	hours	12	12
P-44	Defrost Termination Temperature	-42 to 30 (-43.6 to 86)	0.1	Deg	14 (57.2)	10 (50)
P-45	Def Min Time	00:00 to 99:00	01:00	mm:ss	05:00	05:00
P-46	Def Max Time	00:00 to 99:00	01:00	mm:ss	24:00	24:00
P-47	Drain Down	00:00 to 24:00	00:15	mm:ss	01:30	01:30
P-48	Recovery Time	00:00 to 99:00	01:00	mm:ss	30:00	30:00
P-89	Pump Down Time	00:00 to 99:00	01:00	mm:ss	00:00	00:00
P-86	Fan Delay mode	0 = Time 1 = Temp	1	-	0	0
P-49	Fan Delay Time	00:00 to 99:00	01:00	mm:ss	00:00	00:00
P-88	Fan Delay Temp	-42 to 30 (-43.6 to 86)	0.1	Deg	-20 (-4)	0.0 (32)
P-50	Fans In Defrost	0 = Off 1 = On	-	-	1	1
P-91	Defrost Type	0 = Electric 1 = Electric/ Cin	1	-	0	0
P-94	Defrost Hold	0 = Off 1 = On	-	-	1	1
P-95	Defrost Skip	0 = Off 1 = On	-	-	0	0
P-96	Defrost Skip Time	00:00 to 99:00	01:00	mm:ss	12:00	12:00
P-120	Disp Def Button	0 = Off	1	-	0	0



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

		1 = On				
P-60	Lights Mode	0 = Local 1 = Remote 2 = Man Off 3 = Man On	-	-	Local	Local
P-61	Sun Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-62	Sun Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-63	Mon Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-64	Mon Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-65	Tue Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-66	Tue Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-67	Wed Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-68	Wed Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-69	Thu Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-70	Thu Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-71	Fri Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-72	Fri Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-73	Sat Lights On	00:00 to 23:59	00:01	hh:mm	08:00	08:00
P-74	Sat Lights Off	00:00 to 23:59	00:01	hh:mm	20:00	20:00
P-30	Broadcast ID	0 to 999	1	-	0	0
P-31	Refrigerant	0 to 27 See Refrigerant Table	1	-	0	0
P-110	Ref weight	0 to 100	1	%	0	0
P-32	Pressure Units	0 = Absolute 1 = Gauge	1	-	1	1
P-33	Evap Offset**	0.0 to 5.0 (0 to 72)	0.1	Bar/psi	0.0	0.0
P-34	Glide	-15.0 to 15.0	0.1	Deg	0.0	0.0
P-35	Trans Span***	-3.4 to 180.0	0.1	Bar	13.8	13.8
P-36	Trans Offset***	-3.4 to 180.0	0.1	Bar	0.0	0.0
P-37	MOP Cut-in	-3.4 to 180.0	0.1	Bar/psi	3.4	3.4
P-38	MOP Diff	-3.4 to 180.0	0.1	Bar/psi	0.3	0.3
P-39	MOP Delay	00:00 to 02:00	00:01	mm:ss	00:05	00:05
P-150	Custom A1	-999 to 999	1	-	0	0
P-151	Custom B1 Hi	-999 to 999	1	-	-220	-220
P-152	Custom B1 Lo	0 to 999	1	-	384	384
P-153	Custom C1	-999.9 to 999.9	0.1	-	262.5	262.5
P-154	Custom A2	-999 to 999	1	-	0	0
P-155	Custom B2 Hi	-999 to 999	1	-	-220	-220
P-156	Custom B2 Lo	0 to 999	1	-	384	384
P-157	Custom C2	-999.9 to 999.9	0.1	-	262.5	262.5
P-121	Allow SH Offset	0 = Off 1 = On	1	-	0	0
dFLt	Restore defaults		-	-	-	-
Esc	Escape Menu		-	-	-	-

* Transducer Span and Offset allows for the full range of the transducer to be used by the Intuitive Mercury Controller. 'Span' is the full range of the transducer, 'Offset' is the value below zero.

Example: RDM PR0160 with range -1 bar to 20 bar, Span would be 21 bar, Offset would be -1 bar.

Refrigerant Table for P-31

No.	Gas	No.	Gas	No.	Gas	No.	Gas	No.	Gas
0	None	6	R401A	12	R407A	18	R507	24	R449A
1	Custom	7	R401B	13	R407B	19	R717	25	R513A
2	R32	8	R401C	14	R407C	20	R290	26	R454C
3	R134a	9	R402A	15	R500	21	R744	27	R455A
4	R142B	10	R402B	16	R502	22	R407F		
5	R227	11	R404A	17	R503	23	R410A		



