

Mercury 11-10P Pack/Condenser Controller Installation & User Guide

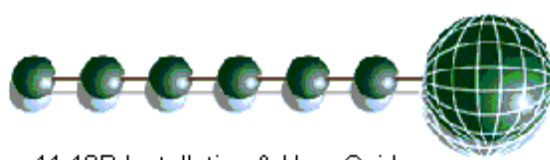


Product Numbers: -

- PR0332**
- PR0334**
- PR0333**
- PR0335**
- PR0339 (DIN rail bracket for controller)**



Ensure that all power is switched off before installing or maintaining this product



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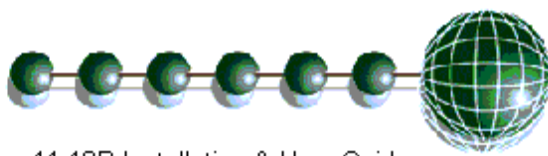
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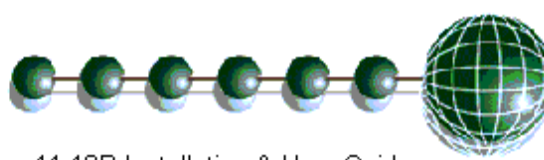
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The Mercury Range

From Resource Data Management

This documentation refers to the Mercury 11-10P controller range

Description

The Mercury 11-10P is a versatile controller intended for Pack and Condenser control. It has 10 relay outputs that are configurable for compressors, loaders or fans. The 10 digital inputs can be assigned for Pack or Condenser section inputs or general alarms. There are two 4-20mA inputs for pressure transducers and one temperature probe input.

The controller has 4 options, Pack, Dual Pack, Pack and Condenser, and Condenser. The control is a "Fuzzy logic" based algorithm, giving enhanced control whilst maintaining the starts/hr requirement. The algorithm also reduces the number of input parameters required for control; only a target pressure is needed.

Like all Mercury controllers, the 11-10P has a serial output that can connect directly to a PC for quick set-up (PC running RDM Communicator application) or to one of RDMs' network modules. Each relay can switch in excess of 2 Amps. There is an internal or remote display option as well as mains supply versions (100 – 250Vac) or low voltage supply versions (10 - 35 Vdc or 15 - 30 Vac).

There are four variants to choose from: -

PR0332	Mercury 11-10 P -	Mains voltage version with internal display.
PR0333	Mercury 11-10 P -	Low voltage version with internal display.
PR0334	Mercury 11-10 PR -	Mains voltage version with Remote display (Inc 5M cable).
PR0335	Mercury 11-10 PR -	Low voltage version with Remote display (Inc 5M cable).

Configuration

The controller has four configuration options: - (see [Set/View Type](#) for changing the type)

Display value	Type
1	Pack
2	Dual Pack
3	Pack/Condenser
4	Condenser

The controller is delivered pre-configured as a Pack Controller (Type 1)

Networks

The controller is capable of connecting to either a TCP/IP local area network or a RS485 network or controlling in standalone mode with no network output.

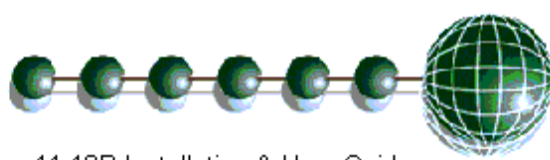
To connect to a network you must add the correct communications module. (See [network set-up](#))

- 485 Legacy module (Part No PR0026)
- IP Futura module (Part No PR0016)

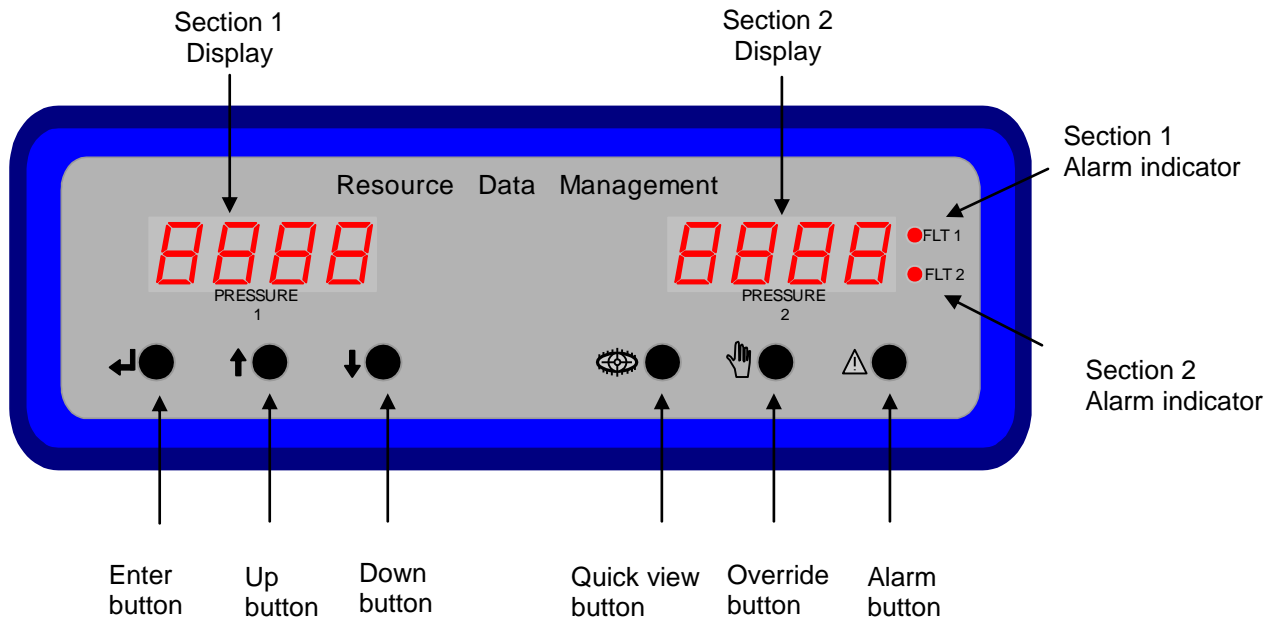
Connecting to either of these communication modules will automatically be detected on power up and this will affect the set up screens made available to you.



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Front Panel: -



Section 1 Display

4 character display, normally shows the pressure for section 1
 In set-up mode, displays the set-up menu items
 In quick view mode, indicates the target pressure for section 1
 In alarm view mode, indicates the alarm number
 In Override mode, indicates and allows the number of stages of section 1 forced on

Section 2 Display

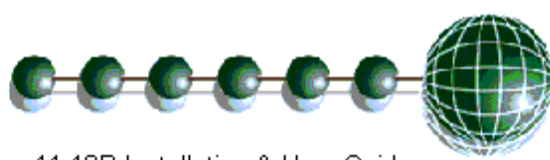
4 character display, normally shows the pressure for section 2
 In set-up mode, display is blank
 In quick view mode, indicates the target pressure for section 2
 In alarm view mode, indicates the alarm channel (e.g. S101 = section 1 input 1)
 In Override mode, indicates and allows the number of stages of section 2 forced on

Front Panel Buttons

- Enter Button: -** Used to enter menu items.
- Up Button: -** Used to scroll up
- Down Button: -** Used to scroll down
- Quick View Button: -** Used to view the target pressures (See [Quickview](#) section)
In "alarm view" mode, used to view the alarm occurred
- Override Button: -** Used with the "Enter" button, to go into the override mode. (See [Override](#) section)
- Alarm Button: -** Used to enter the "alarm view" mode. (See [View Alarms](#) section)

