CLAUDGEN

SCREENZONE

LARGE COMMERCIAL AIR CURTAINS

RAC10HL
RAC15HL
RAC20HL

INSTALLATION AND OPERATING MANUAL

Contents

1. General Information

1.1 Warnings

All installations must be in accordance with the regulations in force in the country of use.

These instructions must be handed to the user on completion of the installation.

Installers and service engineers must be able to demonstrate competence and be suitably qualified in accordance with the regulations in force in the country of use.

To ensure continued and safe operation it is recommended that the appliance is serviced annually.

The manufacturer offers a maintenance service. Details are available on request.

The air curtain outlet/inlet grille must not be obstructed during use.

Any modifications made to the unit not approved by Consort will void any manufacturers warranty and potentially create a hazard.

1.2 Health and Safety

Please read this instructions thoroughly before installing the appliance. Sole liability rests with the installer to ensure that all site safety procedures are adhered to during installation. Sole liability rests with the installer to ensure that protective safety wear such as hand, eye, ear and head protection is used during installation of the product. Ensure that all anchoring points are suitable for the weight of the appliance.

1.3 Electrical Supply

For full electrical loadings, please refer to the technical data sheets within this manual.

It is recommended that the electrical supply to the base unit in the air curtain is via an appropriate switched isolator in accordance with the regulations in force in the country of use and via a fused isolator having a contact separation of greater than 3mm in all poles.

BMS control, time switches, room thermostats and door interlocks can be installed at the discretion and responsibility of the installer.

All units must be wired in accordance with I.E.E. regulations for the Electrical Equipment of Buildings and the installer should ensure that a suitable isolating switch is connected in the mains supply.

Electrically heated supply is 415V 3 phase, Neutral and Earth. Max cable inlet size is 4mm² or 6mm² (refer to individual technical specification).

Remote unit is wired to the base unit via a cat5/6 ethernet cable.

1.4 Location

All units should be installed horizontally directly over the door opening. It is recommended that the air curtain is installed on the inside of the building, within the ceiling void or roof space.

Care must be taken to allow complete free air movement into the inlet grilles of the unit to ensure correct working operation of the air curtain. The discharge opening should be as close to the top of the door as possible and cover the entire door width.

Units can be mounted adjacent to each other to cover the full door opening across wider entrances.

1.5 Clearance Distance

It is recommended that a minimum clearance of 50mm is allowed around the case sizes detailed below. The clearance allows for cable entry and prevents combustible surfaces overheating.

The minimum mounting height (floor to grille) is 2m. The maximum mounting height is 4m.

1.6 Standards

The heater conforms to the following standards

Electrical Equipment (Safety) Regulations 2016 SI. 2016 1101
Electromagnetic Compatibility Regulations 2016 SI. 2016 No. 1091
Radio Equipment Regulations 2017 SI. 2017 No. 1206
The Ecodesign for Energy Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019. SI. 2010 2617
The Restriction of use of Certain Hazardous Substances. SI. 2012 No. 3032
The Supply of Machinery (Safety) Regulations 2008
(SI 2008/1597)

2. Introduction

2.1 Introduction

This instruction manual describes the Screen-Zone Large Commercial Recessed range of air curtains. They are designed for discreet positioning in a suspended ceiling or bulkhead in the doorways of retail or commercial premises up to 4m ceiling height.

The air curtains comprise multiple modular blower units 500mm wide and with nominal maximum power output of 6kW 3Ph 415V.

Models are available in 1000mm, 1500mm and 2000mm lengths, made up of 2, 3 and 4 blower units. For wider doorways, up to 7 air curtains can be easily interconnected using CAT5/CAT6 RJ45 networking cable.

It is recommended that this control cable is run separately within its own trunking to avoid external interference.

The air curtain can be controlled by Touchscreen controller (supplied with the heater), mechanical switches (not supplied) or BMS.
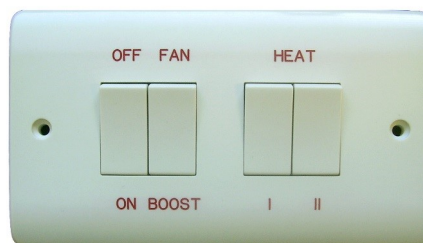
> **WARNING:**
>
> THIS AIR CURTAIN SHOULD <u>NOT</u> BE INSTALLED WHERE THERE IS A CORROSIVE ATMOSPHERE.

ø 25mm and ø 20mm knock-out positions for cable entry

Outlet

Inlet
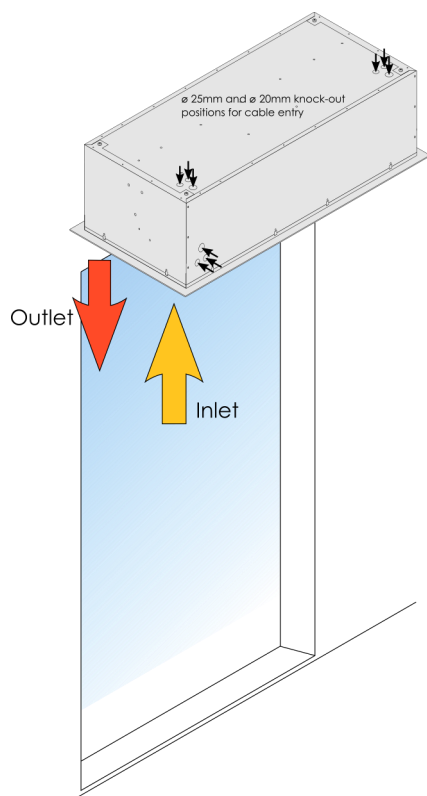
2.2 Mechanical switch Controller

Optional HE8408 mechanical switch. (not supplied with the heater) More details at Installer wiring section. This controller will provide 2 fan speed and 3 heat setting options.

2.3 Touchscreen Controller

Each air curtain is supplied with an electronic controller giving option for 8 fan and 8 heat settings which can be mounted up to 50m from the air curtain. Optional BMS control, remote thermostats and door interlocks can be installed.

The electronic touch screen controller shown on the picture below allows the user to control either a single air curtain, or a network of up to 7 air curtains with the same settings.

The controller is designed to be mounted on a surface double gang back box, and is powered by an RJ45 connection. **The controller will not fit metal or dry lining back box.**

The cable length between the base unit and the controller can be up to 50 metres.
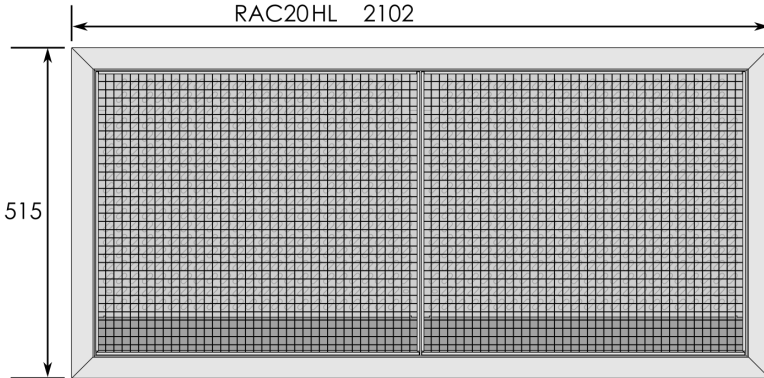
3. Dimensions

3.1 Air Curtain Dimensions

RAC10HL	1024
RAC15HL	1534
RAC20HL	2044

454

270 min
277 max

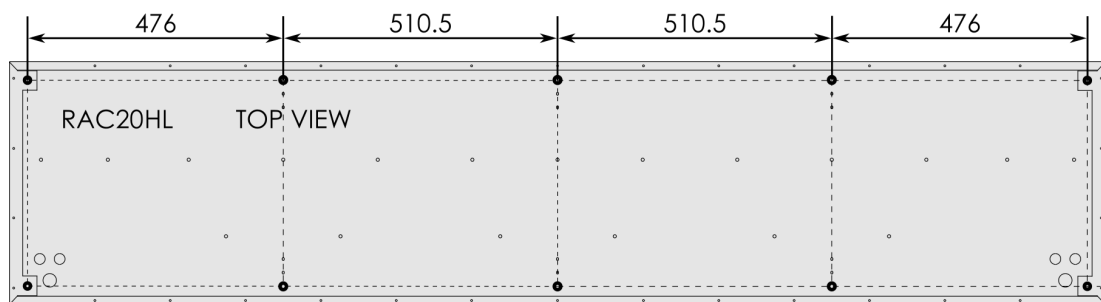|	
RAC10HL	1082
RAC15HL	1592
RAC20HL	2102