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

Parameter Descriptions

Number	Parameter	Description
P-01	Cut-in Temp	Temperature at which the valve will switch on. See P-11 Control Type.
P-02	Diff	Differential temperature below the cut-in temperature. The valve 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 calculated from the Air-Off temperature. Example, P-03 set to 30% Control temp = 30% Air-on + 70% Air-off. Note: The air on value used is the highest of the two probe (air on 1/2) values
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-08	Superheat Ref	The controller will attempt to maintain this superheat value
P-09	Response on	Allows the user to adjust the valve opening rate in relation to superheat change, with 30 providing the quickest response and 1 providing the slowest response.
P-10	Response off	Allows the user to adjust the valve closing rate in relation to superheat change, with 30 providing the quickest response and 1 providing the slowest response.
P-11	Control Type	Allows the user to select either EEV control, EET control or EEV/EET control. EEV uses the superheat as its main reference with the cabinet temperature as a secondary control. EET uses the cabinet temperature as its main reference with the superheat as a secondary control. EEV/EET uses cabinet temperature as the main control until the SH gets close to the SH reference point, then it switches to EEV control, it switches back to EET control when the SH reference is satisfied.
P-51	EEV Minimum Opening	Sets the minimum valve opening level, during normal operation the valve will not go below this level when cooling is required. (Default 10%)
P-52	Superheat Problem	Sets the point at which the controller will go to the "EEV Problem" state due to the superheat value. For example if this parameter is set to 0 Degrees and the Superheat value falls to 0 degrees or below, for the duration of P-54, then the controller will enter the superheat problem state which will force the valve opening to the value set in P-53.
P-53	Superheat EEV Problem Opening	Sets the valve open position when entering the "Superheat EEV Problem" state.
P-54	Superheat EEV Problem Time	Sets the time the controller stays in the "Superheat EEV Problem" state.
P-56	EEV Start Opening	Sets the valve opening % which is used after a defrost or when the controller exits a problem state for, example Superheat EEV Problem state
P-55	Average Valve Opening	Normally the valve during recovery will open to the last average position. This setting allows for that value to be reduced by said percentage. For example if the average valve opening is calculated as 80% and P-55 is set to 50% then the valve will open at 40%.
P-57	EEV Divide value	This parameter takes effect when the controller is used in conjunction with a pressure transducer. When an MOP (maximum operating pressure) alarm is generated the controller reduces the maximum valve opening to this percentage. For example if this parameter is set to 50% and the MOP alarm is generated then the maximum valve opening will be limited to 50%. (When P-103 is set to "on" then the divide value will be used all the time regardless of MOP). Note P-51 EEV Minimum opening overrides the valve output operation and the valve will not open below this setting. Please see MOP note. Please note parameters P-51 through to P-57 should not be altered without first understanding the effects they may have on the case operation. If incorrectly set they may have undesired affects.
P-12	Trim Mode	The trims can be set to operate from a local settings or from a Mercury Switch <ul style="list-style-type: none"> ➤ Trim Local – The relay is pulsed in accordance with the setting in P-14 ➤ Trim Hub – Relay is pulsed in accordance with the Trim Control feature present in the Mercury Switch (PR0018-PHI). Please see the Mercury switch user document for further details.
P-13	Trim in Defrost	Allows the trims to be off or on during a defrost.
P-14	Trim Level	Sets a percentage level, of a 5-minute period, to pulse the trim heater relay off/on. Example: - P-14 set to 50% = 2.5 minutes on, 2.5 minutes off. If the



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		controller is networked to a Data Manager operating the energy feature Trim Control then the Data Manager feature will override this parameter setting. Please refer to the Data Manager user document for further details. Note the trims are turned off when an over temperature alarm occurs.
P-85	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) ➤ Turn Key Switch Off
P-92	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 (P93) ➤ When an over-temperature alarm is present ➤ When either P93 is reached or an OT alarm is present
P-93	Fans Off Temperature	Temperature for the above (P92) operation. Note the defrost termination probe is the source of the temperature reading used in this feature. If no probe is fitted the fans will not switch off on temperature.
P-17	Evap. Select	This selects the source of the pressure input which is used in conjunction with the suction line temperature probe to calculate the superheat. The pressure can be derived from a pressure transducer connected directly to the controller, a pressure transducer connected to a local PHI network hub or a pressure transmitted from an RDM pack controller. Please see: EEV Control Using Pressure .
P-97	Control Fail Valve Value	This value is used in the event of a control probe fail; In the control algorithm the valve will remain at this opening until the probe fault has been cleared. Please note the incorrect setting of this value may result in flood back causing damage to the pack compressors. Do not adjust this parameter if you are unsure of the consequences.
P-18	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-98	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 controller is in case off all alarms are inhibited and all outputs are turned off. Therefore care must be taken when enabling this parameter. <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-99	Load Shedding	<ul style="list-style-type: none"> ➤ Off – Feature is not used ➤ Mode 1 – Case goes to Load Shedding Mode 1 (Valve open and fans off) ➤ Mode 2 – Case goes to Load Shedding Mode 2 (Valve closed and fans off) <p>See: Load Shedding</p>
P-100 P-101	Digital 1 Mode Digital 2 Mode	Sets the status input type for the two Digital Inputs; <ul style="list-style-type: none"> ➤ Plant 1/2 – When the DI is activated, it would alarm Plant Fault 1/2 (N/O or N/C) ➤ Case Switch – Would carry out the operation set on the 'Key Switch mode' (p-85) ➤ Temp Switch – Adds temperature setpoint offset value set in P-102 ➤ Defrost – The DI activation would signal the unit to go into a defrost (must be set to external defrost).
P-102	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-103	Evap Cust Off	The low limit of the custom voltage/mA range for the locally connected



