



Resource  
Data Management

# Mini Intuitive 3 EEV Case Controller

Installation & User Guide  
Revision 1.9



PR068X-3EC

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# Mini Intuitive 3 EEV Case Controller

## From Resource Data Management

The Mini Intuitive 3EC Case Controller is intended for use in multi-evaporator single refrigeration display case applications. The Mini Intuitive 3EC Case Controller can control up to three pulse width modulation (PWM) electronic expansion valves (EEVs), or up to three mechanical expansion valves. Alternatively, up to 3 stepper valves can be controlled using the same main controller, but utilising stepper expansion modules. The controller contains logic for staggered modulation of valves during controller start-up or after defrost to reduce impact of liquid hammer.

Each evaporator section will control, monitor, and alarm on temperature independently of each other according to a set of shared control/alarm parameters. The controller also operates a shared defrost relay, case lights relay, fans relay, anti-sweat SSR, and optional alarm relay and remote relay. The 3EC controller can support operation of an LLSV for pump-down.

The PR0680-3EC integrates seamlessly into the existing RDM suite of energy saving features available in the PR0510 Data Manager allowing for remote defrost and case light scheduling, remote valve control, case performance monitoring, MOP protection and alarm monitoring, and rack shutdown support.

The controller requires the addition of a PR0663 8P-4E or up to three PR0653s (connected via CAN bus) to expand its IO for desired operation. The controller does not have an in-built display option, but offers a remote display option (see ordering information for more details). The controller is offered only as an IP communications variant.

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

As mentioned above, the Mini Intuitive 3 EEV Case Controller offers a number of choices concerning the physical hardware including choice of IO, Display and communications type. For specific part numbers see [Ordering Information](#).

Device Module	Inputs/ Outputs	Display	Comms
PR0680-3EC	6 Probe, 4 Digital Inputs, 4 UIO, 5 Relay Outputs	Remote Display	Ethernet
PR0663-8P-4E	8 Probe Inputs, 4 SSRs	N/A	CAN bus Rotary ID 1
PR0653	2 Probe Inputs, 1 Stepper Output	N/A	CAN bus Rotary ID 1, 2, 3

## Compatible Displays

The following displays are compatible with the Mini Intuitive 3 EEV Case Controller:

Description	Part Number
Mercury MK2 Remote Display with 5m cable	PR0725

## Configuration

The controller gives you up to four configuration options (see '[Type](#)' menu):

Display value	Intuitive Mini Multi-Valve
3 (Default)	EEV remote piped case controller (HT)
4	EEV remote piped case controller (LT)
5	Stepper remote piped case controller (HT)
6	Stepper remote piped case controller (LT)
7	M remote piped case controller (HT)
8	M remote piped case controller (LT)

**Note:** The controllers are delivered pre-configured as **Type 3**.



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## Front Display Features

LEDs: -

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



### Mercury Mk3 Display



#### Keys



Enter



Up



Down



Defrost

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

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

#### Main Display

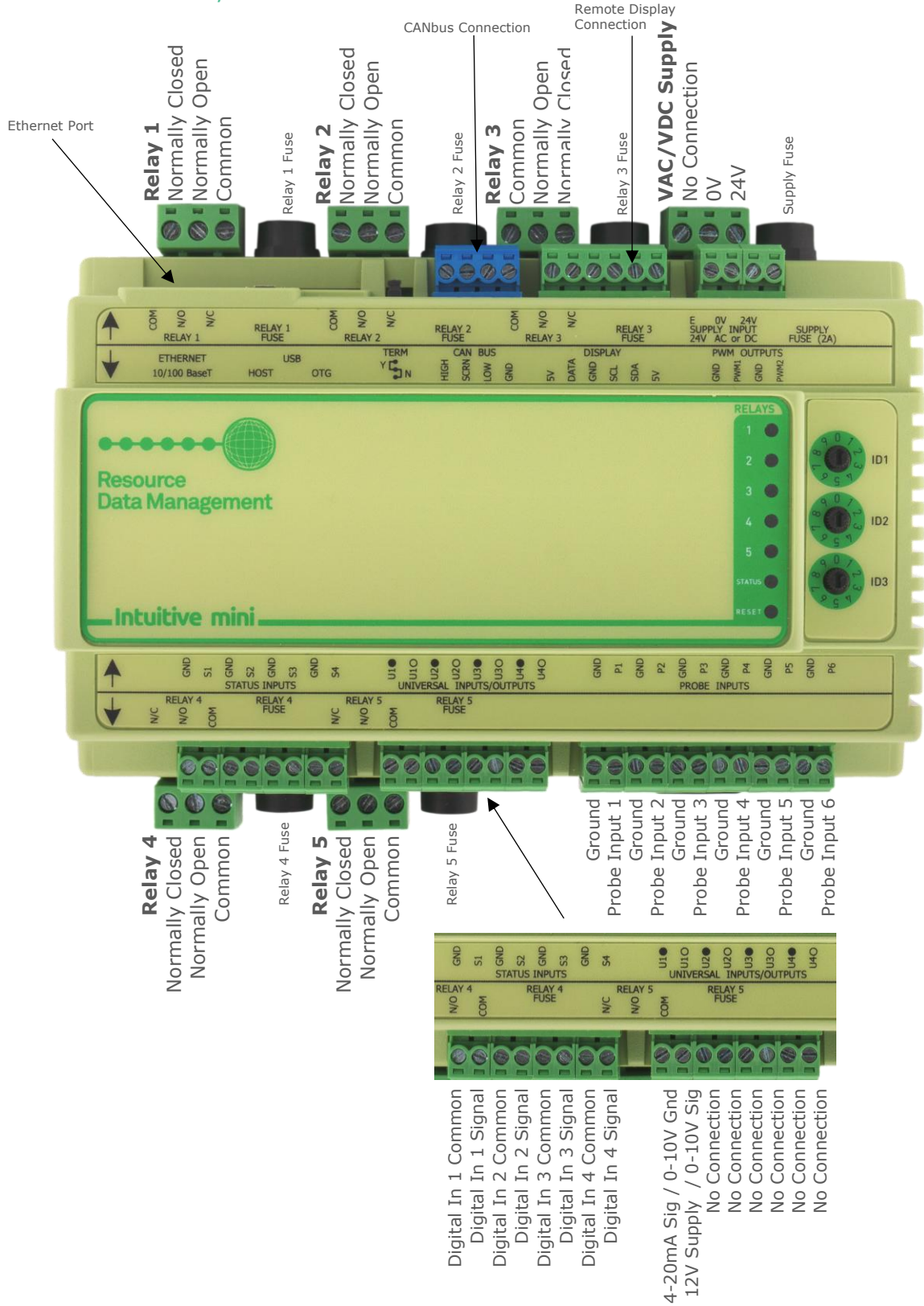


4 character LED display, used to display temperature and status messages.



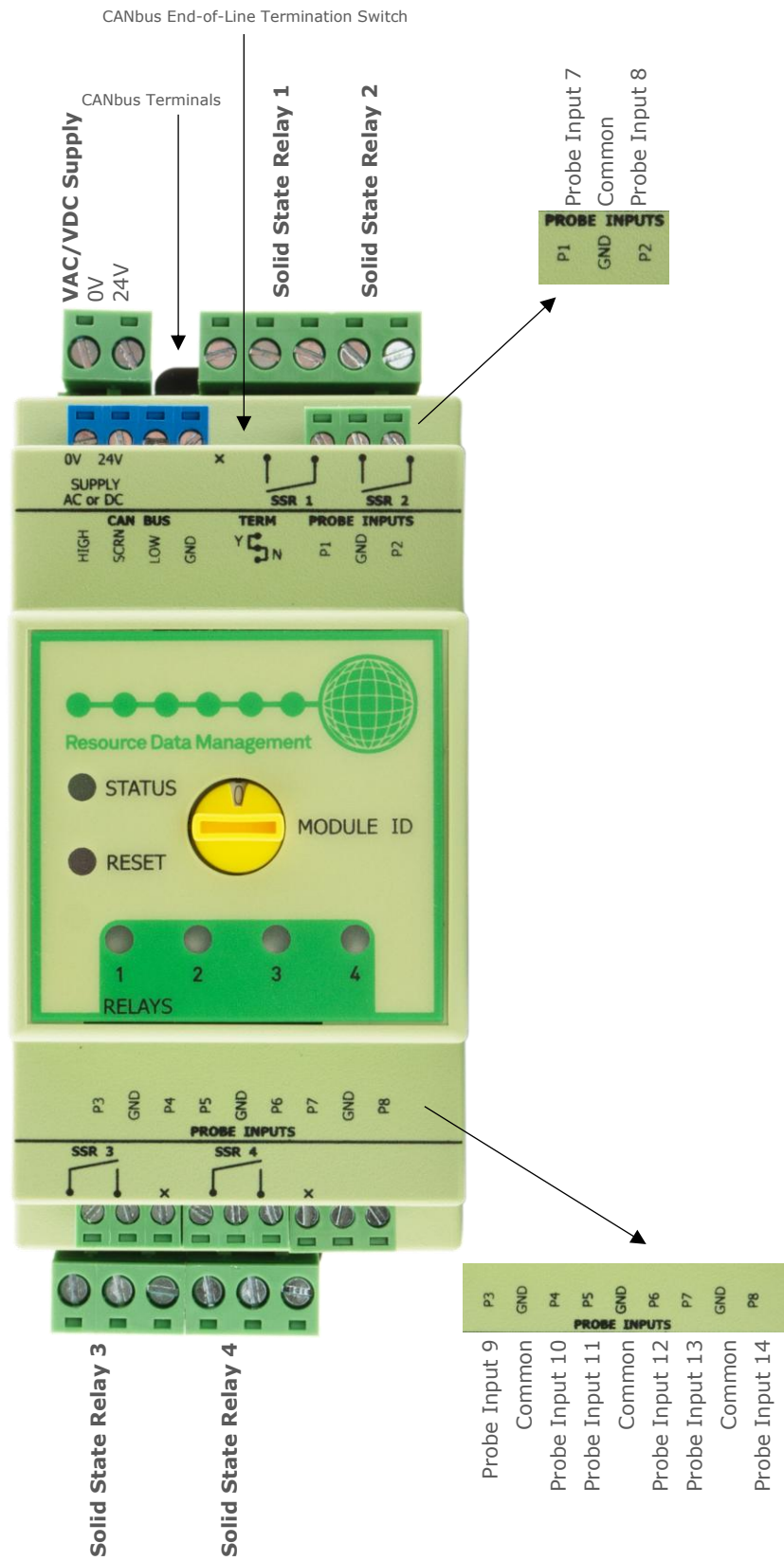
Please ensure all power is switched off before installing or maintaining this product.