Dimensions in mm

515

3.2 Fixing Locations

952

RAC10HL   TOP VIEW
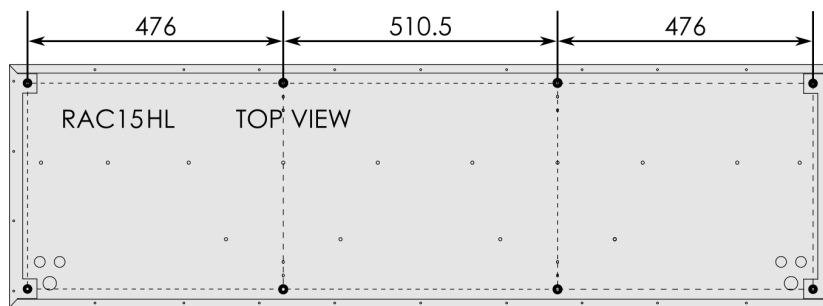
381
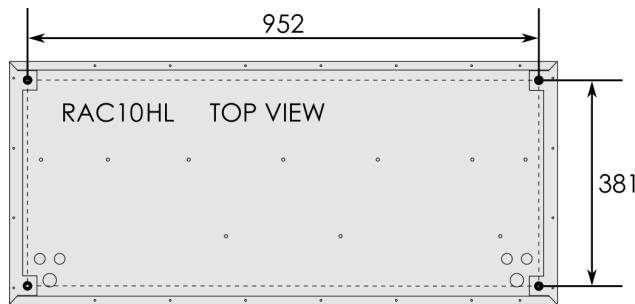
M8 threaded fixing are located as shown.

20mm knock-out fixings are also available alongside the threaded fixings.

476   510.5   476

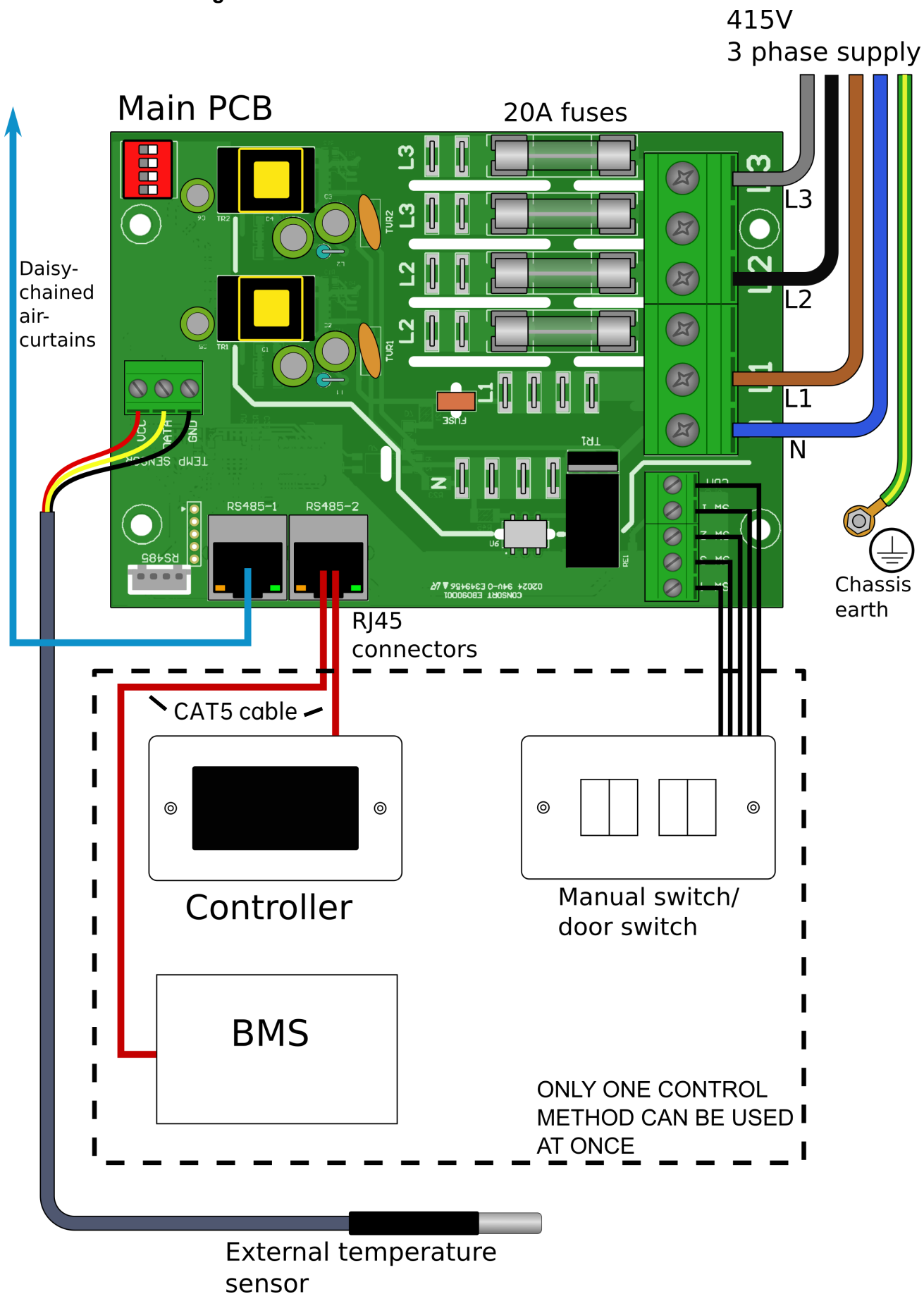RAC15HL   TOP VIEW

476   510.5   510.5   476

RAC20HL   TOP VIEW

Dimensions in mm

4. Technical Specifications

4.1 General Data			RAC10	RAC15	RAC20
Maximum height	M		4.0		
Door width	M		1.0	1.5	2.0
Heat medium			Electric heating element		
Heat output selected at the installation	kW		8 / 12	12 / 18	16 / 24
Fan type			EC Centrifugal 133 x 180		
Fan control			Electronic fan speed control		
Switching type			Colour Screen Controller with Touch Screen		
Weight	kg		34	51	84.0
Electrical Data					
Supply voltage			415V 3ph 50Hz		
Total load	kW		9 / 12	18	24
Max current per phase	A/pha		13 / 16.5	16.5 / 25	25 / 34
Max motor power	W		196	294	392
External fuse size amps	A/pha		16 / 20	20 / 32	32 / 40
Controller			Touch colour screen controller		
Controller wiring			CAT5 / CAT6 with RJ45 connectors		
Cable terminal size			10mm² Max		
Mains terminal block position			Corner of base unit. Terminals N; L1; L2 & L3		
Control terminal position			Corner of base unit RJ45 type		
Air Data					
Air volume	*Max speed*	m³/h	1164	1475	2013
Air velocity	*Max speed @ 0M*	m/s	8		5.4
	Max speed @ 1M	m/s	5		4.2
	Max speed @ 2M	m/s	1.6		2.1
	Max speed @ 3M	m/s	0.8		1.0
Delta T	*Max speed*	°C	26	25	21
	Min speed	°C	20	19	19
Noise level @ 3m	*Max speed*	dBA	61		
	Min speed	dBA	50		
Dims Data					
Length w/o grille		mm	1024	1534	2044
Width w/o grille		mm	454		
Height		mm	270		
Length with grille		mm	1082	1592	2102
Depth with grille (width)		mm	270 - 277		

