



Resource  
Data Management

# Mercury Stepper Coldroom Panel

Commissioning/User Guide  
Revision 7.1b



PR0150-XX

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# The Mercury Range

## From Resource Data Management

The Mercury Stepper Coldroom control panel has been specifically developed to suit a variety of coldroom control applications using a motorised stepper valve which controls the flow of refrigerant. A connection is provided for an optional pressure transducer (4-20mA or 0-10vdc) with a 12vdc supply feed which can be used to power the pressure transducer.

The controller has a build in power store so that in the event of a power failure to the controller, the power store will send a fail signal to the controller and will provide a supply to enable the controller to fully close the valve. When power is restored, the controller and valve will start operating again normally.

The purpose developed enclosure has a detachable display/keypad for applications where the main enclosure is required to be "out of reach". The panel is available with or without a main isolator switch. Each internal circuit has either fuse or circuit breaker protection.

Based on Mercury technology, the controller has parameters that give this product complete flexibility for controlling either produce (HT) or freezer coldrooms (LT).

Coldroom lights can be configured for maximum energy saving by using a timer (local or remote) to enable the lights and using the "lights on when door is open" feature. A front panel over-ride switch is available when the door needs to be closed and the lights are required to be on.

## Networks

The panel is capable of connecting to either a TCP/IP local area network (recommended) or a RS485 network or controlling in standalone mode with no network connection. The built-in communication options are determined by the part number of the coldroom panel.

See [Parts Numbers](#) section for more information.

For non network versions it is possible to connect the coldroom panel to the following network interfaces:

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

## Configuration

The Coldroom Panel has 2 types:

Display value	Type
1	LT Coldroom
2	HT Coldroom



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## Front Panel Features

### LED's: -

Valve 

Fans 

Lights 

Defrost 

On-Line 

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

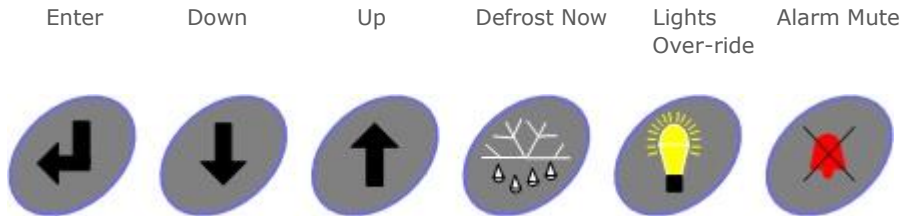
Service 

Alarm 

HACCP 



### Keys



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

### Main Display

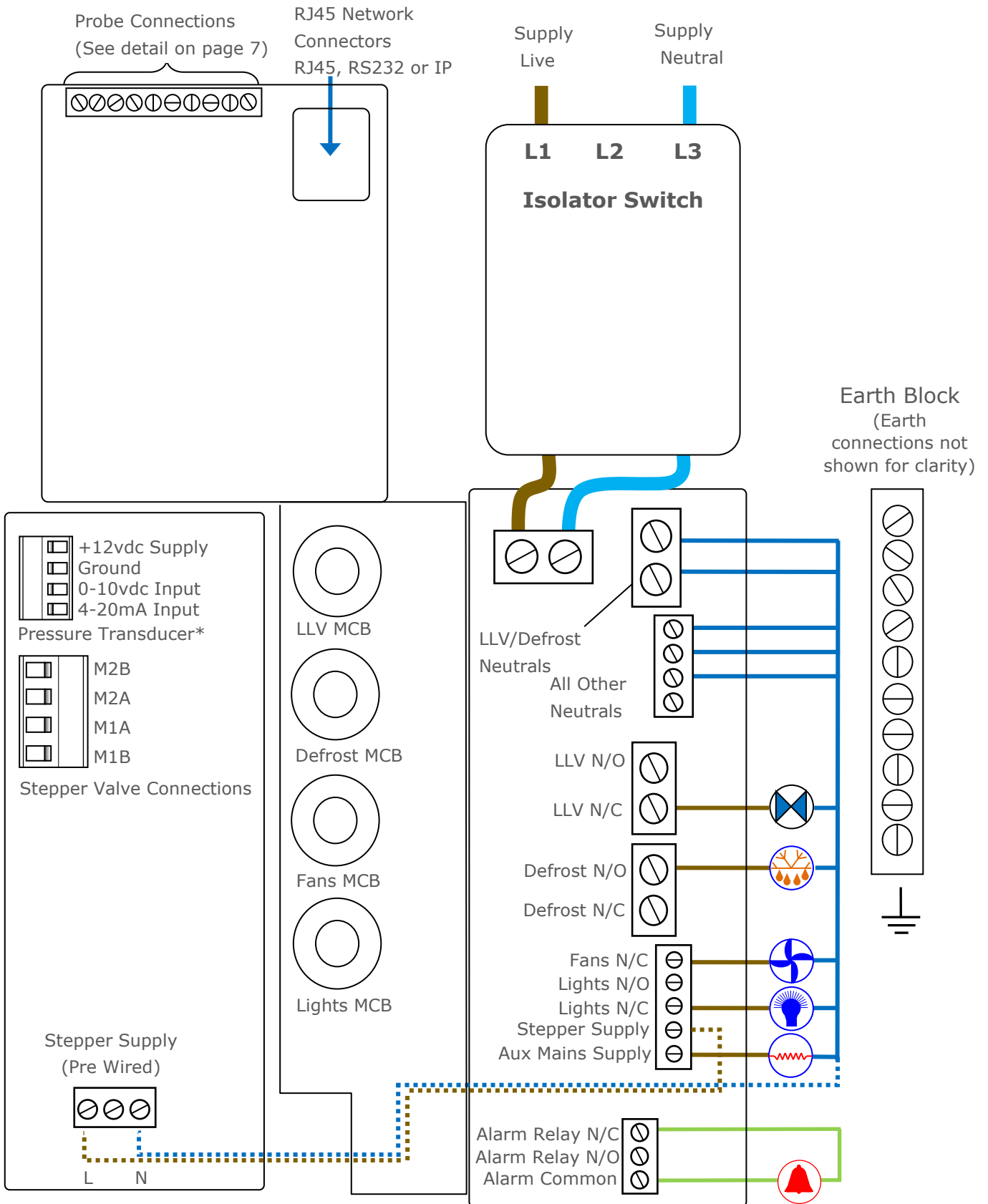


4 character blue LED display, used to display temperature and status messages.



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## Internal Connections



\*Use of a pressure transducer is optional and can be selected using parameter P-17 "Evap Select"



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## Probe and Alarm inputs

Note:

When wiring in the probes to the connector, ensure that the 3 wires fitted to the probe connector (not shown on the diagram below) are not moved and remain firmly connected. These wires are used for the external digital inputs; door-open and entrapment. The resistors for the digital inputs are already present on the PCB for PT1000, 2K, 2K5, and 3K probe types and therefore external resistors are not required to signal door-open and entrapment alarms, the user only needs to configure the jumper switches (below).