## Mini Intuitive I/O Connections



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## PR0663 8P-4E I/O Connections



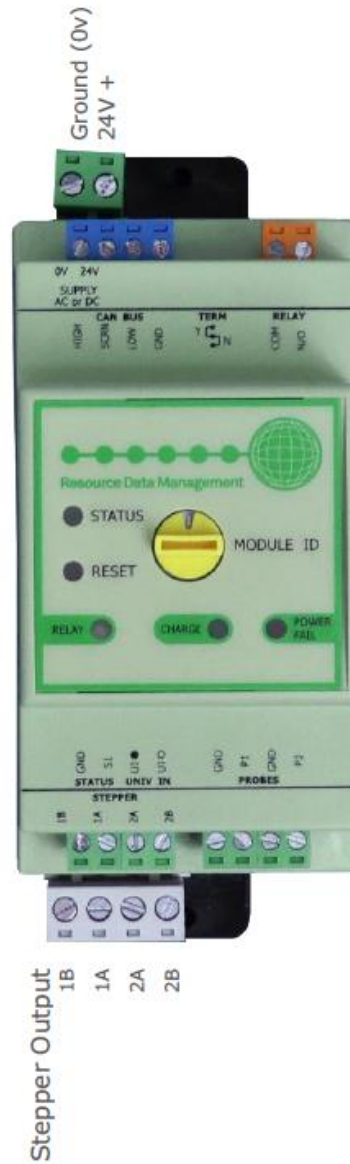
Please ensure all power is switched off before installing or maintaining this product.

## PR0653 I/O Connections

**PR0653**  
Top Row  
Connections



**PR0653**  
Bottom Row  
Connections



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## Input and Output Allocation Tables

### 3 EEV Pulse Case: Configuration Type 3 & 4

The following tables indicate; on a controller type basis, the functions of the inputs and outputs. Since the PR0663-8P-4E is required for operation of the PR0680-3EC platform, the IO numbering sequence of the PR0663-8P-4E is ordered as extending the PR0680 controller's IO.

#### Mini Intuitive IO

I/O	Remote Case Types 3&4	Alarm Action
P1 (Input 1)	Case 1 Return Temp	Yes
P2 (Input 2)	Case 1 Discharge Temp	Yes
P3 (Input 3)	Case 2 Return Temp	Yes
P4 (Input 4)	Case 2 Discharge Temp	Yes
P5 (Input 5)	Case 3 Return Temp	Yes
P6 (Input 6)	Case 3 Discharge Temp	Yes
Universal Input 1	Transducer Input (if fitted, VDC / mA)	Yes
Status 1	Selectable; Plant 1 N/O, Plant 1 N/C	Conditional
Status 2	Selectable; Plant 2 N/O, Plant 2 N/C	Conditional
Status 3	Case Clean	Yes
Status 4	Ext Defrost	N/A
Relay 1	Fans	N/A
Relay 2	Lights	N/A
Relay 3	Defrost Heaters	N/A
Relay 4	Alarm Relay	N/A
Relay 5	Selectable; Remote Relay / LLV	N/A

#### PR0663 IO

I/O	Remote Case Types 3&4	Alarm Action
<b>Rotary ID 1</b>		
P7 (Input 7)	Case 1 Evap Temp	Yes
P8 (Input 8)	Case 1 Suction Temp	Yes
P9 (Input 9)	Case 2 Evap Temp	Yes
P10 (Input 10)	Case 2 Suction Temp	Yes
P11 (Input 11)	Case 3 Evap Temp	Yes
P12 (Input 12)	Case 3 Suction Temp	Yes
P13 (Input 13)	Not Used	N/A
P14 (Input 14)	Not Used	N/A
SSR 1	Case 1 Electronic Expansion Valve	N/A
SSR 2	Case 2 Electronic Expansion Valve	N/A
SSR 3	Case 3 Electronic Expansion Valve	N/A
SSR 4	Anti-Sweat Heater	N/A

### Transducer Input

There are two possible inputs that can be used for a transducer on the Mini Intuitive 3 EEV Case Controller variant; either using the 0-10v or the 4-20mA. Please consult the [I/O Connections](#) for wiring. Depending on the type of transducer (0-10v or 4-20mA) the physical input can be chosen using p-17. The parameters on the controller (p-35 & p-36) must then be set so the transducer is read.



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### 3 Stepper Case: Configuration Type 5 & 6

The following tables indicate the functions of the inputs and outputs for a 3 Stepper Case configuration. Since the PR0653 (Quantity 3) is required for operation of the PR0680-3EC platform with this configuration type, the IO numbering sequence of the PR0653 is ordered as extending the PR0680 controller's IO.

#### Mini Intuitive IO

I/O	Remote Case Types 5 & 6	Alarm Action
P1 (Input 1)	Case 1 Return Temp	Yes
P2 (Input 2)	Case 1 Discharge Temp	Yes
P3 (Input 3)	Case 2 Return Temp	Yes
P4 (Input 4)	Case 2 Discharge Temp	Yes
P5 (Input 5)	Case 3 Return Temp	Yes
P6 (Input 6)	Case 3 Discharge Temp	Yes
Universal Input 1	Transducer Input (if fitted, VDC / mA)	Yes
Status 1	Selectable; Plant 1 N/O, Plant 1 N/C	Conditional
Status 2	Selectable; Plant 2 N/O, Plant 2 N/C	Conditional
Status 3	Case Clean	Yes
Status 4	Ext Defrost	N/A
Relay 1	Fans	N/A
Relay 2	Lights	N/A
Relay 3	Defrost Heaters	N/A
Relay 4	Alarm Relay	N/A
Relay 5	Selectable; Remote Relay / LLV	N/A

#### PR0653 IO

I/O	Remote Case Types 5 & 6	Alarm Action
<b>PR0653 #1 (Rotary ID 1)</b>		
P7 (Input 7)	Case 1 Evap Temp	Yes
P8 (Input 8)	Case 1 Suction Temp	Yes
S1	Case 1 Stepper Valve	N/A
<b>PR0653 #2 (Rotary ID 2)</b>		
P9 (Input 9)	Case 2 Evap Temp	Yes
P10 (Input 10)	Case 2 Suction Temp	Yes
S2	Case 2 Stepper Valve	N/A
<b>PR0653 #3 (Rotary ID 3)</b>		
P11 (Input 11)	Case 3 Evap Temp	Yes
P12 (Input 12)	Case 3 Suction Temp	Yes
S3	Case 3 Stepper Valve	N/A

#### Transducer Input

There are two possible inputs that can be used for a transducer on the Mini Intuitive 3 EEV Case Controller variant; either using the 0-10v or the 4-20mA. Please consult the [I/O Connections](#) for wiring. Depending on the type of transducer (0-10v or 4-20mA) the physical input can be chosen using p-17. The parameters on the controller (p-35 & p-36) must then be set so the transducer is read.



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### 3 M-type Case: Configuration Type 7 & 8

The following tables indicate; on a controller type basis, the functions of the inputs and outputs. Since the PR0663-8P-4E is required for operation of the PR0680-3EC platform, the IO numbering sequence of the PR0663-8P-4E is ordered as extending the PR0680 controller's IO.

#### Mini Intuitive IO

I/O	Remote Case Types 3&4	Alarm Action
P1 (Input 1)	Case 1 Return Temp	Yes
P2 (Input 2)	Case 1 Discharge Temp	Yes
P3 (Input 3)	Case 2 Return Temp	Yes
P4 (Input 4)	Case 2 Discharge Temp	Yes
P5 (Input 5)	Case 3 Return Temp	Yes
P6 (Input 6)	Case 3 Discharge Temp	Yes
Universal Input 1	Not Used	N/A
Status 1	Selectable; Plant 1 N/O, Plant 1 N/C	Conditional
Status 2	Selectable; Plant 2 N/O, Plant 2 N/C	Conditional
Status 3	Case Clean	Yes
Status 4	Ext Defrost	N/A
Relay 1	Fans	N/A
Relay 2	Lights	N/A
Relay 3	Defrost Heaters	N/A
Relay 4	Alarm Relay	N/A
Relay 5	Selectable; Remote Relay / LLV	N/A

#### PR0663 IO

I/O	Remote Case Types 3&4	Alarm Action
<b>Rotary ID 1</b>		
P7 (Input 7)	Case 1 Evap Temp	No (Monitor Only)
P8 (Input 8)	Case 1 Suction Temp	No (Monitor Only)
P9 (Input 9)	Case 2 Evap Temp	No (Monitor Only)
P10 (Input 10)	Case 2 Suction Temp	No (Monitor Only)
P11 (Input 11)	Case 3 Evap Temp	No (Monitor Only)
P12 (Input 12)	Case 3 Suction Temp	No (Monitor Only)
P13 (Input 13)	Not Used	N/A
P14 (Input 14)	Not Used	N/A
SSR 1	Case 1 Mechanical Valve*	N/A
SSR 2	Case 2 Mechanical Valve*	N/A
SSR 3	Case 3 Mechanical Valve*	N/A
SSR 4	Anti-Sweat Heater	N/A

\* Since an SSR has only two contacts, the Mechanical Valve must operate as N/O. The SSRs for Types 7 & 8 will energize with the respective valve is called to be closed.



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## Ordering Information

### Mini Intuitive Hardware

When ordering a Mini Intuitive 3 EEV Case Controller the following ordering scheme can be used to purchase the base hardware configuration.

#### **PR0680-3EC**

### Mini Intuitive 3EC EEV / M-type Kit

When configured for EEV pulse valves or mechanical valves, the Mini Intuitive 3 EEV Case Controller requires a PR0663 expansion module to extend the base IO of the PR0680 hardware for control of three evaporator valves. The following ordering scheme can be used to purchase the extended hardware configuration.

#### **PR0685-3EC**

Which contains the following

**1 x PR0680-3EC**

**1 x PR0663-8P-4E**

### Mini Intuitive 3EC Stepper Kit

When configured for EEV stepper valves, the Mini Intuitive 3 EEV Case Controller requires (3) PR0653 expansion modules to extend the base IO of the PR0680 hardware for control of three evaporator valves. The following ordering scheme can be used to purchase the extended hardware configuration.

