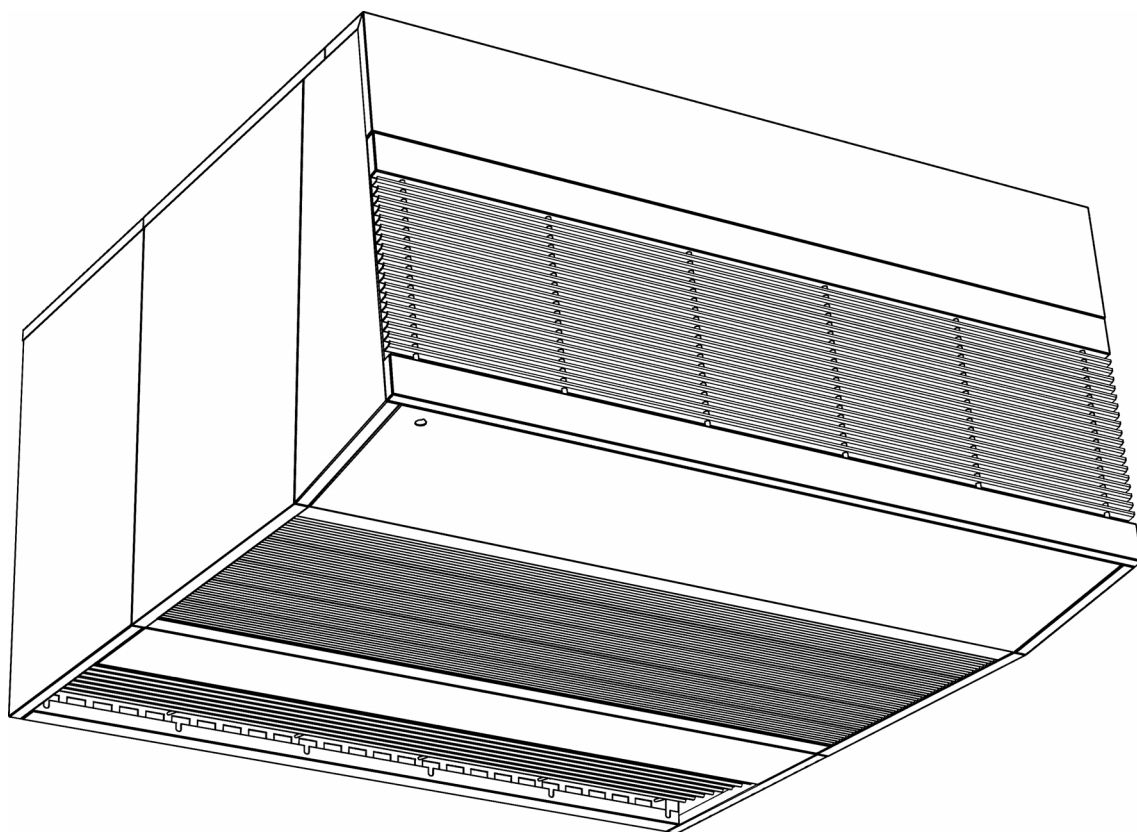


Manual

Cold Store Air Curtain

Model MAT



Version 6.0
Original Manual

English



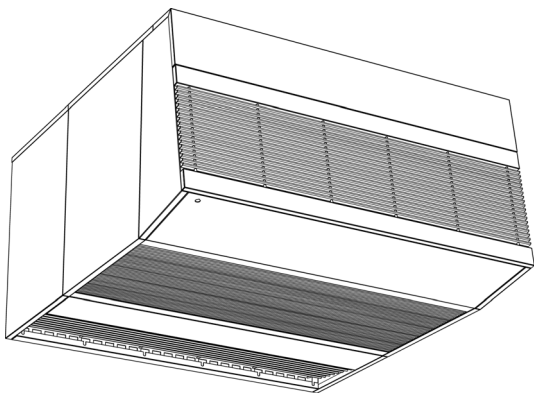
biddle

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1. Introduction

1.1 About this manual



This manual explains how to install, maintain and repair the MAT cold store air curtain.

This document contains important instructions for proper, safe and effective unit operation.

Please read this manual carefully before working on the unit. Familiarise yourself with the unit and follow instructions carefully.

1.2 How to read this manual

1.2.1 Intended audience

This manual is intended for persons responsible for installing, operating or maintaining a MAT air curtain.

If you are unfamiliar with MAT air curtains, please read following sections in order.



Note:

An understanding of the MAT air curtain's basic operating principles is essential for correct unit installation, operation and maintenance.

See also:

1.3.3 "MAT air curtain operation" on page 8

I.2.2 Designations used in the manual

The following symbols are used in the manual:



Note:
Refers to an important section in the text.



Caution:
If you do not carry out the procedure or action correctly, you may cause damage to the unit.

Follow the instructions precisely.



Warning:
If you do not carry out the procedure or action correctly, you may cause physical injury and/or damage.

Follow the instructions precisely.







Danger:
Is used to designate actions that are not permitted.

Ignoring this prohibition may lead to serious damage or to accidents resulting in physical injury.

I.2.3 Symbols used on the unit and in the manual

The following symbols indicate possible risks or hazards. The same symbols will also be found on the unit.

SYMBOL	DESCRIPTION
	 <p>You have accessed a section of the unit with components carrying a voltage.</p> <p>Access restricted to qualified maintenance staff only.</p> <p>Caution is required.</p>
	 <p>This surface or component may be hot. Risk of burns on contact.</p>

1.2.4 Related documentation

In addition to this manual, the following documentation is also supplied with the unit:

- wiring diagram for installation and servicing.
- a dimensional sketch for purposes of corridor construction must be provided by the steel supplier (in consultation).

1.3 About the unit

1.3.1 Application

The MAT cold store air curtain partitions cold store and front hall climates with the aim of:

- saving energy
- improving temperature control in cold store
- preventing misting and ice formation in cold store without physically or visually obstructing passageways

MAT air curtains work in combination with regular cold store doors. The air curtain operates whenever the door is open.



Warning:

Applications other than those described above are deemed to be 'usage other than for the intended purpose'. Biddle is not liable for damage or loss resulting from usage other than for the intended purpose. Usage for the intended purpose also entails observance of the instructions in this manual.

1.3.2 MAT air curtain components

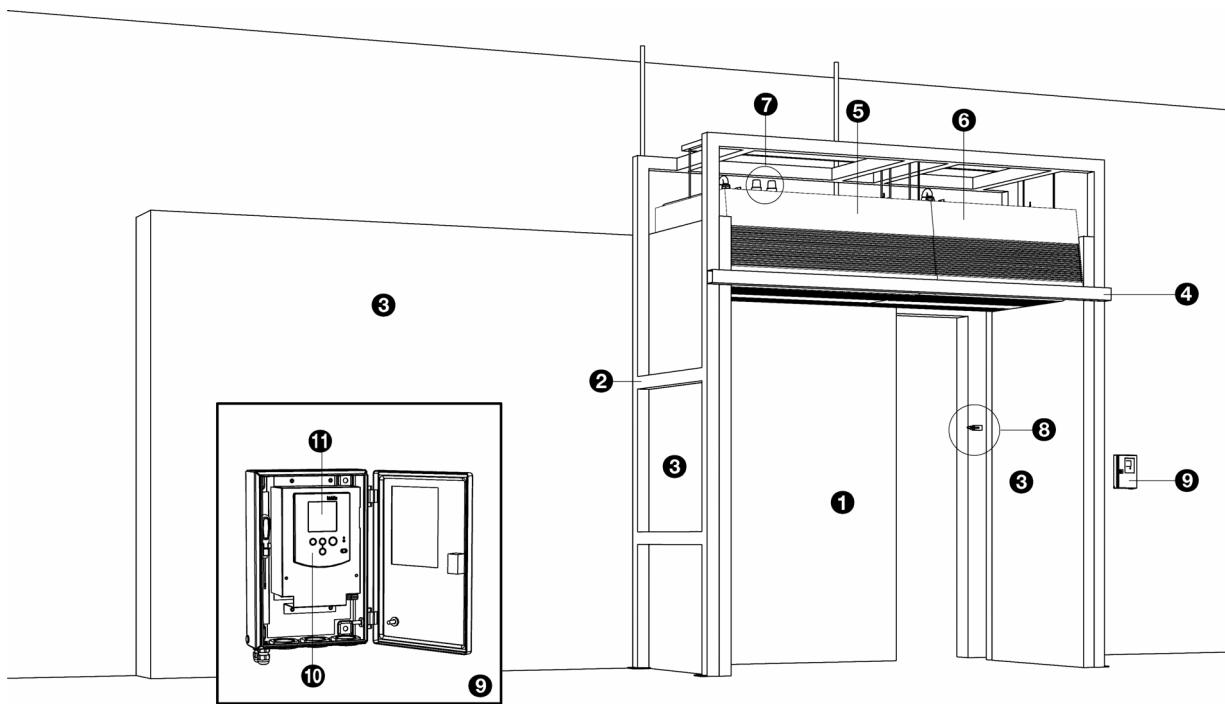
A MAT air curtain is installed around a cold store door. This is always located in the front hall outside the cold store.

A MAT air curtain consists of various components supplied with the unit. These have been explained in the figure below.



Note:

The MAT air curtain shown in this manual serves merely as an example. It is feasible that your MAT air curtain consists of only one air curtain unit. Unit dimensions may also vary depending on the size of the cold store door in question. Operation, however, remains identical unless otherwise stated.



- 1 cold store door
- 2 corridor framework¹⁾
- 3 insulated corridor structure
- 4 protection beam²⁾
- 5 air curtain unit (master unit: always applied)
- 6 air curtain unit (slave unit: optional or required for wider doorways)
- 7 the master unit has either one or two warning lights (accessory)
- 8 door contact switch controls operating mode (accessory)
- 9 control unit
- 10 control panel
- 11 display

1)The corridor is a special-purpose structural framework. This is not supplied by Biddle.

2)This protection beam is a structural component and is not supplied by Biddle. This item is recommended to prevent damage caused by collisions with vehicles. The beam may be installed at a later stage to simplify unit installation.

1.3.3 MAT air curtain operation

General

The air curtain unit creates a constant, vertical airflow across the full width of the door opening. This acts as a barrier between indoor climates in the cold store and front hall. This minimises the exchange of heat and humidity.



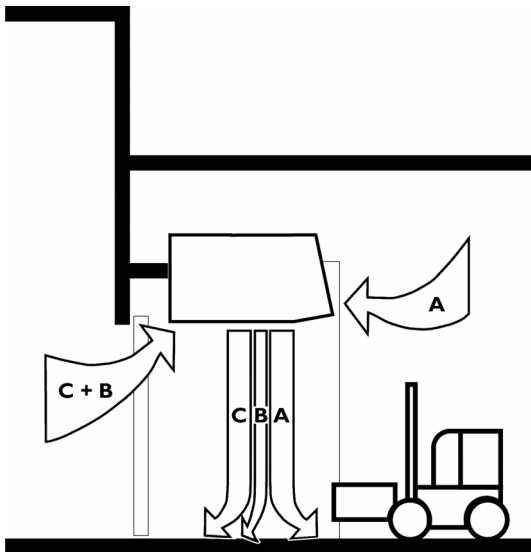
Note:

The climate partition does not work properly if the air curtain airflow is disrupted. ¹⁾For this reason:

- all obstructions should be removed from the air curtain's airflow – even the slightest irregularity can cause turbulence and disrupt effective operation.
- all air inlets and outlets must be kept clear
- door must be fully open (or closed)

Operating principle for MAT air curtain

MAT operating principle



MAT stands for 'Multi Air stream Technology'. According to this principle, the MAT air curtain's airflow pattern comprises three layers (see figure).