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		transducer.
P-104	Evap Cust High	The high limit of the custom voltage/mA range for the locally connected transducer.
P-20	Alarm Delay	Delay for the over and under-temperature alarms
P-21	UT Alarm	Under temperature alarm set point. This alarm uses the control temperature.
P-22	OT Alarm	Over temperature alarm set point. This alarm uses the air-off temperature.
P-40	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 Data Manager. ➤ External - Requires DI 1 or DI 2 (P100/P101) to be set to 'defrost'. When a signal is given (from DI) a defrost is initiated. 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.
P-41	Defrost Start	When defrost mode is set to "Local", this is the start time for the 1 st defrost
P-42	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-43	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 period.
P-44	Def Terminate	The controller has two independent defrost controls. Each defrost will terminate (defrost control relay off) when the associated temperature probe reaches the defrost termination value. If the "defrost termination" probe is not fitted defrost termination will occur once the defrost max time has been reached.
P-45	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 continue the defrost cycle until the end of the defrost min period)
P-46	Def Max Time	Time period after defrost minimum that defrosts are allowed to terminate
P-47	Drain Down	A period after defrost max to allow the draining of any surplus water
P-48	Recovery Time	The valve is opened 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-89	Pump Down Time	Time period before the defrost min period to allow for a pump down
P-86	Fan Delay mode	This parameter allows the fans start after a drain-down period to be delayed, either by time (P-49) or when the temperature point (P-88) is reached. This parameter uses the same probe strategy as the defrost terminate.
P-49	Fan Delay	Time after a drain-down period before the fans start if P-86 is set to time
P-88	Fan Delay Temp	Temperature at which the fans start after a drain-down period when P-86 is set to temperature.
P-50	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-91	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.
P-94	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-95	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-96). Operates only when the controller is set to local defrost scheduling.
P-96	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-120	Disp Def Button	Allows to option to turn off the local defrost button (#) on the controller display.
P-60	Lights Mode	Allows the user to set the lights mode: -



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		<ul style="list-style-type: none"> ➤ Always off ➤ Always on ➤ Use a local schedule P-61 to P-74) ➤ Use a remote schedule (Set up in the system front end)
P-61	Sun Lights On	When P-60 is set to Local, Sunday on time
P-62	Sun Lights Off	When P-60 is set to Local, Sunday off time
P-63	Mon Lights On	When P-60 is set to Local, Monday on time
P-64	Mon Lights Off	When P-60 is set to Local, Monday off time
P-65	Tue Lights On	When P-60 is set to Local, Tuesday on time
P-66	Tue Lights Off	When P-60 is set to Local, Tuesday off time
P-67	Wed Lights On	When P-60 is set to Local, Wednesday on time
P-68	Wed Lights Off	When P-60 is set to Local, Wednesday off time
P-69	Thu Lights On	When P-60 is set to Local, Thursday on time
P-70	Thu Lights Off	When P-60 is set to Local, Thursday off time
P-71	Fri Lights On	When P-60 is set to Local, Friday on time
P-72	Fri Lights Off	When P-60 is set to Local, Friday off time
P-73	Sat Lights On	When P-60 is set to Local, Saturday on time
P-74	Sat Lights Off	When P-60 is set to Local, Saturday off time
P-30	Broadcast ID	<p>ID of Plant Controller being used to broadcast Suction Pressure. The Broadcast ID is derived from the Rotary Switch positions set on the Plant controller which is providing the remote suction pressure.</p> <p>Note: No two Plant controllers on a local area network can have the same rotary switches positions set. This will have adverse effects on control.</p>
P-31	Refrigerant	Type of refrigerant gas used in the system. See: Refrigerant Table
P-110	Ref weight	<p>When using a local pressure transducer or a transmitted pressure from a pack controller is used to calculate superheat, the controller can use a weighted average of liquid pressure and vapour pressure to calculate the temperature. When the refrigerant weight parameter is set to 0% then the liquid pressure is used (bubble), when set to 100% the vapour pressure is used (dew).</p> <p>For example, when the Ref Weight parameter is set to 50%, then the controller will use a weighted average of 50% liquid pressure and 50% vapour pressure. Any percentage from 1 to 99% will give an appropriate weighted average between the two pressures.</p>
P-32	Pressure Units	Absolute or Gauge
P-33	Evap Offset	Offset to allow for pressure drop over distance
P-34	Glide	Allows a glide value to be applied for a particular refrigerant mix where the component gases have different boiling points (at the same pressure).
P-35	Trans Span	Total range of the transducer
P-36	Trans Offset	Value below zero
P-37	MOP Cut-in	If the pressure exceeds this value, then the controller's valve will close or be reduced to a predetermined percentage. A MOP alarm is also created. (See Maximum Operating Pressure (MOP)). If the controller is connected to a Mercury switch (PR0018-PHI) with a pressure transducer connected fitted then the MOP parameters are contained within the switch, MOP parameters in the Mercury controller do not apply.
P-38	MOP Diff	When the pressure reduces below this value, the controllers valve will recover to their normal operational
P-39	MOP Delay	Delay after the MOP value has been exceeded before the MOP actions and alarm occurs.
P-150	Custom A1	For more information regarding the setting up of custom refrigeration, please contact RDM Technical Support.
P-151	Custom B1 Hi	
P-152	Custom B1 Lo	
P-153	Custom C1	
P-154	Custom A2	
P-155	Custom B2 Hi	
P-156	Custom B2 Lo	
P-157	Custom C2	
P-121	Allow SH Offset	<p>Allows for the superheat reference setpoint (P-08) to be offset by +/-12 degrees using a remote command. See Remote Commands.</p> <p>Note: - The controller will only take this command for 10 minutes before reverting back.</p> <p>The incorrect setting of this value may result in flood back causing damage to the pack compressors, do not adjust this parameter if you are unsure of the</p>