#### **PR0685-3EC STEP**

Which contains the following

**1 x PR0680-3EC**

**3 x PR0653**



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## Setting up the controller

Access to the controller can be achieved by several ways;

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	<a href="#">Input / output table</a>	nEt	Set/view network configuration	<a href="#">Network Configuration</a>
PArA	Set/View Parameters	<a href="#">Set view parameters</a>	SoFt	View software version	
Unit	Probe type and Celsius/Fahrenheit option	<a href="#">Set View Unit</a>	FANS	Toggle Fans Only mode	<a href="#">Fans Only</a>
PrES	Set Pressure Units	<a href="#">Set Pressure Unit</a>	CASE	Toggle Case Off mode	<a href="#">Case Off</a>
diSP	Display whole units or decimal	<a href="#">Display</a>	Ligt	Toggle Lights Only mode	<a href="#">Lights Only</a>
tyPE	Set/View Controller Type	<a href="#">Set/view controller type</a>	OFSt	Probe Offset	<a href="#">Probe Offset</a>
rtc	Set/view Clock (rtc = Real Time Clock)	<a href="#">Real Time Clock</a>	tEst*	Test Mode	See Note Below
			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 4)
- 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.

## PrES. Set Pressure Units

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

- 0:** Set units for any pressure reading to Bar.
- 1:** Set units for any pressure reading to Psi.

## diSP. Display selection

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.



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## Parameter Tables

Not all parameters apply to all controller types. For example P-125 is the Half Step parameter which only applies to the Stepper configuration of the controller (type 5 & 6). This parameter will not appear if the controller configured for EEV Pulse valves (type 3 & 4). 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	Step	Units	Default LT	Default HT	3&4	5&6	7&8
P-01	Cut-in Temp.	-43.6 – 86 (-42 – 30)	0.1	°F (°C)	-4 (-20)	32 (0)	✓	✓	✓
P-02	Diff.	0 – 18 (0 – 10)	0.1	°F (°C)	3.6 (2)	2.7 (1.5)	✓	✓	✓
P-03	Control Weight	0 – 100	1	%	50	50	✓	✓	✓
P-04	Alarm Weight	0 – 100	1	%	0	0	✓	✓	✓
P-08	Superheat Ref	0 – 21.6 (0 – 12)	0.1	°F (°C)	10.8 (6)	10.8 (6)	✓	✓	
P-09	Response On	1 – 30	1		10	10	✓	✓	
P-10	Response Off	1 – 30	1		10	10	✓	✓	
P-11	Control Type	0 = EEV 1 = EET 2 = EEV/T	1		0	0	✓	✓	
P-51	EEV Minimum Opening	0 – 100	1	%	10	10	✓	✓	
P-52	Superheat Problem	0 – 21.6 (0 – 12)	0.1	°F (°C)	0	0	✓	✓	
P-53	EEV Prob Opening	0 – 100	1	%	10	10	✓	✓	
P-54	EEV Prob Time	00:00 – 99:00	01:00	mm:ss	03:00	03:00	✓	✓	
P-56	EEV Start Opening	0 – 100	1	%	10	10	✓	✓	
P-55	Ave Valve Opening	0 – 100	1	%	100	100	✓	✓	
P-57	Div Value	0 – 100	1	%	50	50	✓	✓	
P-15	Num Coils	0 – 3	1		3	3	✓	✓	✓
P-58	Relay 5 Mode	0 = Remote 1 = LLV	1		0	0	✓	✓	✓
P-13	Anti-Sweat in Defrost	0 = Off 1 = On			0	0	✓		✓
P-14	Anti-Sweat Level	0 to 100	1	%	100	100	✓		✓
P-85	Key-switch Mode	0 = Case Off 1 = Fans only 2 = Toggle 3 = Off	1		0	0	✓	✓	✓
P-87	Display Value	0 = Avg 1 = Lowest 2 = Highest	1		0	0	✓	✓	✓
P-90	Resistor Case Off	0 = Disabled 1 = Enabled			0	0	✓	✓	
P-92	Fans Temp Mode	0 = Off 1 = Temperature 2 = Over-temperature 3 = Temp/OT	1		0	0	✓	✓	✓
P-93	Fans Off Temp	-43.6 – 86 (-42 – 30)	0.1	°F (°C)	14 (-10)	46.4 (8)	✓	✓	✓
P-17	Evap Select	0 = Local 1 = Rem1 2 = Rem2 3 = Rem3 4 = Trans V 5 = Trans mA 6 = Cust V 7 = Cust mA	1		5	5	✓	✓	
P-97	Ctrl Fail Valve	0 – 100	1	%	0	0	✓	✓	
P-18	Service Time	0 – 128	1	KHrs	60	60	✓	✓	✓
P-98	Lights CaseOff	0 = Off	1		0	0	✓	✓	✓



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

Number	Parameter	Range	Step	Units	Default LT	Default HT	3&4	5&6	7&8
		1 = On 2 = Unused							
P-99	Load Shedding	0 = Off 1 = Mode 1 2 = Mode 2	1		0	0	✓	✓	✓
P-100	Digital 1 Mode	0 = Plant 1 N/O 1 = Plant 1 N/C	1		0	0	✓	✓	✓
P-101	Digital 2 Mode	0 = Plant 1 N/O 1 = Plant 1 N/C					✓	✓	✓
P-103	Evap Cust Off	0.0 – 20.0	0.1		0.0	0.0	✓	✓	
P-104	Evap Cust High	0.0 – 20.0	0.1		0.0	0.0	✓	✓	
P-20	OT/UT alarm dly	00:00 – 99:00	01:00	mm:ss	20:00	20:00	✓	✓	✓
P-21	Under Temp Alm	-56.2 – 140 (-49 – 60)	0.1	°F (°C)	-22 (-30)	28.4 (-2)	✓	✓	✓
P-22	Over Temp Alarm	-56.2 – 140 (-49 – 60)	0.1	°F (°C)	5 (-15)	41 (5)	✓	✓	✓
P-40	Defrost Mode	0 = Local 1 = Remote 2 = External			0	0	✓	✓	✓
P-41	Defrost Start	00:00 – 23:59	00:01	hh:mm	01:00	01:00	✓	✓	✓
P-42	Defrosts per Day	0 – 8	1		6	6	✓	✓	✓
P-43	No Defrost Time	0 – 25	1	hours	8	8	✓	✓	✓
P-44	Def Terminate Temp.	-43.6 – 86 (-42 – 30)	0.1	°F (°C)	57.2 (14)	50 (10)	✓	✓	✓
P-45	Def Min Time	00:00 – 99:00	01:00	mm:ss	05:00	05:00	✓	✓	✓
P-46	Def Max Time	00:00 – 99:00	01:00	mm:ss	24:00	24:00	✓	✓	✓
P-47	Drain Down	00:00 – 24:00	00:15	mm:ss	01:30	01:30	✓	✓	✓
P-48	Recovery Time	00:00 – 99:00	01:00	mm:ss	30:00	30:00	✓	✓	✓
P-89	Pump Down Time	00:00 – 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 Types (Cabinet)	00:00 – 99:00	01:00	mm:ss	00:00	00:00	✓	✓	✓
P-88	Fan Delay Temp	-43.6 – 86 (-42 – 30)	0.1	°F (°C)	-4 (-20)	32 (0)	✓	✓	✓
P-50	Fans In Defrost	0 = Off 1 = On			On	On	✓	✓	✓
P-91	Defrost Type M & E	0 = Elec. 1 = Elec/Cln	1		0	0	✓	✓	✓
P-94	Defrost Hold	0 = Off 1 = On			Off	Off	✓	✓	✓
P-95	Defrost Skip	0 = Off 1 = On			Off	Off	✓	✓	✓
P-96	Defrost Skip Time	00:00 – 99:00	01:00	mm:ss	12:00	12:00	✓	✓	✓
P-120	Disp Def Button	0 = Off 1 = On			On	On	✓	✓	✓
P-60	Lights Mode	0 = Local 1 = Remote 2 = Man Off 3 = Man On			Local	Local	✓	✓	✓
P-61	Sun Lights On	00:00 – 23:59	00:01	hh:mm	08:00	08:00	✓	✓	✓
P-62	Sun Lights Off	00:00 – 23:59	00:01	hh:mm	20:00	20:00	✓	✓	✓
P-63	Mon Lights On	00:00 – 23:59	00:01	hh:mm	08:00	08:00	✓	✓	✓
P-64	Mon Lights Off	00:00 – 23:59	00:01	hh:mm	20:00	20:00	✓	✓	✓
P-65	Tue Lights On	00:00 – 23:59	00:01	hh:mm	08:00	08:00	✓	✓	✓
P-66	Tue Lights Off	00:00 – 23:59	00:01	hh:mm	20:00	20:00	✓	✓	✓
P-67	Wed Lights On	00:00 – 23:59	00:01	hh:mm	08:00	08:00	✓	✓	✓
P-68	Wed Lights Off	00:00 – 23:59	00:01	hh:mm	20:00	20:00	✓	✓	✓
P-69	Thu Lights On	00:00 – 23:59	00:01	hh:mm	08:00	08:00	✓	✓	✓
P-70	Thu Lights Off	00:00 – 23:59	00:01	hh:mm	20:00	20:00	✓	✓	✓
P-71	Fri Lights On	00:00 – 23:59	00:01	hh:mm	08:00	08:00	✓	✓	✓
P-72	Fri Lights Off	00:00 – 23:59	00:01	hh:mm	20:00	20:00	✓	✓	✓