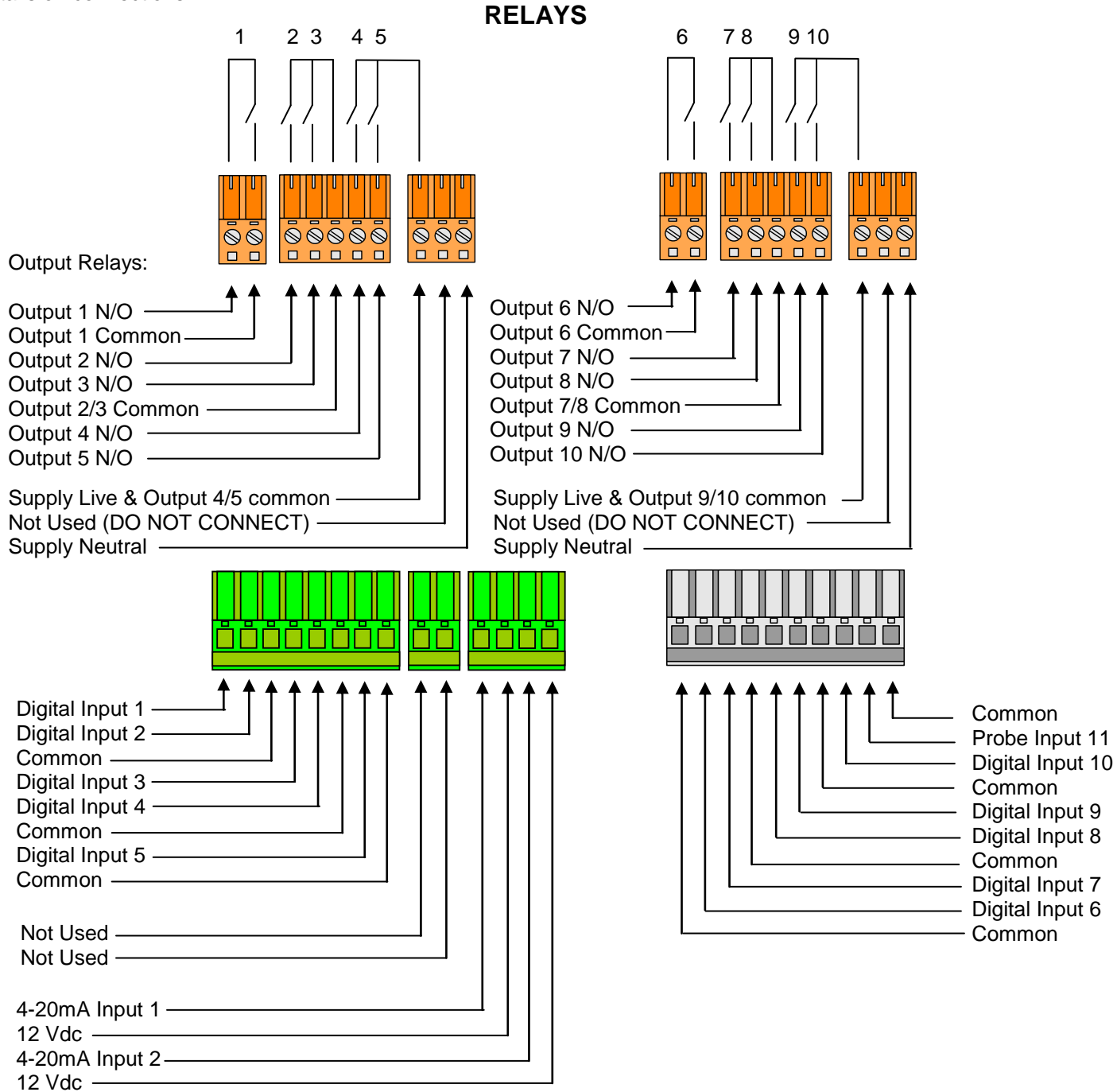


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Connections (Mains Version: PR0332 & PR0334)

All connections are made to the back of the controller. The diagram below shows the connection detail. Inputs and outputs are assigned according to the chosen configuration. See [Specification](#) and [wiring](#) for further details on connections.

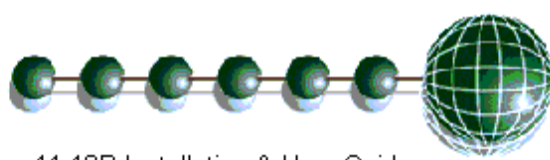


Probe input is PT1000 only.

Both Supplies must be connected. Do not connect an earth.

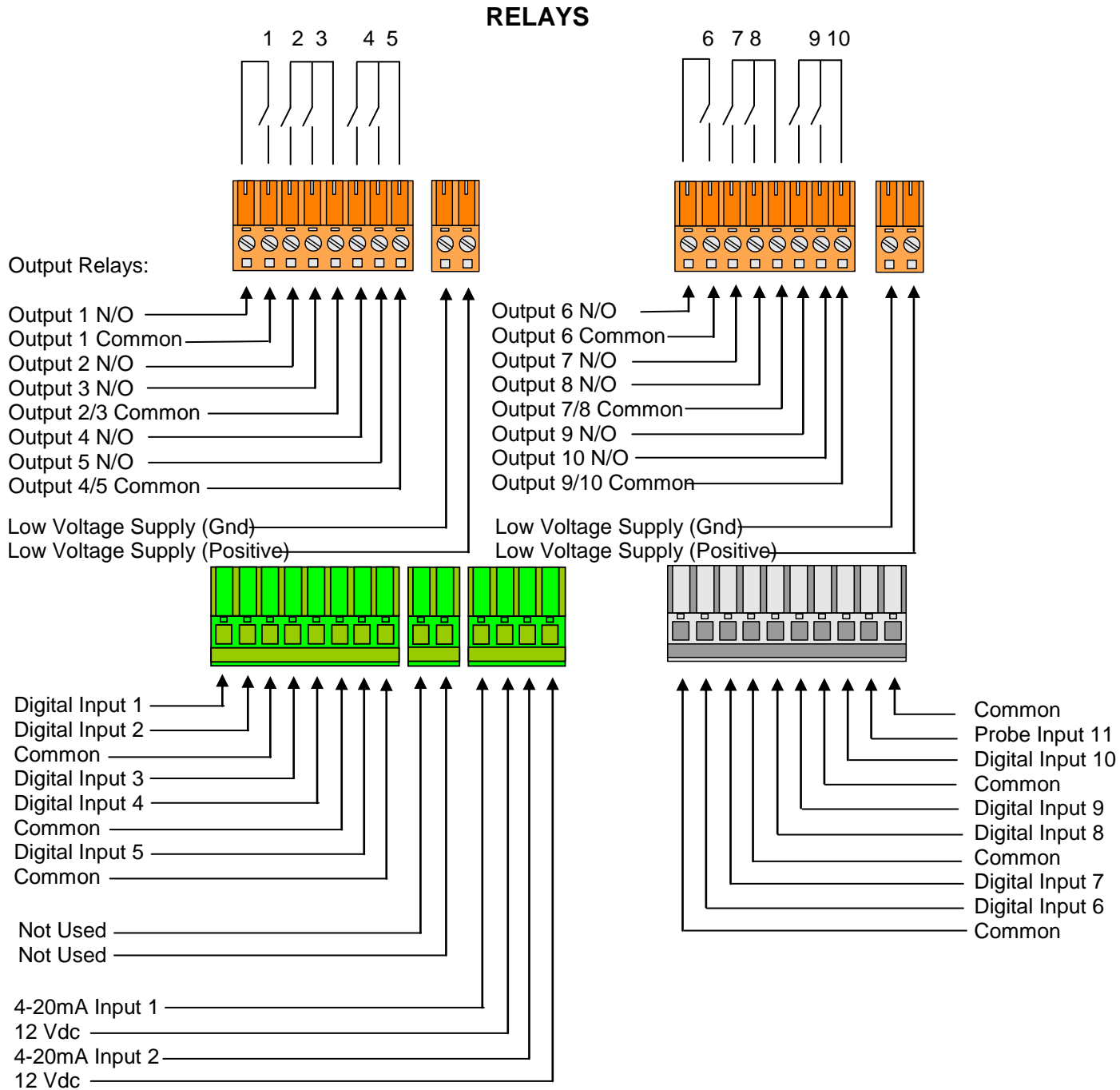


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Connections (Low Voltage Version: PR0333 or PR0335)

All connections are made to the back of the controller. The diagram below shows the connection detail. Inputs and outputs are assigned according to the chosen configuration. See [Specification](#) and [wiring](#) for further details on connections.



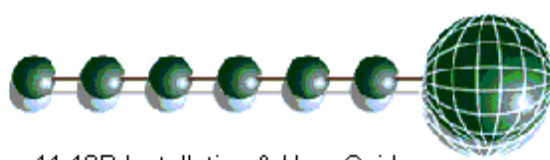
Probe input is PT1000 only.

Both Supplies must be connected.

Low Voltage Supply (Gnd) can be Earthed if required



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Input/Output Allocation Tables

All Types	Description	Alarm Action	Comments
Digital Input 1	0V return	Yes	See note 1
Digital Input 2	0V return	Yes	
Digital Input 3	0V return	Yes	
Digital Input 4	0V return	Yes	
Digital Input 5	0V return	Yes	
Digital Input 6	0V return	Yes	
Digital Input 7	0V return	Yes	
Digital Input 8	0V return	Yes	
Digital Input 9	0V return	Yes	
Digital Input 10	0V return	Yes	
Probe Input 11	PT1000 Temperature	No	Monitor probe only
Standby Input	Puts the controller into standby	Yes	590 Ohm resistor on Probe I/P See Standby Mode
4-20mA Input 1	Section 1 Pressure transducer	Yes	See note 3
4-20mA Input 2	Section 2 Pressure transducer	Yes	See note 3
Relay 1	N/O	N/A	See note 2
Relay 2	N/O	N/A	
Relay 3	N/O	N/A	
Relay 4	N/O	N/A	
Relay 5	N/O	N/A	
Relay 6	N/O	N/A	
Relay 7	N/O	N/A	
Relay 8	N/O	N/A	
Relay 9	N/O	N/A	
Relay 10	N/O	N/A	

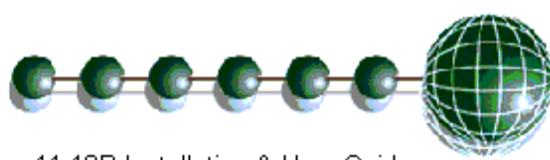
Note 1: Digital inputs are configured as either "stage" inputs or as "general" depending on the set-up
Digital inputs can be configured as "normally open" or "normally closed"

Note 2: All relay outputs are normally open. The functional allocation depends on the set-up parameters.

Note 3: Pressure transducers must be of the current loop 4-20mA type. Excitation voltage (12 Vdc) is provided for each transducer input.
The range of the transducer will vary according to the application, this can be set to match the transducer by changing the ["span and offset"](#) in the controller parameters.