5. Wiring Details

5.1 Installer Wiring

415V
3 phase supply

Main PCB

20A fuses

Daisy-
chained
air-
curtains

L3

L2

L1

N

L3

L2

L1

Chassis
earth

RS485-1   RS485-2

RJ45
connectors

CAT5 cable

Controller

Manual switch/
door switch

BMS

ONLY ONE CONTROL
METHOD CAN BE USED
AT ONCE

External temperature
sensor

5.2   Factory Wiring

Main PCB

Secondary PCB

Fan motor

to other PCBs
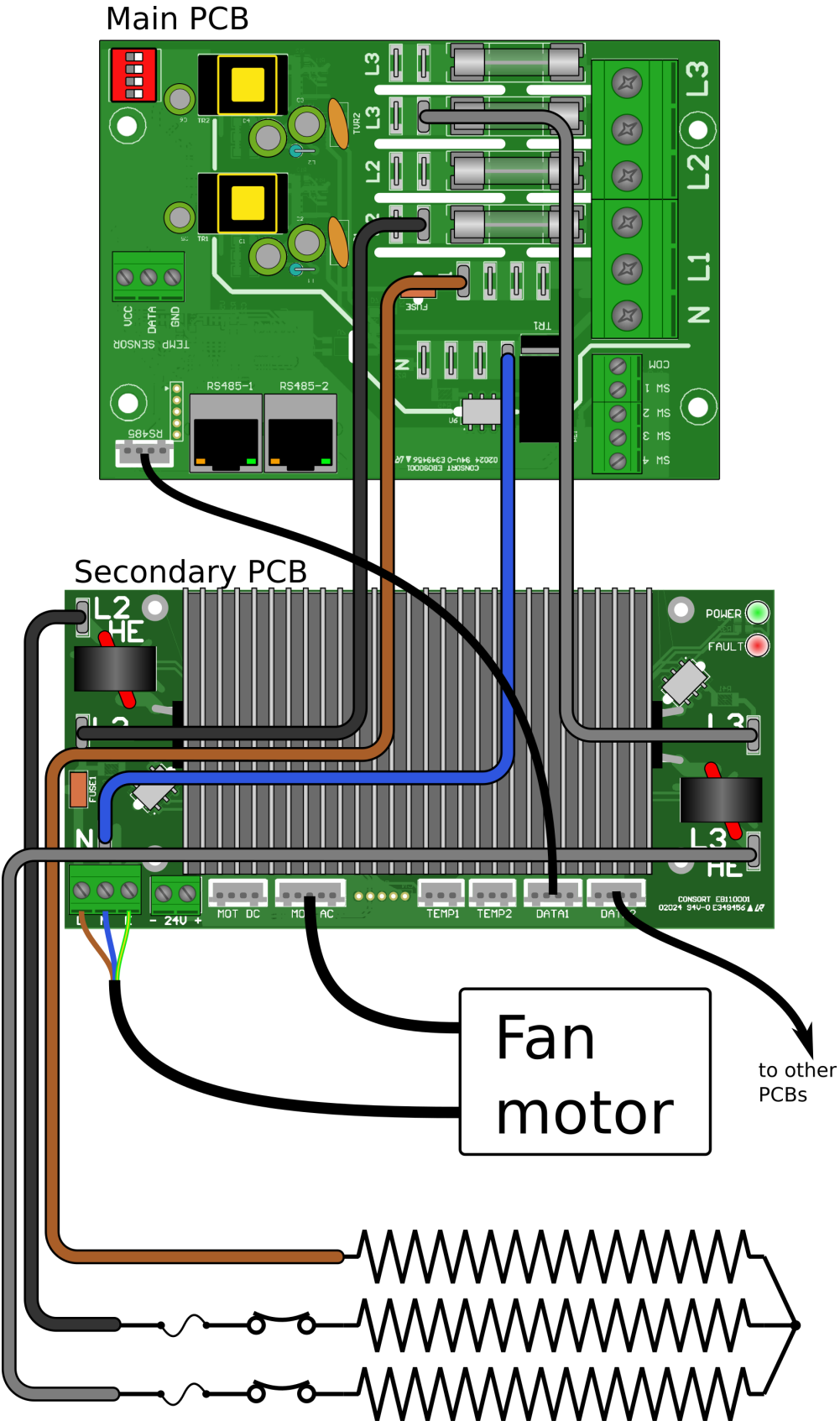
5.3   Network Wiring - Controller

Controller or BMS
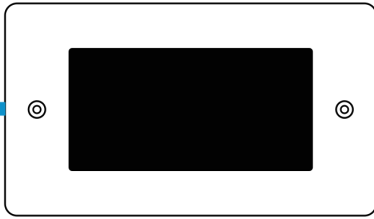
Main PCB air curtain 1

Main PCB air curtain 2

CAT5 cable with RJ45 connectors can be used to network up to 7 air curtains in a daisy-chain configuration.

The DIP switches 1, 2 and 3 are used to configure each air curtain with a unique address.
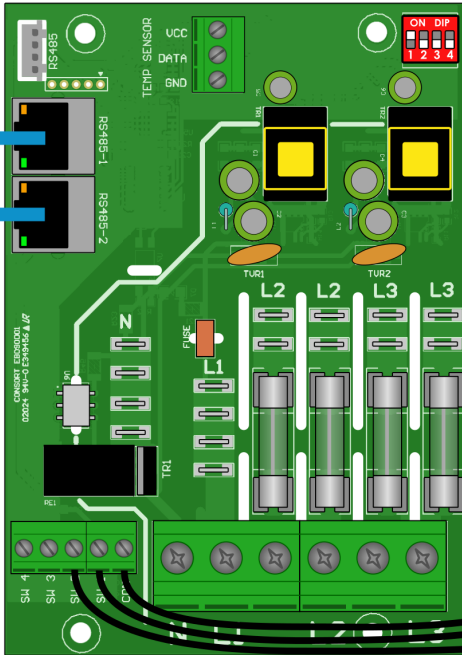
DIP switch setting 000X is reserved for when a controller or BMS is not used.

E.g. air curtain 1 DIP switches set to 1000.

External and door switches are connected between COM and SW1 or SW2.
Their behaviour can be configured in the controller settings menu.

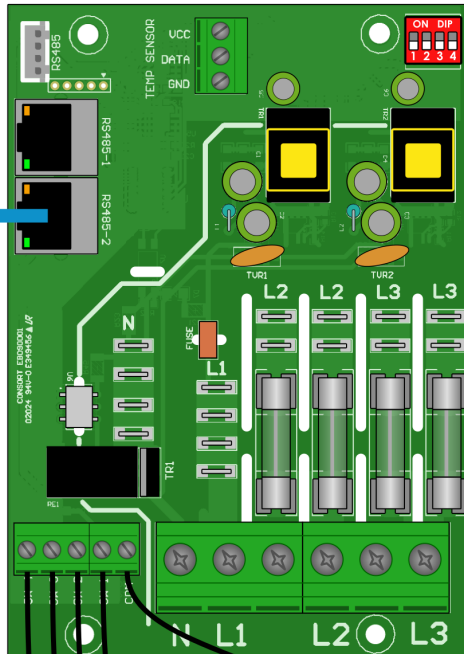External switch

Door Switch
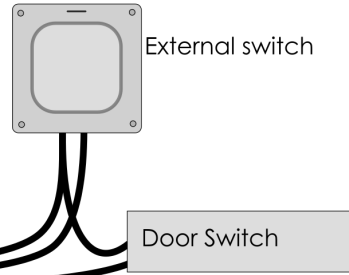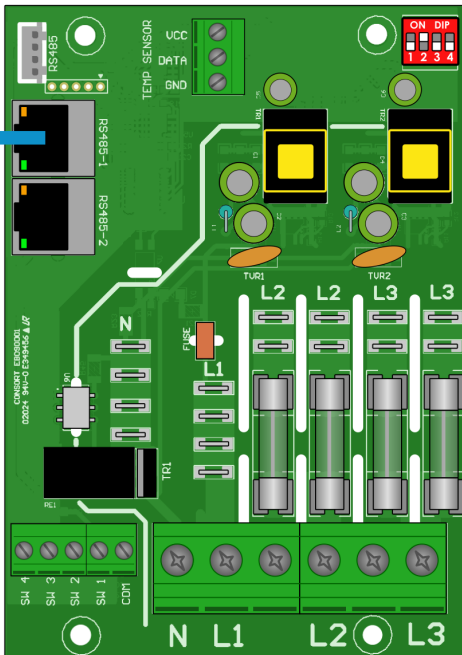
E.g. air curtain 2 DIP switches set to 0100.