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

Number	Parameter	Range	Step	Units	Default LT	Default HT	3&4	5&6	7&8
P-73	Sat Lights On	00:00 – 23:59	00:01	hh:mm	08:00	08:00	✓	✓	✓
P-74	Sat Lights Off	00:00 – 23:59	00:01	hh:mm	20:00	20:00	✓	✓	✓
P-30	Broadcast ID	0 – 999	1		0	0	✓	✓	
P-31	Refrigerant	0 – 25	1		0	0	✓	✓	
P-110	Ref Weight	0 – 100	1	%	0	0	✓	✓	
P-32	Pressure Units	0 = Absolute 1 = Gauge	1		0	0	✓	✓	
P-33	Evap Offset	0.0 to 1.0	0.1		0.0	0.0	✓	✓	
P-34	Glide	-15.0 – 15.0 (-15.0 – 15.0)	0.1	°F (°C)	0.0	0.0	✓	✓	
P-35	Trans Span*	-49 – 2610 (-3.4 – 180.0)	0.1	PSI (Bar)	13.8	13.8	✓	✓	
P-36	Trans Offset*	-49 – 2610 (-3.4 – 180.0)	0.1	PSI (Bar)	0.0	0.0	✓	✓	
P-37	MOP Cut-in	-49 – 2610 (-3.4 – 180.0)	0.1	PSI (Bar)	3.4	3.4	✓	✓	
P-38	MOP Diff	-49 – 2610 (-3.4 – 180.0)	0.1	PSI (Bar)	0.3	0.3	✓	✓	
P-39	MOP Delay	00:00 – 02:00	00:01	hh:mm	00:05	00:05	✓	✓	
P-150	Custom A1	-999 – 999	1		0	0	✓	✓	
P-151	Custom B1 Hi	-999 – 999	1		-220	-220	✓	✓	
P-152	Custom B1 Lo	0 – 999	1		384	384	✓	✓	
P-153	Custom C1	-999 – 999	0.1		262.5	262.5	✓	✓	
P-154	Custom A2	-999 – 999	1		0	0	✓	✓	
P-155	Custom B2 Hi	-999 – 999	1		-220	-220	✓	✓	
P-156	Custom B2 Lo	0 – 999	1		384	384	✓	✓	
P-157	Custom C2	-999 – 999	0.1		262.5	262.5	✓	✓	
P-121	Allow SH Offset	0 = Off 1 = On			0	0	✓	✓	
P-120	Valve Type	0=Carel, 1=Sporlan1, 2=Sporlan2, 3=Alco, 4=Other*	1		0	0		✓	
P-121	Step Max	0 to 6800 (See: Valve Type)	1		480	480		✓	
P-122	Step Close	0 to 6800 (See: Valve Type)	1		500	500		✓	
P-123	Step Speed	0 to 6800 (See: Valve Type)	1	Hz	50	50		✓	
P-124	mA Peak	0 to 500 (See: Valve Type)	1	mA	450	450		✓	
P-125	Half Step	0=Off, 1=On (See: Valve Type)	1		0	0		✓	
P-126	mA Hold	0 to 500	1		0	0		✓	
P-127	Shut Speed	0 to 6800	1	Hz	200	200		✓	
P-128	Overdrive Time	1 to 25	1	hours	8	8		✓	
P-130	Shut Time	00:00 to 99:00	01:00	mm:ss	04:00	04:00		✓	
P-131	Step In Defrost	0 to 3	1		0	0		✓	
dFLt	Restore defaults						✓	✓	✓

\* Transducer Span and Offset allows for the full range of the transducer to be used by the Mini Intuitive 3 EEV Case Controller. 'Span' is the full range of the transducer, 'Offset' is the value below zero.

**Example:** RDM PR0162 with range -14.5 PSI to 485.5 PSI

Span would be 500 PSI (34.5 Bar) Offset would be -14.5 PSI (-1 Bar)



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

## 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		

\***Note** When P-31 is set to Custom, the controller will use the settings in P-150 – P-157.

## Parameter Descriptions

Number	Parameter	Description
P-01	Cut-in Temp.	Temperature at which an EEV will switch on.
P-02	Diff.	Differential temperature below the cut-in temperature for a section. The sections EEV switches off when below this temperature.
P-03	Control Weight	Percentage of the Return Air temperature that is used to calculate a sections control temp. The remaining percentage will be used on the return air temperature. Example, P-03 set to 30% Control temp = 30% Return Air temp + 70% Discharge Air temp
P-04	Alarm Weight	Percentage of the Return Air temperature that is used to calculate a sections Over Temp alarm state.
P-08	Superheat Ref	The controller will attempt to maintain this superheat value for each sections if P-11 is set to 0 or 2.
P-09	Response On	Allows the user to speed up the EEV on time. With 30 providing the quickest response and 1 providing the slowest response. Affects all sections.
P-10	Response Off	Allows the user to speed up the EEV off time. With 30 providing the quickest response and 1 providing the slowest response. Affects all sections.
P-11	Control Type	Allows the user to select the control type for all sections as 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 will control each section using that sections superheat as its main reference with the section cabinet temperature as a secondary control. EET will control each section using that sections control temperature as its main reference. EEV/EET will control using each sections 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. <b>See:</b> <a href="#">Valve Control Type</a>
P-51	EEV Min Opening	Sets the minimum valve opening level, during normal operation each sections valve will not go below this level. (Default 10%) IF used in conjunction with remote pressure from Plant Pack or local pressure from a mA / V input, then the Minimum value should be set at <b>0%</b>
P-52	Superheat Problem	Sets the point at which a control sections algorithm will go to the "EEV Problem" state due to that sections superheat temperature. For example if this parameter is set to 0 Degrees and the Superheat value for section 1 (Valve 1) falls to 0 degrees or below, for the duration of P-54, then section 1 (Valve 1) will enter the superheat problem state.
P-53	EEV Prob Opening	Sets the valve open position when entering the "Superheat EEV Problem" state.
P-54	EEV Prob Time	Sets the time the algorithm stays in the "Superheat EEV Problem" state.
P-56	EEV Start Opening	Sets the initial valve opening % which is used when there is a demand for cooling or when the device is first powered on.
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	When the Mini Intuitive controller generates a MOP alarm 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



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Number	Parameter	Description
		valve opening will be limited to 50%. Therefore as the controller pulses the valve the maximum the valve will open is 50%. Note P-51 EEV Minimum opening overrides the valve output operation and the valve will not pulse below this setting.  Please see <a href="#">Maximum Operating Pressure (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 case operation. If incorrectly set they may have undesired affects.
P-15	Num Coils	Sets the numbers of evaporator sections in use by the controller. In-use sections start sequentially from Section 1. Unused sections will not control, or alarm.
P-58	Relay 5 Mode	Relay 5 can be a Remote or LLV relay.  Remote - The relay is available for remote purposes such as the Data Manager GP timer channel or Data Builder software. LLV - Liquid Line Valve (N/C Operation). Energizes when the controller is in refrigeration mode. Relay 5 will close for Pump down, Defrost and Drain Down.
P-13	Anti-Sweat in Defrost	Allows the Anti-Sweat SSR to be off or on during defrost.
P-14	Anti-Sweat Level	S Sets a percentage level, of a 5-minute period, to pulse the Anti-Sweat heater relay off/on. Example: - P-14 set to 50% = 2.5 minutes on, 2.5 minutes off. If the controller is networked to a Data Manager operating the energy feature Anti-Sweat Control then the Data Manager feature will override this parameter setting. Please refer to the Data Manager user document for further details. <b>Note</b> the Anti-Sweats are turned off when an over temperature alarm occurs.
P-85	Key Switch	Allows the keys switch to be: - Single turn for case off (Case off mode) Single turn for Fans only (Fans Mode) Single turn for case off, double turn for fans only (Toggle mode)
P-87	Display Value	Changes Display Temp (I-22) to be an average of all in-use sections, the lowest temp of all in-use sections, or the highest temp of all in-use sections.
P-92	Fans Temp Mode	Allows the user to set the fans to turn off when: - Temp - A pre-determined temperature is reached (P93) OT - When an over-temperature alarm is present Temp/OT - When either P93 is reached or an OT alarm is present
P-93	Fans Off Temp	Temperature for the above (P92) operation. <b>Note</b> the defrost termination probe is the source of the temperature reading used in this feature. If the defrost termination probe isn't fitted then a similar process to P-44 is used.
P-17	Evap Select	This allows the control algorithm to use either, the Evaporator in probe temperature, a remote temperature input in place of the Evaporator in value or a transducer connected to the controller via the transducer inputs.  In the event of no remote value being received, the control algorithm will revert to using the evaporator in probe value until the remote value is restored.  Please see: <a href="#">EEV Control Using Pressure</a> .
P-97	Ctrl Fail Valve	This value is used in the event of a control probe fail; In the EEV 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-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.



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Number	Parameter	Description
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 42.8°F (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. 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	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) See: <a href="#">Load Shedding</a>
P-100	Digital 1 Mode	Sets the status input type for Status Input 1; Plant N/O – When the DI is activated, it would alarm Plant Fault Plant N/C – When the DI is de-activated, it would alarm Plant Fault
P-101	Digital 2 Mode	Sets the status input type for Status Input 2; Plant N/O – When the DI is activated, it would alarm Plant Fault Plant N/C – When the DI is de-activated, it would alarm Plant Fault
P-103	Evap Cust Off	Offset of 0 for the locally connected transducer. For example, if the parameter value is set to 1 and P-104 is set to 4 then this will give the transducer a span of 1 – 4. Only applicable if P-17 is set to 6/7 for Cust V/Cust mA
P-104	Evap Cust High	High Limit of the local transducer
P-20	OT/UT alarm dly	Time delay for the over and under-temperature alarms
P-21	Under Temp Alm	Under temperature alarm set point. This alarm uses a sections control temperature to alarm. Each section has a unique OT alarm notification.
P-22	Over Temp Alarm	Over temperature alarm set point. This alarm uses a sections return air temperature to alarm. Each section has a unique UT alarm notification.
P-40	Defrost Mode	Allows the user to set the defrost mode: - Local (Uses the internal parameters P-41 and P-42) Remote (Requires a defrost schedule in the front end) External (Status Input 4). When this signal is present, then 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. See P-29 for external defrost signal setup.
P-41	Defrost Start	When defrost mode is set to "Local", this is the start time for the first defrost of the day.
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 over a 24 hour period. Ex. P-41 of 3:00, and P-42 of 3 would set a defrost schedule of 3:00, 11:00, and 19:00
P-43	No Defrost Time	If the controller misses a defrost command for any reason, 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 Term Temp	Defrost will terminate (defrost control relay off) when the temperature of the control temperature reaches this value. Each section must satisfy this temperature to terminate on temp. Otherwise, the defrost cycle will end according to 'Def Max Time'. 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 return air probe reaches the set point (If fans are selected as "on during defrost"). If the "coil in" probe is not fitted, the "Discharge Air" probe will be used.



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Number	Parameter	Description
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	Refrigeration mode 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 return air temperature is still above the OT alarm setpoint when this period expires, an immediate OT alarm occurs; there is <b>not</b> 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 defrost terminate.
P-49	Fan Delay Time	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 Def	Allows the user to set the fans on or off in defrost.
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 set point 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).
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 defrost.
P-120	Disp Def Button	Enables the '#' button on the PR0725 display to initiate defrost if held.
P-60	Lights Mode	Allows the user to set the lights mode: - 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	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.



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

Number	Parameter	Description
		<b>Note:</b> 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-110	Ref Weight	When using a local pressure transducer or a transmitted pressure from a pack controller is used to calculate superheat, the Mini Intuitive 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 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 <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-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	Allows for the superheat reference setpoint (P-08) to be offset by +/-12 degrees using a remote command. See <a href="#">Remote Commands</a> . <b>Note:</b> - The controller will only take this command for 10 minutes before reverting back. 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-120	Valve Type	Choose from four preconfigured stepper valve types or select "Other" to enter the Stepper characteristics for a valve which is not listed. See <a href="#">Valve Type</a>
P-121	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-120). See <a href="#">Valve Type</a>
P-122	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-120). See <a href="#">Valve Type</a>
P-123	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-120). See <a href="#">Valve Type</a> and <a href="#">Appendix 3: Step Speed</a>
P-124	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-120). See <a href="#">Valve Type</a>
P-125	Half Step*	Allows the stepper motor to be rotated in half step increments when used in conjunction with a half step compatible valve.