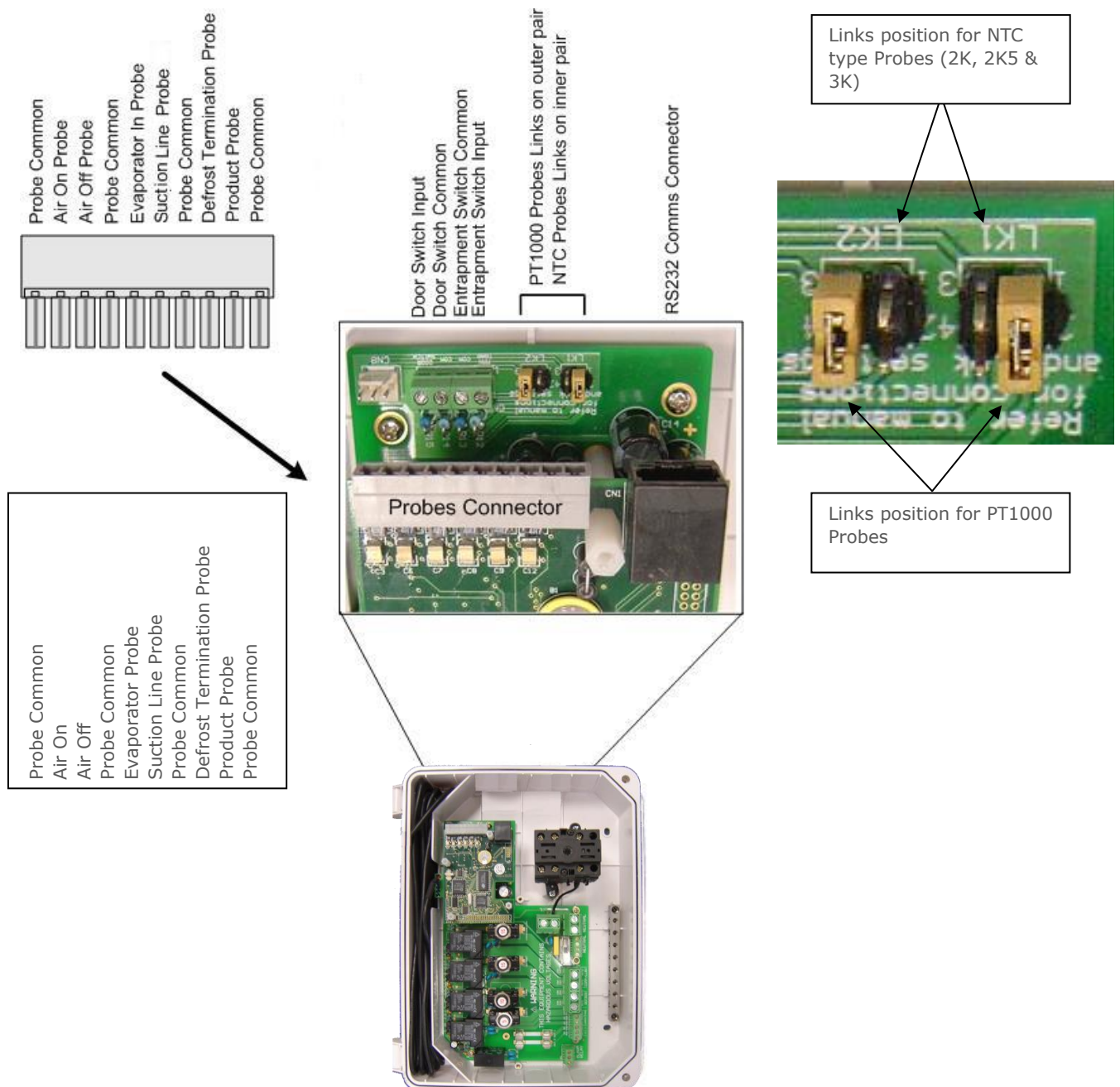
For all other probe types the 3 wires which connect the probe connector to the bottom circuit should be removed and a fixed value fixed resistor switched across the probe input used to activate door-open and entrapment alarms, the resistor values that should be used are as follows:

For 5K and 6K use 1K Ohm switched resistors.

For NTC10K probes use 2k7 Ohm switched resistors.

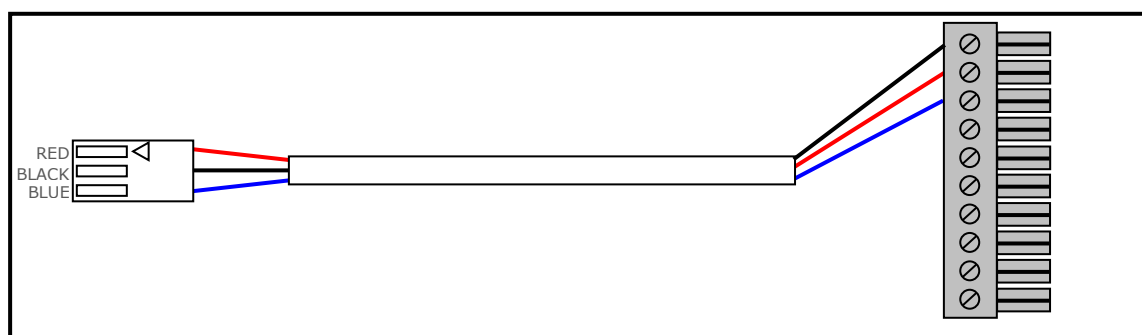
For NTC10K(2) probes use 2k2 Ohm switched resistors.

For suitable resistor values when using the additional switched resistor functions "Case Off", 'External Defrost' and 'Plant Fault 1' see "[Switched Resistor Values](#)"



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## Internal Cable Diagram



The above cable is used internally to bring the Door Switch and Man-trap inputs to the main processing board. This cable must not be removed or changed in any way.

## Input / 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.

### Inputs and Outputs

Connection	Description	Alarm Action	Comments
Earth	Bus-bar	N/A	This unit must be Earthed
L1	Incoming Live Feed	N/A	Connection on the isolator
L2	Not Used	N/A	
L3	Incoming Neutral Feed	N/A	Connection on the isolator
L	Incoming Live Feed	N/A	On the PCB (Non-isolator version)
N	Incoming Neutral Feed	N/A	On the PCB (Non-isolator version)
Input 1	Air on Temperature	Yes	Green probe Connector
Input 2	Air off Temperature or Defrost Termination	Yes	Green probe Connector
Input 3	Evaporator Temperature	No	Green probe Connector
Input 4	Suction Line Temperature	No	Green probe Connector
Input 5	Defrost Termination (if used)	No	Green probe Connector
Input 6	Logging Probe (If fitted)	Conditional	Green probe Connector
Door Switch	Door Switch	Yes	Uses Ground Return
Entrapment Switch	Entrapment Switch	Yes	Uses Ground Return
Liquid Line Valve	N/O and N/C	N/A	See Specification for further details
Defrost	N/O and N/C	N/A	See Specification for further details
Fans	N/C	N/A	See Specification for further details
Lights	N/O and N/C	N/A	See Specification for further details
Out 1	Stepper Driver Board supply	N/A	See Specification for further details
Out 2	Always Live	N/A	See Specification for further details
Alarm	N/O, N/C & Common (Volt-free)	N/A	See Specification for further details
Stepper Supply	Mains Supply From Out 1	N/A	Supplied Pre Wired
Stepper Valve	Stepper Valve Connection	N/A	Bi Polar 24v Chopper Drive

Note:

For PT1000 probes, jumpers; LK1 & LK2, are in the outer positions for the additional switched resistor functions to operate.

For NTC probe types 2K, 2K5 & 3K, jumpers; LK1 & LK2, are in the inner positions for the additional switched resistor functions to operate.



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## Digital Inputs

Models	Alarm Action	Plant input
Fixed input on PCB	Yes	Man trap
Fixed input on PCB	Yes	Door Switch
Air on Temperature Probe	Conditional	Plant Fault 1/External defrost input*
Air off Temperature Probe	Yes	Case Off

\*See: [Switched Resistor Values for External Defrost and Plant Fault 1 Inputs](#)

## Setting up the Panel

Access to the Panel can be achieved by the following methods:

- Through the front panel keypad
- Direct access by PC or palm top into the RS232 comms port. This requires a software package (Communicator) available on the RDM website
- Direct access by PC using Ethernet (IP-L) and an IP browser (e.g. Internet Explorer)
- Through legacy front end panels on 485 networks
- Through the RDM Data Manager

### Setup through the keypad



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.