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Setting up the controller

Set-up access to the controller can be achieved several ways

- Through the front mounted buttons
- Direct access by PC or palm top into the rear comms port. This requires a software package available on the RDM website (Communicator)
- Through legacy front end panels on 485 networks
- Through the RDM Data Director.

Set-up Mode

Set-up through front buttons

To enter set-up 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.

Set-up Menu for Single Pack controller (Type1)

LH Display	RH Display	Option	Menu Item seen in type:	Explained in Paragraph
IO		View Input/Output States	All types	View Input/Output States
PArA		Set/view Parameters	All types	Set/view parameters
Unit		Set/View units	All types	Set/View Units
TyPE		Set/View Controller Type	All types	Set/view product type
rLy		Set/View Relay Invert	All types	Set/View Relay Invert
rtc		Set/view Clock (rtc = Real Time Clock)	All types	Real Time Clock
nEt		Set/view network configuration	All types	Network Configuration
SoFt		View software version	All types	
ESC		Exit set-up mode		

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.

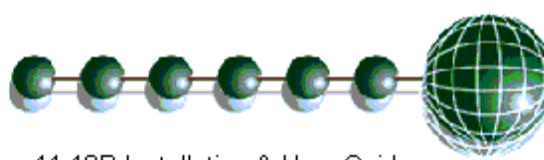
rtc. Real time clock (This will automatically synchronise on network systems)

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

Time clock is now set



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Set/View Relay Invert

When enabled this feature will invert all relay operation on the controller e.g. if relay 1 is off and the relay invert feature is enabled it will invert the relay to on. This feature affects all relays on the controller.

- 0 = Normal Relay Operation (Default)
- 1 = Inverted Relay Operation

type. Set/view controller type

1. From the function menu scroll to "type", press enter
2. Use the up/down buttons to scroll through the type values. (See [configuration](#) on page 4)
3. Press enter.

The controller will reset with the selected type now programmed.

PArA. Set/view parameters

(We recommend setting parameters from "Communicator" or the network front end such as "Data Director")

1. From the function menu scroll to PArA
2. Pressing Enter while PArA is displayed will enter the parameter menu.

The first parameter option will be displayed as P-01. Pressing the Up or Down button will present the other parameter options P-02, P-03 etc. See the parameter list below to find what parameter number corresponds to which actual parameter.

Pressing the Enter button will show the current value of the selected parameter. Press Up or Down to modify the value and press Enter again to save the value. The parameter list number will be displayed again.

Two other options are present in the parameter menu – dFLt and ESC. Selecting ESC will exit the parameter set-up mode. Selecting dFLt will reset all parameters back to the default values for the current controller type.

See [Parameter Tables](#) for values

Set/View Units

This option allows the user to set the pressure units to either PSI or BAR. The user can also select an option to display the monitoring probe temperature, if used, in °F.

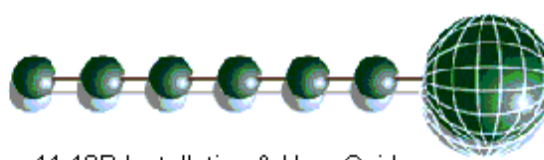
- 0 = PSI °C (default)
- 1 = BAR °C
- 2 = PSI °F
- 3 = BAR °F

Once activated, the controller parameters and display units will be in the set units. Note. If using the controller on a Genus system, bar units will not display on the system front-end.

Note: - If the units are set to PSI °C or BAR °C then on the event of a pressure transducer probe failure, on a pack section, all compressor and loader stages are turned **off**. If the units are set to PSI °F or BAR °F then in the event of a pressure transducer probe failure, on a pack section, all compressor and loader stages are turned **on**.



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Network Configuration

The final section to set-up 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 set the controller onto a network you must first connect the controller to a communications module. This is either a: -

- 485 Legacy, or
- IP Futura

485 Legacy module

The legacy module provides for Genus compatibility

Display	Option
485t	485 Network Type
485A	485 Address/Name
gAdd	Show underlying network address assigned to the Controller by the 485 system manager (e.g. Data Director)
rLog	Re-log the controller back onto the network
CLrA	Clear the address/name from the controller
ESC	Exit network menu. N.B. this option must be selected to save any changes made in this menu

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

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

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

In a Genus compatible system, 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 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

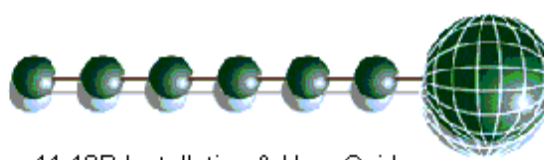
The CLrA option will clear out the network address and name in the controller. The 'ClrA' message will flash for confirmation. Press the Enter button to execute the command, Up or Down buttons to cancel.

To enter this mode, use the Up/Down button from the "nEt" menu screen until "clrA" is reached.

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



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

IP Futura module

In an IP system there are two options

- IP-L
- IP-r

IP-L allows you to fix 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 (normally used mode) 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. N.B. this option must be selected to save any changes made in this menu

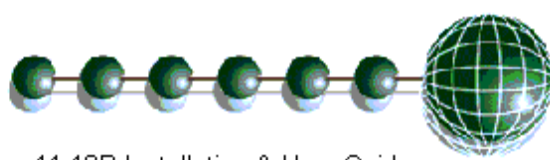
IP-r

To configure the communication module for IP-r, set the three rotary switches to give each controller a unique identifier. The module should then be connected to the controller and the network.

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



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Parameter Tables:

Parameter table for Pack Controller (Type 1)

Number	Parameter	Range	Step	Units	Default
P-01	Section 1 Target Pressure	-50 - 500	1	PSI	30
P-02	Section 1 Transducer Span*	-50 - 500	1	PSI	200
P-03	Section 1 Transducer Offset*	-50 - 500	1	PSI	0
P-04	Section 1 Target Number of Starts/hr	0 - 60	1		6
P-05	Section 1 Optimise Limit	-50 - 500	1		30
P-13	Section 1 HP Alarm Pressure	-50 - 500	1	PSI	60
P-14	Section 1 LP Alarm Pressure	-50 - 500	1	PSI	4
P-15	Section 1 LP Shut-down Pressure	-50 - 500	1	PSI	2
P-16	Section 1 Alarm Delay	0 - 99	1	mins	5
P-21 ↓ P-30	Stage 1 Type ↓ Stage 10 type	(0) None, (1) Unused, (2) Compressor, (3) Loader, (4) Fan			0
P-41 ↓ P-50	Stage 1 Input Type *** ↓ Stage 10 Input Type	(0) N/O (1) N/C (2) Unused,			2
P-51 ↓ P-60	Stage 1 Size ↓ Stage 10 size	0-60	1		0
P-80	Startup Delay	0 - 5 mins	1	mins/sec	0
P-82	Run Smallest**	0 = off, 1 = on			0
P-81	General Alarm Delay	0 - 60 mins	1	mins/sec	3 mins
dFLt	Restore Default Settings				
ESc					

* Span and Offset allows for the full range of the transducer to be used by the controller.

Span is the full range of the transducer

Offset is the value below zero.

E.g. Danfoss AKS 33 with range: -1 bar to 12 bar

Span would be 190 (13 bar)

Offset would be -15 (-1 bar)

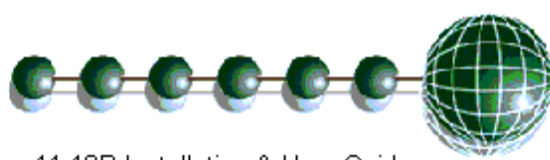
Run smallest=on:- When all compressors are off (because the target pressure has been satisfied) the controller, when the pressure rises, will always turn on the smallest compressor. If the ASC timer is running for the smallest compressor, the controller will **NOT bring on any other available compressors, it will wait until the ASC timer has elapsed and turn on the smallest.

Please note that this is true for **any** pressure condition.

*** Stage inputs have a pre-programmed delay of 10 seconds, this cannot be changed.



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Parameter Table for Dual Pack Controller (Type 2)

Number	Parameter	Range	Step	Units	Default
P-01	Section 1 Target Pressure	-50 - 500	1	PSI	30
P-02	Section 1 Transducer Span*	-50 - 500	1	PSI	200
P-03	Section 1 Transducer Offset*	-50 - 500	1	PSI	0
P-04	Section 1 Target Number of Starts/hr	0 - 60	1		6
P-05	Section 1 Optimise Limit	-50 - 500	1	PSI	30
P-13	Section 1 HP Alarm Pressure	-50 - 500	1	PSI	60
P-14	Section 1 LP Alarm Pressure	-50 - 500	1	PSI	4
P-15	Section 1 LP Shut-down Pressure	-50 - 500	1	PSI	2
P-16	Section 1 Alarm Delay	0 - 99	1	Mins	5
P-07	Section 2 Target Pressure	-50 - 500	1	PSI	30
P-08	Section 2 Transducer Span*	-50 - 500	1	PSI	200
P-09	Section 2 Transducer Offset*	-50 - 500	1	PSI	0
P-10	Section 2 Target Number of Starts/hr	0 - 60	1		6
P-11	Section 2 Optimise Limit	-50 - 500	1	PSI	30
P-17	Section 2 HP Alarm Pressure	-50 - 500	1	PSI	60
P-18	Section 2 LP Alarm Pressure	-50 - 500	1	PSI	4
P-19	Section 2 LP Shut-down Pressure	-50 - 500	1	PSI	2
P-20	Section 2 Alarm Delay	0 - 99	1	Mins	5
P-21 ↓ ↓ ↓	Section 1 Stage 1 Type ↓ Section 1 Stage 10 Type	(0) None, (1) Unused, (2) Compressor, (3) Loader, (4) Fan			0
P-30					
P-31 ↓ ↓ ↓	Section 2 Stage 1 Type ↓ Section 2 Stage 10 Type	(0) None, (1) Unused, (2) Compressor, (3) Loader, (4) Fan			0
P-40					
P-41 ↓ ↓ ↓	Stage 1 Input Type ↓ Stage 10 Input Type	(0) N/O (1) N/C (2) Unused,			2
P-50					
P-51 ↓ ↓ ↓	Section 1 Stage 1 Size ↓ Section 1 Stage 10 Size	0-60	1		0
P-60					
P-61 ↓ ↓ ↓	Section 2 Stage 1 Size ↓ Section 2 Stage 10 Size	0-60	1		0
P-70					
P-80	Startup Delay	0 - 5 mins	1	mins/sec	0
P-82	Run Smallest**	0 = off, 1 = on			0
P-81	General Alarm Delay	0 - 60 mins	1	mins/sec	3 mins
dFLt	Restore Default Settings				
ESc					