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Number	Parameter	Description
		The parameter has no effect if the Valve Type (P-120) is set to 0, 1, 2 or 3 (See Valve type). To allow for half stepping P-120 <b>must</b> be set to '4' (other).
P-126	mA Hold	Current supplied to valve when it is stationary, to prevent any drift in valve position. See <a href="#">Holding Current</a>
P-127	Shut Speed	This is the speed in Hz that the valve will shut at if power is lost to the stepper expansion module(s)
P-128	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>
P-130	Shut Time	In the event of a power fail the valve(s) will stay closed for this period once power has been restored.
P-131	Step In Defrost	Determines the operation of the stepper valve during the defrost cycle. Both – Both the Liquid Line Valve (relay 5 when set to LLV) and the Stepper Valve close at the start of defrost when pump-down starts. Stp Pmp – The Liquid Line Valve closes at the start of defrost but the Stepper Valve remains open and then closes after the pump-down period. Stp Opn – The Liquid Line Valve closes at the start of defrost but the Stepper Valve remains open for the duration of defrost.
dFLt	Restore default values	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 1 or mode 2 to reduce the load on the pack or to reduce the CO2 vessel pressure.

Mode 1 will open the LLV/EEV and stop the fans, mode 2 will close the LLV/EEV and stop the fans.

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-120 and make sure parameters P-121, P-122, P-123, P-124 and P-125 are all set to the correct values.

**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.**

## Half Step

Parameter P-125 allows the stepper motor to be rotated in half step increments when used in conjunction with a half step compatible valve. The parameter has no effect if the Valve Type (P-120) is set to 0, 1, 2 or 3 (See [Valve type](#)). To allow for half stepping P-120 must be set to '4' (other).

## Stepper Valve Type

Parameters P-121, P-122, P-123, P-124 and P-125 only have an effect if "Other" is selected when configuring parameter P-120. Other allows the user to map in the requirements the stepper valve.

Selecting option 0, 1, 2 or 3 at parameter P-120 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-121, P-122, P-123 and P-125. **Note** the parameters relating to the Stepper Valve type should be configured prior to wiring the Stepper Valve to the Mercury 2 Stepper controller. If one of the three default valve types is selected then changing P-121, P-122, P-123, P-124 and P-125 will have no effect.



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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

## Valve Wiring

Manufacturer	Model	Wiring (Colours)	Connection Description (See Stepper Output)
Carel	E <sup>3</sup> V / E <sup>2</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
		Black (B)	M1A
		Blue (C)	M2A
		Brown (D)	M2B

**Important** – Our information is taken from 3rd 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.

## 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 (P-128) will overdrive the Stepper motor output by 10% of the step max value at the pre-set 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.



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## Superheat Options

The superheat for EEV control can be calculated using different means to suit the application. Selectable from parameter P-17 – Evap Select;

- **Local** - Based on the value of the Evaporator and Suction line temperature probe inputs connected directly to the controller.
- **Rem1/2/3** - The local Suction line temperature probe and a remote suction pressure value broadcast by an Intuitive Pack controller on the same IP network. The pressure received from the Intuitive Pack controller is converted to a temperature based on the gas type being used by the system. **Note:** Broadcast ID (P-30) must be set to the pack's network ID (rotary address). See section: [Plant Pack Controller](#) below.
- **Trans V / Trans mA / Cust V / Cust mA** - The local suction line temperature probe and a local suction pressure measured by a transducer connected to the controller's internal transducer input and converted to evaporator temperature. See section: [Local Analogue Input](#) below.

## EEV Control Using Pressure

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

### Remote pressure Direct from a Pack Controller

(P-17 set to Rem1/ Rem2/ Rem3)  
(P-30 set to network ID of Plant Pack)  
(P-31 set to refrigerant type)

P-17 is set depending on which input the suction transducer is connected to on the plant controller (Transducer input 1, 2 or 3). The broadcast ID (P-30) should be set to the network ID of Plant Pack Controller (Rotary Switch Setting). The Refrigerant type (P-31) must be set along with pressure units (P-32) set to Absolute or Gauge. This method cannot be used when using a PR0018-PHI Hub.

### Local Analogue Input – mA or V

(P17 set to Trans mA / Trans V / Cust V / Cust mA)  
(P-31 to P-36 must be set accordingly)

A suction transducer can be connected directly to the analogue input of the controller (See I/O Connections of the [Mini Intuitive 3 EEV Case 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. 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.

## Maximum Operating Pressure (MOP)

If the controller is set to use a local or remote pressure transducer to calculate the suction temperature, then a MOP alarm can be generated (using parameters (P-37/P-38/P-39). When a MOP alarm is generated on the controller, it will either close or reduce the EEV valve opening when a predetermined pressure is reached. This MOP value is configured in the Mini Intuitive 3 EEV Case Controller. When the MOP alarm is generated, the controller reduces the maximum valve opening to this percentage. For example if the "EEV Divide Value" parameter is set to 50% and the MOP alarm is generated then the maximum valve opening will be limited to 50%.

## Ref Weighting

When using a local pressure transducer to calculate superheat, the Mini Intuitive 3 EEV Case 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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## Valve Control Type

The controller has three methods of valve control selectable using P-11. The control parameters are shared over all sections. The control algorithm is designed in a way to stagger the opening of each of the three evaporator section valves to disallow them all opening at the same time after defrost or during controller start-up to mitigate the effects of liquid hammer.

### EEV

This is the default method and most commonly used. The control temperature for each evaporator coil (Return Air and Discharge Air average) is used to start valve operation, when the temperature rises above the cut in temp parameter (P-01) the valve will switch on and open to its start opening value (P-56) for 30 seconds to establish a superheat reading, valve state will show "Start".

After 30 seconds the valve state will change to "Run" and valve opening is controlled according to the superheat value referenced to the superheat target parameter (P-08). Generally speaking if the superheat value is higher than the target (P-08, default 6 degrees) then the valve will open, if the superheat is below target then the valve will start to close.

As a safety feature to prevent liquid flood back, if the superheat drops too low (below the superheat problem setting P-52, default 0 degrees) for a period longer than the problem time (P-54, default 3 minutes) then the valve will close to the problem opening value (P-53, default 10%) for the superheat problem time (P-54), valve state will show "Problem". After the valve problem opening period has expired, the valve will go through the normal "Start" and "Run" process as detailed above. If the superheat value still remains low after another problem time period then the valve will re-enter the problem state and the process will be repeated.

If at any point the control temperature (Return Air and Discharge Air average) drops below the cut in parameter (P-01) minus the diff (P-02), the valve will be switched off and closed fully. Once the control temperature rises above the setpoint again (P-01), the valve will start up again and the above procedure will be repeated.

In summary, the control temperature (Return Air and Discharge Air average) acts as a thermostat to switch the valve on and off, once switched on the valve will control to the superheat target.

### EET

This method uses the control temperature for each evaporator coil (Return Air temp and Discharge Air temp) to control the corresponding valve around the cut in set point (P-01). If the control temperature is above setpoint then the valve will start opening, and if that temperature is below setpoint then that valve will start closing. The further away the temperature is from setpoint the faster the valve will open and close.

As a safety feature the superheat will still be monitored but will only take control of the valve if the superheat drops below the superheat problem value and will then enter the "problem", "start" and "run" sequences as detailed above. Once the superheat has recovered valve control will pass back to the Return Air and Discharge Air probes.

### EEV/ EET

This method uses a combination of EEV and EET control detailed above. The control temperature for each evaporator coil (Return Air and Discharge Air average) will control the corresponding valve around the cut in setpoint (P-01). At the same time the superheat for each coil is monitored and if this gets close to the superheat target (P-08) then valve control will pass to the superheat value referenced against the superheat target. Control will switch between superheat and Return Air/Discharge Air temperature control and will attempt to maintain the superheat target (P-08) and the control temperature (P-01) alternatively.



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## Relay State and functional operation

Relay 1-3 State	Function State	Wired contact	Relay 4-5 State	Function State	Wired contact
Relay 1 off	Fans on	N/C	Relay 4 off	Alarm Relay = Alarm	N/C
Relay 1 on	Fans off	N/C	Relay 4 on	Alarm Relay = OK	N/C
Relay 2 off	Lights on	N/C	Relay 5 off	RemRly off / LLV open	Variable
Relay 2 on	Lights off	N/C	Relay 5 on	RemRly on / LLV close	Variable
Relay 3 off	Defrost off	N/C			
Relay 3 on	Defrost on	N/C			

Normally open (N/O) and normally closed (N/C) contacts refer to the relay contacts that are fed from the common connection when the controller is unpowered. Items connected to the N/C contact, such as fans and lights, will remain on if the controller loses power. Items connected to the N/O contact, such as defrost and Anti-Sweat heaters, will switch off if the controller loses power.

The wired contact of the Relay 5 will vary with application, since Relay 5 is configurable as Remote / LLV. Please consider the N/O vs N/C relation of power to common in the event that the controller would become unpowered.

The SSRs on the PR0663 expansion board only have two wired contacts.

## Relay and screen states during defrost

State:	Pump Down	Defrost Min	Defrost Max	Drain Down	Fan Delay	Recovery
<b>Screen</b>	DEF	DEF	DEF	DEF	DEF	REC
<b>Def LED</b>	On	On	On	Off	Off	Off
<b>SSR 1 EEV</b>	Closed	Closed	Closed	Closed	Open	Open
<b>SSR 2 EEV</b>	Closed	Closed	Closed	Closed	Open	Open
<b>SSR 3 EEV</b>	Closed	Closed	Closed	Closed	Open	Open
<b>SSR 4 Anti-Sweat on in defrost</b>	On	On	On	On	On	On
<b>SSR 4 Anti-Sweat off in defrost</b>	Off	Off	Off	Off	Off	On
<b>RLY 3 Defrost Relay</b>	Off	On	On	Off	Off	Off
<b>RLY 2 Lights relay</b>	On	On	On	On	On	On
<b>RLY 1 Fans (On in DF)</b>	On	On	On	On	Off	On
<b>RLY 1 Fans (Off in DF)</b>	On	Off	Off	Off	Off	On



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## Defrost Termination

Defrost termination will be when the temperature parameter "Def Terminate" has been reached satisfied according to either of the following,

- Or The evaporator "Coil In" probe reaches the set point (If fans are selected as "off during defrost")
- Or The "Discharge Air" probe reaches the set point (If fans are selected as "on during defrost")

If the "coil in" probe is not fitted, the "Discharge Air" probe will be used. If the "Discharge Air" probe is faulty termination will occur when the time-out period has elapsed as defined by 'Def Max Time'.