- Airflow 'A' enters air inlet from front hall and is expelled unheated.
- Airflow 'B' enters air inlet from cold store and is pre-heated before being expelled.
- Airflow 'C' enters air inlet from cold store and is expelled unheated.

Airflows are expelled at same flow rate and brought together at airflow rectifier grille. This avoids turbulence and significantly minimises mixing of airflows.

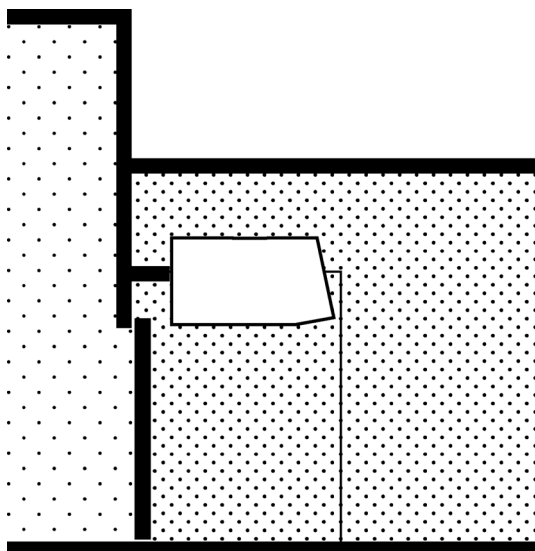
Purpose of heating

Preheating Airflow 'B' reduces its relative humidity thus preventing mist formation in the air curtain's airflow.

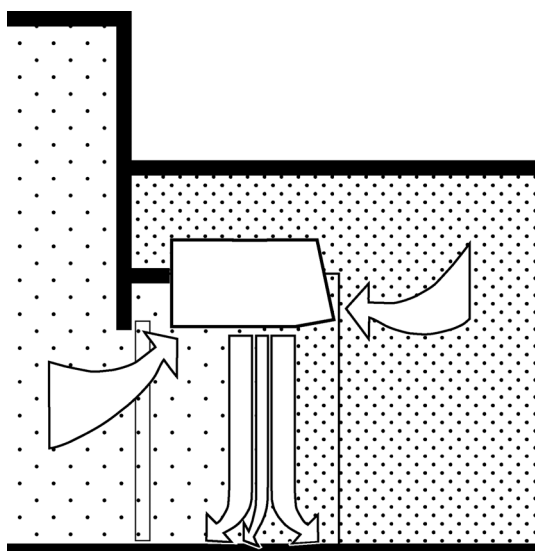
The heating level should be set as low as possible to minimise energy costs. This minimum level depends on ambient conditions in the cold store and front hall. If your MAT air curtain has been fitted with a humidity sensor (optional), then you can allow the unit to regulate heating levels automatically.

1) For example, the airflow is disrupted as a person or vehicle passes through the curtain. Once the person or vehicle has passed, the airflow re-establishes itself within a few seconds.

Climate partitioning – door closed



MAT air curtain climate partitioning – door open



Purpose of corridor

The corridor is essential in order for the MAT air curtain to work properly.

When the cold store door is closed (see figure above), this acts as a partition between the cold store and front hall. When the cold store door is open, the MAT air curtain establishes an effective barrier between these climates (see figure below). The corridor is required to:

- separate the two indoor climates where the air curtain is not acting as a barrier
- route air from the cold store into the air curtain unit and back again without any disruption to the airflow



Note:

Even the slightest opening can prevent the air curtain from working properly rendering it ineffective. For this reason:

- corridor must be completely sealed
- corridor must fit seamlessly against air curtain unit



Note:

When the air curtain is running, the corridor's walls separate the flow of air originating from the cold store from the warm and humid air in the front hall. For this reason:

- corridor must be fully thermally insulated
- thermal bridges should be avoided

Otherwise adverse side effects, e.g. water accumulation and/or ice formation may occur on outer surfaces, which can result in unhygienic conditions.

I.3.4 Type designation

Type designations, when combined, form a unit type code, e.g.:

MAT 135-E-P

MAT 200-EE-S

Different combinations may arise.



Explanation of the type code

TYPE CODE ELEMENT	DESIGNATION	MEANING
product series	MAT	general designation for the series
length	135, 180, 225, 250	discharge length in cm
battery type	E	electrical heating
	EE	electrical heating with extra power
	H4E	hybrid: water heating (element is 4 rows thick) and electrical heating
sequence	P	master unit (Primair)
	S	slave unit (Secundair)

I.3.5 Type plate

The type plate is located on the top of the unit.

Example of a type plate

 Biddle bv Markovlei 4 NL-9288 HA Kootsterlille 	Type	MAT 135-E-P		
	Code	2100	U	400 V 3N~ 50 Hz
	Nº *		I _{max} L1	39 A
			I _{max} L2	38.5 A
	M	309 kg	I _{max} L3	39 A
	Medium	ELECTRIC HEATING	P _{motor}	23.6 kW
	P _{max}	-	P _{heating}	23/6 kW

Designations on the type plate

DESIGNATION	MEANING
Type	complete type code of the unit
M	weight of unit
P _{max}	For water-heated models: max. permissible operating pressure
U	power supply voltage
I _{max}	max. current
P _{motor}	max. power consumption by fans
P _{heating}	For electrically heated models: max. power consumption by heating element

I.3.6 Field of application

The cold store air curtain is predominantly used in cold store front halls. The following operating limits must be observed:

Operating limits for all models

Ambient conditions:	Temperature	5 °C to 40°C
	Max. air humidity	90%, not condensing
Power supply voltage	see type plate	
Power	see type plate	
Min. air temperature at inlet in deep-freeze unit	-25 °C	

Application limits for hybrid models (type H4E):

Heating medium of water element	water containing enough glycol to prevent freezing
Maximum operating pressure	see type plate



Warning:

The air curtain may not be used in potentially explosive atmospheres, wet environments, outdoors or in very dusty or aggressive air conditions.

Biddle shall not be held liable for damage caused by use under these conditions.

I.3.7 CE declaration

The unit is compliant with the applicable CE standards. The complete CE Declaration of Conformity can be found at: www.biddle.info

I.3.8 Modifications and changes

Without the approval of Biddle, no changes or modifications may be made to the unit that could adversely affect safety. The CE declaration is no longer valid if the unit has been modified or changed in any way.

I.4 Components and accessories

I.4.1 Components supplied

- suspension frame;
- control unit (with control cable);
- mains power cable (attached to the unit);
- **in the event of two units:** extension cable (attached to one of the units);
- **only for hybrid models (type H4E):** RCM module to monitor the heat of the water element. (with mains power cable and control cable);
- **Only for hybrid models (type H4E):** water-side control (valve and drive) (The connection cable for the drive is attached to the unit).

I.4.2 Accessories

- door contact switch.

I.4.3 Components not supplied

- threaded rods (M12);
- other cabling.

I.5 Safety instructions

See also:

8.1 "Safety instructions" on page 60

I.5.1 Safety in use



Warning:
Do not put any objects into the inlets and outlets.



Warning:
Do not obstruct the unit's inlets or outlets.

**Warning:**

The upper surface of the unit becomes hot during operation.

**Caution:**

In exceptional situations, water may run out of the unit. Therefore, do not place anything under the unit that could be damaged as a result.

1.5.2 Safety issues relating to installation, maintenance and servicing

**Danger:**

The unit may only be opened by qualified technical staff.

**Warning:**

Perform the following actions before opening the unit:

1. Switch the unit off using the control panel.
2. Wait until the fans have stopped.

**Danger:**

The fans may continue rotating for a while.

3. Allow the unit to cool down.

**Caution:**

The heat exchanger or, as the case may be, the heating elements, can get very hot.

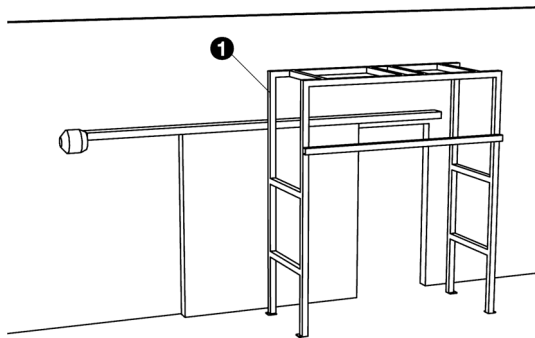
4. Disconnect the mains supply (set the isolation switch to OFF).
5. If you are going to conduct maintenance or repairs on electrical components: switch the mains supply group off.
6. **For water-heated models:**
shut off the central heating feed (if possible).

**Warning:**

The fins of the heat exchanger are sharp.

2. . Corridor construction

2.1 Introduction



This section explains how to install corridor insulation.

It is assumed that by this stage the corridor framework **1** has been installed and is ready for use.



Note:

The corridor is a special-purpose structural framework. This is not supplied by Biddle.



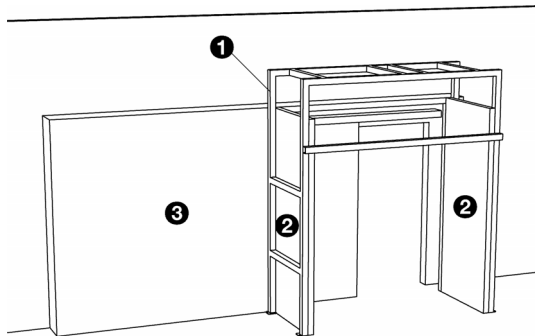
Note:

The required corridor dimensions depend on the situation on site.

See also:

1.3.3 "MAT air curtain operation" on page 8

2.2 Essential components

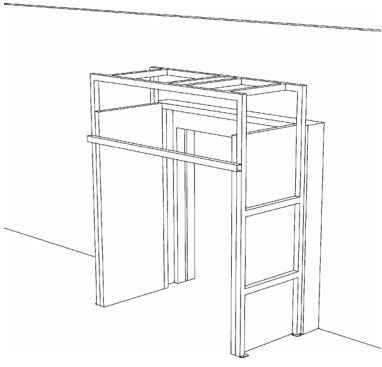
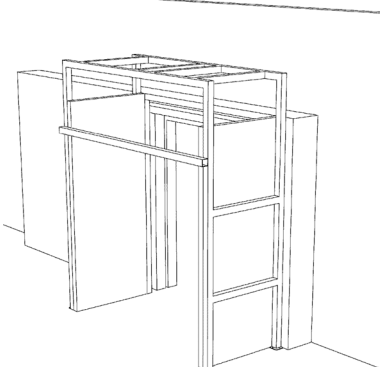
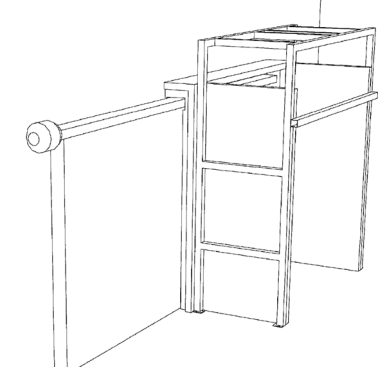
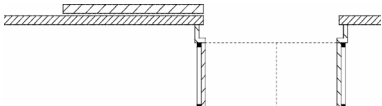
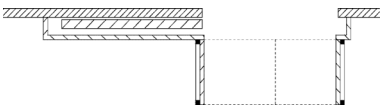
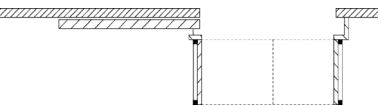


Essential components include:

- corridor framework **1**.
- one or two air curtain unit(s) – for later installation
- two thermally insulated side panels **2** that fit seamlessly around unit(s)
- one fully sealed insulation **3** that thermally separates front hall and deep-freeze unit. This insulation should also separate the deep-freeze unit door from the front hall.