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		consequences.
dFLt	Restore default values	Restores all of the parameters to their default values

Selecting a Pressure Source

Direct Transducer Connection

(P-17 set to Trans V, Trans mA, Cust V or Cust mA) A suction transducer can be connected directly to the controller, the controller will calculate the evaporator temperature from the suction pressure, and along with the suction temperature probe local to the controller, the superheat is calculated. (Parameters P31/110/32/33/34/35/36) will need to be set accordingly

Mercury Switch (PR0018-PHI)

(P-17 set to Rem1) The Mercury Switch can be used for superheat control on an island by island basis. In the application the evaporator temperature is obtained from the Mercury switch on which the controller is connected. A suction pressure transducer is connected from the case Island to the 4-20mA input of the Mercury Switch and the pressure read from this transducer is converted to a temperature based on the gas type being used by the system. This temperature is transmitted to each controller connected to the switch and, along with the suction temperature probe local to the controller, the superheat is calculated. P-17 allows for the use of this remote temperature provided by the Mercury Switch. Please see the Mercury Switch user document (PR0018-PHI) for further details.

Remote pressure Direct from a Plant Pack Controller

Using IP Module

(P-17 set to Rem1, Rem2 or Rem3 depending on which input the suction transducer is connected to on the plant controller, transducer input 1, 2 or 3). Set the broadcast ID (P-30) to the ID of Plant Pack Controller (Rotary Switch Setting), (P-31) set to refrigerant type, (P-32) set to pressure units absolute or gauge

Maximum Operating Pressure (MOP)

The Mercury controller can calculate its superheat using a pressure value. This pressure value can be obtained in 3 different ways: transmitted from an RDM pack controller, from a pressure transducer fitted to a local Mercury Switch or a pressure transducer connected directly to the Mercury controller (via an appropriate daughter card). If the MOP cut-in value is exceeded then the stepper valve opening is reduced by the "Div Value" parameter and an MOP alarm generated. For example if the "Div Value" parameter is set to 50% and the MOP alarm is generated then the maximum valve opening will be limited to 50%.



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Ref Weighting

When using a local pressure transducer to calculate superheat, the Mercury controller can use a weighted average of liquid pressure and vapour pressure to calculate the temperature. For example, when the Ref Weight parameter is set to 50%, then the controller will use a weighted average of 50% liquid pressure and 50% vapour pressure. Any percentage from 1 to 99% will give an appropriate weighted average between the two pressures.

Load Shedding

Used on in conjunction with the Pack Fail Setup feature in the DMTouch for load shedding on Compressor Faults or High Pressure. Cases can be put into a "Load Shed" mode 1 or mode 2 to reduce the load on the pack or to reduce the pack pressure.

Mode 1 will open the valve and stop the fans, mode 2 will close the valve and stop the fans.

Relay State and functional operation

Relay State	Function State	Wired contact	Relay State	Function State	Wired contact
Relay 1 off	Valve on	N/C	Relay 4 off	Trim on	N/O
Relay 1 on	Valve off	N/C	Relay 4 on	Trim off	N/O
Relay 2 off	Fans on	N/C	Relay 5 off	Defrost 1 Control off	N/O
Relay 2 on	Fans off	N/C	Relay 5 on	Defrost 1 Control on	N/O
Relay 3 off	Lights on	N/C	Relay 6 off	Defrost 2 Control off	N/O
Relay 3 on	Lights off	N/C	Relay 6 on	Defrost 2 Control 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
Valve	Closed	Closed	Closed	Closed	Open	Open
RLY 2 Fans (On in DF)	On	On	On	On	Off	On
RLY 2 Fans (Off in DF)	On	Off	Off	Off	Off	On
RLY 3 Lights relay	On	On	On	On	On	On
RLY 4 Trim on in defrost	On	On	On	On	On	On
RLY 4 Trim off in defrost	Off	Off	Off	Off	Off	On
RLY 5 Defrost Relay	Off	On	On	Off	Off	Off
RLY 6 Defrost Relay	Off	On	On	Off	Off	Off