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## Setup Function Menu

(Common to all types)

Display	Option	Explained in Paragraph
IO	View Inputs / Outputs and States	<a href="#">Input / output table</a>
PArA	Set/View Parameters	<a href="#">Set view parameters</a>
Unit	Probe type and Celsius/Fahrenheit option	<a href="#">Set View Unit</a>
PrES	Pressure Units, 0=Bar, 1=psi	
diSP	Display whole units or decimal	<a href="#">Display</a>
tyPE	Set/View Controller Type	<a href="#">Set/view controller type</a>
rtc	Set/view Clock (rtc = Real Time Clock)	<a href="#">Real Time Clock</a>
nEt	Set/view network configuration	<a href="#">Network Configuration</a>
SoFt	View software version	
FANS	Toggle Fans Only mode	<a href="#">Fans</a>
CASE	Toggle Case Off mode	<a href="#">Case Off</a>
Ligt	Toggle Lights Only mode	<a href="#">Lights</a>
OFSt	Probe Offset	<a href="#">Probe Offset</a>
ESC	Exit Setup mode	

## PIN Menu Access

The configuration menus within the controller can be PIN-protected (excluding "IO" and "Soft"). I.e. trying to access the settings on the controller's display will prompt the user for a PIN code (P-35 on the parameters list). When enabled, if trying to access a menu within the above table, the display will show 'Pin'. Pressing the Enter button at this point will allow you to enter a 3 digit PIN, allowing access to the menus. The PIN code can be set up through P-35 on the controller parameter's page, either through the display or Data Manager.

NB – if the PIN has been lost then RDM technical can be contacted to retrieve it

## 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 case/coldroom configuration types. (see [configuration table on page 3](#))
- Press enter.
- Scroll to select "ESC"
- Press enter

**Controller type configuration is now set**



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## 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 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)

Range of probes -49.0 degrees to +60.0 Degrees (PT1000 - 60.0 to 128.0 Degrees C)

Note: If probe is used with switched resistor range at low end is only -42.0 degrees

**Note:** Temperature range for NTC2K25 is restricted to -42 °C to +60 °C for probe inputs with a secondary function (switched resistors) and -49 °C to +60 °C for inputs that have no secondary function.

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.

### 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.



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## Parameter Table

Number	Parameter	Range °C ( °F )	Step	Units	Def. LT °C ( °F )	Def. HT °C ( °F )
P-01	Cut-in Temp	-49 to 30 (-56.2 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 100	1	%	50	50
P-19	Alarm Weight	0 to 100	1	%	0	0
P-08	Superheat Ref	0 to 12 (0.0 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/T)	1		0	0
P-17	Evap select	0 (Local). 1 (Rem 1). 2 (Rem 2). 3 (Rem 3) 4 (Trans V). 5 (Trans mA)	1		0	0
P-51	Valve Min Opening	0 to 100	1	%	10	10
P-52	Superheat Problem	0.0 to 12.0 (0.0 to 21.6)	0.1	Deg	0.0	0.0
P-53	Valve Problem Opening	0 to 100	1	%	10	10
P-54	Valve Problem Time	00:00 to 99:00	01:00	mm:ss	03:00	03:00
P-56	Valve Start Opening	0 to 100	1	%	50	50
P-55	Ave Valve Opening	0 to 100	1	%	100	100
P-57	Div Value	0 to 100	1	%	50	50
P-58	Div Size	0 = Off. 1 = On	1		0	0
P-87	Control Probe type	0 = Use Air on Probe 1 = Use Log Probe	1		0	0
P-90	Resistor Case Off	0 = Off. 1 = On			0	0
P-92	Fans temperature mode	0 = Off 1 = Temperature 2 = Over-temperature 3 = Temp/OT	1		0	0
P-93	Fans Off Temperature	-49 to 30 (-56.2 to 86)	0.1	Deg	-10 (14)	8 (46.4)
P-83	Fan Control	0 (Off). 1 (Run). 2 (Pulse)	1		1	1
P-78	Fan Pulse On	00:00 to 99:00	01:00	mm:ss	05:00	05:00
P-79	Fan Pulse Off	00:00 to 99:00	01:00	mm:ss	30:00	30:00
P-77	Control Fail Valve	0 to 100	0.1	%	0.0	0.0
P-98	Control Fail On/Off	00:00 to 10:00	01:00	mm:ss	00:00	00:00
P-29	Probe 1 Operation ( Digital Input )	0 = Plant Fault 1 = External Defrost Input	1		0	0
P-18	Service Time	0 to 128	1	K Hrs	60	60
P-95	Trap Stops LLV/Fans	0 (No). 1 (Yes)	1		0	0
P-99	Load Shedding	0 (Off). 1 (Mode 1). 2 (Mode 2)	1		0	0
P-35	Display PIN	0 = Off. 1 = On	1		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)	0.1	Deg	-30 (-22)	-2 (28.4)
P-22	OT Alarm	-49 to 128 (-56.2 to 262)	0.1	Deg	-15 (5)	5 (41)
P-23	Log Probe Type	0 = Off. (Logging with no alarms)			Off	Off



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Number	Parameter	Range °C ( °F )	Step	Units	Def. LT °C ( °F )	Def. HT °C ( °F )
		1 = Logging (Probe Fault alarm only) 2 = Logging/Alarm (Prb Flt and OT/UT)				
P-24	Slug Log Probe	0 = Off. 1 = On			Off	Off
P-25	Log Alarm Delay	00:00 to 99:00	01:00	mm:ss	20:00	20:00
P-26	Log UT Alarm	-49 to 128 (-56.2 to 262.4)	0.1	Deg	-35 (-31)	-1 (30.2)
P-27	Log OT Alarm	-49 to 128 (-56.2 to 262.4)	0.1	Deg	-12 (10.4)	6 (42.8)
P-28	Buzzer Mode	0 = Off. 1 = On			On	On
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 25	1	Hours	12	12
P-44	Def Terminate	-49 to 30 (-56.2 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		Time	Time
P-49	Fan Delay	00:00 to 99:00	01:00	mm:ss	00:00	00:00
P-88	Fan Delay Temp	-49 to 30 (-56.2 to 86)	0.1	Deg	-20 (-4)	0.0 (32)
P-50	Fans In Defrost	0 = Off. 1 = On			On	On
P-91	Defrost Type	0 (Elec). 1 (Elec/Cin)	1		Elec	Elec
P-94	Defrost Hold	0 = Off. 1 = On			Off	Off
P-95	Defrost Skip	0 = Off. 1 = On	1		Off	Off
P-96	Defrost Skip Time	00:00 to 99:00	01:00	mm:ss	12:00	12:00
P-80	Door alarm delay	00:00 to 99:00	01:00	mm:ss	20:00	20:00
P-81	Door Closes Valve	0 = No. 1 = Yes			No	No
P-82	Door Stops Fan	0 = No. 1 = Yes			No	No
P-60	Lights Mode	0 = Local. 1 = Remote 2 = ManOff. 3 = ManOn			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	See <a href="#">Refrigerant Table</a> Below	1		None	None
P-36	Refrigerant Weight	0 to 100	1	%	0	0
P-32	Pressure Units	0 = Absolute. 1 = Gauge	1		Gauge	Gauge
P-33	Evap Offset	0.0 to 5.0	0.1	Bar	0.0	0.0