2.3 Possible configurations

The following configurations can be used in a corridor depending on on-site cold store situation:

THE DOOR ON THE INSIDE OF THE COLD STORE (PREFERRED CONFIGURATION)	AN INSULATED DOOR ON THE OUTSIDE OF THE COLD STORE (PREFERRED CONFIGURATION)	AN UNINSULATED DOOR ON THE OUTSIDE OF THE COLD STORE (DOES NOT HAVE PRIORITY)
		
		
<p>The corridor connects directly with the door opening.</p>	<p>The corridor is built all the way around door. In order to gain access to the door mechanism, sections of the corridor structure need to be removable or sufficient space needs to be left between the corridor structure and the door.</p>	<p>The corridor connects with the door. All openings between the open door and corridor need to be sealed using flexible material, e.g. PVC strip.</p>

2.4 Important points

2.4.1 Essential structural matters

The corridor's structure is critical in order for the MAT air curtain to work properly. Pay close attention to the following points in this section.

Rules regarding shape and dimensions

1. The entire corridor needs to be *completely airtight*. Even the slightest hole or gap allowing air to escape will disrupt proper operation.
2. Side panels must *fit seamlessly* against the air curtain unit.
3. Side panels must be *smooth*. Even the slightest protrusion can disrupt proper operation.



Warning:

Minimum assembly height should be 1.8 m measured from unit base.



Caution:

Adhere strictly to these instructions. Otherwise:

- effective partitioning cannot be achieved and the MAT air curtain will be rendered ineffective
- side effects may arise, e.g. misting, water accumulation or ice formation, resulting in unhygienic conditions and even potentially hazardous situations.

Rules regarding materials

1. Corridor must be *fully thermally insulated*.
2. *Thermal bridges* should be avoided.



Caution:

Do not leave any components uninsulated,

otherwise, water may accumulate or ice may form on outer surfaces, which can result in unhygienic conditions.

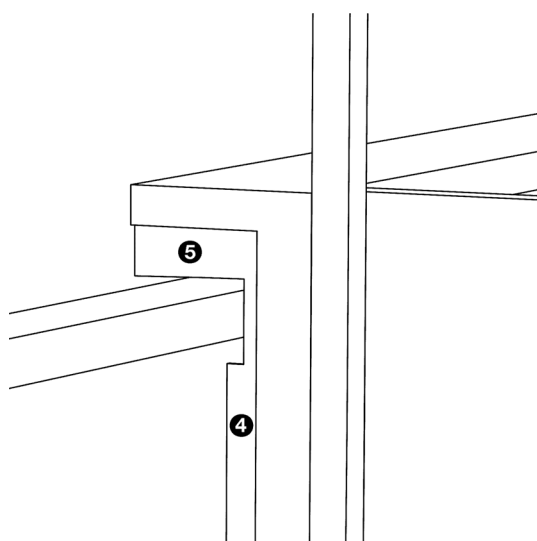
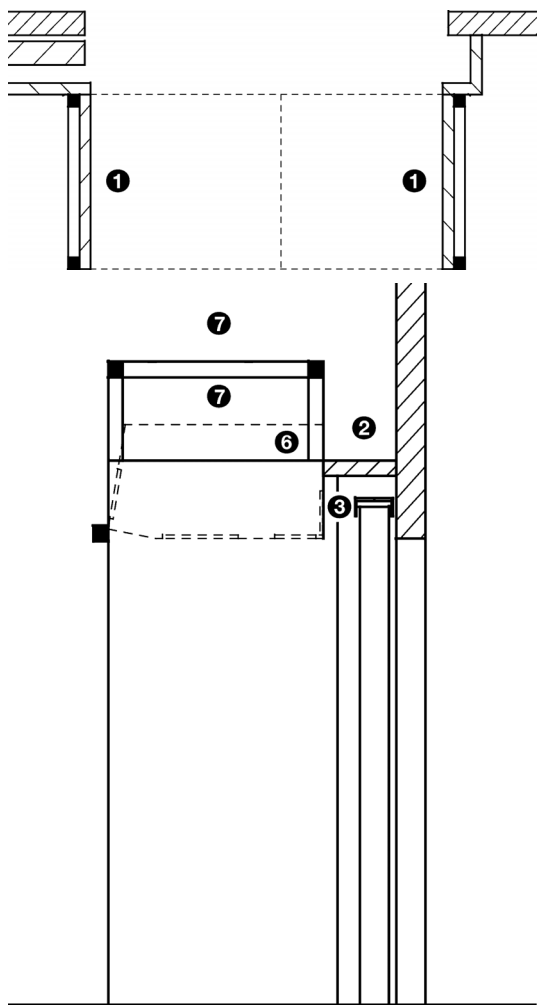
2.4.2 Important points



Note:

Pay particular attention to the following points when assembling the corridor:

- Mount side panels **1** to *inside* of framework (see figure), *not to outside of framework*.
- Seal gaps between insulation sections.
- Seal space **2** above door opening, between wall and unit.
- Do not obstruct area around air inlet **3** at rear of unit – air inlet must be positioned entirely within corridor.
- When using pliable materials for sealing gaps **4** around door, do not forget to seal opening **5** around door guide rail.
- Unit housing **6** has been thermally insulated. If unit is fitted seamlessly into corridor, then it is not necessary to use additional insulation material.
- Leave space **7** clear above unit for access when performing maintenance.



3. . Installation

3.1 Introduction

This section explains how to attach and connect MAT air curtain components and prepare it for use.

It is assumed that by this stage the corridor is ready for use.

A lifting vehicle is needed to install air curtain, e.g. a lifting platform or forklift truck.

3.2 Safety instructions



Warning:
Installation activities may only be performed by technical staff qualified for this purpose.



Warning:
Before starting installation: read the safety instructions.

3.3 Inspection on delivery

- Check the unit and the packaging to ensure they have been delivered in good order. Notify the driver and the supplier immediately if any shipping damage is detected.
- Ensure that all components are present. Notify supplier of any missing parts immediately.

3.4 Hanging the unit up

3.4.1 Two units

If two air curtain units have been installed, then the master unit may be placed on either the left- or the right-hand side. Take position of control unit into account.

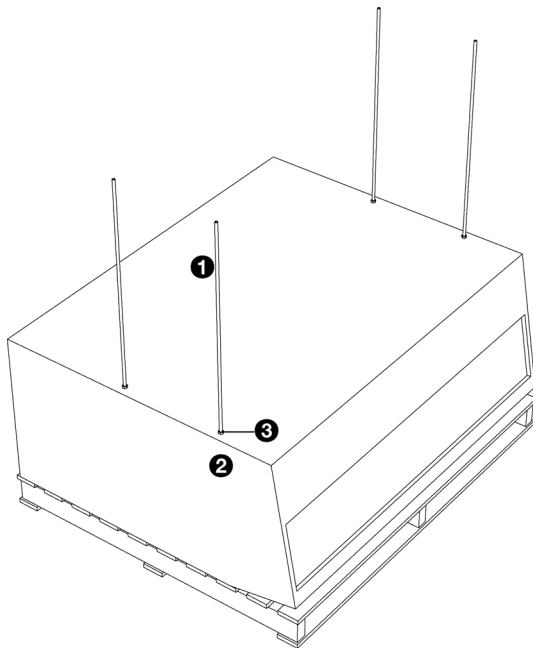
Follow instructions below for both units.

See also:

3.6 "Installing control unit" on page 26

3.4.2 Preparation

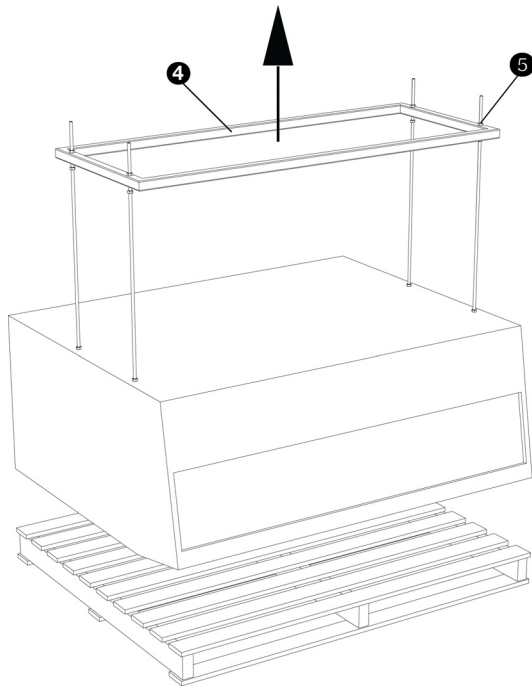
1. Remove packaging material from unit, but leave unit on pallet.
2. Screw a threaded rod ❶ into all four screw holes ❷ on top of unit to a depth of approx. 3 cm.
3. Lock each threaded rod using a lock nut ❸. Tighten nuts well.



Warning:
Threaded rods must be securely locked.

If pallet is too wide

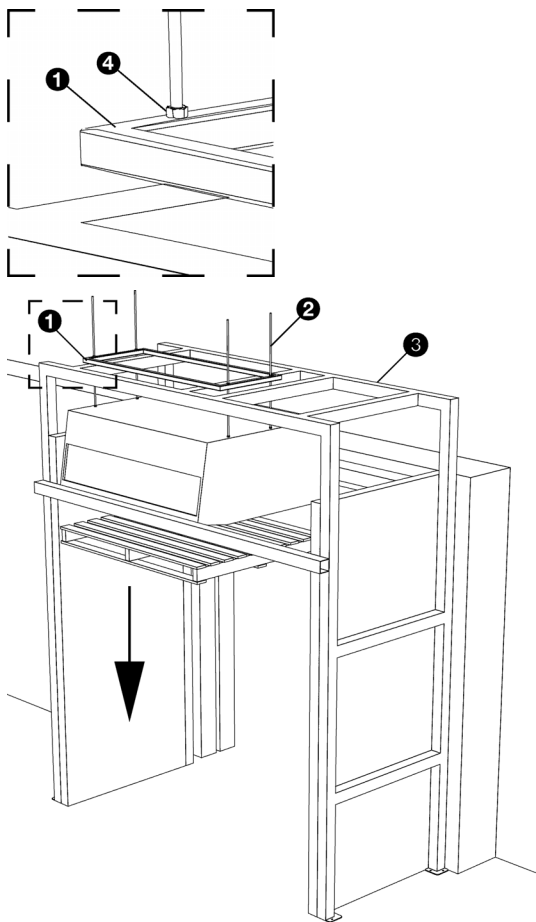
If pallet does not fit between corridor walls, then swap out pallet for a smaller one:



1. Position suspension frame ④ above threaded rods.
2. Attach suspension frame to each threaded rod using nuts ⑤.
3. Raise unit on suspension frame using a forklift truck.
4. Swap out pallets.
5. Lower unit onto pallet.
6. Dismantle suspension frame.

3.4.3 Suspension

1. Raise unit on pallet and position it approximately in its final location. Use a forklift truck to do this.
2. Position suspension frame ① on threaded rods ② above corridor framework's horizontal beams ③.
3. Secure suspension frame by threading a nut ④ onto each threaded rod.
4. Remove forklift truck and pallet. Unit should now be freely suspended.



Warning:
Minimum assembly height should be 1.8 m measured from unit base.

3.4.4 Vertical adjustment and secure attachment

1. Adjust unit's vertical position using nuts ①.



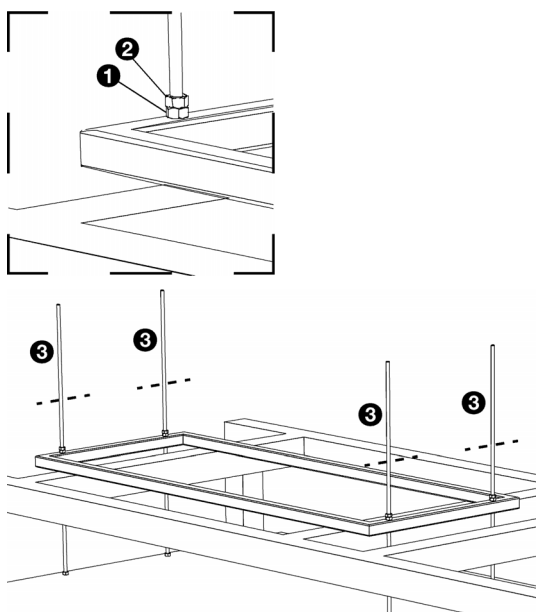
Caution:
 Unit must be level.