All possible addresses are:
1   100X
2   010X
3   110X
4   001X
5   101X
6   011X
7   111X

5.4 Network Wiring - Switches

Main PCB air curtain 1

The aircurtain can be also controlled by mechanical switches.
In this configuration touchscreen controller or BMS controls will not work.
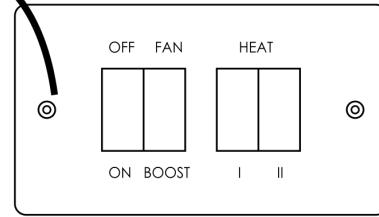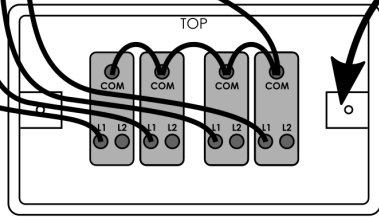
To operate heater by mechanical switches, the DIP switches on the main pcb need to be set to 000X.

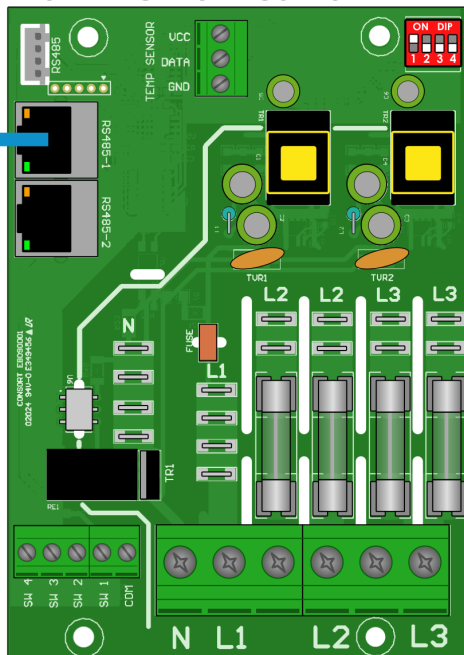The DIP switch 4 is used to select fan speed range.

For installation height of 2 - 3m set the DIP switches to 0000.

For installation height of 3 - 4m set the DIP switches to 0001.

SW1 - on / off
SW2 - low speed / high speed
SW3 - 1/3 heat output
SW4 - 2/3 heat output

Main PCB air curtain 2

CAT5 cable with RJ45 connectors can be used to network up to 7 air curtains in a daisy-chain configuration.

The 2 DIP switches on all 7 connected aircurtains must be set to different address.

All possible addresses are:

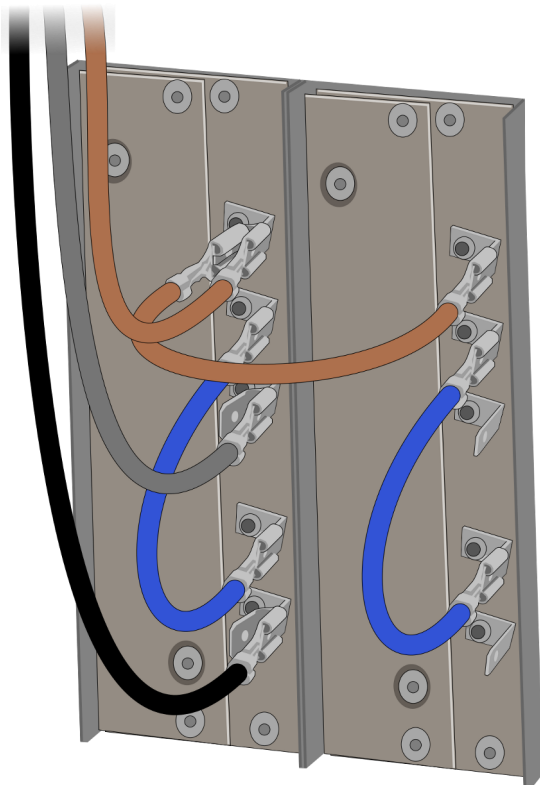|	
1	100X
2	010X
3	110X
4	001X
5	101X
6	011X
7	111X

6. Heat Output Configuration

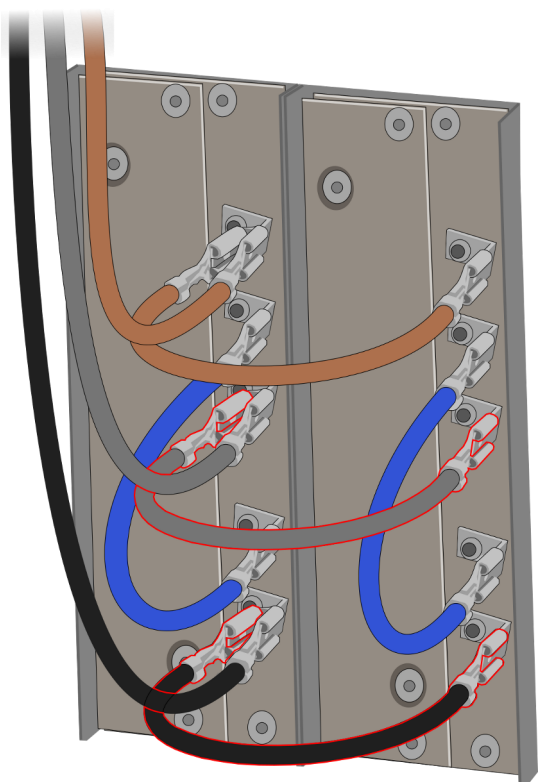Fig. 1 Heating Element connection as supplied

Fig. 2 Heating Element with links installed

The air curtain is supplied configured for standard power output.

RAC10HL - 8kW
RAC15HL - 12kW
RAC20HL - 16kW

This configuration is suitable for installation height from 2 to 3m or where maximum power usage must be limited for other reasons. As supplied, the each blower unit configured for 4kW power output. Cable links are supplied to increase the output to the rated 6kW. Once the links are installed the heaters are configured to maximum power output.

RAC10HL - 12kW
RAC15HL - 18kW
RAC20HL - 24kW

This configuration is suitable for installation height from 3 to 4m or in areas with more draft where higher fan speed is required.

Two cable links are supplied per blower unit. These are 100mm x 2.5mm² with female spade connector terminations. Grey and Black PVC sheathed cables are intended for use with L2 and L3 phases.

In each blower unit, locate the end of the heating element, where the cables connect. Before modification it will look like fig. 1.

The cable links are installed as shown in fig. 2.

Push the spade connectors over the free terminals without twisting until it clicks and locks into place.

7. Disassembly / Assembly
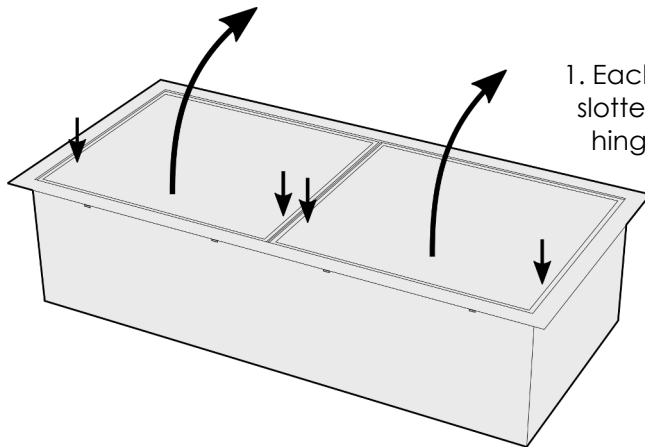
1. Each panel of the heater is secured by 2x slotted screws. The other side of the panel is hinged.

   After installation, panels can be easily opened for cleaning or servicing.