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Number	Parameter	Range °C ( °F )	Step	Units	Def. LT °C ( °F )	Def. HT °C ( °F )
P-34	Glide	0.0 to 5.0	0.1	Deg	0.0	0.0
P-37	MOP Cut-in	-3.4 to 180.0 (25.9 to 356)	0.1	Bar	3.4	49.3
P-38	MOP Diff	-3.4 to 180.0 (25.9 to 356)	0.1	Bar	0.3	4.4
P-39	MOP Delay	00:00 to 02:00	00:01	mm:ss	00:05	00:05
P-101	Transducer Span	-3.4 to 180.0	0.1	Bar	13.8	13.8
P-102	Transducer Offset	-3.4 to 180.0	0.1	Bar	0.0	0.0
P-110	Valve Type	0=Carel, 1=Sporlan1, 2=Sporlan2 3=Alco, 4=Other*	1	---	Sporlan1	Sporlan1
P-111	Step Max*	0 to 6800 See: Valve type	1	---	2500	2500
P-112	Step Close*	0 to 6800 See: Valve type	1	---	3500	3500
P-113	Step Speed*	0 to 6800 See: Valve type	1	Hz	200	200
P-114	mA Peak*	0 to 500 See: Valve Type	1	mA	80	80
P-115	Half Step*	0 = Off. 1 = On. See: Valve Type	1	---	Off	Off
P-116	mA Hold Current*	0 to 500	1		0	0
P-117	Shut speed	0 to 6800	1		200	200
P-120	Overdrive Time	1 to 48	1	Hours	24	24
dFLt	Restore default settings					

## Refrigerant Table

0 = None	1 = R22	2 = R32	3 = R134a	4 = R142B	5 = R227
6 = R401A	7 = R401B	8 = R401C	9 = R402A	10 = R402B	11 = R404A
12 = R407A	13 = R407B	14 = R407C	15 = R500	16 = R502	17 = R503
18 = R507	19 = R717	20 = R290	21 = R744	22 = R407F	23 = R410A
24 = R449A	25 = R513A				

## Parameters Description

Number	Parameter	Description
P-01	Cut-in Temp	Temperature at which the valve will switch on
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 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-19	Alarm Weight	Percentage of the Air-On temperature that is used to calculate the temperature that triggers 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 speed up the stepper valve opening rate with 30 providing the quickest response and 1 providing the slowest response.
P-10	Response Off	Allows the user to speed up the stepper valve closing rate 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. <b>Note</b> the Evaporator Temperature probe should be fitted to the coldest point in the evaporator. EEV uses the superheat as its main reference with the cabinet temperature as a secondary control. EET use the cabinet temperature as its main reference. 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.



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

Number	Parameter	Description
P-17	Evap select	Local – Uses local probes Rem1 – Uses section 1 pressure from plant pack selected OR If no plant pack can use Mercury Switch pressure Rem2 - Uses section 2 pressure from plant pack selected Rem3 - Uses section 3 pressure from plant pack selected Trans V- Uses a 0-10v pressure transducer connected directly to the controller Trans mA - Uses a 4-20mA pressure transducer connected directly to the controller See: <a href="#">EEV Control using Pressure</a>
P-51	Valve Min Opening	Sets the minimum valve opening level, during normal operation the valve will not go below this level. (Default 10%) IF used in conjunction with a Mercury Pressure Hub PR0018-PHI, remote pressure from Plant Pack or local pressure from a daughter card, then the Minimum value should be set at <b>0%</b>
P-52	Superheat Problem	Sets the point at which the algorithm will go to the "EEV Problem" state due to the superheat temperature. 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.
P-53	EEV Problem Opening	Sets the valve open position when entering the "Superheat EEV Problem" state.
P-54	EEV Problem Time	Sets the time the algorithm 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	Ave 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	Div Value	This parameter takes effect when the controller is using an optional pressure transducer to calculate superheat. When the pressure rises above the MOP (maximum operating pressure) an MOP alarm is generated and the controller reduces the maximum valve opening to this percentage. The MOP alarm can be generated by the controller itself or the Mercury switch it is connected to, which ever device is set to read the pressure. 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%. Note P-51 EEV Minimum opening overrides the valve output operation and the valve will not close below this setting.  Please see <a href="#">MOP</a> note.  <b>Please note</b> parameters P-51 through to P-57 should not be altered without first understanding the effects they may have on the coldroom operation. If incorrectly set they may have undesired affects.
P-58	Div Size	If set to ON then the maximum valve opening is permanently limited by the Div Value set in P-57 regardless of pressure. This parameter can be used to compensate for over sized valves.
P-87	Control Probe type	Switches between using the air-on probe or 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-90	Resistor Case Off	Allows probe 2 to double as a case off switch using a switched resistor.
P-92	Fans temperature mode	Allows the user to set the fans to turn off when: - <ul style="list-style-type: none"> <li>➤ A pre-determined temperature is reached (P93)</li> <li>➤ When an over-temperature alarm is present</li> <li>➤ When either P93 is reached or an OT alarm is present</li> <li>➤</li> </ul>
P-93	Fans Off Temperature	Temperature for the above (P92) operation. Use the defrost probe.
P-83	Fan Control	This feature allows for coldroom fans to be stopped when the coldroom is down to temperature thus saving energy. <ul style="list-style-type: none"> <li>➤ Run – fans operate as per the normal control strategy.</li> <li>➤ Pulse – When the valve closes the fans will stop when the Fan Pulse On parameter (P-78) time expires. The fans then remain off for the Fan Pulse Off</li> </ul>



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Number	Parameter	Description
		<p>time (P-79). When the parameter Fan Pulse Off time expires the fans come back on for the Fan Pulse on time. The cycle then repeats. The fans resume normal operation if the valve operates. The fans pulse on/off to ensure the circulation of air within the coldroom.</p> <ul style="list-style-type: none"> <li>➤ Off – When the valve closes the fans stay on for the Fan Pulse On (P-78) time before going off until the valve next operates.</li> </ul> <p>Placement of the temperature control probes is important when using this feature</p>
P-78	Fan Pulse On	The duration of the fans are pulsed on in Fan Control.
P-79	Fan Pulse Off	The duration of the fans are pulsed off in Fan Control.
P-77	Control Fail Valve	This value is used in the event of a control probe fail; In the valve control algorithm the valve will remain at this opening until the probe fault has been cleared. <b>Please note</b> 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-29	Probe 1 Operation	<p>Plant - when a fixed resistor is switched in across the appropriate input a plant fault alarm is generated.</p> <p>External Defrost - when a fixed resistor is switched in across the appropriate input then it places the controller into defrost. See also P-40 for setup. If the defrost signal is continually present after completing the initial defrost then the controller will resume refrigeration. If the defrost signal remains active then the controller will initiate a defrost and generate a missed defrost alarm when the no defrost time parameter expires. Subsequent defrosts will follow the no defrost time until the defrost input is removed.</p>
P-18	Service Time	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-95	Trap Stops Cooling/Fans	When man trap input is activated the valve closes and Fans are stopped. Normal operation resumes when the mantrap input is deactivated.
P-99	Load Shedding	<ul style="list-style-type: none"> <li>➤ Off – Feature is not used</li> <li>➤ Mode 1 – Case goes to “CO2 Load Shedding Case Off Mode”</li> <li>➤ Mode 2 – Goes to Case Clean Mode</li> </ul> <p>See: <a href="#">Load Shedding</a></p>
P-35	Display Pin	Feature used for restricting access to settings menu via controller display. '0' disables the feature. A pin can be set between 1 and 999. The pin must be entered to access the menus. On non-networked units, if the pin is lost, RDM technical can be contacted to assist retrieval.
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 or if there is no air off probe used (see P-08) then the air on probe is used.
P-23	Log Probe Type	<p>0 = Off. (Logging with no alarms)</p> <p>1 = Logging (Probe Fault alarm only)</p> <p>2 = Logging/Alarm (Prb Flt and OT/UT)</p>
P-24	Slug Log Probe	Applies a damping factor. This can be used to make a standard probe have the same temperature response as a Product probe.
P-25	Log Alarm Delay	Delay for the Logging probe over and under-temperature alarms
P-26	Log UT Alarm	Logging probe under temperature alarm set point
P-27	Log OT Alarm	Logging probe over temperature alarm set point
P-28	Buzzer Mode	Allows the user to turn the local alarm buzzer off. Note. Man-trap alarms will sound the buzzer irrespective of this parameter setting
P-40	Defrost Mode	<p>Allows the user to set the defrost mode: -</p> <ul style="list-style-type: none"> <li>➤ Local (Uses the internal parameters P-41 and P-42)</li> <li>➤ Remote (Requires a defrost schedule in the front end)</li> <li>➤ External (Requires an external signal on the appropriate input)</li> </ul> <p>If set to Local or Remote the external defrost input will be ignored.</p>
P-41	Defrost Start	When defrost mode is set to “Local”, this is the start time for the 1st 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.