2. Lock all nuts using lock nuts ② on threaded rods.



Warning:
 Nuts on threaded rods must be locked.

3. Saw off excess threaded rod lengths ③. Leave approx. 10 cm intact.

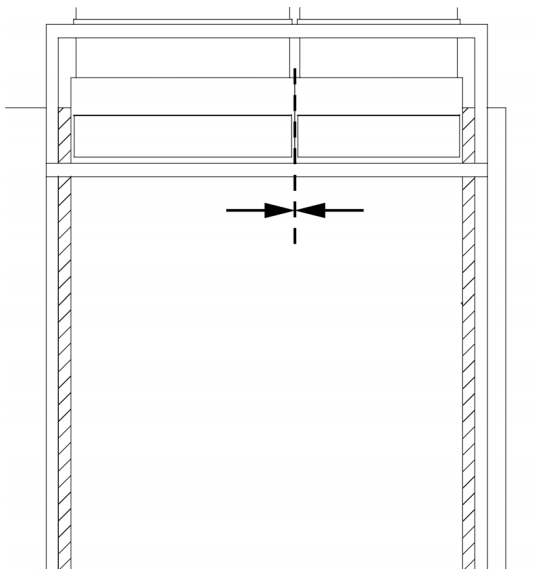
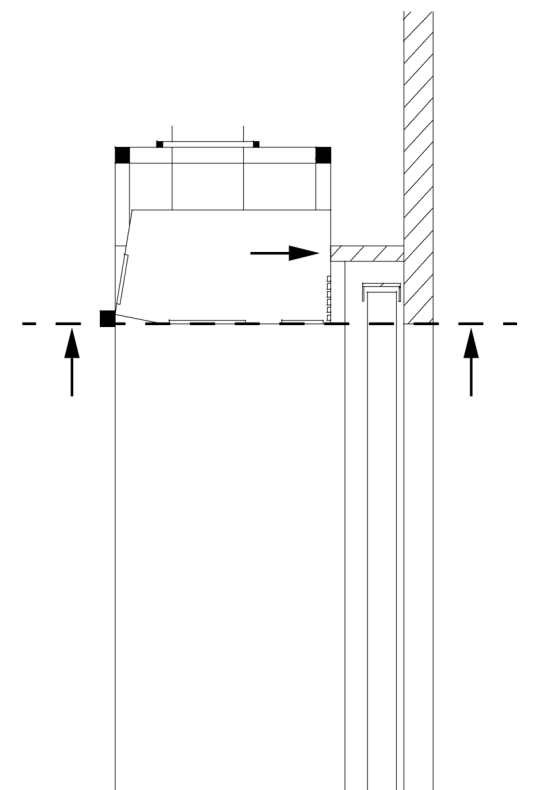


3.4.5 Horizontal adjustment

Position unit in its definitive location by moving it on its suspension frame over the corridor framework's horizontal beams.



Warning:
Make sure that suspension frame cannot shift off corridor framework in any way whatsoever. If necessary, connect them together.



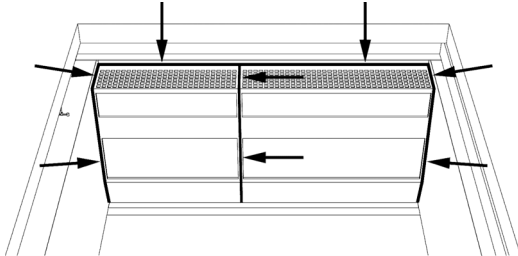
If two air curtain units have been installed

If two units are being installed, position them side by side.



Caution:
Do not leave a gap between air curtain units or between units and corridor. Even the slightest hole or gap will render the air curtain ineffective and may result in adverse side effects, e.g. misting and ice formation.

Gaps to be sealed (as viewed from deep-freeze unit)



3.4.6 Final insulation work

- Seal gaps between unit(s) and corridor using silicon putty.
- If two units have been installed, then gap between both units should also be sealed.
- Check gaps and seams in corridor and between unit(s) and deep-freeze unit door openings:
 - seal all leaks
 - seal larger openings with insulation material



Caution:

Seal all holes and gaps in corridor to make it airtight.

Even small openings can render the MAT air curtain ineffective and can result in adverse side effects, e.g. misting and ice formation.



Caution:

Larger openings need to be filled with thermal insulation material, otherwise water accumulation and/or ice formation may occur on outer surfaces, which can result in unhygienic conditions.

3.5 Connecting the unit to the water system

Only for hybrid models (type H4E):

In addition to electric heating, hybrid models use the waste heat from the cold store's refrigeration system. The unit is fitted with a water element through which this hot water flows.

3.5.1 Special points regarding the water connection



Caution:

The water connection must meet the following conditions:

- There must be a provision to bleed the system.
- The water must contain enough glycol to prevent freezing.
- Hot water must always be available when the unit is operating.
- The water system's supply and return pipes must be attached to the correct corresponding connectors. On the unit, the directions are indicated with arrows.

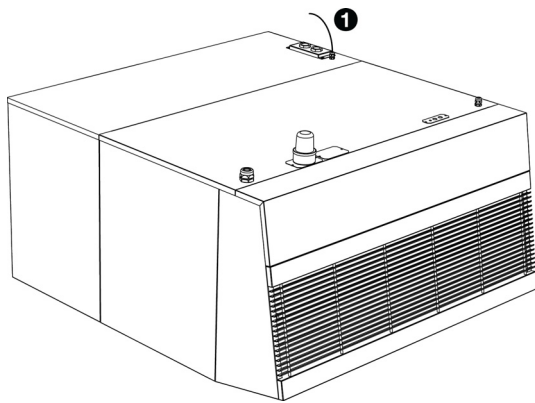
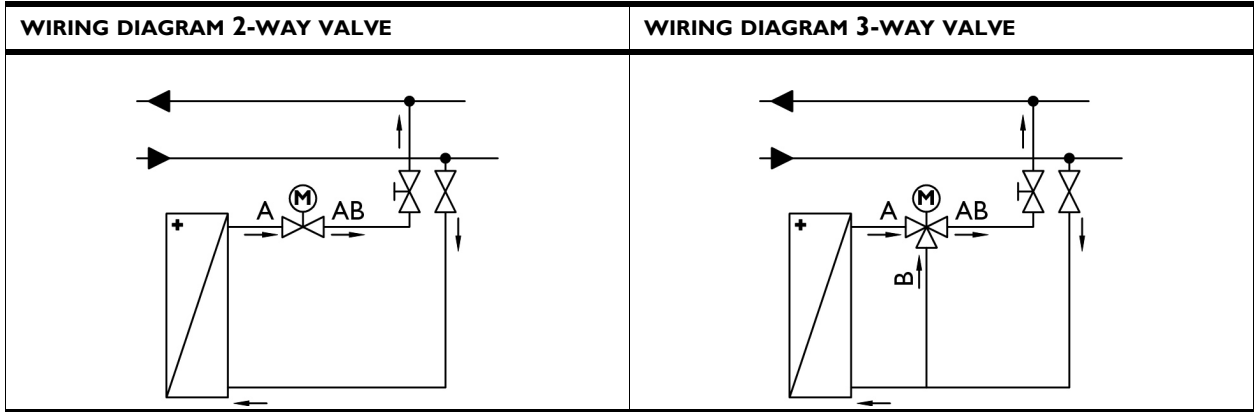
SYMBOL FEED PIPE	SYMBOL RETURN PIPE
arrow points towards the connection	arrow points away from the connection



Caution:

Biddle recommends the inclusion of a valve in both pipes.

3.5.2 Connecting the water-side control

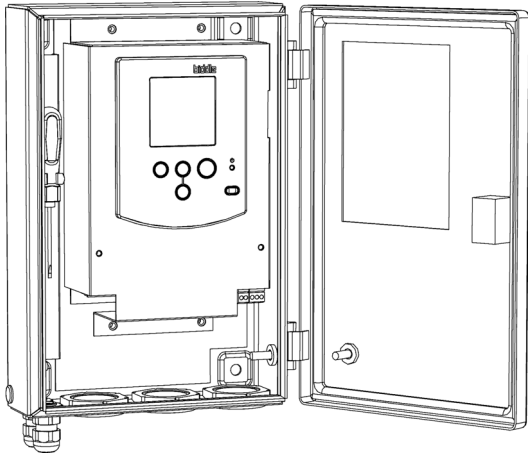


1. Connect the control valve and the drive in accordance with the diagram on the heat exchanger. In doing so, follow the instructions in the control valve manual.
2. Lay the cord for the drive ❶, which is attached to the unit, close to the drive of the valve.
3. Connect the cord to the drive in accordance with the diagram.

3.5.3 Connecting the unit

1. Connect the unit to the water system.
2. Bleed the piping
3. Check the connections for leakage.

3.6 Installing control unit



3.6.1 Mounting control unit

1. Determine position of control unit:
 - Position control unit in front hall, *not* in deep-freeze unit.
 - Position the control unit close to the master unit – take the length of the control cable into account (10 m).
 - Position control unit for ease of use.
2. Attach control unit to wall using suspension rails. Connectors should point down.



Caution:

Control unit housing is watertight. Do not drill any holes in housing.

3.6.2 Connect air curtain to control unit.

- Lay control cable ❶ attached to control unit to air curtain unit. Connect cable to M8 connector ❷.

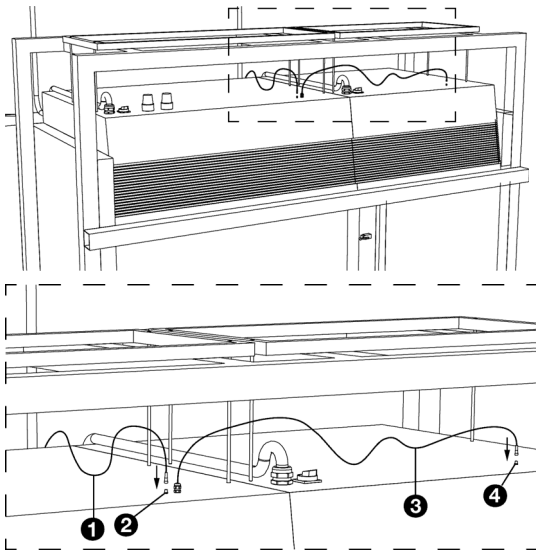
If two air curtain units have been installed

- Connect the control unit to the master unit as detailed above.
- Sluit de kabel ❸ die aan het master toestel bevestigd is, aan op het slave toestel op de M8-connector ❹.



Note:

Tighten gland well to prevent water and dust ingress.



3.7 Installing external controls

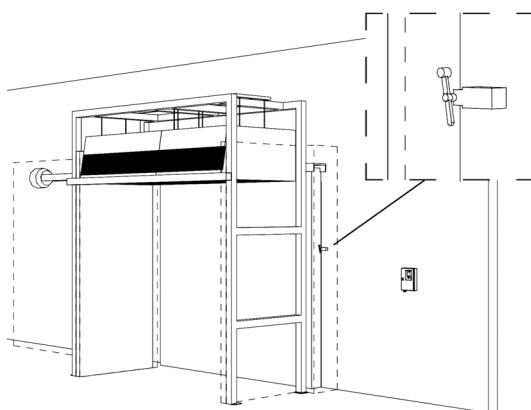
3.7.1 Installing door contact switch

Installation

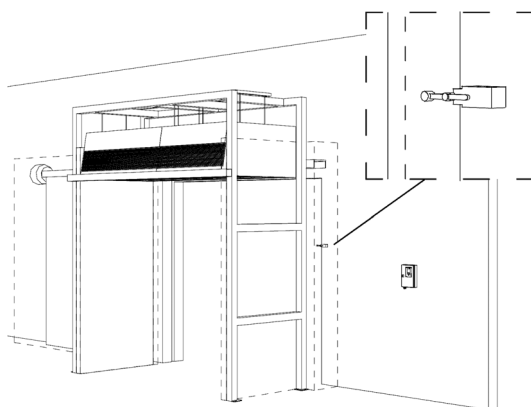
Mount door contact switch against deep-freeze unit door-frame according to manufacturer's instructions.