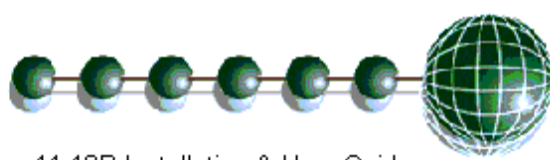
* Span and Offset allows for the full range of the transducer to be used by the controller.

Span is the full range of the transducer

Offset is the value below zero.



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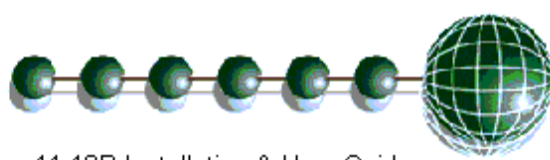
Eg Danfoss AKS 33 with range: -1 bar to 12 bar

Span would be 190 (13 bar)
Offset would be -15 (-1 bar)

****Run smallest=on:-** When all compressors are off (because the target pressure has been satisfied) the controller, when the pressure rises, will always turn on the smallest compressor. If the ASC timer is running for the smallest compressor, the controller will **NOT** bring on any other available compressors, it will wait until the ASC timer has elapsed and turn on the smallest.
Please note that this is true for **any** pressure condition.



Ensure that all power is
switched off before
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this product



Parameter table for Pack/Condenser Controller (Type 3)

Number	Parameter	Range	Step	Units	Default
P-01	Section 1 Target Pressure	-50 - 500	1	PSI	30
P-02	Section 1 Transducer Span*	-50 - 500	1	PSI	200
P-03	Section 1 Transducer Offset*	-50 - 500	1	PSI	0
P-04	Section 1 Target Number of Starts/hr	0 - 60	1		6
P-05	Section 1 Optimise Limit	-50 - 500	1	PSI	30
P-13	Section 1 HP Alarm Pressure	-50 - 500	1	PSI	60
P-14	Section 1 LP Alarm Pressure	-50 - 500	1	PSI	4
P-15	Section 1 LP Shut-down Pressure	-50 - 500	1	PSI	2
P-16	Section 1 Alarm Delay	0 - 99	1	Mins	5
P-07	Section 2 Target Pressure	-50 - 500	1	PSI	185
P-08	Section 2 Transducer Span*	-50 - 500	1	PSI	500
P-09	Section 2 Transducer Offset*	-50 - 500	1	PSI	0
P-17	Section 2 HP Alarm Pressure	-50 - 500	1	PSI	260
P-18	Section 2 LP Alarm Pressure	-50 - 500	1	PSI	100
P-19	Section 2 LP Shut-down Pressure	-50 - 500	1	PSI	90
P-20	Section 2 Alarm Delay	0 - 99	1	Mins	5
P-21 ↓ P-30	Section 1 Stage 1 Type ↓ Section 1 Stage 10 Type	(0) None, (1) Unused, (2) Compressor, (3) Loader, (4) Fan			0
P-31 ↓ P-40	Section 2 Stage 1 Type ↓ Section 2 Stage 10 Type	(0) None, (1) Unused, (2) Compressor, (3) Loader, (4) Fan			0
P-41 ↓ P-50	Stage 1 Input Type ↓ Stage 10 Input Type	(0) N/O (1) N/C (2) Unused,			2
P-51 ↓ P-60	Section 1 Stage 1 Size ↓ Section 1 Stage 10 Size	0-60	1		0
P-80	Startup Delay	0 - 5 mins	1	mins/sec	0
P-82	Run Smallest**	0 = off, 1 = on			0
P-81	General Alarm Delay	0 - 60 mins	1	mins/sec	3 mins
dFLt	Restore Default Settings				
ESc					

* Span and Offset allows for the full range of the transducer to be used by the controller.

Span is the full range of the transducer

Offset is the value below zero.

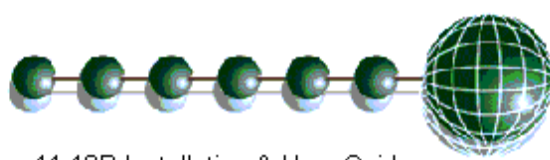
Eg Danfoss AKS 33 with range: -1 bar to 12 bar

Span would be 190 (13 bar)

Offset would be -15 (-1 bar)



Ensure that all power is switched off before installing or maintaining this product



****Run smallest=on:-** When all compressors are off (because the target pressure has been satisfied) the controller, when the pressure rises, will always turn on the smallest compressor. If the ASC timer is running

for the smallest compressor, the controller will **NOT** bring on any other available compressors, it will wait until the ASC timer has elapsed and turn on the smallest.

Please note that this is true for **any** pressure condition.

Parameter table for Condenser Controller (Type 4)

Number	Parameter	Range	Step	Units	Default
P-01	Section 1 Target Pressure	-50 - 500	1	PSI	185
P-02	Section 1 Transducer Span*	-50 - 500	1	PSI	500
P-03	Section 1 Transducer Offset*	-50 - 500	1	PSI	0
P-13	Section 1 HP Alarm Pressure	-50 - 500	1	PSI	260
P-14	Section 1 LP Alarm Pressure	-50 - 500	1	PSI	100
P-15	Section 1 LP Shut-down Pressure	-50 - 500	1	PSI	90
P-16	Section 1 Alarm Delay	0 - 99	1	Mins	5
P-21	Section 1 Stage 1 Type	(0) None, (1) Unused, (2) Compressor, (3) Loader, (4) Fan			0
P-30	Section 1 Stage 10 Type				
P-41	Stage 1 Input Type	(0) N/O (1) N/C (2) Unused,			2
P-50	Stage 10 Input Type				
P-80	Startup Delay	0 - 5 mins	1	mins/sec	0
P-82	Run Smallest**	0 = off, 1 = on			0
P-81	General Alarm Delay	0 - 60 mins	1	mins/sec	3 mins
dFLt	Restore Default Settings				
ESc					

* Span and Offset allows for the full range of the transducer to be used by the controller.

Span is the full range of the transducer

Offset is the value below zero.

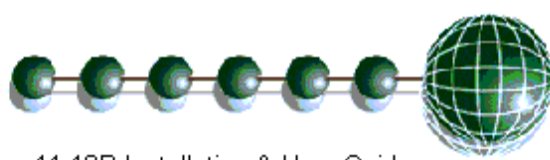
Eg Danfoss AKS 33 with range: -1 bar to 12 bar

Span would be 190 (13 bar)

Offset would be -15 (-1 bar)



Ensure that all power is switched off before installing or maintaining this product



Configuration of inputs and outputs:

Stage Inputs:

Digital inputs can be configured as Normally Open, Normally closed or Unused,. Each input, when assigned will attach to the corresponding section output. If there are any stages left as "None" at the end, the digital input will become a "General Alarm" input.

Section Stages:

Section stages can be set up as: - None, Unused, Compressor, Loader or Fan. These parameters determine which relay is assigned to the section outputs. There are a total of 10 relays that can be assigned in any combination.

Stage	Description	
None	Use this option to end the number of stages in the controller If the controller is a 2 section type (Type 2 or 3) this will indicate the end of the 1st section and start assigning subsequent relays to the 2nd stage	
Unused	Use this option to skip a relay output within a stage	
Comp	Use this option to assign a relay output to a compressor	See note 4
Loader	Use this option to assign a relay output to a compressor loader	
Fan	Use this option to assign a relay to a fan	

Note 4: In a pack configuration, at least 1 output must be assigned to a compressor. Loader outputs will not energise without a compressor being on.