2. For installation, panels should be removed. Where two panels meet, the hinge is a machine screw and nut assembly, requiring a 10mm spanner and #2 Pozidrive screwdriver.
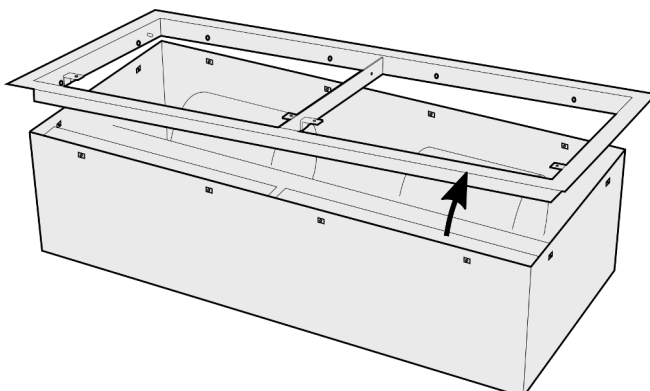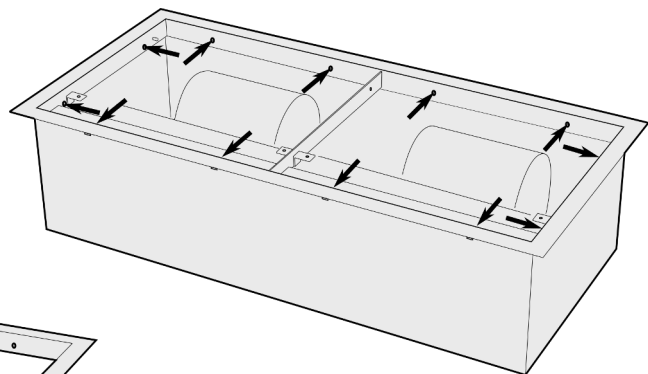
   The outside edge hinge pin is fixed in place.
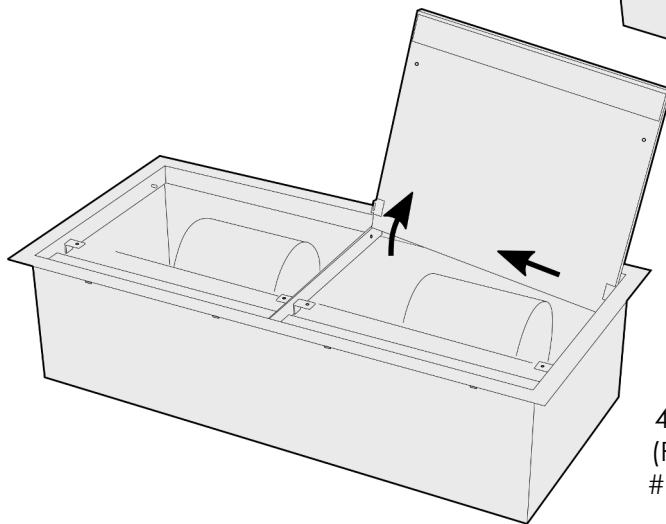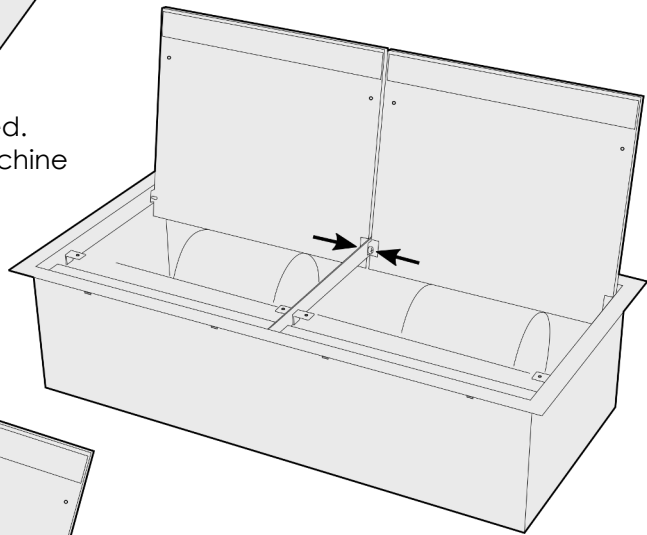
3. Remove panels by rotating and sliding inwards from the edge.

4. The surround is held in place by 12 (RAC10HL), 16 (RAC15HL) or 20 (RAC20HL) #2 Pozidrive screws.

5. For installation, remove surround and fit unit back-box into recess first. The lip of the back-box should be recessed 3-10mm from the surface of the ceiling.

6. After wiring and testing, the surround and panels should be refitted.

8. Installation Details

8.1 Mounting

All units should be installed horizontally directly over the door opening. It is recommended that the air curtain is installed on the inside of the building, within the open room space against a wall or ceiling.

Care must be taken to allow complete free air movement into the inlet grilles of the unit to ensure correct working operation of the air curtain. The discharge opening should be as close to the top of the door as possible and must cover the entire door width.

Units can be mounted adjacent to each other to cover the full door opening across wider entrances.
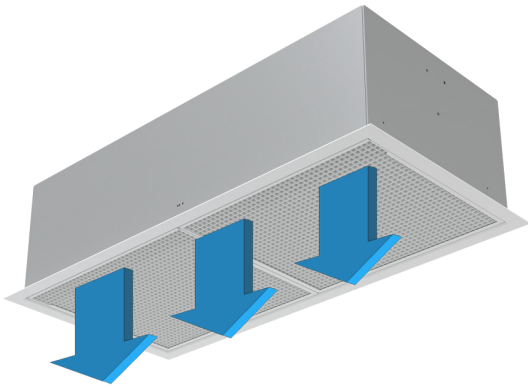
! ENSURE AIR OUTLET LOUVRES ARE NEAREST TO DOOR APERTURE.

8.2 Electrical Supply

These units are suitable for connection to a 415 Volt, 50Hz 3 phase and neutral supply for electrically heated 8-24kW models.

The appliance shall be connected to the supply via an appropriate switched fused double pole isolator having a contact separation of greater than 3mm. Test for correct operation and refit the cover.

For safety reasons, a sound earth connection must be made to the unit. The unit should be wired in accordance with IEE Regulations for the Electrical Equipment of Buildings.

8.3 Installation

It is the sole responsibility of the installer to ensure that the points of attachment to the building are sound. Consultation with the consultant/architect or owner of the building is recommended to ensure that a sound, mechanically stable installation is achieved.

! All attachments must be capable of supporting the weight of the product .

Step 1
Disassemble the heater following section 7.

Step 2
Either drop rods or catenary wire can be used to fasten the air curtain to the ceiling support structure. The mounting points can be seen in section 3.

Step 3
The height between the ceiling face and the edge of the air curtain case needs to be adjusted to 3-10 mm to enable the grille assembly to fit flush against the ceiling. Adjust accordingly.
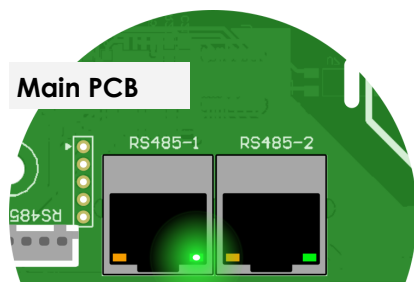
Step 4
Refit grille assembly and panels following section 7. Ensure the grille sits flush against the ceiling.