All three sections must satisfy the above termination criteria before the shared defrost cycle will exit.

## Fan Delay after Defrost

The fans will come back on when: -

- Or The fan delay time has elapsed if the "fan delay mode" is set to time
- Or The fan delay mode is set to "temp", the fans will come on when the 'Coil In' / 'Discharge Air' probe reaches the fan delay set point, or on the time parameter, whichever occurs first.

If the "defrost termination" probe is not fitted, the fans will come on when: -

- Or The "coil in" probe reaches the control set point (If fans are selected as "off during defrost")
- Or The "Discharge Air" probe reaches the control set point (If fans are selected as "on during defrost")



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## 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 Mini Intuitive comes standard with built in IP (See [Ordering details](#) for more information).

### Mini Intuitive 3 EEV Case Controller – IP

When logging a Mini Intuitive 3 EEV Case Controller with an in-built IP interface it will be connected directly into an IP network without the need of a communications module.

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

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 set in the controller by navigating to 'IP-L' within the 'Net' menu. 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 <b>network mask length</b> 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. <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



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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*	Step	Units
I-01	Control Temp 1	-43.6 to 262 (-42 to 128)	0.1	°F (°C)
I-02	Alarm Temp 1	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-03	Return Air temp 1	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-04	Discharge Air temp 1	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-05	Evap temp 1	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-06	Suction temp 1	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-07	Superheat 1	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-08	Control Temp 2	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-09	Alarm Temp 2	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-10	Return Air temp 2	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-11	Discharge Air temp 2	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-12	Evap temp 2	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-13	Suction temp 2	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-14	Superheat 2	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-15	Control Temp 3	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-16	Alarm Temp 3	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-17	Return Air temp 3	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-18	Discharge Air temp 3	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-19	Evap temp 3	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-20	Suction temp 3	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-21	Superheat 3	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-22	Display Temp	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-23	Plant Fault 1	0 (OK), 1 (Alarm)		
I-24	Plant Fault 2	0 (OK), 1 (Alarm)		
I-25	Case Clean	0 (Off), 1 (On)		
I-26	Remote Evap Temp	-56.2 to 262 (-49 to 128)	0.1	°F (°C)
I-27	Ext Defrost	0 (Off), 1 (On)		
I-28	MOP	0 (OK), 1 (Alarm)		
I-29	Div Input	0 to 100	1.0	%
I-30	Remote Press	-3.4 to 180.0 (-49.3 to 2610.7)	.1	PSI (Bar)
I-31	Local Press	-3.4 to 180.0 (-49.3 to 2610.7)	.1	PSI (Bar)
I-32	Local Calc Temp	-49 to 128 (-56.2 to 262)	0.1	°F (°C)
I-33	Load Shed	0 (OK), 1 (Alarm)		
O-01	Valve Opening 1	1 to 100	1.0	%
O-02	Thermostat 1	0 (Off), 1 (On)		
O-03	Valve Opening 2	1 to 100	1.0	%
O-04	Thermostat 2	0 (Off), 1 (On)		
O-05	Valve Opening 3	1 to 100	1.0	%
O-06	Thermostat 3	0 (Off), 1 (On)		
O-07	Anti-sweats	1 to 100	1.0	%
O-08	Case Fans	0 (Off), 1 (On)		
O-09	Lights	0 (Off), 1 (On)		
O-10	Defrost Control	0 (Off), 1 (On)		
O-11	Alm Relay	0 (Off), 1 (On)	0.1	%
O-12	Remote Rly / LLV	0 (Off), 1 (On)		



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Number	IO	Range*	Step	Units
O-13	Last Def. Time	00:00 to 23:59		hh:mm
O-14	Last Def. Length	00:00 to 03:00		hh:mm
O-15	Last Def. Ctrl Temp.	-42 to 128 (-43.6 to 262)	.1	°F (°C)
O-16	Last Def. Type	0 (None), 1 (Internal), 2 (External), 3 (Network), 4 (Display), 5 (Timed) 6 (Forced), 7 (Skipped)		
O-17	Setpoint Offset	-18 to 18	.1	°F (°C)
O-18	Anti-Sweat Off Period	00:00 to 05:59		mm:ss
O-19	Run Time	0 – 128 K Hours	1	k hrs
O-20	Superheat Offset	-12 to 12	.1	°F (°C)
S-01	Control State	0 (Stabilise), 1 (Normal), 2 (Defrost Min), 3 (Defrost Max), 4 (Drain Down), 5 (Fan Delay), 6 (Recovery), 7 (OT Alarm), 8 (UT Alarm), 9 (Fans Only), 10 (Lights Only), 11 (Case Off), 12 (Pump Down), 13 (Defrost Hold), 14 (Load Shed)		
S-02	Valve 1 State	0 (Off), 1 (Start), 2 (Run), 3 (Problem), 4 (Fail), 5 (Shed)		
S-03	Valve 2 State	0 (Off), 1 (Start), 2 (Run), 3 (Problem), 4 (Fail), 5 (Shed)		
S-04	Valve 3 State	0 (Off), 1 (Start), 2 (Run), 3 (Problem), 4 (Fail), 5 (Shed)		

\* Range is dependent on probe type

## Display Messages

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

Display Message	System status	Display Message	System status
Ft	Control Fault	dEF	Control State in Defrost
Prb1	Probe 1 Fault	AL	Control State in Alarm
Prb2	Probe 2 Fault	Plt1	Plant fault 1
Prb3	Probe 3 Fault	Plt2	Plant Fault 2
Prb4	Probe 4 Fault	Plt3	Plant Fault 3
Prb5	Probe 5 Fault	Plt4	Plant Fault 4
Prb6	Probe 6 Fault	FanS ONLY	Controller in Fans Only
Prb7	Probe 7 Fault	LitS ONLY	Controller in Lights Only
Prb8	Probe 8 Fault	CASE OFF	Controller in Case Off
Prb9	Probe 9 Fault	Ot	Over Temperature Alarm
Prb10	Probe 10 Fault	Ut	Under Temperature Alarm
Prb11	Probe 11 Fault	Brd	Expansion Board offline
Prb12	Probe 12 Fault		
rEC	Control State in Recovery		

## 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.



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

Alarm text	Type # (index)	Alarm text	Type # (index)
Missed defrost	15	Product under temperature	9
Plant Fault 1, 2	3	Person Trapped	1
Case over temperature	4	Monitor Probe OT	12
Case under temperature	5	Case Clean	29
Probe 1 - 12 Faulty	6	Remote evap temperature	6
Door Left Open	2	Transducer Fault	6
Product over temperature	8	Load Shedding	7
MOP Alarm	3	Lights Only	29
Ext Problem	6		

## 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.

### Probe Offset

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



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

## Rack Optimisation

Optimisation is supported when used in conjunction with an RDM Data Manager V4.0 or higher.

On the Data Manager up to three valves can be set up on the "Item Matching" page. The Data Manager will use the highest single valve opening of the three valves in the rack optimisation calculation.

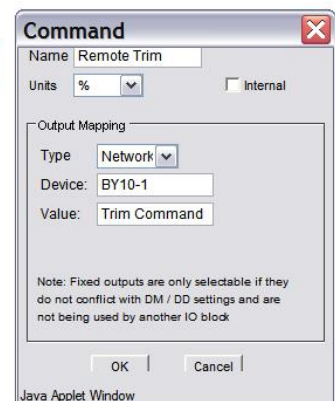
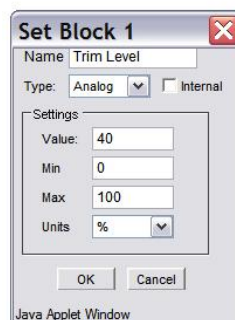
## Remote Commands

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 Anti-Sweat level to this value (Anti-Sweat period is 5 min)	Relay 4 mode: Anti-Sweat Heater
Setpoint Command	+/-18	Is added to or subtracted from the setpoint	
Case Off Command	5	Sets the controller to Case Off	
	6	Sets the controller to Fans Only	
	8	Sets the controller to Lights Only	
	0	Restores the controller from Case Off to Normal	
Haccp Command	0	HACCP LED OFF	
	1	HACCP LED On	
	2	HACCP LED Flashes	
Button Command	0	Buttons backlights Off	
	1	Buttons backlights On	
EEV Command	2	Shuts all valves off	
	1	Restores the valves to normal operation	
Divider Command	0 to 100%	Sets the maximum valve opening to this percentage.	MOP input from Merc PHI hub 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 Anti-Sweat Heater on BY10-1 at 40%.



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

## Mercury / Intuitive Controller Passcode

The Service menu allows access to all the controller's settable parameters and requires a password to access.

Due to increased cyber security protection, implemented from April 2025 onwards, the Mercury / Intuitive range of controllers have a firmware update which removes the previous shipping default legacy password and replaces it with a unique passcode from the factory. This unique passcode can be changed by the engineer, if required, using a PC connection and the controller display.

Any version of Mercury / Intuitive controller will log onto a Data Manager front end as before, the April 2025 update only affects the Data Manager's ability to change parameters on the Mercury controller. At the controller itself the normal method of accessing the "Para" menu using it's display remains unchanged.

### Action Overview

There are three possible actions to take when networking a Mercury / Intuitive , these are fully documented later in this application note, below is a summary table.

Combinations	Action
New Mercury / Intuitive (post-April 2025) and new Data Manager (V4.2.3 or newer)	No action needed. Logon and network as before.
Older Mercury / Intuitive (pre-April 2025) and any Data Manager software version	No action needed. Logon and network as before.
New Mercury / Intuitive (post-April 2025) and older Data Manager (V4.2.2 or earlier)	Navigate to "PASS" via Mercury display and set to "OLD". Logon and network as before.

### Using a new Mercury / Intuitive controller with a recent Data Manager

If connecting a new Mercury / Intuitive Controller (Manufactured on April 2025 or later) with a Data Manager with firmware version V4.2.3 or newer (Manufactured on September 2023 or later), then there will be no compatibility issues.

A quick way to determine if a Mercury / Intuitive controller is legacy or not is the "PASS" menu being present, see: [Setting the legacy passcode on a new Mercury / Intuitive controller](#) later on in this document. If the "PASS" menu is **not** present then the controller is classed as a legacy controller (pre April 2025).