Defrost Termination

The controller has two defrost probes fitted, so each defrost control will terminate separately. The termination will be when the temperature parameter "Def. term. temp" has been reached on the "Defrost Probe". So when Defrost Probe 1 reaches termination temperature Defrost Control 1 will turn off and the same will happen to Defrost Control 2 when Defrost Probe 2 reaches termination temperature. If the "defrost termination" probe is not fitted, defrost termination will occur when the defrost max time has been reached.

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 probes reach the fan delay set point, or on the time parameter, whichever occurs first.

Note: If the "fan delay mode" is set to temp then at least one defrost probe must be fitted. If not, the controller will bring the fans on straight after drain down.



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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 an Intuitive Mercury with an RS232 interface onto a network you must first connect the controller to a communications module, this is either a 485 Legacy or IP Futura or Mercury Switch. For Intuitive Mercury'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. The possible values are:

Value	Network Type
1	Genus compatible (all versions)

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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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 (see table below)
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

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



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Mercury Switch

The method of logging on the Intuitive Mercury (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

Intuitive Mercury 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'.

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 menus 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.



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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
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 1 Probe	-42 to 60 (-43.6 to 140)	0.1	Deg
I-04	Air on 2 Probe	-42 to 60 (-43.6 to 140)	0.1	Deg
I-05	Air off Probe	-42 to 60 (-43.6 to 140)	0.1	Deg
I-06	Suction Line Probe	-49 to 60 (-56.2 to 140)	0.1	Deg
I-07	Superheat	-49 to 60 (-56.2 to 140)	0.1	Deg
I-08	Defrost Probe 1	-30 to 60 (-54 to 108)	0.1	Deg
I-09	Defrost Probe 2	-49 to 60 (-56.2 to 140)	0.1	Deg
I-10	Alarm Temp 1	-49 to 60 (-56.2 to 140)	0.1	Deg
I-11	Alarm Temp 2	-49 to 60 (-56.2 to 140)	0.1	Deg
I-12	Case Clean	0 (Off), 1 (On)		
I-14	Ext Defrost	-49 to 60 (-56.2 to 140)	0.1	Deg
I-16	Remote Evaporator Temp	-49 to 60 (-56.2 to 140)	0.1	Deg
I-17	MOP	-0 (Off), 1 (On)		
I-18	Hub Trim Level	0 (Off), 1 (On)		
I-19	Divide Input	0 to 100	0.1	%
I-20	Remote Pressure	0 to 100	0.1	%
I-21	Local Pressure	-3.4 to 100.0	0.1	Bar
I-22	Local Calculated Temp.	-3.4 to 100.0	0.1	Bar
I-25	Load Shed	0 (Off), 1 (On)	0.1	Deg
I-30	Plant Fault 1	0 (Off), 1 (On)		
I-31	Plant Fault 2	0 (Off), 1 (On)		
O-01	Refrigeration Demand	0 (On), 1 (Off)		
O-02	Case Fans	0 (Off), 1 (On)		
O-03	Case Lights	0 (Off), 1 (On)		
O-04	Trims	0 (Off), 1 (On)		
O-05	Defrost Control 1	0 (Off), 1 (On)		
O-06	Defrost Control 2	0 (Off), 1 (On)		
O-09	Valve Opening	0 - 100	0.1	%
O-10	Last Def Time	00:00 to 23:59	0.1	hh:mm
O-11	Last Def. Length	00:00 to 03:00	0.1	hh:mm
O-12	Last Def. Ctrl Temp.	-49 to 128	0.1	Deg
O-13	Last Def. Type	0 (None), 1 (Internal), 2 (External), 3 (Network), 4 (Display), 5 (Timed), 6 (Forced), 7 (Skipped)		
O-18	Run Time	0 - 128 K Hours	1	K Hrs
O-30	Setpoint Offset	-18 - 18	0.1	Deg
O-31	Trim Off Period	00:00 - 05:00	0.1	hh:mm
O-32	Superheat Offset	-12 - 12	0.1	Deg
S-01	Control State	0 (Stabilise), 1 (Normal), 2 (Df Min), 3 (Df 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 (Shut		
S-02	Valve State	0 (Off), 1 (Start), 2 (Run), 3 (Problem), 4 (Fail), 5 (Initial)		