Position door contact switch so that electrical contact is made when door is slightly ajar, as shown in figure.

When the door is fully closed, the door contact switch is broken.

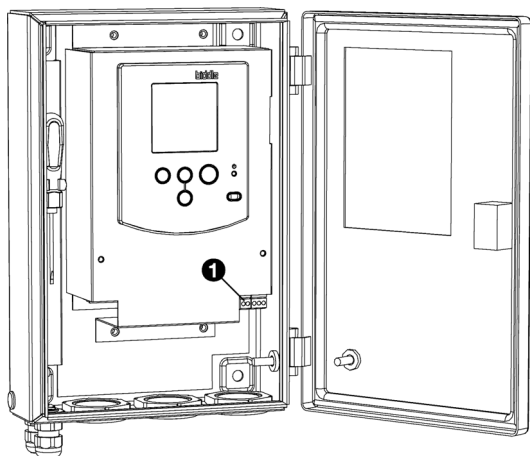


When the door is slightly ajar or wide open, the door contact switch is closed.



Note:

To prevent damage, mount door contact switch in such a position that it cannot be knocked by vehicles or personnel passing through deep-freeze unit door.



Connection

Connect door contact switch to control unit using two-core cable:

1. Open control unit cover.
2. Route cable through free cable gland.
3. Connect cable to two-pin connector (X426).
4. Tighten cable gland well to prevent water and dust ingress.

Connect other end of cable to door contact switch as per manufacturer's instructions.

3.7.2 Installing the RCM module

Only for hybrid models (type H4E):

To prevent freezing up, warm water must always be available when the unit is operating. Connect the RCM module in order to monitor this during a test period.



Note:
After the test period, the module is removed.

Connecting the RCM module to the unit

1. Mount the RCM module in the vicinity of the unit.



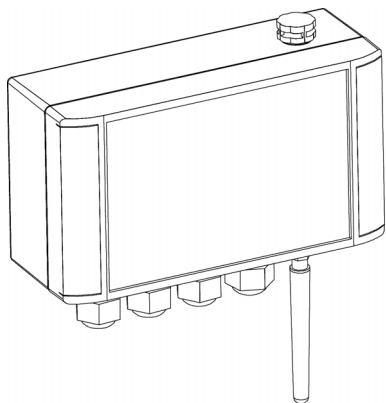
Note:
Take the lengths of the cables to be connected into account.

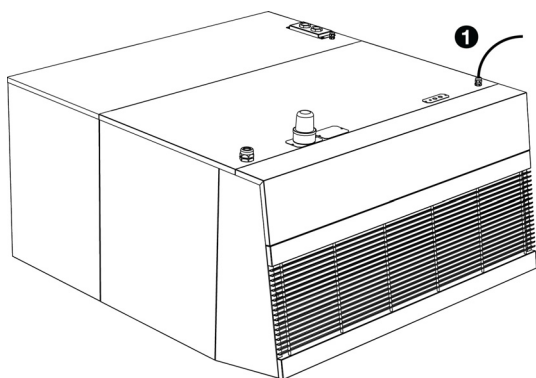


Note:
Point the antenna of the module as much as possible towards the free space.

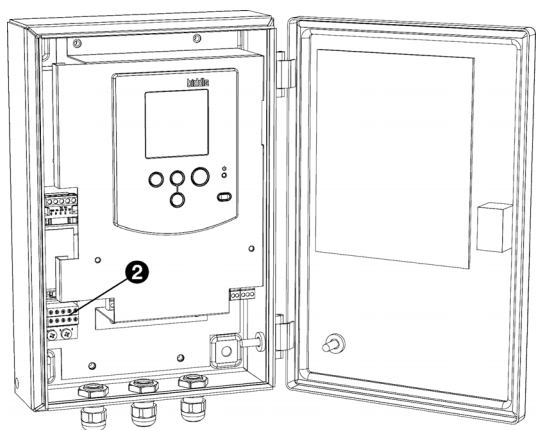


Note:
Ensure that the node on the side of the module remains visible.





2. Connect the module's mains power cable to the coupling cord that is attached to the (type P) master unit **1**.



Connecting the RCM-module to the control unit

1. Open control unit cover.
2. Route cable through free cable gland.
3. Connect the cable to the socket at RS-232 **2**.
4. Tighten cable gland well to prevent water and dust ingress.

3.8 Connecting the unit to the mains supply

This section explains how to connect the MAT air curtain to the mains supply.



Danger:
High voltages

Only connect unit if qualified to work on three-phase power systems.



Warning:
Before starting, carry out the following:

- Set isolation switch to position '0' (OFF). Repeat for second unit if two air curtains have been installed.
- Make sure that mains supply has been isolated at work site.

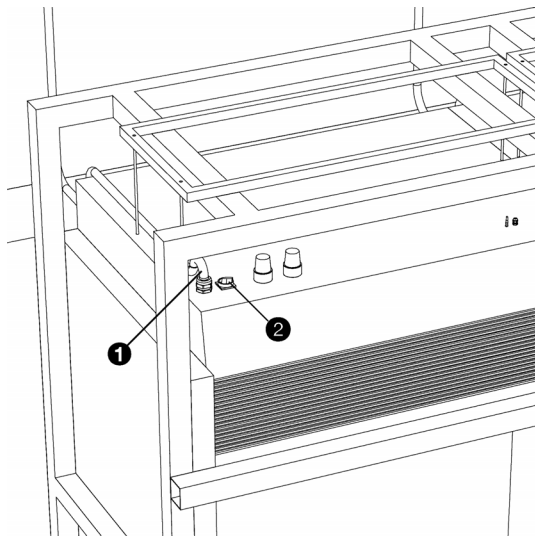


Warning:
Do not turn the unit on and off at the power supply. Use control unit for this purpose.



Warning:
The unit must be connected in accordance with the applicable local requirements.

By this stage, air curtain unit(s) should have been mounted in their definitive position.



3.8.1 Instructions

Connect air curtain unit to mains supply using mains power cable ❶ attached to unit. If two air curtain units have been installed, connect each unit to mains supply separately.

Take the following into account when connecting to the mains power supply:

- Only connect unit to a three-phase 400-V supply. Connect both neutral and earth connectors.
- Each unit has a built-in, four-pole isolation switch ❷.
- Make sure that high-voltage supply and connections are correctly rated for unit(s).
- Connect unit in accordance with locally prevailing legislation, regulations, instructions and standards.



Warning:
Earth each unit.

3.8.2 Fuse ratings



Warning:
Each unit must be fused in accordance with the table below.

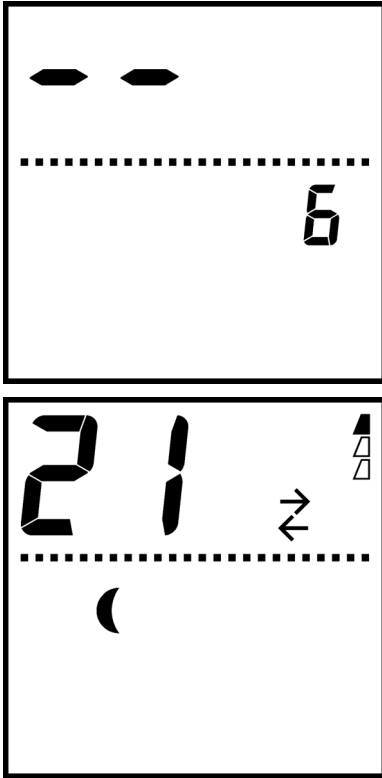


Warning:
Electrical models (type E) must each be individually fused in accordance with the table below.

Fuse ratings


	MAXIMUM FUSE VALUE A
≤ 10 A	16 A
≤ 20 A	25 A
≤ 25 A	35 A
≤ 35 A	50 A
≤ 50 A	63 A
≤ 65 A	80 A
≤ 80 A	100 A
≤ 102 A	125 A

3.9 Preparing unit for use




3.9.1 Initialising and testing air curtain

The MAT air curtain requires a one-time initialisation following installation and after a component has been powered down, disconnected or replaced.

1. Switch isolation switch on top of air curtain unit to Position 'I' (ON). Repeat for second unit if two air curtains have been installed.
2. Press  button on control panel once.

Unit fans then start to rotate. Control unit looks for connected components. After a while, either a '3' (one air curtain unit) or a '6' (two units) appears on the display as shown in top figure.





3. Press  buttons simultaneously for 3 secs.

Fans stop rotating. Display should appear as in bottom figure.

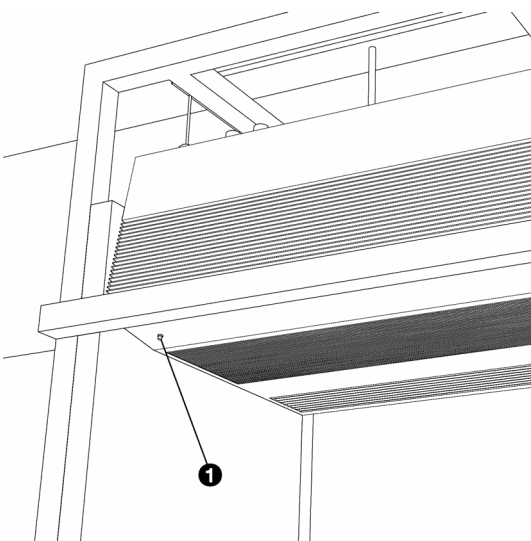
If air curtain is not working as described here, or an **SERVICE** and/or **Er** symbol is displayed, then it is not working correctly.

3.9.2 Door contact switch adjustment

Check whether door contact switch is working properly.

- If the deep-freeze unit door is slightly ajar or wide open, then:
 - a  symbol should be displayed at operating panel.
 - door indicator lamp  on unit should turn ON.
- If the deep-freeze unit door is closed, then:
 - the  symbol should no longer be displayed.
 - door indicator lamp  should turn OFF.

Adjust door contact switch until it works as described above.



3.9.3 Check the water-side control

Only for hybrid models (type H4E):

Check that the water-side control is working properly (see [4.3 Heating level control](#) on setting the heating level and reading out the climate conditions)

1. Set the heating level to -5°C.
2. Set the door slightly ajar. The unit will start running but will not draw in any cold air from the cold store.
3. Check for a couple of minutes whether climate condition $\epsilon b.\bar{u}$ is remaining approximately the same as $\epsilon \epsilon.\bar{u}$.



Note:

This means the control valve is closed.

4. **If a slave unit is present:** Check for a couple of minutes whether climate condition $\epsilon b.\bar{5}$ is remaining approximately the same as $\epsilon \epsilon.\bar{5}$.
5. Open the door fully. The unit will now draw in air from the cold store.
6. Check for a couple of minutes whether $\epsilon b.\bar{u}$ is rising in relation to $\epsilon \epsilon.\bar{u}$.



Note:

This means the control valve is open.

7. **If a slave unit is present:** Check for a couple of minutes whether $\epsilon b.\bar{u}$ is rising in relation to $\epsilon \epsilon.\bar{u}$.

3.9.4 Settings

Configure air curtain as follows to prepare it for use.