If connecting a PC directly to the Mercury / Intuitive controller the previous default legacy password will not work and a new passcode will need to be set up. The Mercury controller requires a built-in display or remote display (PR0725 for example) to enable this.

### Using a legacy Mercury / Intuitive controller with a Data Manager

If connecting a legacy Mercury / Intuitive Controller (Manufactured **before** April 2025) with any Data Manager then there will be no compatibility issues.

If connecting a PC directly to the Mercury controller the legacy default password will work as before.

### Using a new Mercury / Intuitive controller with a legacy Data Manager

If connecting a new Mercury / Intuitive Controller (Manufactured on April 2025 or later) with a Data Manager with firmware version V4.2.2 or earlier, then the Mercury / Intuitive controller will require the unique factory shipping passcode to be changed to enable the legacy Data Manager to make parameter changes in the controller.

If connecting a PC directly to the new Mercury / Intuitive controller the previous default legacy password will not work and a new passcode will need to be configured. The Mercury controller requires a built-in display or remote display (PR0725 for example) to enable this.



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

## Setting the legacy passcode on a new Mercury / Intuitive controller

If using a new Mercury / Intuitive controller with a legacy Data Manager (V4.2.2 or earlier) a PC connection is not required and a legacy default passcode can be set using the controller's display.

To enter the setup menu on the Mercury / Intuitive Controller press and hold the Enter and Down keys for 3 seconds, the display will show "Ent", release both keys and press the Enter key and the display will show "IO", this is the Input/Output menu.

Press the Up or Down keys to scroll through the set up menus until the "PASS" menu is shown, press the Enter key to select. The display will show "Hi".



Pressing the Up key again will show "Lo" on the display, pressing the Up key again will show "Old".



Pressing the Enter key on "Old" will show "dFLt", this allows the legacy default passcode to set in the controller, pressing the Enter key again will set the legacy passcode and the display will return to "PASS".

The Legacy passcode is now set. Navigate to "Esc" and press the Enter key to save the setting otherwise the display will timeout after 60 seconds after no user interactions.

The Data Manager will now be able to set parameters in the Mercury / Intuitive controller.



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## Technical Specifications

### Mini Intuitive Controller (PR0680)

Power Requirements	
Supply Voltage Range	24 VDC $\pm 10\%$ or 24 VAC $\pm 10\%$
Supply Frequency	DC or 50 – 60 Hz $\pm 10\%$
Maximum supply current	1.8A
Typical supply current	<0.3A
Class 2 Insulation	<b>No</b> protective Earth is required. A functional earth can be connected if the equipment is located in an electrically noisy environment.

**Note:** The use of centre tapped to earth transformers is not allowed. This is to prevent damage to the transformer and/or controller. The host equipment must provide adequate protection against contact to hazardous live parts.

Insulation and Fuse Requirements	
Class 2 Insulation	<b>No</b> protective Earth is required. A functional Earth may be fitted in noisy environments.
Supply Fuse	Built in fuse holder, fuse 2A 240Vac Ant surge (T) HRC conforming to IEC60127, 32 x 6.3mm
Or MCB	2A, 240 VAC Type D conforming to BS EN 60898 (Note: controller has integral 2A fuse)
Relay Fuse	10A 240Vac Ant surge (T) HRC conforming to IEC60127, 32 x 6.3mm

RDM advise the use of a suitable external over-current protection device on the Mini Intuitive Controller.

Warranty may be invalidated due to excess current being unlimited if there are no fuses/circuit breakers installed.

General	
Operating temperature range	Without Internal LCD Display : -40°F to +140°F (-40°C to +60°C) With Internal LCD Display: -4°F to +140°F (-20°C to +60°C)
Operating Humidity	80% maximum
Storage temperature range	Without Internal LCD Display : -40°F to +149°F (-40°C to +65°C) With Internal LCD Display or SSR fitted : -22°F to +149°F (-30°C to +65°C)
Environmental	Indoor use at altitudes up to 2000m, Pollution Degree 1, Installation Category II. Voltage fluctuations not to exceed $\pm 10\%$ of nominal voltage
Dimensions	157mm (L) x 101mm (W) x 67mm (H)
Weight	TBC
Safety	EN 61010-1:2010
EMC	EN 61326-1:2013 FCC CFR 47 Parts 15.107 & 15.109 and ICES-003 Issue 6
UL Compliance	UL 60950-1 and CAN/CSA C22.2 No. 60950-1-07 Information Technology Equipment - Safety - Part 1: General Requirements.
Ventilation	There is no requirement for forced cooling ventilation

Inputs	
Probe Input type	See <a href="#">Set/change Units</a> for probe types.
Status Input type	The preferred option is a 0 volt return through a volt free relay or 24 Vac referenced to the supply voltage. If a 24Vac signal is being sourced from the Plant controller power supply then <b>do not</b> ground the Status Input common rail, this is grounded internally.
4-20mA	4-20mA current loop, use the 12 Vdc output to feed the device (28mA Maximum)

Outputs	
Mechanical Relay	10A/250 VAC/AC1 (Resistive load)
	10A/30 VDC (Resistive load)
	5A/250 VAC $\cos\phi=0.4$
Solid State Relay (SSR)	1A/250 VAC (AC only, will not switch DC)

Communications	
Comms	Ethernet, CANbus



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

## Mini IO Expansion Module (PR0663 8P-4E)

Power Requirements	
Supply Voltage Range	24 VDC $\pm 10\%$ or 24 VAC $\pm 10\%$
Supply Frequency	DC or 50 – 60 Hz $\pm 10\%$
Maximum supply current	0.25A
Typical supply current	<0.15A
Class 2 Insulation	<b>No</b> protective Earth is required. A functional earth can be connected if the equipment is located in an electrically noisy environment.

General	
Operating temperature range	Without SSR Fitted : -40°F to +140°F (-40°C to +60°C) With Internal LCD Display: -22°F to +140°F (-30°C to +60°C)
Operating Humidity	80% maximum
Storage temperature range	Without SSR Fitted : -40°F to +149°F (-40°C to +65°C) With Internal LCD Display: -22°F to +149°F (-30°C to +65°C)
Environmental	Indoor use at altitudes up to 2000m, Pollution Degree 2, Installation Category II.
Dimensions	52.5mm (L) x 134mm (W) x 70mm (H)
Weight	TBC
Safety	EN 61010-1:2010, UL 62368-1
IP Rating	IP20
EMC	EN 61326-1:2013 FCC CFR 47 Parts 15.107 & 15.109 and ICES-003 Issue 6
UL Compliance	UL 60950-1 and CAN/CSA C22.2 No. 60950-1-07 Information Technology Equipment - Safety - Part 1: General Requirements.
Ventilation	There is no requirement for forced cooling ventilation
Class 2 Insulation	No protective Earth is required.
External Supply Fuse	2A 240VAC Anti Surge (T) HRC conforming to IEC60127, 32x6.3mm
External MCB	2A 240VAC Type D conforming to BS EN 60898

Inputs	
Analogue Inputs 1-8	See <a href="#">Set/change Units</a> for probe types.

Solid State Relays	
Max Load Current	1Arms
Min Load Current	0.025Arms
Load Voltage Range	20-280VAC (Not DC Voltage Compatible)

Communications	
Comms	CANbus
Module ID	Position 0 through to 9 - Select a unique ID for each expansion board in use

## Intuitive Stepper Module with Auto Close (PR0653 / PR0653-C)

Power Requirements	
Supply Voltage Range	24VDC $\pm 10\%$ or 24VAC $\pm 10\%$
Supply Frequency	DC or 50-60Hz $\pm 10\%$
Maximum Supply Current	0.3A (Not Including Stepper Current)
Typical Supply Current	<0.15A (Not Including Stepper Current)
Maximum Supply Current	1A (Running 8W Stepper Valve at 24VDC)
General	
Operating Temperature Range	0°C to +50°C (32°F to +122°F)
Operating Humidity	80% Maximum
Storage Temperature Range	0°C to +65°C (32°F to +149°F)
Environmental	Indoor use at altitudes up to 2000m, pollution degree 2, installation category II.
Dimensions – L x W x H	52.5mm (2in) x 134mm (5.2in) x 70mm (2.8in)