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Number	Parameter	Description
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 1 hour over the normal defrost period.
P-44	Def Terminate	The defrost will terminate (defrost control relay off) when the temperature of the defrost termination probe reaches this value. If the "defrost termination" probe is not fitted, defrost termination will occur when: - The "coil in" probe reaches the set point (If fans are selected as "off during defrost") Or The "air off" probe reaches the set point (If fans are selected as "on during defrost") If the "coil in" probe is not fitted, the "air off" probe will be used.
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 cooling 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-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 – Heater is turned Off when termination probe reaches termination temperature Electric Cin – Heater cycles on and off in defrost min if termination probes reaches termination temperature but then falls below it again
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 terminates the defrost and starts the recovery process. Note: defrosts will also terminate when the defrost max time-out period elapses. This command works in "Defrost Remote" only
P-96	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-97	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-80	Door alarm delay	Delay after the door open input is activated before the alarm occurs. If P-81 and P-81 are set to switch cooling and fans off when the door is open, this will be overridden.
P-81	Door Closes Valve	This parameter is used to close the valve if the door opens.
P-82	Door Stops Fan	This parameter is used to stop the fans if the door opens.
P-60	Lights Mode	Allows the user to set the lights mode: - ➤ 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



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Number	Parameter	Description
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	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. 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-31	Refrigerant	Type of refrigerant used in system. See: <a href="#">Refrigerant Table</a> above
P-36	Ref Weight	When using a local pressure transducer or a transmitted pressure from a pack controller is used to calculate superheat, the coldroom 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). 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-32	Pressure Units	Absolute or Gauge
P-33	Evap Offset	Offset to allow for pressure drop over distance
P-34	Glide	Allows the calculated temperature to be offset by subtracting this value.
P-37	MOP Cut-in	If the pressure exceeds this value, then the valve will close or be reduced to a predetermined percentage. A MOP alarm is also created. See <a href="#">Maximum Operating Pressure (MOP)</a>
P-38	MOP Diff	When the pressure reduces below this value, the controller's 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-101	Transducer Span	Total range of the transducer
P-102	Transducer Offset	Value below zero
P-110	Valve Type	Choose from four preconfigured stepper valve types or select "Other" to enter Stepper characteristics for a valve which is not listed. See <a href="#">Valve Type</a>
P-111	Step Max*	Number of steps controller will send to open valve to 100%. Consult the valve manufacturer to obtain the required number of steps. (Has no effect if Valve Type 0, 1, 2 or 3 selected at P-110) See <a href="#">Valve Type</a>
P-112	Step Close*	Number of steps controller will send to close valve fully to 0% and overdrive the valve. The Steps required when overdriving the valve can vary. Please consult the valve manufacturer to obtain the required number of steps (Has no effect if Valve Type 0, 1, 2 or 3 selected at P-110) See <a href="#">Valve Type</a>
P-113	Step Speed*	Increases and decreases the rate of step change. Enter a value in Hz. Valve Manufacturers specification must be followed. (Has no effect if Valve Type 0, 1, 2 or 3 selected at P-110) See <a href="#">Valve Type</a> and <a href="#">Appendix 3 Step Speed.</a>
P-114	mA Peak*	Current requirement of motor. Care should be taken when setting this parameter as too high a setting could damage the valve motor. Valve Manufacturers specification must be followed. (Has no effect if Valve Type 0, 1, 2 or 3 selected at P-110) See <a href="#">Valve Type</a>
P-115	Half Step*	Allows the valve to be opened and closed in half step increments. <b>When half stepping is set to ON then the Step Max and Step Close values (P-111 / 112) need to be doubled.</b> For example, if using a Carel E2V valve then the Step Max setting would be set to 960 and the Step Close value 1000. Has no effect if Valve Type 0, 1, 2 or 3 selected at P-110. See <a href="#">Valve type</a>
P-116	mA Hold Current*	Current supplied to valve when it is stationary, to prevent any drift in valve position See: <a href="#">Holding Current</a>



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Number	Parameter	Description
P-117	Shut speed	This is the speed in Hz that the valve will shut at if the shut input is active
P-120	Overdrive Time	This is the period in hours that the valve will close fully to allow the controller to re calibrate the valve position, this is required as there is no feedback to the controller from the valve in regards to its position. See: <a href="#">Valve State – Overdriving</a>
dFlt	Restore defaults	Restores all of the parameters to their default values

## Load Shedding

Used on CO2 sites for load shedding on CO2 Compressor Faults or CO2 Vessel High Pressure Alarms.

Cases can be put into a "CO2 Case Off" mode which will open the valve and stop the fans to reduce the load on the pack or to reduce the CO2 vessel pressure.

See: RDM CO2 load shedding user guide.

## Holding Current

If using a type of valve that requires a holding current you must select "Other" at P-110.

**Warning:** Not all valves require a holding current and applying a holding current to valves that do not require one could result in damage to the valve and/or controller. **Refer to Manufacturers Data Sheet for information on holding current.**

## Stepper Valve Type

Parameters P-111 to P-116 only have an effect if "Other" is selected when configuring parameter P-110, "Other" allows the user to map in the requirements the stepper valve.

Selecting option 0, 1, 2 or 3 at parameter P-110 sets the controller for use with the factory set values for the type of valve selected. The controller will override any values set in parameters P-111 to P-116

**Note** the parameters relating to the Stepper Valve type should be configured prior to wiring the Stepper Valve to the coldroom controller. If one of the three default valve types is selected then changing P-111 to P-116 will have no effect.

Manufacturer	Model	Step Max	Step Close	Step Speed (Hz)*	mA Peak	mA Hold	Half Step	Overdrive (Hours)
Carel	E <sup>3</sup> V	480	500	50	450	0	Off	8
Sporlan 1	SER A/B/C/D	2500	3500	200	80	0	Off	24
Sporlan 2	SER 1.5 to 20, SEI 6	1596	1756	200	80	0	Off	24
Alco	EX4/5/6	750	825	500	500	0	Off	8
Other	Various	2500	3500	200	80	0	Off	8

When the Half Step parameter P-115 is set to ON then the Step Max and Step Close parameter values need to be doubled.

See [Appendix 3 Step Speed](#) also.

## Valve Wiring

Manufacturer	Model	Wiring (Colours)	Connection Description (See Stepper Output)
Carel	E <sup>3</sup> V	Yellow	M1B
		White	M1A
		Green	M2A
		Brown	M2B
Sporlan	SER 1.5 - 20 SER B/C/D SEI 6	Green	M1B
		Red	M1A
		White	M2A
		Black	M2B
Alco	EX4/EX5/EX6	White (A)	M1B



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		Black (B)	M1A
		Blue I	M2A
		Brown (D)	M2B

**Important** – Our information is taken from 3<sup>rd</sup> party data sheets at the time our document is created, any changes since will not be incorporated in our document.

Review the manufacturer’s datasheet for the selected valve before installation. If you are unsure regarding any of the above steps please contact RDM Technical Support for further assistance.