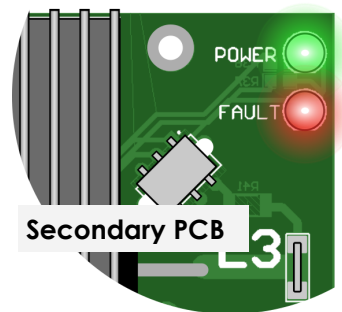## 8.4 Installation - Wiring

With hatches open, connect the electrical supply and controller interconnecting wiring to the appropriate terminals on the controller base unit (See relevant wiring diagram section 4).
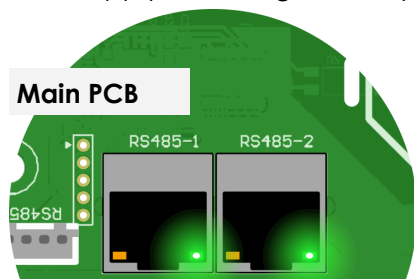
9. Fault detection and LEDs

When the air curtains are powered up in standby mode, a green LED on the main board shows that the 12V power supply is working correctly:
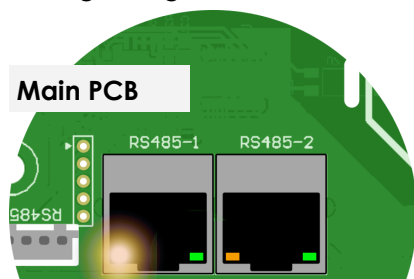

When heat or cold blow is demanded the secondary PCBs are powered. A second LED on the main PCB shows that the second 12V power supply is working correctly:


A fault with the auxiliary power is indicated by a flashing orange LED on the main PCB:

A green LED on the secondary PCBs shows that they are receiving 12V power:

The air curtain monitors the fan speed, power output and heatsink temperature. In the event of a fault the red LED on the secondary PCB flashes:

The red LED flashes a number of times and then pauses. The number of flashes denotes the fault.
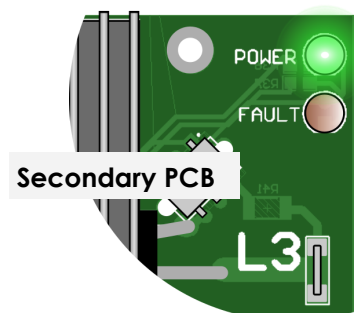
Number of flashes	Fault
1	Power measurement when triacs switched off: Response: Auto run motor
2	Motor fault Response: Disable heating
3	Triac heatsink overheat: Response: Reduce heating
4	Low power measurement when triacs switched on: Causes: Thermal cutout tripped, blown fuse, missing phase

10. BMS Connection MODBUS Protocol

9.1 BMS Connection

The heater is compatible with BMS systems using MODBUS protocol.

The connection to BMS system can be made using one of the RJ45 connectors.

Main PCB
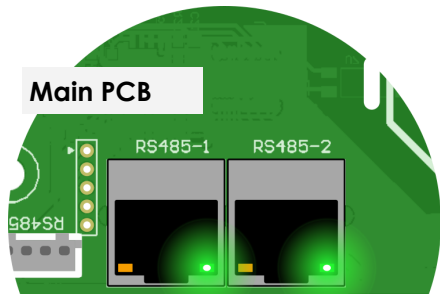
Only one means of control can be used at the same time. If BMS is used to control the heater, the colour screen controller must not be used.

The BMS can control fan speed and heat output and also read and report the heater status.

Speed can be set in the range of 600 - 1700RPM in 1RPM steps. If the speed is set below 600RMP, the heating element is automatically disabled. Care has to be taken when selecting speed. The fan speed should be always correct for the selected heat output. If the speed is too low, the heater can overheat.

Heat output can be set in the range of 0 - 100% in 1% steps.

9.2 MODBUS Protocol

 The DIP switches 1, 2 and 3 are used to configure each air curtain with a unique address.

RJ45 cable can be used to network up to 7 air curtains in a daisy-chain configuration.

DIP switch setting 000X is reserved for when a controller or BMS is not used.

All possible addresses:

1	100X
2	010X
3	110X
4	001X
5	101X
6	011X
7	111X

RS485 serial half-duplex interface
MODBUS RTU
9600 baud
8 bits
1 start bit
no parity + 2 stop bits
'mark' parity + 1 stop bit

Supported MODBUS function codes:
0x03 read multiple input registers
0x04 read multiple holding registers
0x06 write single holding register
0x10 write multiple holding registers

16 Bit Input Registers:
1 Status
2 Temp 1
3 Temp 2
4 Temp Heatsink
5 Temp External
6 External Switches

Temperatures are formatted as 16 bit signed integers. Units are sixteenths of a degrees Celsius, as used by DS18B20 temperature sensors. The hex value 0xF000 is used to denote an invalid reading.

The status register uses bits to indicate faults:
Bit 0 - overheat
Bit 1 - heatsink overheat
Bit 2 - temp sensor 1
Bit 3 - temp sensor 2
Bit 4 - heatsink temp sensor
Bit 5 - remote temp sensor
Bit 6 - L2 on current low
Bit 7 - L2 off current high
Bit 8 - L3 on current low
Bit 9 - L3 off current high
Bit 10 - motor PSU
Bit 11 - motor
Bit 12 - MCU
Bit 13 - connection
Bit 14 - 12V auxiliary power
Bit 15 - main PCB relay

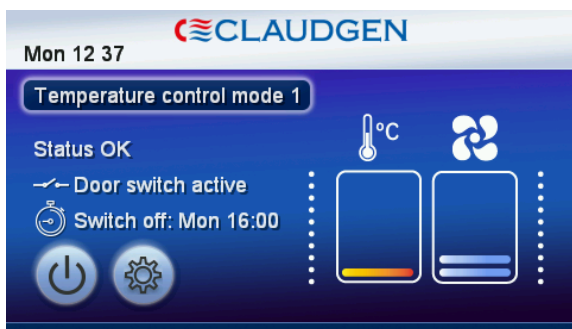External switches register uses bits to show the state of switches:
Bit 0 - Switch 1
Bit 1 - Switch 2
Bit 2 - Switch 3
Bit 3 - Switch 4

16 Bit Holding Registers:
1 RPM (units revolutions per minute)
2 Power (units percentage 0 –100)
RPM must be set to at least 600, otherwise heating is disabled.
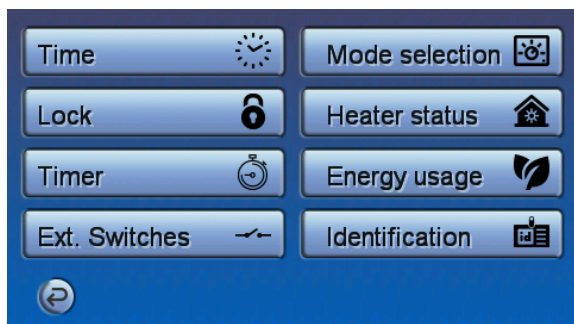
11. Touchscreen Controller Operation

11.1 Home Screen

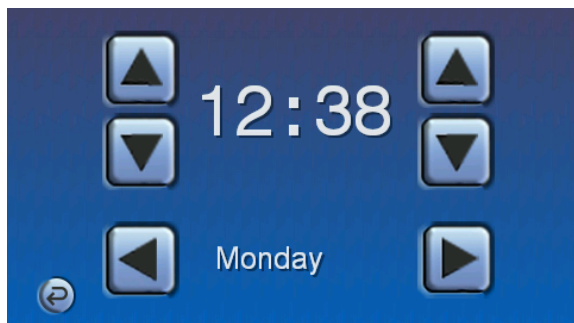The home screen provides information about the heater status and all relevant functions.

- Time
- Operating mode
- Heater status
- Door switch status
- Timer status
- Heat output
- Fan speed
- ON / Stand-by button
- Settings menu button
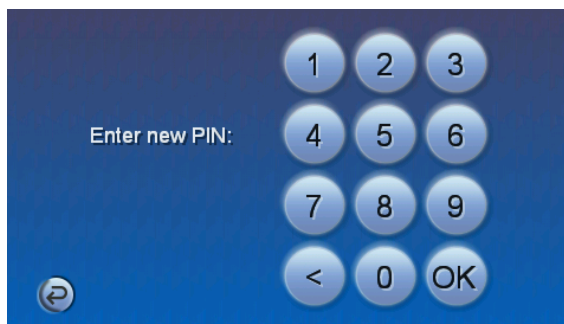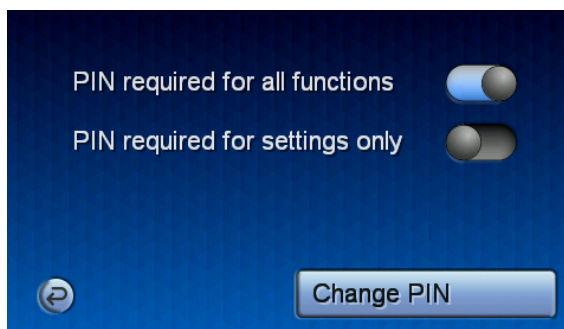
11.2 Settings menu

All functions and settings are available from this menu.