* Range is dependent on probe type



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

Display Messages

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

Display Message	System status	Display Message	System status
Ft	Control Fault	AL	Control State in Alarm
Prb1	Probe 1 Fault	Plt1	Plant fault 1
Prb2	Probe 2 Fault	Plt2	Plant Fault 2
Prb3	Probe 3 Fault	FanS ONLY	Controller in Fans Only
Prb4	Probe 4 Fault	LitS ONLY	Controller in Lights Only
Prb5	Probe 5 Fault	CASE OFF	Controller in Case Off
Prb6	Probe 6 Fault	Ot	Over Temperature Alarm
Prb7	Remote Evap Temperature / Transducer Fault	Ut	Under Temperature Alarm
rEC	Control State in Recovery	Ld Shed	Load Shedding
dEF	Control Sate in Defrost		

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)
Missed defrost	15	Case Clean	29
Plant Fault 1,2	3	Remote evap temperature	6
Case over temperature 1, 2	4	Transducer Fault	6
Case under temperature 1, 2	5	Load Shedding	7
Probe 1,2,3,4,5 or 6 Faulty	6	Lights Only	29
Fans Only	29	Transducer Fault	6
No refrigerant selected	6	MOP Alarm	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".

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". An alarm is generated, fixed delay of 1 minute, when the controller is placed into the Lights Only state.

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.



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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.

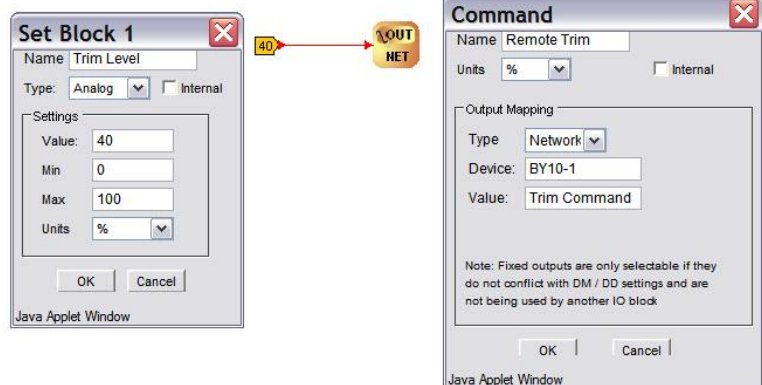
Remote Commands

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
Trim Command	0 to 100%	Sets the trim level to this value (Trim period is 5 min)	Relay 4 mode: Trim Heater
Setpoint Command	+/- 18	Is added to or subtracted from the setpoint	
Case Off Command	5 8 0	Sets the controller to Case Off Sets the controller to Lights Only 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	Buttons backlights Off Buttons backlights On	
EEV Command	2 1	Shuts the valve off Restores the valve to normal operation	
Divider Command	0 to 100%	Sets the maximum valve opening to this percentage.	MOP input from Merc PHI Switch must be 'Off'.
Superheat Command	+/- 12	Is added to or subtracted from the Superheat reference target (P-08). Adding a negative offset will reduce the Superheat reference and will generally cause the valve to open more.	P-121 "Allow SH Offset" must be set to on

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

See Example on the right, which sets the Trim Heater on BY10-1 at 40%.



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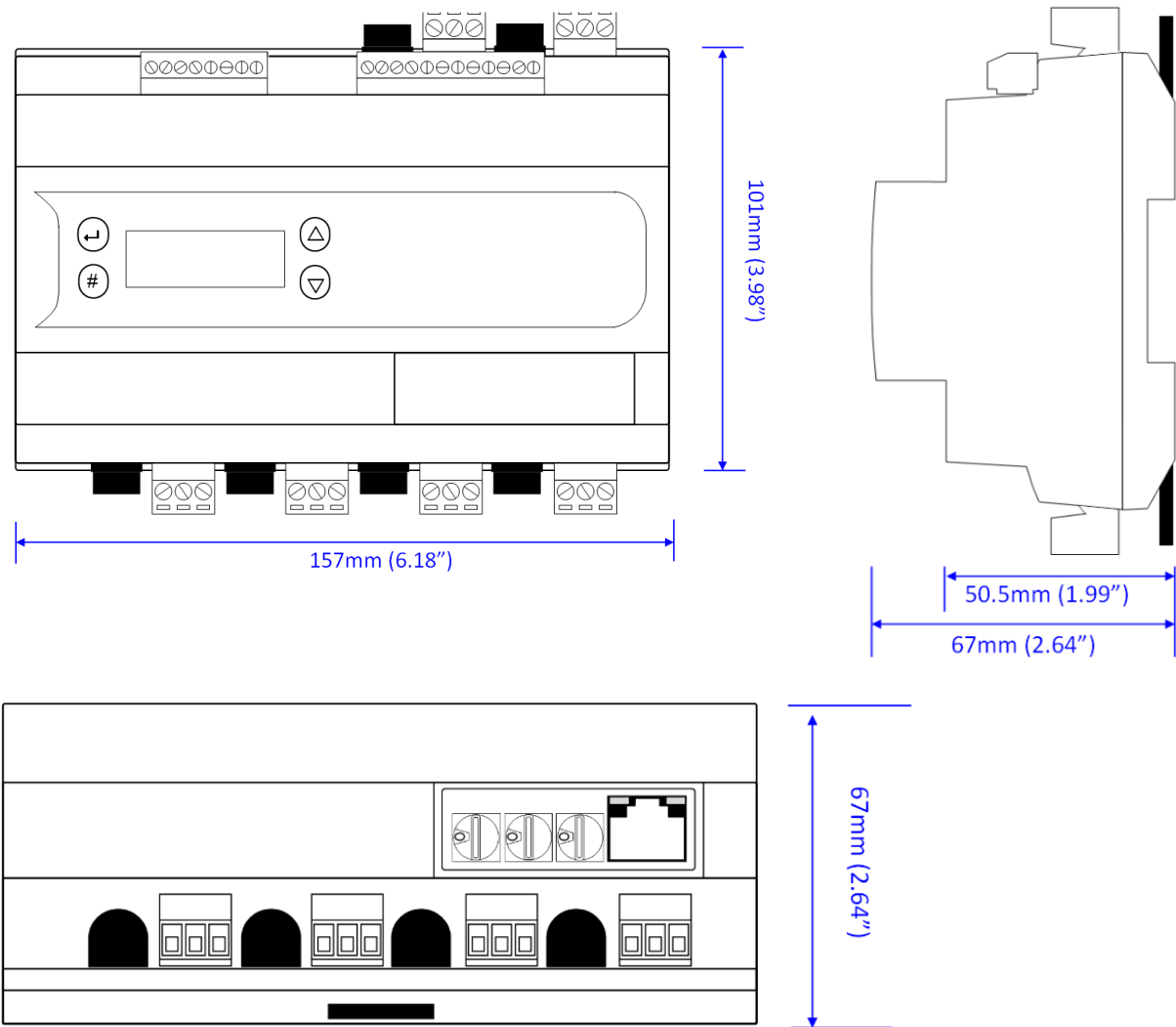
Specification