Example: Pack/Condenser mode (Type3)

Parameters

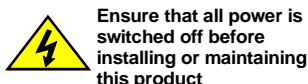
Control Alarms **Section Stages** Stage Sizes Stage Inputs

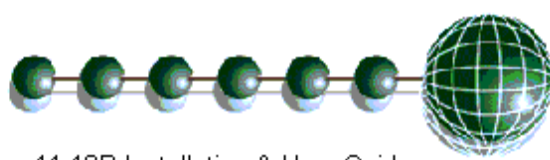
Section 1 Stage Types		Section 2 Stage Types	
Relay 1 →	Sect 1 Stg 1 Comp	Sect 2 Stg 1 Fan	← Relay 7
Relay 2 →	Sect 1 Stg 2 Loader	Sect 2 Stg 2 Fan	← Relay 8
Relay 3 →	Sect 1 Stg 3 Comp	Sect 2 Stg 3 Fan	← Relay 9
Relay 4 →	Sect 1 Stg 4 Loader	Sect 2 Stg 4 None	← Relay 10 not used
Relay 5 →	Sect 1 Stg 5 Comp	Sect 2 Stg 5 None	
Relay 6 →	Sect 1 Stg 6 Loader	Sect 2 Stg 6 None	
	Sect 1 Stg 7 None	Sect 2 Stg 7 None	
	Sect 1 Stg 8 None	Sect 2 Stg 8 None	
	Sect 1 Stg 9 None	Sect 2 Stg 9 None	
	Sect 1 Stg 10 None	Sect 2 Stg 10 None	

This configuration shows a 6-stage pack with a 3-stage condenser controller. All digital inputs are assigned to N/O, making the first 6 inputs: - section 1 stage 1-6, the next 3 inputs; section 2 stage 1-3, and the last input a "general fault" (no relay has been assigned)

Stage Sizes

Stage sizes will determine the order in which compressors or loaders are switched on and off. This is a relative number between 0 and 60, reflecting the size of the compressor (usually horse power) The default stage size is 0; stage sizes must be entered for correct operation.





Operation

Once the controller has been set-up and configured, normal operation will resume. The controller operates a "fuzzy logic" based control algorithm. The controller will determine the stages to bring on and off using the fuzzy logic rules and adhering to the starts/hr criteria. Note that on and off delays will vary according to the current conditions. The fuzzy logic will attempt to optimise the compressor starts and keep them at a minimum.

Viewing

Inputs and Outputs

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

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

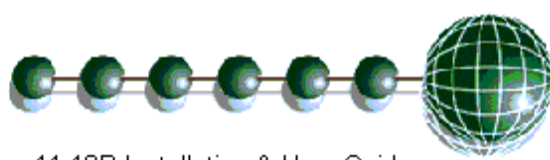
Input/Output Tables

Input/Output table for Pack Controller (Type 1)

Number	IO	Range	Units
I-01	Suction Pressure	-50 - 500	PSI
I-11	Digital Input 1	(0) Alarm (1) OK (2) Unused	
I-20	Digital Input 10		
I-31	Temperature Probe	-50 → +70	°C
0-01	Relay 1	(0) Off (1) On	
0-10	Relay 10		
0-21	Optimisation Level	-50 - 500	PSI
S-01	Section 1 Control States	(0) Stabilize (1) Initial (2) Normal (3) High Pressure (4) Low Pressure (5) Low Shut-down (6) Fail Probe (7) Stand-by	



Ensure that all power is switched off before installing or maintaining this product

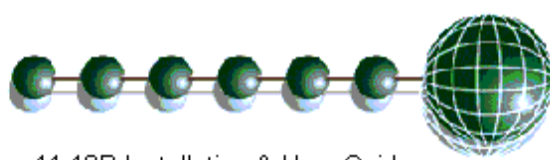


Input/Output table for Dual Pack Controller (Type 2)

Number	IO	Range	Units
I-01	Section 1 Suction Pressure	-50 - 500	PSI
I-02	Section 2 Suction Pressure	-50 - 500	PSI
I-11 ↓	Digital Input 1 ↓	(0) Alarm (1) OK (2) Unused	
I-20	Digital Input 10		
I-31	Temperature Probe	-50 → +70	°C
0-01 ↓	Relay 1 ↓	(0) Off (1) On	
0-10	Relay 10		
0-21	Section 1 Optimisation Level	-50 - 500	PSI
0-22	Section 2 Optimisation Level	-50 - 500	PSI
S-01	Section 1 Control States	(0) Stabilize (1) Initial (2) Normal (3) High Pressure (4) Low Pressure (5) Low Shut-down (6) Fail Probe (7) Stand-by	
S-02	Section 2 Control States	(0) Stabilize (1) Initial (2) Normal (3) High Pressure (4) Low Pressure (5) Low Shut-down (6) Fail Probe (7) Stand-by	



Ensure that all power is switched off before installing or maintaining this product

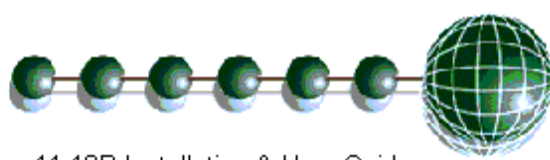


Input/Output table for Pack/Condenser Controller (Type 3)

Number	IO	Range	Units
I-01	Section 1 Suction Pressure	-50 - 500	PSI
I-02	Section 2 Suction Pressure	-50 - 500	PSI
I-11 ↓ I-20	Digital Input 1 ↓ Digital Input 10	(0) Alarm (1) OK (2) Unused	
I-31	Temperature Probe	-50 → +70	°C
0-01 ↓ 0-10	Relay 1 ↓ Relay 10	(0) Off (1) On	
0-21	Optimisation Level	-50 - 500	PSI
S-01	Section 1 Control States	(0) Stabilize (1) Initial (2) Normal (3) High Pressure (4) Low Pressure (5) Low Shut-down (6) Fail Probe (7) Stand-by	
S-02	Section 2 Control States	(0) Stabilize (1) Initial (2) Normal (3) High Pressure (4) Low Pressure (5) Low Shut-down (6) Fail Probe (7) Stand-by	



Ensure that all power is switched off before installing or maintaining this product

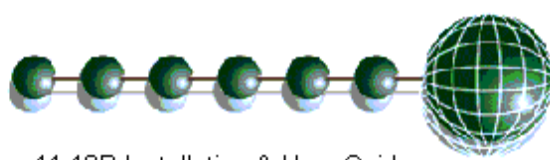


Input/Output table for Condenser Controller (Type 4)

Number	IO	Range	Units
1-01	Discharge Pressure	-50 - 500	PSI
I-11 ↓	Digital Input 1 ↓	(0) Alarm (1) OK (2) Unused	
I-20	Digital Input 10		
1-31	Temperature Probe	-50 → +70	°C
0-01 ↓	Relay 1 ↓	0 1	Off On
0-10	Relay 10		
S-01	Section 1 Control States	(0) Stabilize (1) Initial (2) Normal (3) High Pressure (4) Low Pressure (5) Low Shut-down (6) Fail Probe (7) Stand-by	

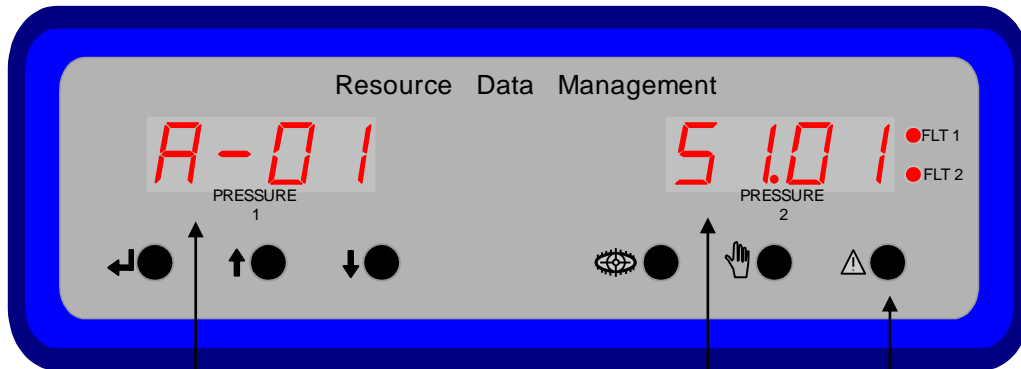


Ensure that all power is switched off before installing or maintaining this product



Viewing Alarms

Press the "View Alarms" button to enter this mode, the two fault LED's will flash while in this mode.

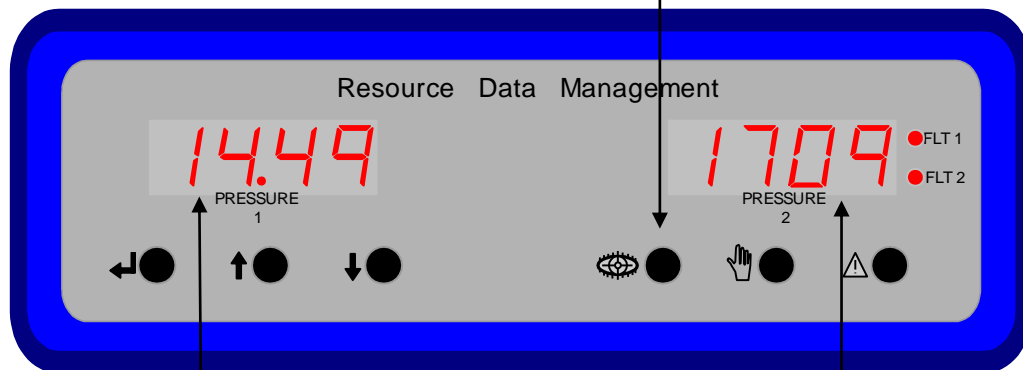


This display shows the alarm number:
E.g. Alarm 1

This display shows the alarm type:
E.g. section 1 stage 1

View Alarm button

Press the "down" button to scroll through the alarm log.
Press the "Quick View" button to see the occurred time



This display shows the alarm time:
E.g. 14:49

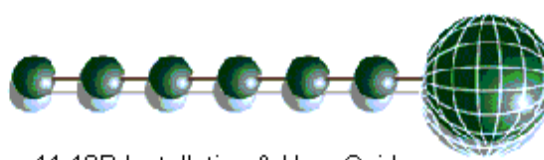
This display shows the alarm date:
E.g. 17:09(sept 17)

Press the "Quick View" button again to see the alarm "cleared" time & date.
20 alarms are held in the controller.