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

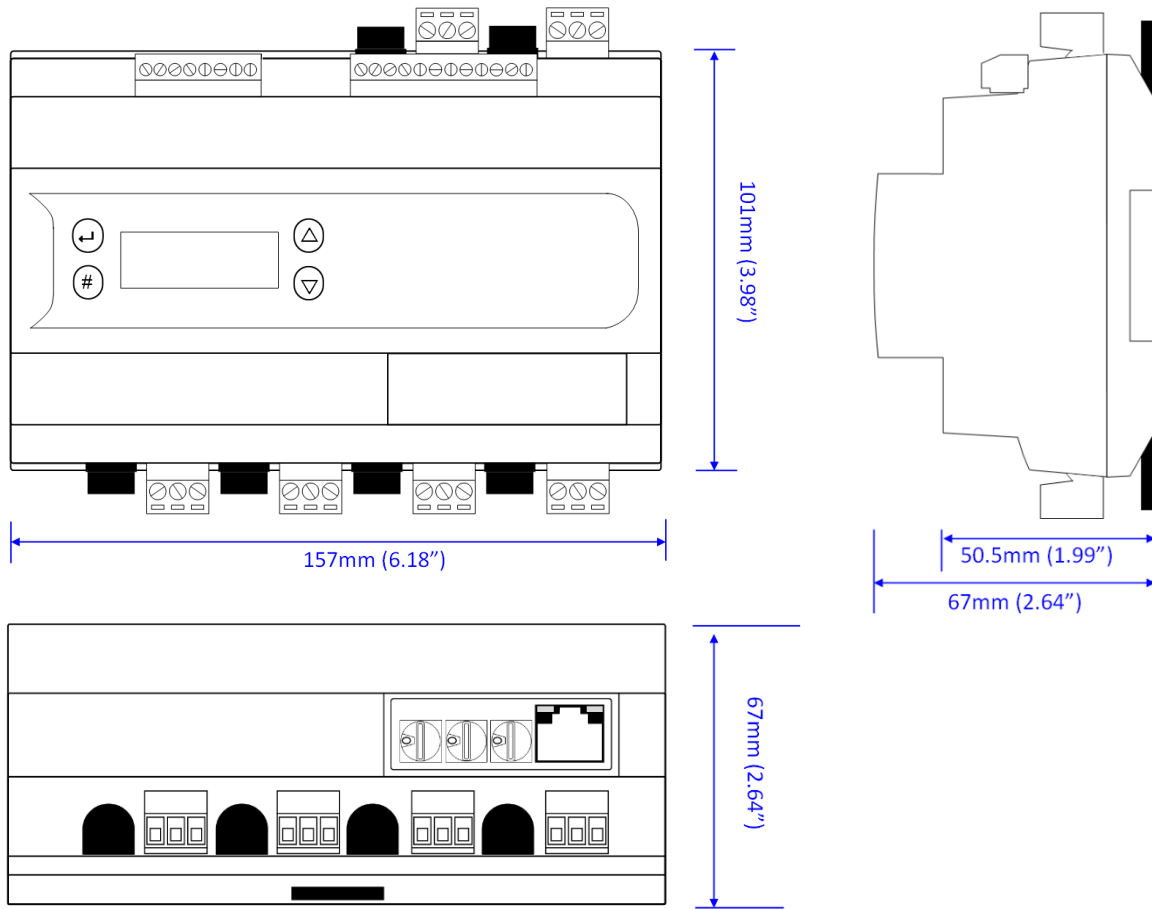
Approx. Mass	165g					
Safety	EN 61010-1:2010 UL 62368-1 (Not yet Certified)					
IP Rating	IP20					
EMC	EN 61326-1:2013 FCC CFR 47 Parts 15.107 & 15.109 ICES-003 Issue 6					
Ventilation	There is no requirement for forced cooling ventilation					
Insulation	Class III. No protective Earth is required.					
External Supply Fuse	2A Anti Surge (T) HRC conforming to IEC60127					
External Supply MCB	2A Type D conforming to BS EN 60898					
<b>Mechanical Relay</b>						
Max Contact Current	3A (cos $\theta$ = 1)		2A (cos $\theta$ = 0.6)			
Max Contact Voltage	250VAC, 30VDC					
<b>Stepper Output</b>						
Chopper current drive suitable for Bipolar (4-Wire) and Unipolar (6/8-Wire) stepper valves						
Max Valve Motor Power	8W					
Max Phase Current	580mA Arms / 825mA peak					
<b>Valve Closure Power Reserve</b>						
Maximum Charge Time	450 seconds (7min 30sec)					
Typical Charge Time	380 seconds (6min 20sec)					
	<ul style="list-style-type: none"> <li>Charge times apply to supercapacitors that have been completely discharged.</li> <li>A full valve closure is possible even if the module is not completely charged depending on the valve's energy usage.</li> <li>The relay output is controlled using TDB under normal operating conditions however if a power fail is detected the relay is de-energised. This allows the relay to function as a power fail alarm by being set permanently on in TDB until a power fail overrides this and disables it.</li> </ul>					
<b>LED Functions</b>						
Status	Flash green when module is active.					
Reset	Solid red when module is in reset.					
Relay	Solid blue when relay is energized.					
Charge	Flash green when module is charging - pulse length proportional to charge level. Solid green when module is charged.					
Power Fail	Flash red when power to the module has been interrupted.					
<b>Guaranteed Closure Valve list</b>						
<b>ALCO</b>	EX4	EX5	EX6			
<b>SPORLAN</b>	SEI 0.5-11	SEI 30/50	SHE 100/175	SER 1.5-20	SER G/J/K	SER AA/A/B/C/D
<b>DANFOSS</b>	ETS 12.5-25B	ETS 50B	ETS 100B	ETS 250/400		
<b>CAREL</b>	E2/5/6V	E3/4/7V				
Note: guaranteed valve closure subject to configuration of valve parameters						



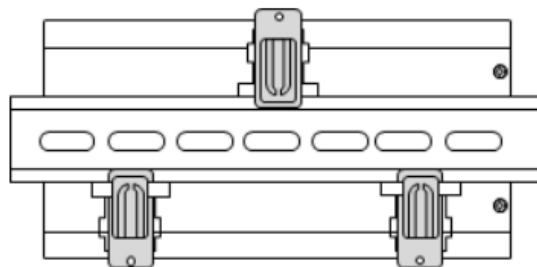
Please ensure all power is switched off before installing or maintaining this product.

## Installation & Dimensions

### Dimensions – Mini Intuitive Controller



### Mini Intuitive Mounting Instructions



Three clips fix the Mini Intuitive 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

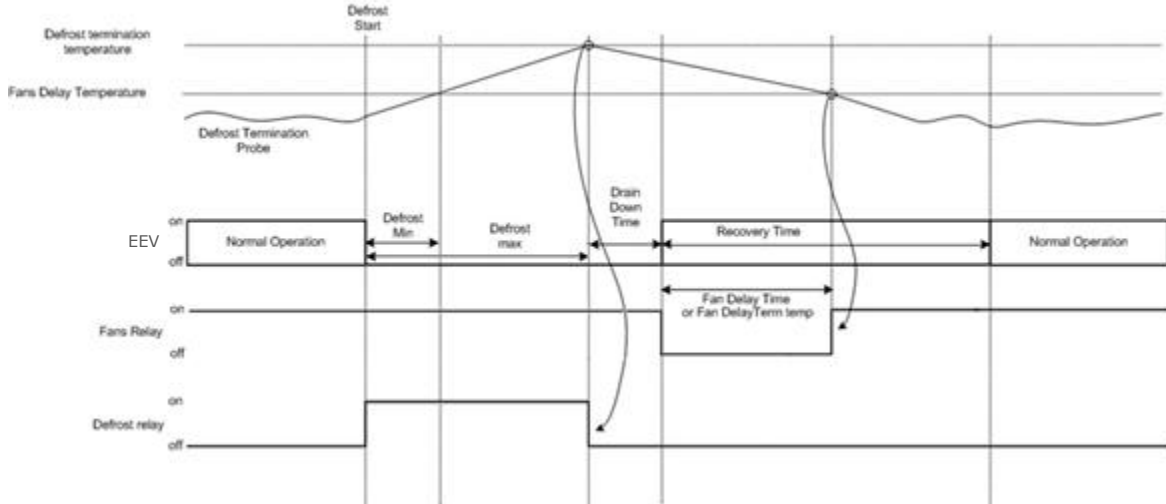
Do not wet the controller when cleaning. Clean the front by wiping with slightly dampened lint free cloth.



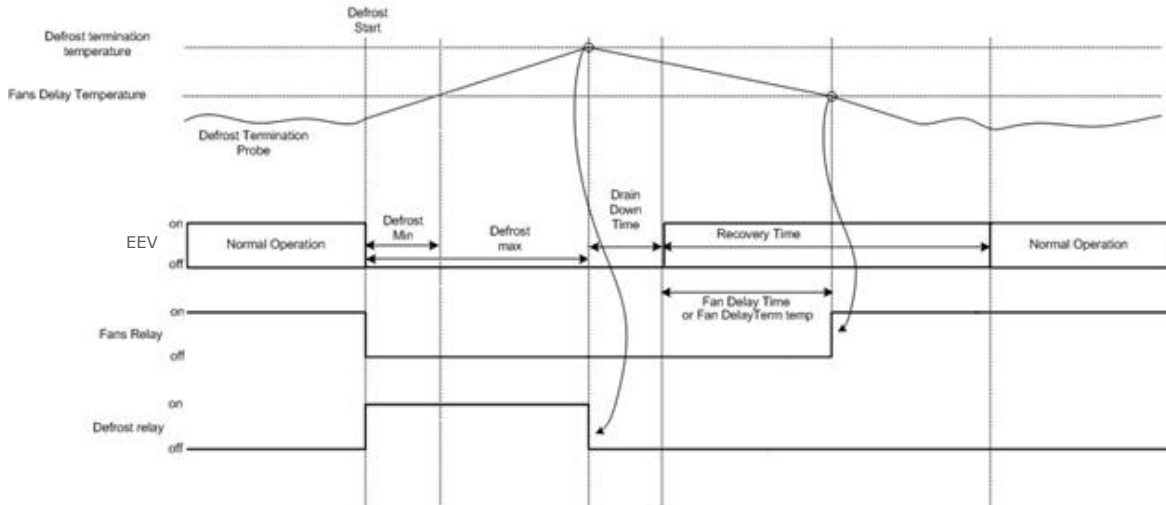
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# Appendix 1: Defrost Cycles

## Fans On in Defrost



## Fans Off in Defrost



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## Appendix 2: Anti-Sweat Heater Control via Mercury/Intuitive 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 Anti-Sweat heater relay off for a given period of time. One way to pulse the Anti-Sweat heater is by configuring P-14. For greater energy savings the Data Manager Energy feature Anti-Sweat control or the Mercury Switch Anti-Sweat control feature can be used. These two options pulse the Anti-Sweat relay dependant on the actual shop floor humidity levels. Thus if the shop floor humidity is relatively low the Anti-Sweat heaters can be pulsed off for longer durations. Please see the relevant user guides for further details.

Due to the high switching rate, Anti-Sweat heaters must not be switched directly from the Mercury Anti-Sweat heater relay and a Anti-Sweat Heater Pulse Module (PR0723) must be used in all instances of Anti-Sweat control. This module is fitted in between the Anti-Sweat heater of the case and the relay output of the Controller which is pulsing the heater. The Anti-Sweat 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 Anti-Sweat heater on and off via a normal relay, without using the RDM Anti-Sweat heater pulse module, may damage the Anti-Sweat heater and reduce the operational life of the heater.

Please see the Anti-Sweat Heater Pulse Module user guide for further details.

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## Revision History

Revision	Date	Changes
1.0	01/20/2020	Introduction of Mini Intuitive 3 EEV Case Controller
1.1	08/05/2020	Individual alarms for each evaporator sections Reordered items to group sections 1 / 2 / 3 Renamed some items to be Return Air / Discharge Air / Anti-Sweats Added/Removed parameters for alarm weighting Addition to control algorithm to disallow all valves opening at the same time during controller start-up or after defrost
1.2	01/26/2021	Added support for Stepper configuration PR0653 expansion module added Added parameters P-120 through P-129; additional Stepper info
1.3	10/25/2021	Added support for operation of pump-down LLV Added parameter P-58 for Relay 5 LLV mode
1.4	11/01/2021	Added support for operation of mechanical valves Added type 7, 8 for control of mechanical valves
1.5	06/13/2023	Added parameter P-131 Controller Type default changed to 3 from 5
1.6	08/22/2023	Improvements made to the broadcast pressure feature
1.9	14/04/2025	Added support for new password operation. Added support for offsets on expansion boards.

## Current Software Versions

Variant	Version
3EC - Electronic Expansion Valve (Pulse, or Stepper), or Mechanical Valve	1.9



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