Intuitive Mercury Controller PR07XX-TWO-EEV	
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 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 \pm 10% of nominal voltage.
Size	157mm (W) x 67mm (H) x 120mm (D)
Approx. Weight	500 grams
Safety	EN61010
EMC	Conforms to EN60730-1 based on UL 60950-1; UL 62368-1 as referenced to IEC60730-1
Ventilation	There is no requirement for forced cooling ventilation
Class 2 Insulation	No protective Earth is required and none should be fitted
Supply Fuse	Built in fuse holder, fuse 2A 240Vac Anti-surge (T) HRC conforming to IEC60127, 32 x 6.3mm
Or MCB	2A, Type C conforming to BS EN 60898
Relay Specification	
Relay 1 SSR	
Max current	1.0A
Max voltage	250Vac (ac only, will not switch dc)
Relays 2 - 6 Mechanical	
Max current	Relays 2-5: 6A Resistive (Cos ϕ = 1) 2A Inductive (Cos ϕ = 0.4) Relay 6: 2A Resistive (Cos ϕ = 1)
Max voltage	250Vac, 30V dc
Mechanical Relay Operational Life	
Switching 3A load (non-inductive)	350,000 operations
Switching 500mA load (non-inductive)	2,000,000 operations
Safety	Conforms to EN60730-1 based on UL 60950-1; UL 62368-1 as referenced to IEC60730-1
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 (for PTC or NTC type probes)
Probe Input type	Selectable. See: Units
Transducer 0-10V	Connect a 0-10v signal
Transducer 4-20mA	4-20mA current loop, provides a 12 Vdc output to power the pressure transducer. See wiring
Digital Inputs	Volt Free
Comms	
Serial Variant	RS232 with flow control
Ethernet Variant	IP comms

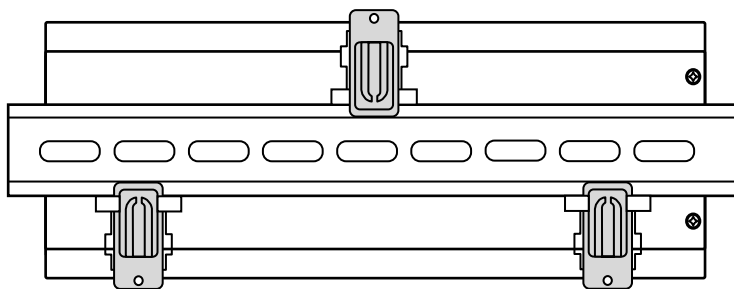


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Dimensions



Intuitive Mercury Mounting Instructions



Three clips fix the Intuitive Mercury securely to DIN rail. Pull each clip until it "clicks" to remove the controller. Each clip has a mounting hole to provide an alternative fixing mechanism to DIN mounting.