1. Adjust outlet flow rate.
2. If MAT air curtain has been fitted with a humidity sensor, then:
 1. Set heating to automatic control (Function No. 51 in 'Expert' menu, Setting 'AU').
 2. Adjust set point for automatic heating control in .

If MAT air curtain has not been fitted with a humidity sensor, or if manual heating control is required for another reason, then:

1. Set heating level.
2. Lock heating setting (Function No. 51 in 'Expert' menu, Setting '0').
3. Set 'Defrost' parameters (Function Nos. 10–20 in 'Advanced' menu).
4. Deactivate manual operating mode control (Function No. 52 in the 'Expert' menu, Setting '1').

3.9.5 Check the connection of the RCM module

Only for hybrid models (type H4E):

Check the connection of the RCM module:

1. Log into www.avision.me.
2. Check that the system recognises the node of the RCM module.



Note:

The node is marked on the side of the RCM module.

3. Check that the values are being received.



Note:

The connection can be forced by briefly pressing button SW1 on the module.

See also:

- 4 "Operation" on page 35
- 5.3 "Outlet flow rate adjustment" on page 49
- 5.4 "Heating adjustment" on page 49
- 6 "Problem resolution" on page 51
- 4.5 "'Expert' menu settings" on page 44
- 4.4 "'Advanced' menu settings" on page 42

4 . . Operation

4.1 Introduction

This section explains how to operate the MAT air curtain.

It is assumed that by this stage the air curtain has been fully installed and is ready for use.



Warning:
High temperatures

High voltages

Read the safety instructions before using the air curtain.

See also:

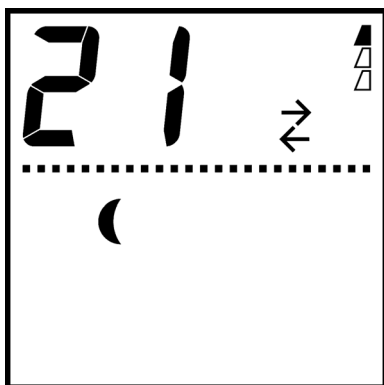
| "Safety instructions" on page |

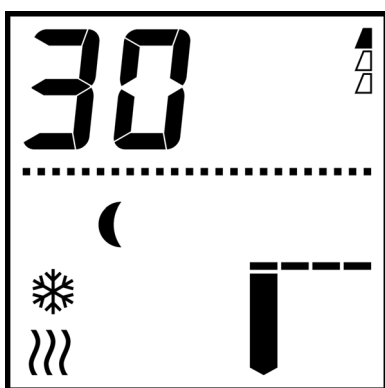
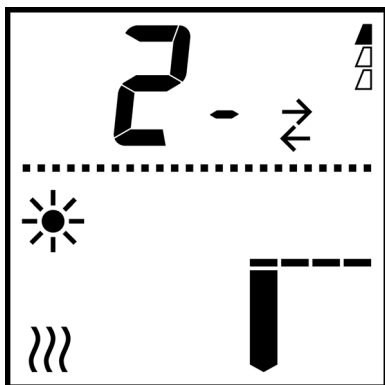
4.2 Operation for daily usage

4.2.1 Operating modes

Under normal circumstances, the control panel is not needed to operate the MAT air curtain. The air curtain runs automatically in response to the deep-freeze unit door being opened and closed. You can view the current operating mode on the control panel display.

- The air curtain remains in 'idle' mode whenever the door is closed. Control panel displays a ☾ symbol.





- The air curtain switches to 'Partition' mode whenever the door opens. Display shows a ☀ symbol.

Ambient conditions in the cold store and the front hall are now segregated by the air curtain.

- The air curtain switches to 'Defrost' mode when the door is closed and the unit has been running for a given duration in 'Partition' mode. The display shows a ❄ symbol.

Defrosting is necessary because ice forms in the unit whenever the door has been left open.

'Defrost' mode works in two stages:

1. air is pre-heated and blown through unit to thaw and remove ice
 2. unheated air is then blown through unit to dry its interior
- Once defrosted, the air curtain reverts to 'Idle' mode. The ❄ symbol disappears.



Note:

Always close or open door fully. Otherwise, effective partitioning cannot be achieved.




Note:

Do not leave any large objects, e.g. vehicles or goods, standing in air curtain airflow. Otherwise, effective partitioning cannot be achieved.

4.2.2 Manual operating mode

It is possible to operate the unit manually for installation, maintenance and repair purposes.


- Press  button to change current mode.
- If the door opens or closes, the air curtain will operate normally in response to the door's position.



Note:

Manual operation makes no sense for normal usage. To prevent improper usage, this function should be disabled once installation, maintenance or repair work has been completed (Function No. 52 in 'Expert' menu).

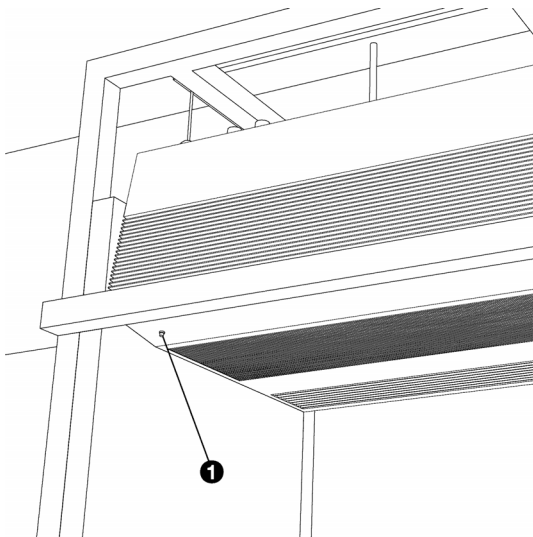
4.2.3 Door position verification

Check position of door by looking at door indicator lamp . Lamp should turn ON as soon as door is even slightly ajar. Lamp is always OFF when door is fully closed.




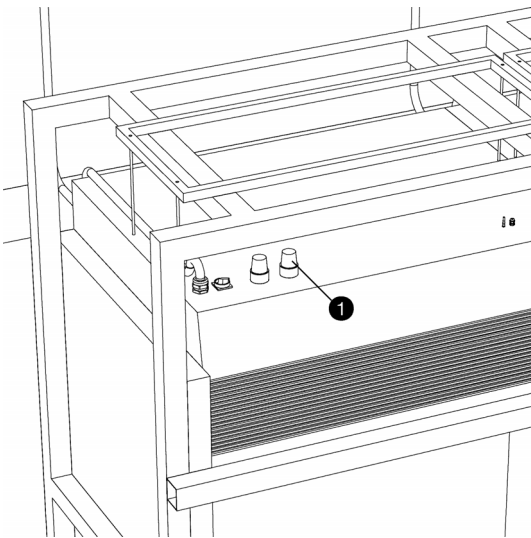
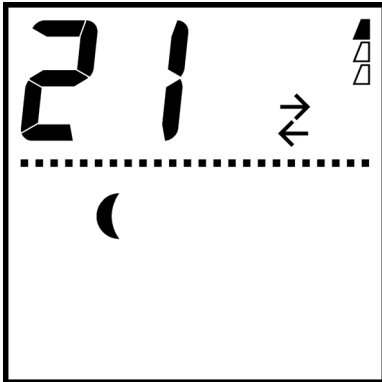
Note:


Always check that door indicator lamp is OFF when closing door. Otherwise, air curtain will remain in 'Partition' mode.



4.2.4 Ice warning light

The duration that the air curtain has been running in 'Partition' mode without having been defrosted is indicated by small triangular  symbols on the control panel display.



Once all triangles are full , it is assumed that the maximum permissible limit has been reached. Ice warning light ❶ (optional) then turns ON. Close door to allow air curtain to defrost.

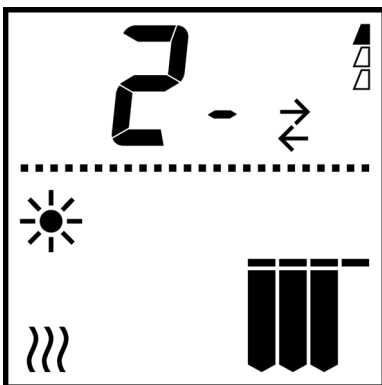






Caution:

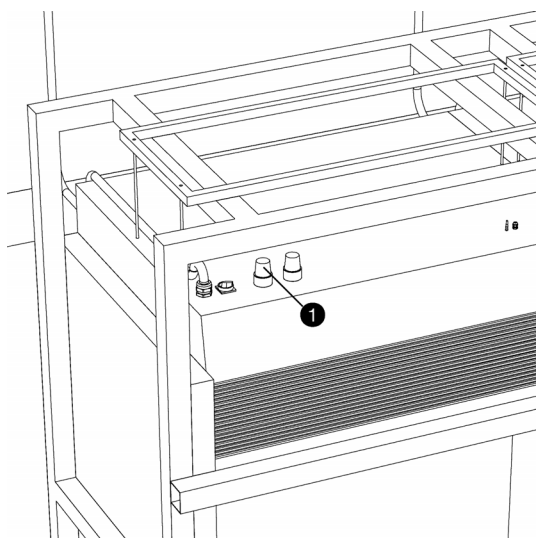
Allow air curtain to defrost whenever all triangle symbols are full and/or when ice warning light is ON. Excessive ice formation prevents air curtain from working properly and may even cause damage to the unit.

4.2.5 Additional display indicators

The display shows several other indicators that can help you verify that the MAT air curtain is working properly.



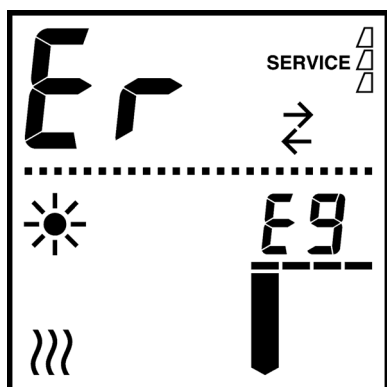
DESIGNATION	EXPLANATION
	current heating level
	door currently open (same as door indicator lamp)
	heating currently ON
	fans currently running (no. of bars indicates speed)



4.2.6 Errors

Whenever MAT air curtain detects a problem:

- error warning light ❶ turns ON



An **Er** symbol appears on display

If an error occurs, then air curtain shuts down normal operation. Take immediate action.



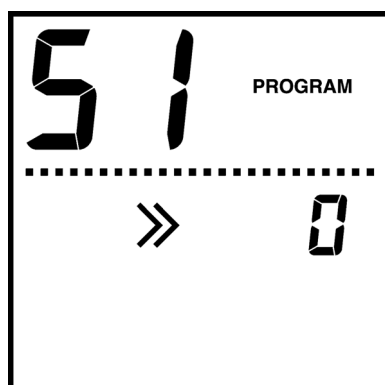
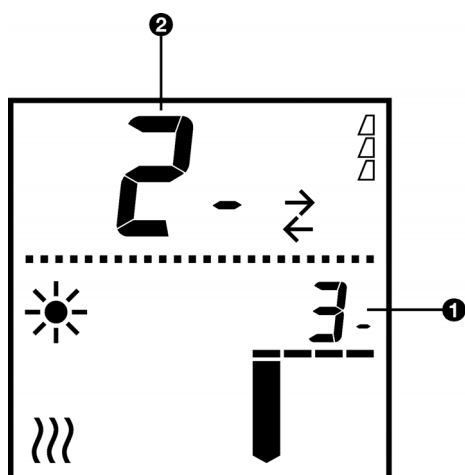
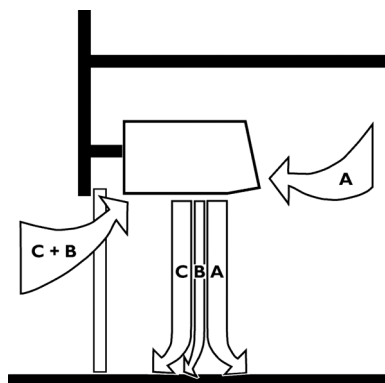
Note:

As long as the **SERVICE** symbol is visible on display, the error persists, even if rest of display is in a normal state.