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## Valve State – Overdriving

Each time the controller is powered on the control valve state has to initialise as the controller will have no knowledge of the current valve opening position for the stepper motor attached. During this process the controller will close the valve by a number of steps greater than the total number of steps for the valve configured. This is achieved using the Step Close parameter and is referred to as “overdriving” the valve. This process will synchronize the controller with the stepper valve output. This ensures the stepper valve is at the 0 steps position, fully closed and the control algorithm will use this for future control operations. The overdrive parameter will overdrive the Stepper motor output by 10% of the step max value at the preset period (24 hours for example), this provides an automatic re-synchronisation of the valve position.

Please consult the stepper valve manufacturer’s data sheet to obtain the number of steps required to overdrive the valve.

## Power Store

In the event of a power failure to the controller and stepper valve, the Power Store sends a fail signal to the stepper controller and provides a backup power supply to enable the controller to fully close the valve.

The built in power store is designed to cope with occasional power failures and requires a minimum of 10 minutes to recharge between power fail conditions. For this reason, the Intuitive power store should not be used if frequent power failures of less than 10 minute intervals are expected.

**Note:-**When first powered up, the Power Store needs 10 minutes to charge fully.

## Valve Control Using Pressure

There are several ways to use the suction pressure to calculate the evaporator in temperature.

### Directly Connected Pressure Transducer

(P17 set to local mA or local Volts) A suction transducer can be connected directly to the input of stepper daughter card, 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. Please note that RDM recommend that the evaporator in temperature probe is fitted as the controller will use this to calculate the superheat in the event of a transducer fault (Parameters P31/32/33/34/101/102) will need to be set accordingly

### Mercury Switch (PR0018-PHI)

(P-17 set to Rem1) The Mercury Switch can be used for valve control on a group of coldrooms. A suction pressure transducer is connected 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. Please note that RDM recommended that the evaporator in temperature probe is fitted as the controller will use this to calculate the superheat in the event of a communication loss with the Mercury Switch. 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

(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)  
(P-30) set to ID of Plant Pack Controller (Rotary Switch Setting), (P-31) set to refrigerant type, (P-32) set to pressure units Absolute or Gauge.

## Ref Weighting

When using a local pressure transducer to calculate superheat, the coldroom 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.



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## Relay State and functional operation

Relay State:	Function State	Wired contact	Comments
LLV Relay off	Valve on	N/C	
LLV Relay on	Valve off	N/C	
Fans Relay off	Fans on	N/C	
Fans Relay on	Fans off	N/C	
Lights Relay off	Lights on	N/C	
Lights Relay on	Lights off	N/C	
Defrost Relay off	Defrost off	N/O	
Defrost Relay on	Defrost on	N/O	
Alarm Relay off	Alarm on	N/C	
Alarm Relay on	Alarm off	N/C	

The panel will display REC (recovery) just after switching on until the control temperature has been reached; where it will then display the temperature (display temp). The panel will operate in accordance to the parameters set.

Lights: If the lights have been set to a timer mode, the lights LED will flash to indicate the timer is running during an "on" period, the lights will come on when the door is opened, or if the lights switch is operated. The lights LED will be off during a timer "off" period and the lights will not come on when the door is opened. The lights can be switched on during the off period by the panel light switch.

Note. When using the lights in "remote" mode, do **not** use a GP timer input over-ride function; it will conflict with the local over-rides and door switch functions. When a person trapped alarm occurs the lights are forced on.

**Note:** When a person trapped alarm occurs it now pulses for 2 seconds on, 1 second off to distinguish from all other alarms.

If either or both of the Valve and Fans are set to go off when the door opens, they will revert to normal operation when the door closes or when the door-open alarm activates.

## Network Configuration

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

To log the controller onto a network you must first connect the controller to a communications module if one is not already internally fitted coldroom panel. This is either a:

- 485 Legacy, or
- IP Futura
- Mercury Hub

Please check [Part Numbers](#) section to determine the communication module fitted.



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## 485 Legacy module

485 legacy support the following protocol:

- Genus

Connecting a 485 legacy module to the controller will govern which set up screens are made available.

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. In this controller there is only one type which cannot be changed:

Value	Network Type
1	Genus compatible (all versions)

The 485A option shows a value representing either the name of the controller in a Genus compatible network.

The value shown is of the form 05-6. This means the controller would try to log onto a Genus compatible network using the name 'RC05-6'.

The following options are also available when the network type is set to Genus compatible.

The gAdd option displays (in hexadecimal format) the underlying network address assigned to the controller when it was logged onto the network.

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

### Fast Network Address Reset

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.

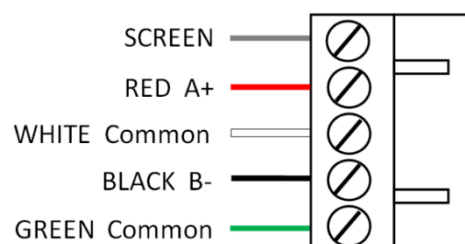
To enter this mode, hold the Enter, Up and Down buttons together for approximately 3 seconds until the message ClrA appears on the display. ClrA is the first option in the menu consisting of the following options:

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.

## RS485 Network Connection.

If the panel has been specified with RS485 communications then an RS485 communications card will be fitted in place of an IP card, connections are as shown, colours are for Belden 8723 cable.



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

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

### IP-L

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

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

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

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

### 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.

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

## Mercury Hub

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



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

## Viewing

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

### IO. View Inputs / Outputs and States

From the function menu, select "IO", press enter, you can now scroll through the IO tables as set out below. The tables you view will depend on the controller type configuration.

### Input / Output Table

Number	IO	Range (dependant on probe type) °C (°F)	Step	Units
I-01	Control Temp.	-49 to 128 (-56.2 to 262)	0.1	Deg
I-02	Display temp	-49 to 128 (-56.2 to 262)	0.1	Deg
I-03	Air on Probe	-49 to 128 (-56.2 to 262)	0.1	Deg
I-04	Air off Probe	-49 to 128 (-56.2 to 262)	0.1	Deg
I-05	Evaporator Probe	-49 to 128 (-56.2 to 262)	0.1	Deg
I-06	Suction Line Probe	-49 to 128 (-56.2 to 262)	0.1	Deg
I-07	Superheat	-49 to 128 (-56.2 to 262)	0.1	Deg
I-08	Logging Probe	-49 to 128 (-56.2 to 262)	0.1	Deg
I-09	Defrost Probe	-49 to 128 (-56.2 to 262)	0.1	Deg
I-10	Plant fault	0 (OK), 1 (Alarm)		
I-11	Case Clean	0 (Off), 1 (On)		
I-12	Door Sensor	0 (Off), 1 (On)		
I-13	Person trapped	0 (OK), 1 (Alarm)		
I-15	External Defrost	0 (Off), 1 (On)	0.1	Deg
I-16	MOP	0 (Off), 1 (On)		
I-19	Div Input	0 to 100	0.1	%
I-20	Rem Evap Temp	-49 to 128 (-56.2 to 262)	0.1	Deg
I-21	Local Evap Temp	-49 to 128 (-56.2 to 262)	0.1	Deg
I-22	Local Pressure	-3.4 to 180.0	0.1	Bar
I-23	Remote Pressure	-3.4 to 180.0	0.1	Bar
I-25	Load Shedding	0 (Off), 1 (On)		
I-26	Shut Input	0 (Off), 1 (On)		
I-27	Alarm Temp	-49 to 128 (-56.2 to 262)	0.1	Deg
O-01	Thermostat	0 (Closed), 1 (Open)		
O-05	Defrost Control	0 (Off), 1 (On)		
O-06	Lights Relay	0 (Off), 1 (On)		
O-07	Case Fans	0 (Off), 1 (On)		
O-09	Valve Opening	0 to 100	0.1	%
O-10	Last Def. Time	00:00 to 23:59	00:01	hh:mm
O-11	Last Def. Length	00:00 to 03:00	00:01	hh:mm
O-12	Last Def. Ctrl Temp.	-49 to 128 (-56.2 to 262)	0.1	Deg
O-13	Last Def. Type	0 (None), 1 (Internal), 2 (External), 3 (Network), 4 (Display), 5 (Timed)		
O-15	Alarm	0 (Off), 1 (On)		
O-18	Run Time	0 to 128	1	K Hrs
O-19	Valve Step	0 to 6800	1	
O-20	Door Open Time	00:00 to 23:59	00:01	hh:mm
O-21	Door Open Length	00:00 to 03:00	00:01	hh:mm
O-30	Set Point Offset	-36 to 36 (-32.8 to 96.8)	0.1	Deg
O-32	Timer	0 (Off), 1 (On)		
O-21	Set Point Offset	-36 to 36 (-32.8 to 96.8)	0.1	Deg
O-30	Run Time	0 to 128	1	K Hrs
O-32	Valve Step	0 to 6800	1	
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 shedding), 15 (Shut)		
S-02	Valve State	0 (Off). 1 (Start). 2 (Run). 3 (Problem), 4 (Fail). 5 (Shed)		