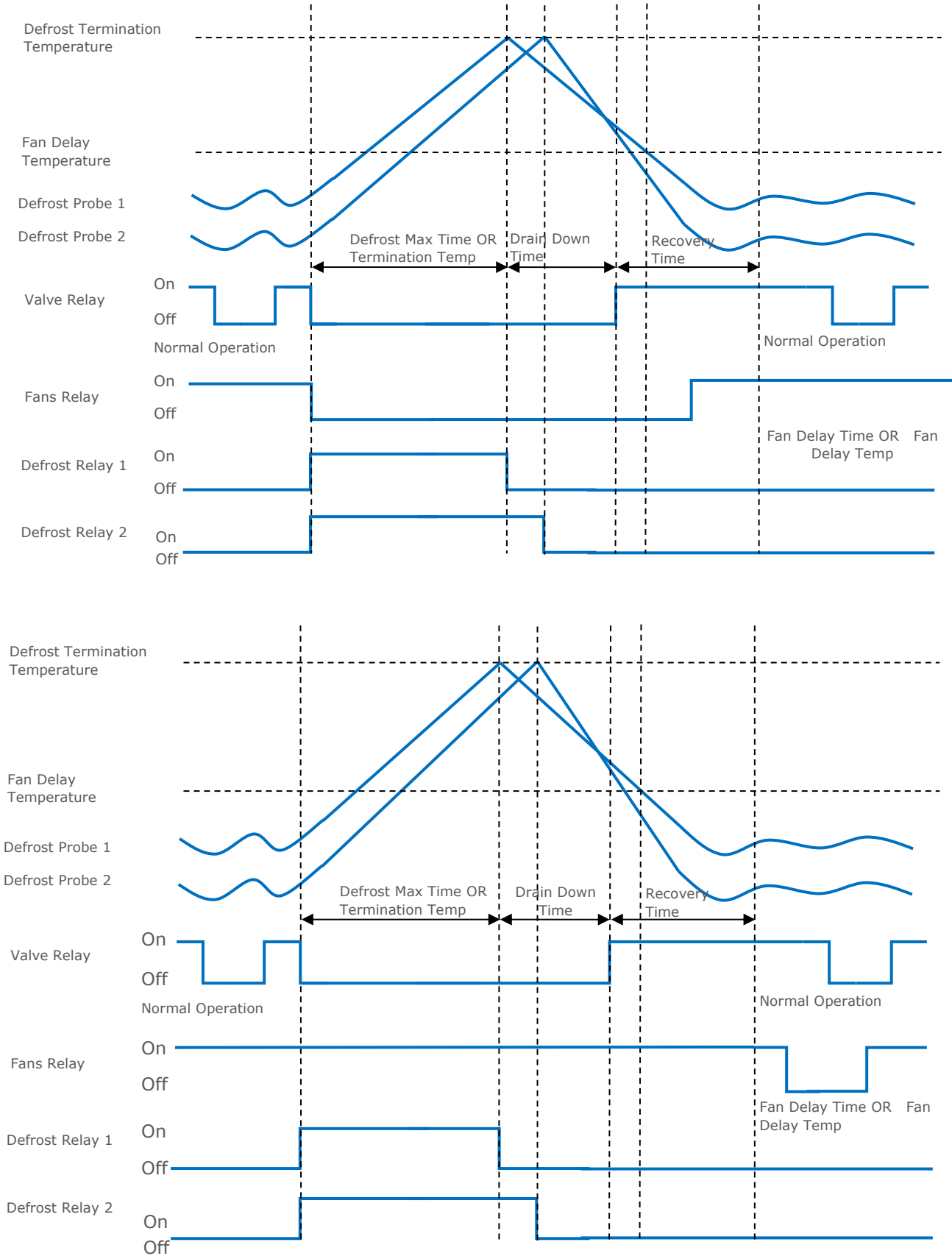
Cleaning

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



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Appendix 1: Defrost Cycles



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Appendix 2: Trim Heater Control via Intuitive Mercury Range

Energy savings via the RDM's range of case controllers can be achieved in a number of ways. One of which is pulsing the trim heater relay off for a given period of time. One way to pulse the trim heater is by configuring P-14. For greater energy savings the Data Manager Energy feature trim control or the Mercury Switch trim control feature can be used. These two options pulse the trim relay dependant on the actual shop floor humidity levels. Thus if the shop floor humidity is relatively low the trim heaters can be pulsed off for longer durations. Please see the relevant user guides for further details.

Due to the high switching rate, trim heaters must not be switched directly from the Mercury trim heater relay and a Trim Heater Pulse Module (PR0723) must be used in all instances of trim control. This module is fitted in between the trim heater of the case and the relay output of the Controller which is pulsing the heater. The trim heater module output provides a smoother power distribution, compared to using the relay output directly, as it switches at the zero voltage crossover point. Switching the trim heater on and off via a normal relay, without using the RDM trim heater pulse module, may damage the trim heater and reduce the operational life of the heater.

Please see the Trim Heater Pulse Module user guide for further details.

Disclaimer

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Revision History

Revision	Date	Changes
1.0	04/02/2020	First Issue Mercury Intuitive Two Section EEV Case Controller
1.0a	29/12/2023	SSR current rating updated



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