11.3 Time

The time can be set using the arrow buttons. A coin battery CR1220 maintains the time when power is interrupted. Time is displayed on the home screen and needs to be set to use the timer function.
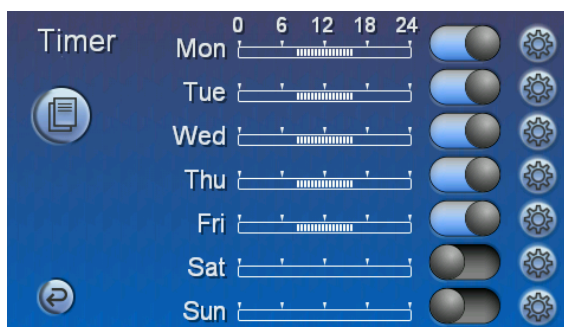
11.4 Lock

PIN function can be enabled to prevent unwanted operation of the heater or changing the settings.

The PIN can be completely disabled, enabled for settings only or all functions.

The default Pin is set as **1234**, but can be changed using the Change Pin button. If the PIN is forgotten contact Consort technical help.
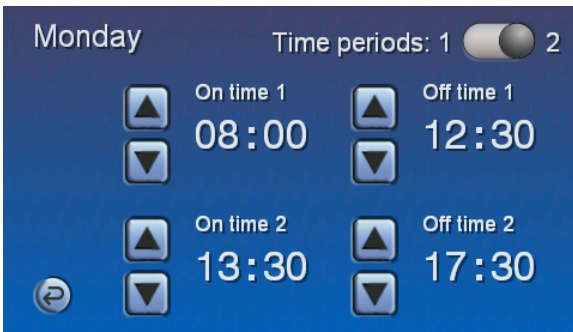
11.5 Timer

The 7 day timer function allows scheduling automatic switching between on and stand-by. Each day can be individually enabled or disabled. The timer allows up to two periods of operation per day. The white bars indicate when the heater is timed to switch on.

Use the settings buttons to set up the time for each day (see next page), and the copy button to copy settings from one day to another.

11.6 Timer - time schedule

There are 2 timer periods for each day available. Tapping the slider in the top right corner will change between 1 or 2 time periods.

The times for the first time periods are on the top of the screen, the times for the second timer period are on the bottom of the screen. Times can be adjusted in 15 minute intervals using the buttons.

When the timer is active, an icon will appear on the home screen giving information about the next switch time.

11.7 External switches
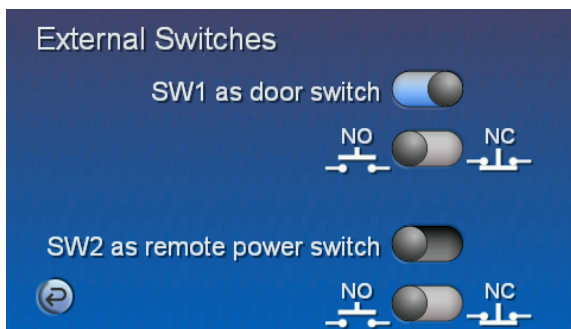
There is a provision for 2 remote switches than can be wired into the air curtain with. The switches must be voltage free type, NO or NC configuration.

SW1 can be connected to a door switch or occupancy sensor installed in the door area. When the function is activated, the door switch will enable the air curtain when the door is open and disable it when the door is closed. The second slider is used to configure the system for the correct switch type. When the air curtain is disabled by the door switch, the heater will operate at a low fan speed. This will allow for a fast start-up when the door is opened. When SW1 is active, the home screen will show the status of the door switch.

SW2 is intended for a remote switch that can be used to disable the air curtain from a remote location. Usually this would be a simple BMS or external timer connection. Once disabled using remote switch the air curtain can't be controller by the touchscreen controller and will remain disabled until enabled remotely.

11.8 Operating Mode selection

One of four operating modes can be selected. Each mode uses a different method of selecting heat and fan settings when the air curtain is not in stand-by mode. Use the settings button to configure each mode.

11.9 Manual Mode
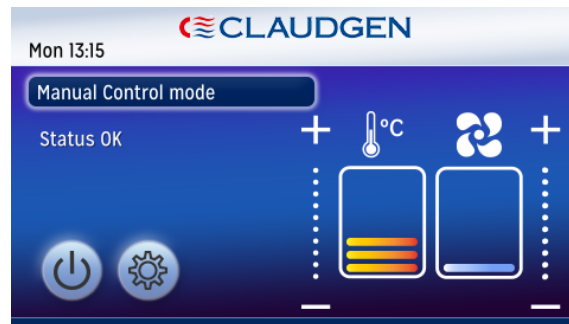
In manual mode user can select required fan and heat output by tapping + or - symbols on the home screen next to the fan and heat bars.
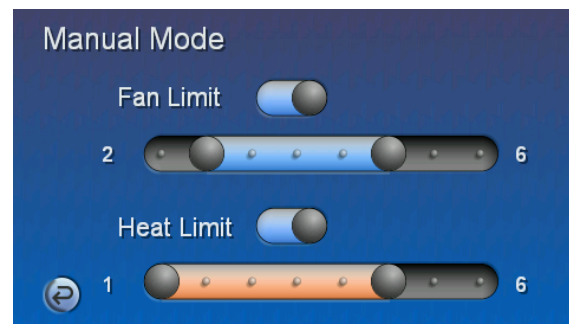
There are 8 fan speeds and 8 heat settings available. It is possible set maximum and minimum limits for fan speed and heat output. Once limits are set and functions activated, only limited fan speed and heat output will be available on home screen when in manual mode.
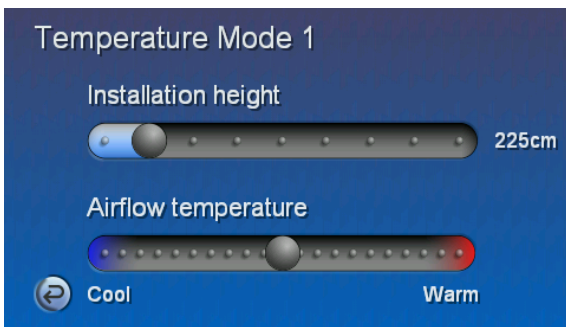
11.10 Automatic Mode
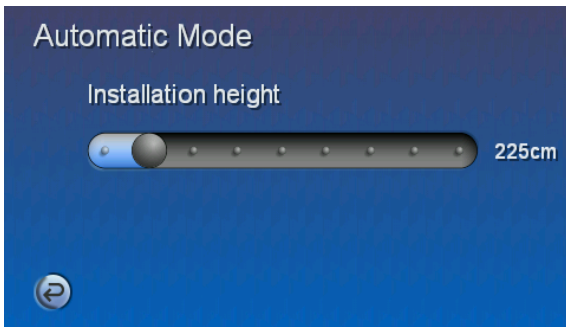
Automatic Mode is the best choice for easy to set-up efficiency and comfort. Set the height by moving slider to the required position. The air curtain will run at optimum fan speed and heat output based on the inlet temperature.

11.11 Temperature Mode 1

Temperature Mode 1 is very similar to Automatic Mode, with the addition of having an option for adjusting the airflow temperature. With the airflow temperature set in the middle of the scale, this is equivalent to Automatic Mode.

In certain situations, when required, airflow can be increased or decreased by increasing or decreasing the set installation height. Using a higher setting for the installation height will make the air curtain less energy efficient.