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## Switched Resistor Values for Case Clean and Plant Fault 1 Inputs

For PT1000 probes use 820 Ohm switched resistors. For NTC2K & NTC2K25 probes use a 590 Ohm switched resistor. 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 Coldroom Controller 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 +60°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.

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.

## Alarm 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
Pd or REC	Control State in Recovery
dEF	Control Sate in Defrost
AL	Control State in Alarm
FanS ONLY	Controller in Fans Only
Ligt ONLY	Controller in Lights Only
CASE OFF	Controller in Case Off
Ot	Over Temperature Alarm
Ut	Under Temperature Alarm
door	Door Open Alarm
Man TrAP	Person Trapped Alarm
PLnt	Plant Fault
LgOt	Log Probe Over Temperature
LgUt	Log Probe Under Temperature

## 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	Product over temperature	8
Plant Fault 1	3	Product under temperature	9
Case over temperature	4	Remote evap temperature	6
Case under temperature	5	Transducer Fault	6
Probe 1 Faulty	6	Person Trapped	1
Probe 2 Faulty	6	Case Clean	29
Probe 3 Faulty	6	Load Shedding	7
Probe 4 Faulty	6	MOP Alarm	3
Probe 5 Faulty	6	Valve Shut	2
Probe 6 Faulty	6	Stepper Fault	3
Door Left Open	2		



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## 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"

### 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"

### 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 "Ligt 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.



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## Remote Commands:

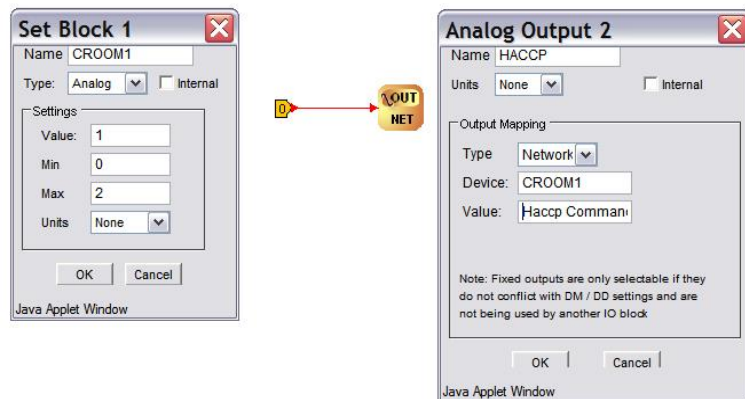
The following commands can be used by a Data Builder program:

Command	Value to send	Description	Conditions;
Setpoint Command	$\pm 10^{\circ}\text{C}$ ( $\pm 18^{\circ}\text{F}$ )	Is added to or subtracted from the setpoint	
Haccp Command	0 1 2	HACCP LED OFF HACCP LED On HACCP LED Flashes	
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
Case Off Command	0 5	Case runs normally Case Off; all alarms are inhibited	
EEV Command	2 1	Shuts the valve off Restores the valve to normal operation	

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 to the right

which sets the HACCP LED on:



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## Specification

### Power requirements

Supply Voltage Range:	100 – 240 Vac $\pm$ 10%
Supply Frequency:	50 – 60 Hz
Maximum supply current:	40 Amps, Inlet power cable must be minimum cross sectional area of 2.6mm (10 AWG)
Operating temperature range:	+5°C to +50°C (41°F to 122°F)
Operating Humidity:	80% maximum
Storage temperature range:	-20°C to +65°C (-4°F to 149°F)
Environmental:	Indoor use at altitudes up to 2000m, Pollution Degree 2, Voltage fluctuations not to exceed $\pm$ 10% of nominal voltage
Size:	240mm (W) x 300mm (H) x 140mm (D) 9.45in (W) x 11.8in (H) x 5.5in (D)
Weight:	2.2 Kilograms
Safety:	EN61010 This device <b>MUST</b> be earthed
EMC:	EN61326-1; 2013
Ventilation:	There is no requirement for forced cooling ventilation
The host equipment must provide a suitable external over-current protection device such as:	
Fuse:	40A 240 Vac Antisurge (T) HRC conforming to IEC 60127
Or MCB:	40A, 240 VAC Type C conforming to BS EN 60898
IP Rating	IP 40

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

### Maximum Output Loads

Thermostat/LLV:	10A (non inductive) 8A Cos $\Phi$ =0.4	
Switched Output Voltage:	Same as supply voltage	
Stepper Valve:	825mA (24vdc)	Chopper Drive Bi Polar
Defrost:	15A (non inductive) 8A Cos $\Phi$ =0.4	
Switched Output Voltage:	Same as supply voltage	
Fans:	6A (non inductive)	Motor Load 1/3hp
Switched Output Voltage:	Same as supply voltage	Tested 100/240V
Lights:	6A (non inductive)	6A Cos $\Phi$ =0.4
Switched Output Voltage:	Same as supply voltage	
Out 1 Stepper Valve Supply:	5A	Permanent Supply to Stepper Board
Permanent Output Voltage:	Same as supply voltage	Factory Wired must not be removed
Out 2:	1A	Protected by 1A Fuse
Permanent Output Voltage:	Same as supply voltage	

### Inputs

Probes:	
Input type	Selectable
Entrapment and Door alarms	0V return
Comms:	RS232 with flow control
Ethernet (IP)	10/100 BaseT
RS485	Genus compatible



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### Pressure Transducer Input (If used)

4-20mA Input: 4-20mA current loop, use the 12Vdc output to feed the 4-20mA device, 25mA maximum.

OR

0-5 or 0-10V Input: Connect a 0-5 or 0-10V Signal.