See also:

- 4.5 "Expert' menu settings" on page 44
- 6.5 "Error messages" on page 54

4.3 Heating level control



4.3.1 General

When MAT air curtain is running in 'Partition' mode, it maintains Airflow 'B' heating at a constant level.

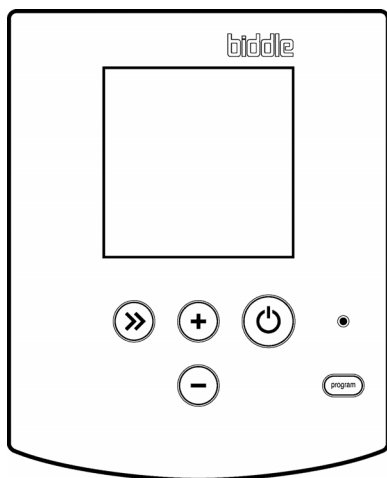
Small digits ❶ on display show heating level – these appear when pressing ⊕ or ⊖ buttons.

The large digits ❷ permanently display Airflow B's actual heating level. The heating level is different when the air curtain is in 'Idle' mode or in 'Defrost' mode.

4.3.2 Heating level adjustment

Automatic heating control

If display shows a » symbol, then heating level is being controlled automatically. You do not have to adjust anything.



Manual heating control

- Press + and - buttons to adjust heating level.

After a while, actual heating level will reach level entered.

If heating level does not change when pressing + or - buttons, then settings are locked. Activate manual operation (Function No. 51 in 'Expert' menu) if required.

4.3.3 Reading ambient conditions


To help control heating level, refer to information about ambient deep-freeze unit and front hall conditions on control panel display.

Press >> button on control panel repeatedly to view numerous climate-related parameters (see *Show ambient conditions* table).

If >> button has not been pressed for a while, then display will return to its normal display mode.

Show ambient conditions

NUMBER OF TIMES THAT >> BUTTON IS PRESSED.	LARGE DIGITS	SMALL DIGITS
Once	tA.0	temperature of Airflow A in master unit (at front hall air inlet)
Twice	tA.5	temperature of Airflow A in slave unit
Third time	rH	air humidity (at front hall air inlet)
Fourth time	tB.0	actual Airflow B heating level in master unit
Fifth time	tB.5	actual Airflow B heating level in slave unit
Sixth time	Pb.0	pressure of Airflow BC in master unit
Seventh time	Pb.5	pressure of Airflow BC in slave unit
Eighth time	tC.0	for non-hybrid models (types E and EE): temperature of Airflow C in master unit (at deep-freeze unit air inlet) for hybrid models (type H4E): temperature of Airflow B after the water element and before the electrical element in the master unit
Ninth time	tC.5	temperature of Airflow C in slave unit

NUMBER OF TIMES THAT  BUTTON IS PRESSED.	LARGE DIGITS	SMALL DIGITS
The following climate conditions only apply to hybrid models (type H4E) <i>For other models the 1st set of climate conditions apply again</i>		
Tenth time	c A.0	pipe sensor for water temperature in master unit
Eleventh time	c A.5	pipe sensor for water temperature in slave unit
Twelfth time	c b.0	temperature of Airflow B after the water element and before the electrical element in the master unit
Thirteenth time	c b.5	temperature of Airflow B after the water element and before the electrical element in the slave unit
Fourteenth time	c c.0	temperature of Airflow C in master unit (at deep-freeze unit air inlet)
Fifteenth time	c c.5	temperature of Airflow C in slave unit (at deep-freeze unit air inlet)
<i>After this the 1st climate condition reappears</i>		

**Note:**

If the small digits display '- -', then the information is unavailable, because a slave unit is not present.

**Note:**

If the small digits display "50", then the relevant sensor is not connected. The screen displays the text **SERVICE** and an error code.

See also:

4.5 "Expert' menu settings" on page 44

4.4 'Advanced' menu settings

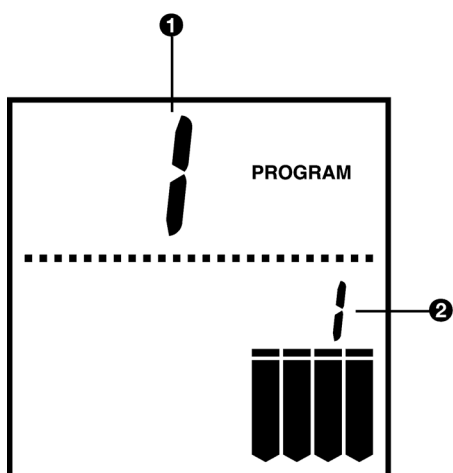
4.4.1 Introduction

You can enter numerous settings via the 'Advanced' menu that are needed on an infrequent basis.

**Note:**

Outlet flow rate (Function No. 1) is generally set one time only when configuring air curtain.

Other settings are optional and default values often suffice in most situations.



4.4.2 Operation



Accessing the 'Advanced' menu

- Press  buttons for 3 secs.

A **PROGRAM** symbol appears on display. You have now accessed the 'Advanced' menu.





Select function

Large digits **1** display current menu function number.

- Press  button to go to next function. First function re-appears after last function.
- Press  button to return to previous function.

Changing settings

Small digits **2** show current menu function setting.



- Press  and  button to change setting.
- Press  and  buttons simultaneously to assign default value.



Note:

Changes only take effect on exiting menu.

Exiting menu

- Press  button for three seconds to save changes.
- Press  button to exit menu without saving changes.

A **PROGRAM** symbol then disappears from display. Control panel has now reverted to its normal display mode.

If a button has not been pressed for two minutes, then control panel automatically exits menu without saving changes.

'Advanced' menu settings

NO.	FUNCTION	SETTING OPTIONS	YOUR SETTING
1	Outlet flow rate	Setting range: Levels 1 to 4 (default setting = 1) In normal display mode, no. of bars represents flow rate level. ▬ (Level 1) ▬▬ (Level 2) ▬▬▬ (Level 3) ▬▬▬▬ (Level 4)	
10	Heating level in 'Defrost' mode	Setting range: -30 to 45 (default setting = 30)	
11	Duration of first 'Defrost' mode phase (with heating)	Setting range: 0 to 99 mins. (default setting = 20 mins.)	
12	Duration of second 'Defrost' mode phase (without heating)	Setting range: 0 to 99 mins. (default setting = 30 mins.)	
15	Time threshold for 'Defrost' mode	Minimum duration (mins.) that air curtain must have been running in 'Partition' mode before 'Defrost' mode can be started. This suppresses defrosting when door has only been open for a short while. Setting range: 0 to 99 mins. (default setting = 10 mins.)	
20	Ice formation time limit	Duration that air curtain may run in 'Partition' mode before it is assumed that ice formation has reached its maximum permissible level. Setting range: 1 to 99 hours '0' = no ice formation warning or indication on display (default setting = 12 hours)	

See also:

5 "Adjustment" on page 48



4.5 'Expert' menu settings**4.5.1 Introduction**

Certain functions are intended for installation, maintenance and repair purposes only. Access these functions via the 'Expert' menu. The 'Expert' menu functions table lists these functions.

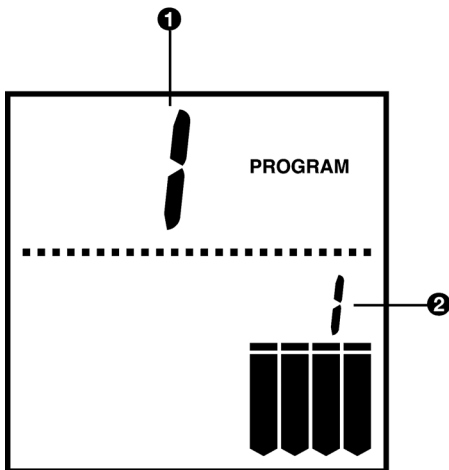
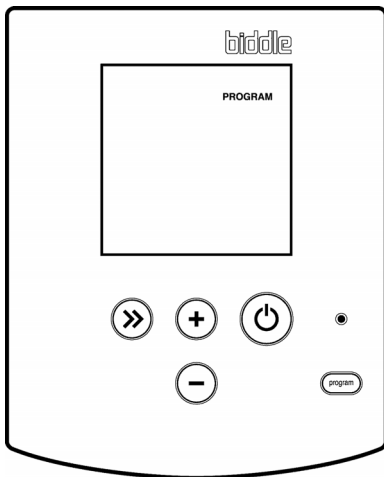
**Note:**

Most of these function settings are optional. Changing any of these settings may prevent air curtain from working properly. Do not change these settings unless instructed to do so.

4.5.2 Operation**Accessing 'Expert' menu**

- Press  and  buttons simultaneously for 3 secs.


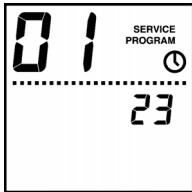
A **PROGRAM** symbol appears on display. You have now accessed the 'Expert' menu.

**Operation from within the 'Expert' menu**

Select function **1**, change settings **2** and leave the 'Expert' menu in the same way as from within the 'Advanced' menu.

4.5.3 'Expert' menu functions

NO.	FUNCTION	SETTING OPTIONS	DEFAULT
51	Heating level control	0 = The heating level is locked at its current manual setting: it cannot be changed. '1' = heating level may be adjusted manually – default setting recommended for air curtain without humidity sensor AU = heating level automatically controlled – recommended for air curtain with humidity sensor ^{a)}	1
52	Manual operating mode ON/OFF	0 = operating mode controlled by door position and with ☉ button – default setting 1 = operating mode controlled by door position only, ☉ button does not work – recommended for normal usage	0
56.0	Function output 1	1 = general error 2 = unit is active 3 = defrosting needed 4 = door is open	3
56.5	NO/NC	0 = NO (normally open) 1 = NC (normally closed)	0
57.0	Function output 2	1 = general error 2 = unit is active 3 = defrosting needed 4 = door is open	2
57.5	NO/NC	0 = NO (normally open) 1 = NC (normally closed)	0
58.0	Function output 3	1 = general error 2 = unit is active 3 = defrosting needed 4 = door is open	0
58.5	NO/NC	0 = NO (normally open) 1 = NC (normally closed)	0
59	Maximum temperature set-point for Airflow B	-9.5°C (-95) to 40 °C (400)	30 °C (300)
60	Set point for automatic heating control	<i>Works in conjunction with 'AU' setting under Function No. 51</i> Setting range: -30 to 30	0
61	use pressure sensor to give alert when heating element is freezing solid	0 = off 1 = on	0
62	maximum pressure percentage for frost protection	12 - 100 %	12

No.	FUNCTION	SETTING OPTIONS	DEFAULT
63	range of air humidity sensor	5 = 0-5V 10 = 0-10V	
65 66 67	PID heating control factors	<i>Do not change these settings, unless instructed to do so by Biddle.</i>	
68	setpoint water valve fully closed ^{b)}	-30°C (-300) to 45 °C (450)	-15 °C (-150)
69	setpoint water valve fully open ^{b)}	-30°C (-300) to 45 °C (450)	+15 °C (150)
70	Control panel software version	Displays current version no. (non-adjustable)	
71 – 80	Operating hour history in 'Partition' mode without 'Defrost' cycle	<i>For internal use by Biddle only.</i>	
81 – 85	Heating level and flow rate setting history	<i>For internal use by Biddle only.</i>	
91 – 95	Error message history '91' = oldest message '95' = most recent message	 <p style="text-align: center;">A</p>	 <p style="text-align: center;">B</p>
		<p>'A' displays error code. 'B' displays time since error occurred. A and B are displayed intermittently. (In this example, error E7 occurred 123 hours ago)</p>	
97	Test program	<p>To run: press ⊕ and ⊖ buttons for 3 secs. <i>For internal use by Biddle only.</i></p>	
98	Resetting control unit	<p>'dF' = all settings set to default values '- -' = settings modified To reset: press ⊕ and ⊖ - simultaneously. First, make a note of settings – settings will be reset to their default values.</p>	
<p>a) If air curtain has not been fitted with a humidity sensor, then maximum humidity is assumed. b) Only applicable to hybrid models (type H4E)</p>			

See also:

- 4.4 "Advanced' menu settings" on page 42
- 5.4 "Heating adjustment" on page 49
- 4.2 "Operation for daily usage" on page 35
- 6.5 "Error messages" on page 54

5. . Adjustment

5.1 Introduction

This section explains how to adjust the MAT air curtain to match ambient conditions, to establish an effective partition and to minimise energy consumption.