11.12 Temperature Mode 2
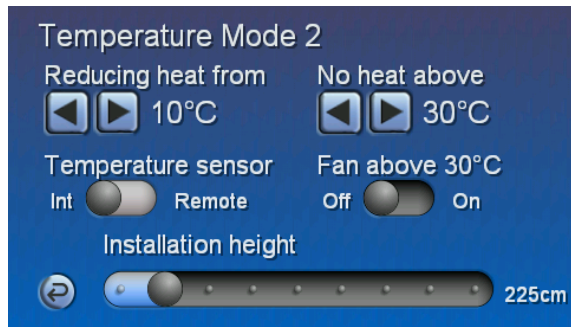
This operating mode is suitable for situations where the heater is used to maintain the room temperature or where the requirement is to adjust the heat output based on the indoor/outdoor temperature.

This operating mode can use either the internal or supplied external temperature sensor.
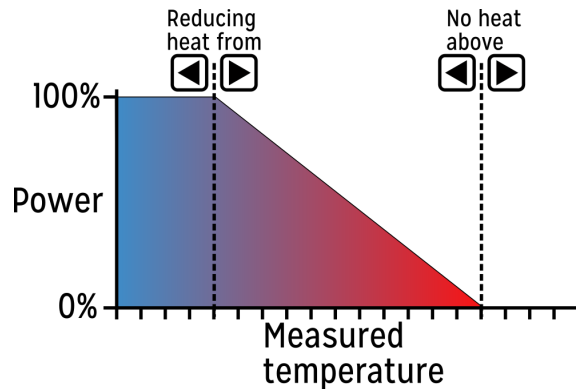
The temperature on the left defines the starting point below which the air curtain uses full power. The temperature on the right defines the point above which the air curtain doesn't produce any heat. As the measured temperature rises the heat output is gradually reduced until heater doesn't produce any heat.
Using the internal temperature, this mode can be used to maintain room temperature.
With remote sensor installed outside, this mode can be used to compensate for external temperature.
There is also an option to select fan function after the heater stops producing heat. Fan can be set to turn off after the heater stops producing heat or run all the time.
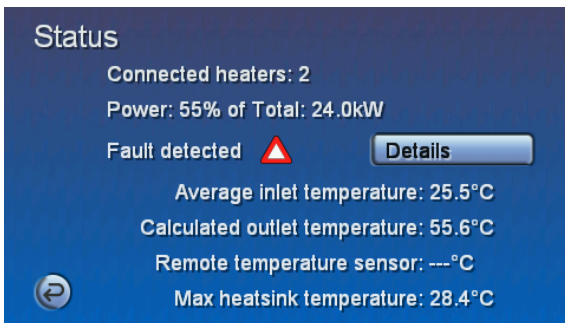
11.13 Heater status
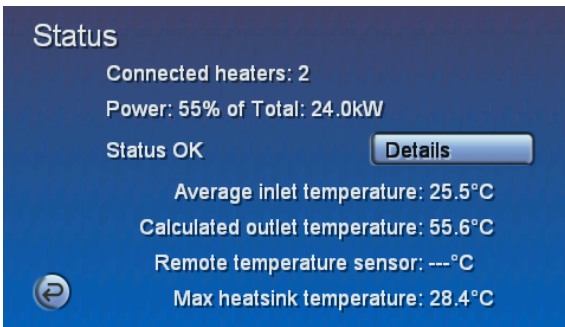
The Status screen provides an overview of values from all connected heaters. The heaters need to be run before some of the values can be calculated.

In the event of a fault a red warning triangle is displayed:

More details are available when tapping the details button. The detailed status screens are primarily for installers or engineers to help with installation or fault diagnostics.
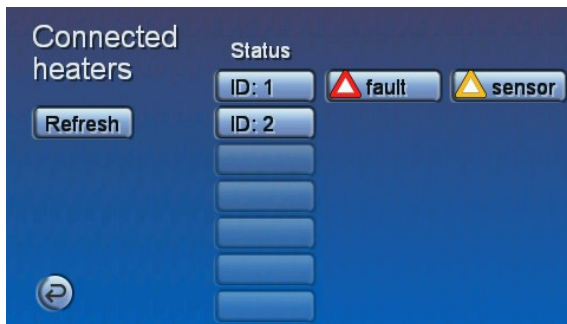

The connected heaters screen shows all of the currently connected heaters, in order of address ID. Heaters are connected when the controller is first powered up. In order to connect to newly powered heaters, press Refresh to re-search for heaters.

For each connected heater, up to 3 detailed status screens are available. These are general status, faults and sensor screens.

The links to the faults and sensor screens are hidden when no faults have been identified.
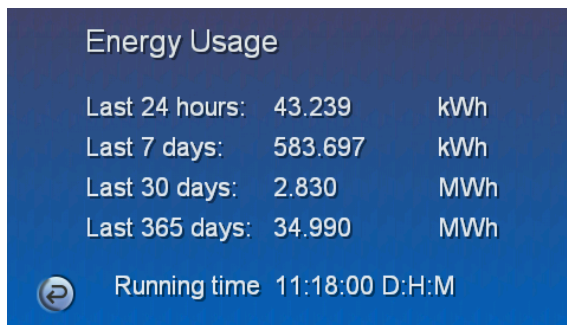
11.13 Heater status - cont.
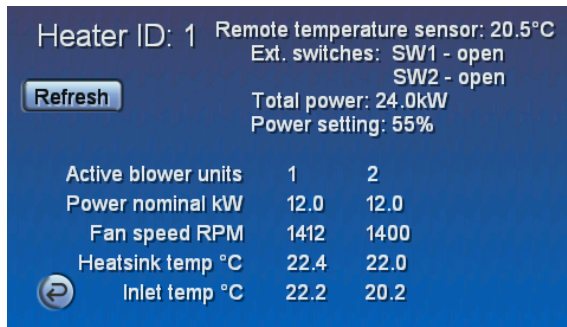
The general status screen shows details about the heater and all of the internal blower units. The heater needs to be run before some of the values can be calculated.

The faults screen can provide detailed diagnostics of faults for each internal blower unit. The sensor screen shows the status of the temperature sensors.

11.14 Energy usage

The energy usage screen provides information related to energy used from the day the heater was installed. The values are calculated based 3PH 400V and so will differ from actual energy usage when mains voltage is lower or higher.

11.15 Identification
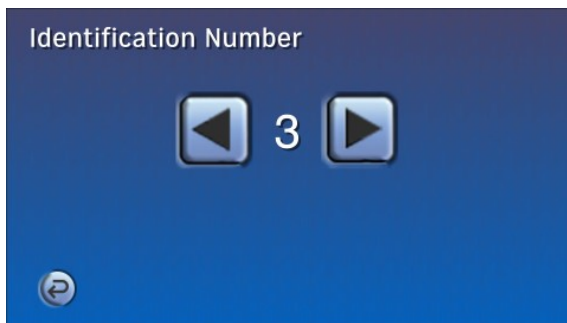
User can set ID number for controller identification. This number is shown on the left hand corner of the home screen. This feature is useful in situation where there are more than one controller side by side.

Declaration Of Conformity

In accordance with UK Government Guidance.

WE HEREBY CERTIFY THAT THE APPLIANCES DETAILED HEREON HAVE BEEN INSPECTED AND TESTED, AND CONFORM TO THE REQUIREMENTS OF THE FOLLOWING UK STATUTORY INSTRUMENTS WHERE APPLICABLE:

Electrical Equipment (Safety) Regulations 2016   SI. 2016 1101

Electromagnetic Compatibility Regulations 2016   SI. 2016 No. 1091

Radio Equipment Regulations 2017   SI. 2017 No. 1206

The Ecodesign for Energy Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019.   SI. 2010 2617

The Restriction of use of Certain Hazardous Substances. SI. 2012 No. 3032

The Supply of Machinery (Safety) Regulations 2008 (SI 2008/1597)

Transposed standards used:

- **BSEN55014 (2006)**
- **BSEN301 489.1 & .3**
- **BSEN300 220.1 & .2**
- **BSEN60 730.2.9**
- **BSEN 60335.1 (2012)**
- **BS EN 60335.2.30 (2009)**

PART NUMBER AND DESCRIPTION OF APPLIANCE: **RAC10HL, RAC15HL, RAC20HL AIRCURTAINS**
NAME OF RESPONSIBLE PERSON: **A C REYNOLDS**
POSITION: **QUALITY ENGINEERING**
DATE: **22/03/21**

bsi. ISO 9001:2015 Quality Management