See [Alarm Display Messages](#) for alarm screens



Ensure that all power is switched off before installing or maintaining this product



Quickview

Pressing the "quickview" button during normal operation displays the target pressure. If a two-stage controller has been configured, both target pressures are displayed. Press the "quickview" button again to go back to the normal display or wait for the time-out period to elapse.

Override

The override function allows the user to switch output stages on or off. (Providing the output stages have been configured)

Press the override and enter button together for approx 3 secs.

Use the "up" button to turn the stage on, and the down button to turn the stage off.

Press "enter" to exit this mode or allow the time-out to elapse.

For a 2-stage controller (types 3 and 4) use the "override" button to turn section 2 stages on, and the "alarmview" button to turn section 2 stages off.

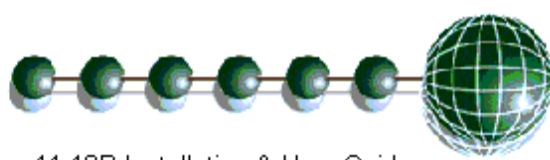
Standby Mode

The controller requires a 590 Ohm resistor present across Probe input 11 and common (gnd) for normal operation. If the resistor is not detected; such as in a fault condition, the controller will go into standby mode. All compressors and/or fans will be turned off and an alarm (controller in standby) generated.

There is a 10 second delay for the detection of the resistor, both in and out.



Ensure that all power is switched off before installing or maintaining this product



Display Messages

The following messages can appear on the Mercury display during normal operation.

Display	System status
hiPr	High Pressure alarm
LoPr	Low Pressure alarm
Prob	Pressure Transducer alarm
Ft	Fault
LoSh	Low Pressure Shut-down

Alarm Display Messages

The following table indicates the messages that can be displayed in the "alarm view" mode.

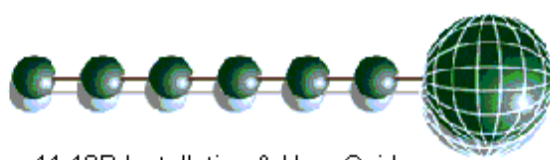
LH Display	RH Display	Message Description
A-nn	S1.xx	Section 1 Stage xx alarm
	S2.xx	Section 2 Stage xx alarm
	Ftxx	General Fault xx
	FnhP	Condenser High Pressure alarm
	FnLP	Condenser Low Pressure alarm
	FnSd	Condenser Low Pressure Shut-down alarm
	FnPr	Condenser Probe alarm
	P1hP	Pack 1 High Pressure alarm
	P1LP	Pack 1 Low Pressure alarm
	P1Sd	Pack 1 Low Pressure Shut-down alarm
	P1Pr	Pack 1 Probe alarm
	P2hP	Pack 2 High Pressure alarm
	P2LP	Pack 2 Low Pressure alarm
	P2Sd	Pack 2 Low Pressure Shut-down alarm
	P2Pr	Pack 2 Probe alarm
	Ctrl	Configuration fault
	Stby	Controller in standby
no	AL	No Alarm
AL	Act	Alarm still active

Where nn = 01 to 20 (20 alarms are stored in the controller)

Where xx = 01 to 10



Ensure that all power is switched off before installing or maintaining this product



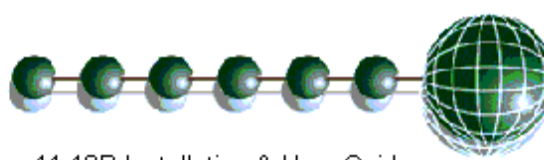
Network Alarms

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 #
Section 1 Pack High Pressure	8
Section 1 Pack Low Pressure	9
Section 1 Pack Low Shutdown	10
Section 1 Pack Pressure Probe Fault	6
Section 2 Pack High Pressure	8
Section 2 Pack Low Pressure	9
Section 2 Pack Low Shutdown	10
Section 2 Pack Pressure Probe Fault	6
Section 1 Cond High Pressure	12
Section 1 Cond Low Pressure	11
Section 1 Cond Low Shutdown	11
Section 1 Cond Pressure Probe Fault	6
Section 2 Cond High Pressure	12
Section 2 Cond Low Pressure	11
Section 2 Cond Low Shutdown	11
Section 2 Cond Pressure Probe Fault	6
General Fault 1	20
General Fault 2	20
General Fault 3	20
General Fault 4	20
General Fault 5	20
General Fault 6	20
General Fault 7	20
General Fault 8	20
General Fault 9	20
General Fault 10	20
Section 1 Stage 1	3
Section 1 Stage 2	3
Section 1 Stage 3	3
Section 1 Stage 4	3
Section 1 Stage 5	3
Section 1 Stage 6	3
Section 1 Stage 7	3
Section 1 Stage 8	3
Section 1 Stage 9	3
Section 1 Stage 10	3
Section 2 Stage 1	3
Section 2 Stage 2	3
Section 2 Stage 3	3
Section 2 Stage 4	3
Section 2 Stage 5	3
Section 2 Stage 6	3
Section 2 Stage 7	3
Section 2 Stage 8	3
Section 2 Stage 9	3
Section 2 Stage 10	3
Configuration fault	20
Controller in standby	20



Ensure that all power is switched off before installing or maintaining this product



Specification

Power requirements for PR0332 and PR0334:

Supply Voltage Range:	100 - 240 Vac \pm 10%
Supply Frequency:	50 - 60 Hz \pm 10%
Maximum supply current:	<1 Amp (with no relay loads) 10 Amps (with relays 4, 5, 9 and 10 fully loaded)
Typical supply current:	<1.0 Amp
Class 2 Insulation:	No protective Earth is required and none should be fitted.

The host equipment must provide a suitable external over-current protection device such as: -

Fuse:	10A, 240 Vac Antisurge (T) HRC conforming to IEC 60127
Or MCB:	10A, 240 Vac Type C conforming to BS EN 60898

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

Power requirements for PR0333 and PR0335:

Supply Voltage Range:	10 Vdc to 35 Vdc or 15 Vac to 30 Vac
AC Supply Frequency:	50 - 60 Hz \pm 10%
Maximum supply current:	1 Amp (Controller only)
Typical supply current:	<1.0 Amp (Controller only)
Class 2 Insulation:	The supply ground can be earthed if required.

The host equipment must provide a suitable external over-current protection device such as: -

Fuse:	3A, 240 Vac Antisurge (T) HRC conforming to IEC 60127
Or MCB:	3A, 240 Vac Type C conforming to BS EN 60898

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

General

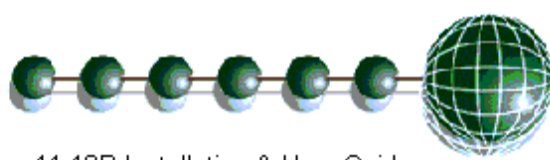
Operating temperature range:	+5 ⁰ C to +50 ⁰ C
Operating Humidity:	80% maximum
Storage temperature range:	-20 ⁰ C to +65 ⁰ C
Environmental:	Indoor use at altitudes up to 2000m, Pollution Degree 1, Installation Category II. Voltage fluctuations not to exceed \pm 10% of nominal voltage
Size:	180mm (W) x 68mm (H) x 110mm (D)
Weight:	260 Grams
Safety:	EN61010
EMC:	EN61326; 1997 +Amdt. A1; 1998
Ventilation:	There is no requirement for forced cooling ventilation

Inputs:

Probe Input type	PT1000 for all versions
Digital Input type	0 volt return (internal pull-up resistor give hi state when there is no return)
Comms:	RS232 with flow control
4-20mA	4-20mA current loop, use the 12 Vdc output to feed the pressure transducer



Ensure that all power is switched off before installing or maintaining this product