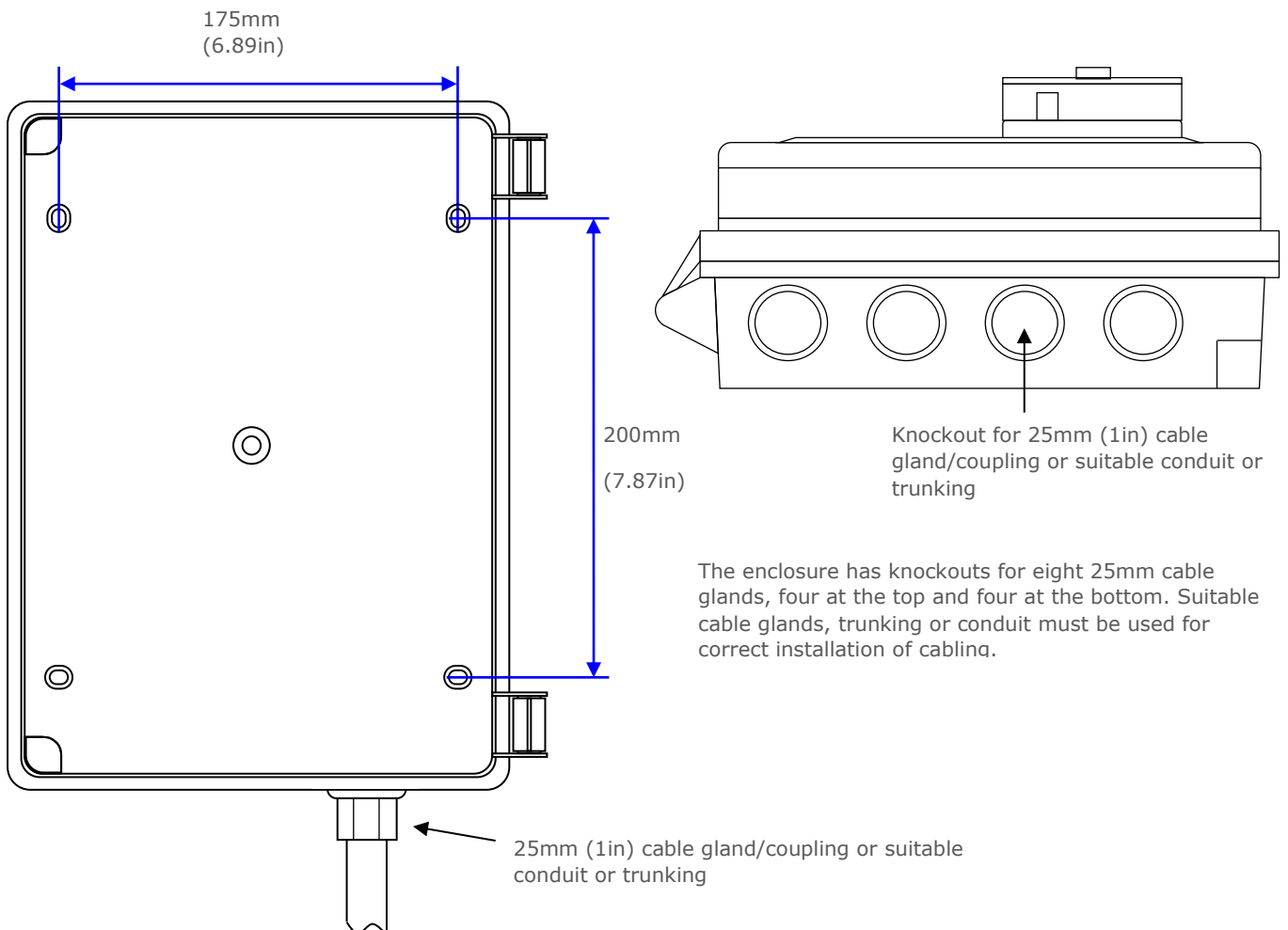
## Installation

### Fixing

NOTE: Force/Torque, the overall weight including the attached objects may not exceed 3 times the weight of the product.

The control panel must be installed at a minimum conductor length of 10m (30ft) from the electrical service panel to the point of utilization.

The Coldroom Panel has 4 fixing holes: (dimensions are in mm and inches)



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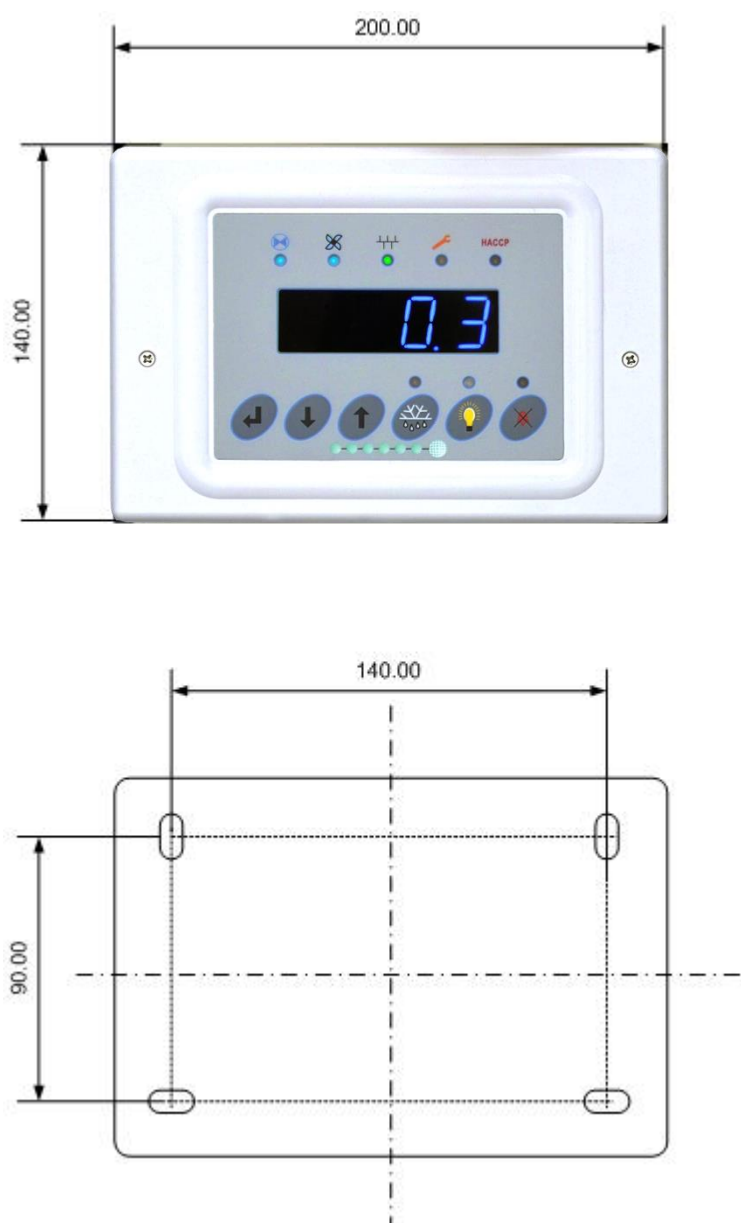
## Display Remote Mounting

The display section of the Coldroom Panel can be removed for remote fixing. Unscrew the two front panel screws; take off the display front and then remove the 4 screws housing the display back onto the main enclosure. The display has a 5 meter (16.4ft) cable which requires to be uncoiled from its internal location. Ensure that all power is disconnected before this operation.

Mount the display back onto the surface using the centres below and then assemble the display front, securing with the 2 front panel screws.

## Display dimensions and fixing

Dimensions are in mm



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## Part Numbers

Variations	Part Number
Coldroom – Stepper, No Isolator, MCB's and No Comms	PR0150-SNB
Coldroom – Stepper, Isolator, MCB's and No Comms	PR0150-SSB
Coldroom – Stepper, Isolator, MCB's and RS485 Comms	PR0150-SSB485
Coldroom – Stepper, Isolator, MCB's and IP Comms	PR0150-SSBIP
PT1000 Air Temperature Probe	PR0170
PT1000 Pipe Temperature Probe	PR0180
Spare Display Unit	PR0152
Stepper Inline Filter Unit	PR0656

## Disclaimer:

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## Revision History

Revision	Date	Changes
7.0	07/06/2018	First Edition
7.0a	21/06/2018	Alarm relay specification added
7.0b	11/07/2018	Glide and control fail time parameter descriptions updated.
7.0c	26/07/2018	Added UL safety.
7.0d	13/12/2018	Amended stepper wiring diagram.
7.0e	19/06/2019	I/O Table amended.
7.1	21/06/2019	Built in Power Store added
7.1a	13/01/2020	Note added regarding doubling step number when using half stepping.
7.1b	09/08/2021	Note added regarding optional use of pressure transducer.



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