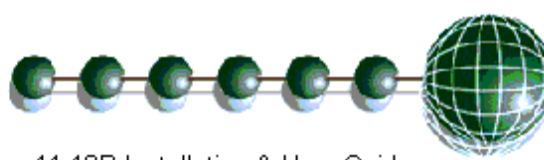


Relay Ratings for PR0332 and PR0334

Max current relay 1: Max Voltage relay 1:	6A (non inductive) 260Vac (external supply)	Exclusive common
Max current relay 2: Max Voltage relay 2: Shared common with relay 3	4A (non inductive) 260Vac (external supply)	Relays 2 and 3 share a common supply line and the loads can have a combined total of 8A.
Max current relay 3: Max Voltage relay 3: Shared common with relay 2	4A (non inductive) 260Vac (external supply)	Relay 2 or 3 can switch a maximum of 6A provided the other is at 2A or lower.
Max current relay 4: Max Voltage relay 4: Common connected to supply 1 "live"	3A (non inductive) 260Vac (Internal supply)	
Max current relay 5: Max Voltage relay 5: Common connected to supply 1 "live"	3A (non inductive) 260Vac (Internal supply)	
Max current relay 6: Max Voltage relay 6:	6A (non inductive) 260Vac (external supply)	Exclusive common
Max current relay 7: Max Voltage relay 7: Shared common with relay 8	4A (non inductive) 260Vac (external supply)	Relays 7 and 8 share a common supply line and the loads can have a combined total of 8A.
Max current relay 8: Max Voltage relay 8: Shared common with relay 2	4A (non inductive) 260Vac (external supply)	Relay 7 or 8 can switch a maximum of 6A provided the other is at 2A or lower.
Max current relay 9: Max Voltage relay 9: Common connected to supply 2 "live"	3A (non inductive) 260Vac (Internal supply)	
Max current relay 10: Max Voltage relay 10: Common connected to supply 2 "live"	3A (non inductive) 260Vac (Internal supply)	



Ensure that all power is switched off before installing or maintaining this product



Relay Ratings for PR0333 and PR0335

Max current relay 1: Max Voltage relay 1:	6A (non inductive) 24Vac (external supply)	Exclusive common
Max current relay 2: Max Voltage relay 2: Shared common with relay 3	4A (non inductive) 24Vac (external supply)	Relays 2 and 3 share a common supply line and the loads can have a combined total of 8A.
Max current relay 3: Max Voltage relay 3: Shared common with relay 2	4A (non inductive) 24Vac (external supply)	Relay 2 or 3 can switch a maximum. of 6A provided the other is at 2A or lower.
Max current relay 4: Max Voltage relay 4:	3A (non inductive) 24Vac (external supply)	Relays 4 and 5 share a common supply line and the loads can have a combined load of 6A
Max current relay 5: Max Voltage relay 5:	3A (non inductive) 24Vac (external supply)	
Max current relay 6: Max Voltage relay 6:	6A (non inductive) 24Vac (external supply)	Exclusive common
Max current relay 7: Max Voltage relay 7: Shared common with relay 8	4A (non inductive) 24Vac (external supply)	Relays 7 and 8 share a common supply line and the loads can have a combined total of 8A.
Max current relay 8: Max Voltage relay 8: Shared common with relay 7	4A (non inductive) 24Vac (external supply)	Relay 7 or 8 can switch a maximum. of 6A provided the other is at 2A or lower.
Max current relay 9: Max Voltage relay 9:	3A (non inductive) 24Vac (external supply)	Relays 9 and 10 share a common supply line and the loads can have a combined total of 6A.
Max current relay 10: Max Voltage relay 10:	3A (non inductive) 24Vac (external supply)	

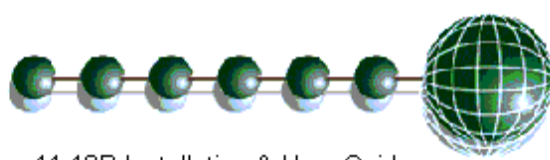
Important Safety Notice:

PR0332 and PR0334 must use a voltage level the same as the supply input voltage on all of the relays common.

PR0333 and PR0335 must use a voltage level no greater than 40 Vdc or 30 Vac on all of the relays common.

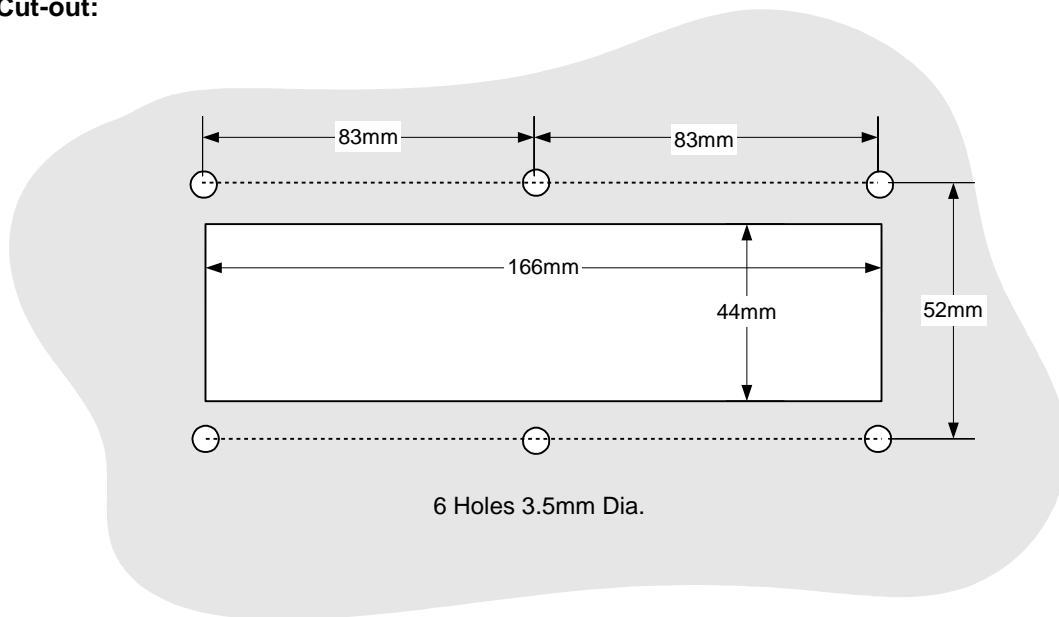


Ensure that all power is switched off before installing or maintaining this product



Installation:

Panel Cut-out:



Fixing:

6 X M3 screws from the rear fix the controller.

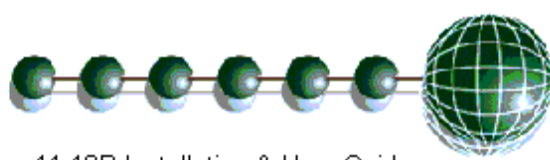
DIN rail: Use PR0039 to mount the controller to a DIN rail.

Clearances:

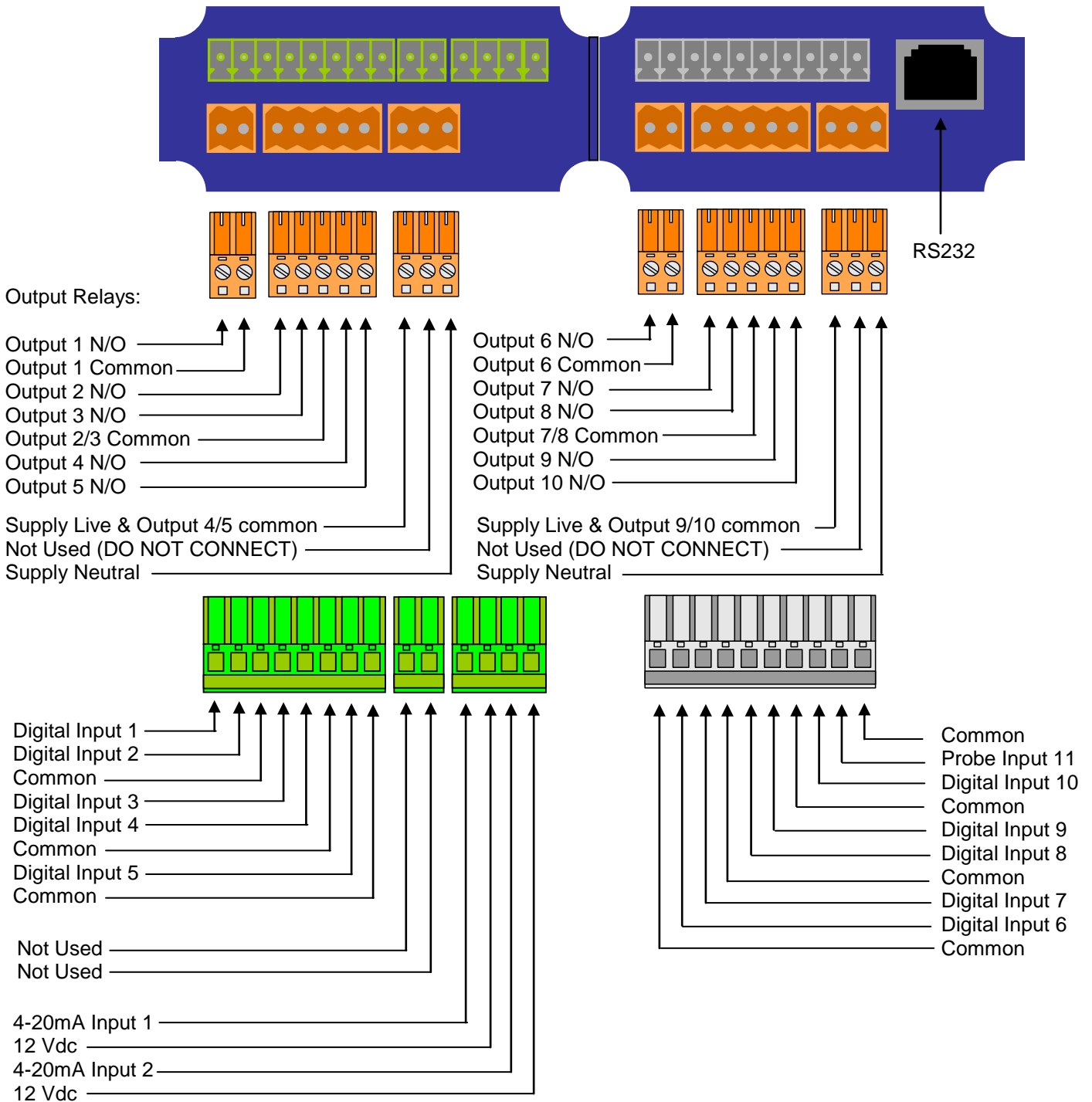
The controller must have 5mm clearance above the top and below bottom, and 25mm clearance from the sides. Clearance at the rear is dependant on the wiring.
There is no requirement for forced cooling ventilation



Ensure that all power is switched off before installing or maintaining this product



Wiring for PR0332 & PR0334:

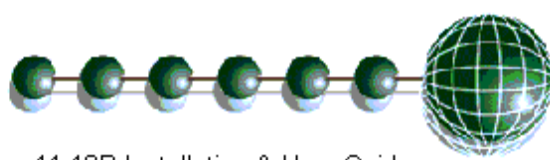


Note:

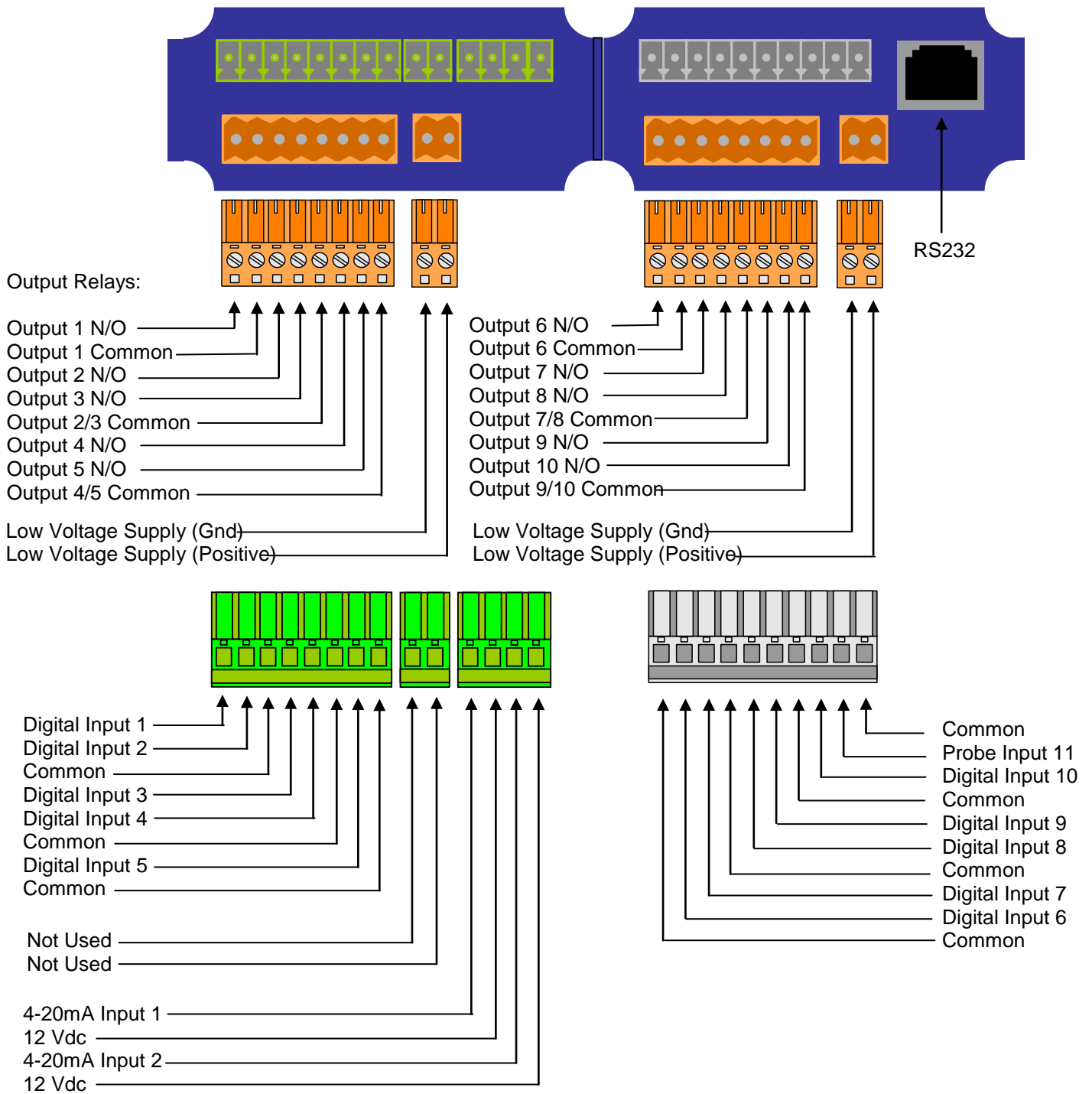
Suitable mechanical restraints on the wiring to the controller may be required; dependant on cable types, to prevent undue stress or distortion on the controller connectors.



Ensure that all power is switched off before installing or maintaining this product



Wiring for PR0333 & PR0335:



Note:

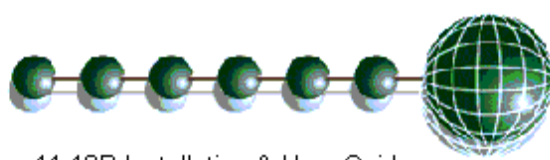
Suitable mechanical restraints on the wiring to the controller may be required; dependant on cable types, to prevent undue stress or distortion on the controller connectors.

Cleaning:

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



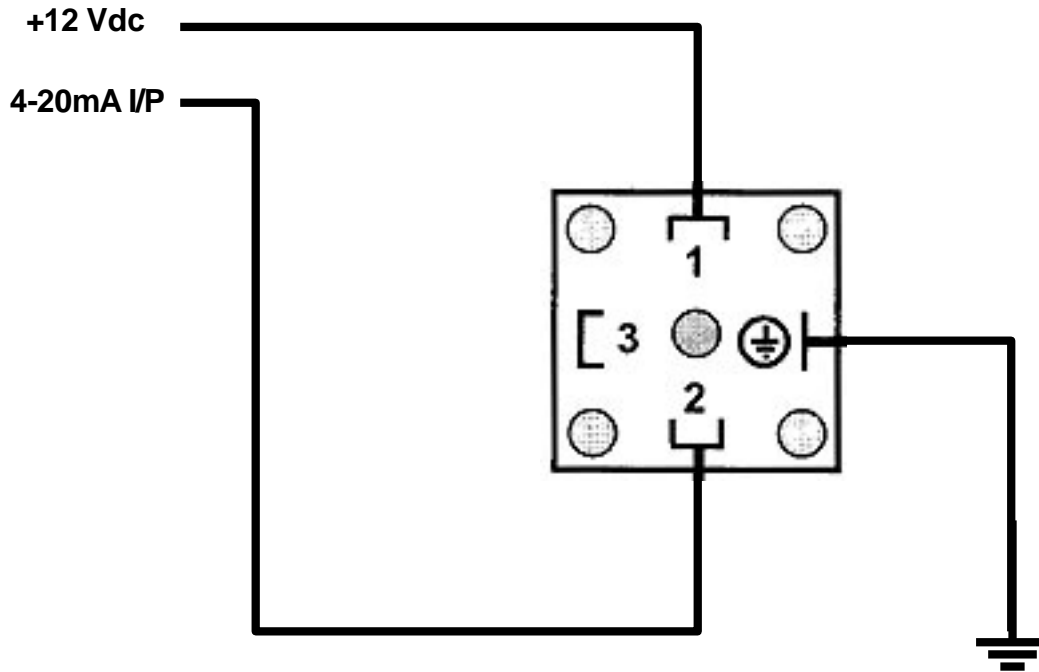
Ensure that all power is switched off before installing or maintaining this product



Appendix 1

Typical Transducer Connection:

For 4-20mA type transducers the diagram below shows the connections to the Mercury 11-10P: -

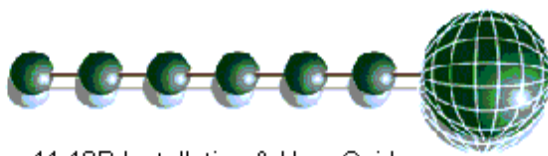


Note: The Earth connection is not necessary unless in a noisy environment.

Please note: The specifications of the product detailed on this set up guide may change without notice. RDM Ltd shall not be liable for errors or for incidental or consequential damages, directly or indirectly, in connection with the furnishing, performance or misuse of this product or document.



Ensure that all power is switched off before installing or maintaining this product



Revision History

Revision	Date	Changes
2.2	15/08/07	Option to display monitoring probe temperature in °F included. Ability to invert all relay operation on the controller introduced.
2.3	10/09/2008	Option added to turn compressors on in the event on a pressure transducer probe failure (See section entitled Set/view Units). Invert relay option modified such that the controller reports the actual compressor/fan status instead of the relay status.
2.4	02/11/2010	Additional ordering information included.
2.5	04/04/2011	Current Release



Ensure that all power is switched off before installing or maintaining this product