It is assumed that the air curtain has been installed correctly including insulation and finishing.

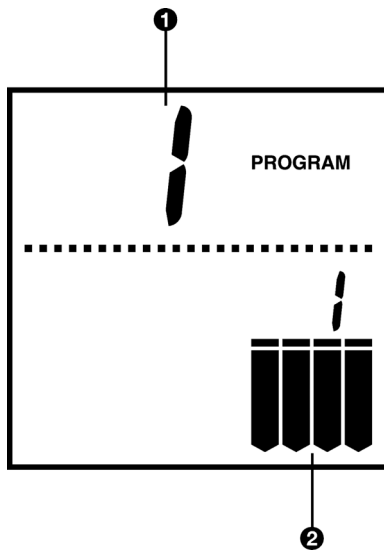
5.2 General task sequence

1. Open deep-freeze unit door fully and check whether air curtain runs in 'Partition' mode. (Control panel displays a ☀ symbol.)
2. Adjust outlet flow rate.
3. Adjust heating setting (for either manual or automatic control).

See also:

- 4.2 "Operation for daily usage" on page 35
- 5.3 "Outlet flow rate adjustment" on page 49
- 5.4 "Heating adjustment" on page 49

5.3 Outlet flow rate adjustment



Adjust outlet flow rate (Function No. 1 **1** in 'Advanced' menu).

Determine lowest air curtain flow rate required to just reach ground level. Check by feeling airflow – start at discharge grille and follow airflow to approx. 20 cm above ground level. (Air-flow may deflect approx. 10-20 cm towards deep-freeze unit.)

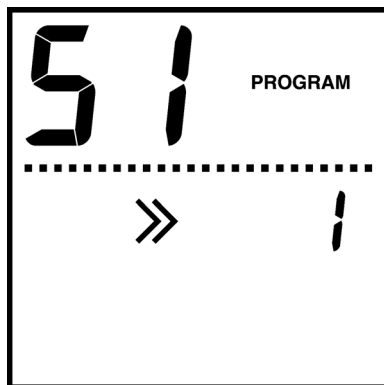
Always start at highest flow rate setting **2** (4 bars) and test lower settings incrementally.

If you can no longer feel airflow just above ground level, then air is not reaching ground level and air curtain will not work properly. First, close door, then set a higher flow rate and try again.

See also:

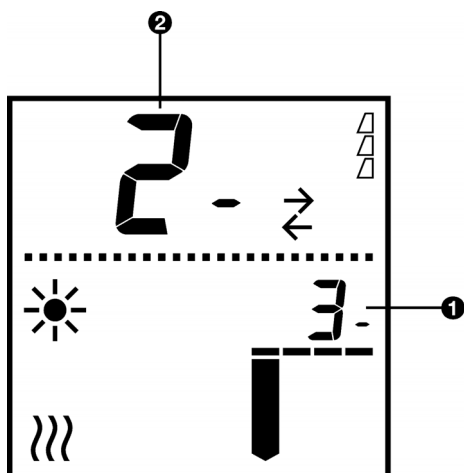
4.4 "Advanced" menu settings" on page 42

5.4 Heating adjustment



5.4.1 Adjustment for manual control

First, check whether heating has been set to manual control (Function No. 51 in 'Expert' menu, Setting '1').



Determine lowest heating level required to just prevent misting. Adjust heating level up or down accordingly and observe result. Wait each time until actual heating level ② reaches set heating level ①.

- If you observe mist flowing *towards deep-freeze unit* (generally above) and *towards front hall* (generally below), then flow rate is too low. Try a higher flow rate.
- If you only observe mist flowing *towards deep-freeze unit*, then heating level is too low. Try a higher setting.
- If you *do not observe any mist*, then heating level is either too high or just right. Try a lower setting.

Recommended setting is 3 to 5 increments above level required to just prevent misting.

5.4.2 Adjustment for automatic control

First, check whether heating has been set to automatic control (Function No. 51 in 'Expert' menu, Setting 'AU').

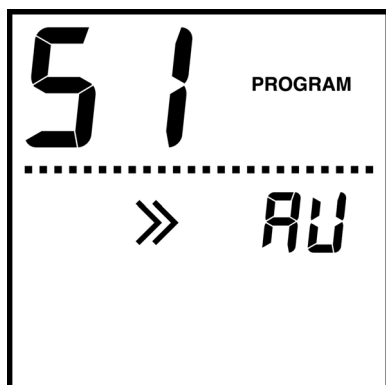
Adjust automatic heating control using set point (Function No. 60 in 'Expert' menu). Determine lowest set point required to just prevent misting. Adjust set point up or down accordingly and observe result. Wait each time until actual heating level becomes stable.

- If you observe mist flowing *towards deep-freeze unit* (generally above) and *towards front hall* (generally below), then flow rate is too low. Try a higher flow rate.
- If you only observe mist flowing *towards deep-freeze unit*, then set point is too low. Try a higher setting.
- If you *do not observe any mist*, then set point is either too high or just right. Try a lower setting.

Recommended set point is 3 to 5 increments above setting required to just prevent misting.

See also:

- 4.3 "Heating level control" on page 40
- 5.3 "Outlet flow rate adjustment" on page 49



6 . . Problem resolution

6.1 Introduction

This section explains what to do when the MAT air curtain is not working properly. This will help you to determine the cause of the problem and to resolve the problem.

6.2 What to do in the event of a problem

- If the air curtain begins to behave unpredictably, then consult the 'Unexpected behaviour' table to determine whether there is actually a problem. This table also provides a solution to any problems found.
- If adverse side effects arise, e.g. misting or excessive ice formation, then first check whether air curtain is working properly using 'Unexpected behaviour' table. If air curtain appears to be working normally, consult 'Adverse side effects' table for solution to problem.
- If an error message appears, always consult section on *Error messages*.
- If this section does not resolve the problem, or the problem persists, then contact Biddle.

See also:

6.3 "Unexpected behaviour" on page 51

6.4 "Adverse side effects" on page 53

6.5 "Error messages" on page 54

6.3 Unexpected behaviour

PROBLEM	PROBABLE CAUSE	WHAT TO DO
Error warning light is ON (red). Display shows an SERVICE and/ or Er symbol.	Air curtain detected an error.	Take immediate action – refer to section relating to <i>Error messages</i> .
Ice warning light is ON (white).	Ice formation time limit for operation in 'Partition' mode exceeded.	Close door to allow air curtain to defrost. Wait until unit has fully defrosted.

PROBLEM	PROBABLE CAUSE	WHAT TO DO
The \odot button not working properly.	Manual operating mode has been deactivated (recommended for normal usage).	No action required. Activate manual operation (Function No. 52 in 'Expert' menu) if required.
The \oplus and \ominus buttons not working properly.	Heating level locked or is being controlled automatically.	No action required. Activate manual control (Function No. 51 in 'Expert' menu) if required.
Control panel display blank.	Control panel not connected to power supply. Possible cause: <ul style="list-style-type: none"> air curtain unit is OFF (or both units OFF if two have been installed). power failure (perhaps only on a single phase). poor connection faulty fuse 	Check following items: <ul style="list-style-type: none"> unit isolation switch: should be in position 'I'. mains supply connection between unit and control panel fuses: in electronics compartment
Air curtain continues running when door is closed.	Air curtain in 'Defrost' mode. (Display shows a \ast symbol.)	Unit working properly – no action required.
	Door contact switch not working properly. Possible cause: <ul style="list-style-type: none"> door contact switch lever restricted – cannot break contact poor connection 	<ul style="list-style-type: none"> Test door contact switch operation by checking indicator lamp. Re-adjust door contact switch . Check connection between control unit and door contact switch.
	<i>In exceptional situations</i> , the unit cools off automatically as a safety precaution. (Display shows a \bullet symbol.)	<ul style="list-style-type: none"> Increase 'Defrost' mode duration (Function No. 12 in 'Advanced' menu).
Air curtain does not run when door is open.	Door contact switch not working properly. Possible cause: <ul style="list-style-type: none"> door contact switch jammed due to dirt or ice poor connection 	<ul style="list-style-type: none"> Test door contact switch operation by checking indicator lamp. Clear dirt and/or ice from door contact switch. Re-adjust door contact switch. Check connection between control unit and door contact switch.

See also:

6.5 "Error messages" on page 54

8.2 "Access to air curtain unit interior" on page 60

3.7.1 "Installing door contact switch" on page 27

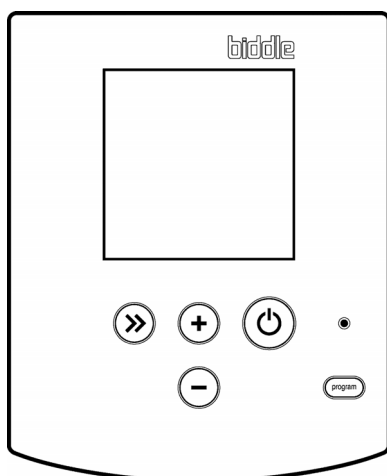
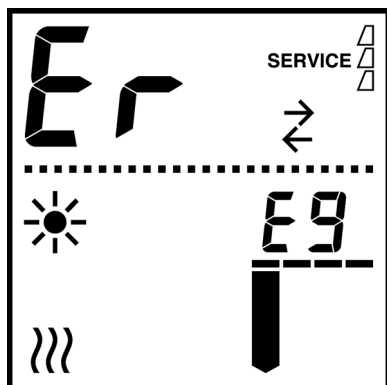
6.4 Adverse side effects

PROBLEM	PROBABLE CAUSE	WHAT TO DO
Misting visible. Air curtain flow possibly disrupted.	Door slightly ajar.	Open or close door fully.
	Object (stored goods or a vehicle) obstructing air curtain.	Remove object.
	Draught from another open door in vicinity.	Close door if deep-freeze unit door is open.
Misting visible in air curtain airflow.	Heating levels insufficient for current ambient conditions in deep-freeze unit and front hall.	<i>For manual heating control:</i> Try a higher heating setting.
		<i>For automatic heating control:</i> Try a higher set point.
Misting visible, possibly in both deep-freeze unit and front hall.	Air curtain airflow not reaching ground level.	Try a higher flow rate setting. Close and open door to test each new setting.
Turbulent airflow and cold air flowing at ground level into front hall.	Air curtain airflow set too high.	Try a lower setting.
Misting visible close to air outlet.	Excessive ice formation obstructing airflow.	Refer to <i>Excessive ice formation at fans and/or air outlet.</i>
	Air inlet or outlet blocked.	Make sure air inlets and outlets are not obstructed.
	Fan not working.	Contact Biddle.
Excessive ice formation at fans and/or air outlet.	Air curtain airflow disrupted.	Refer to <i>Misting visible. Air curtain airflow possibly disrupted.</i>
	Air curtain has been running for too long without having been defrosted.	Close door sooner to allow unit to defrost. Reduce ice formation time limit (Function No. 20 in 'Advanced' menu).
	Defrosting insufficient.	Try adjusting 'Defrost' settings in 'Advanced' menu.
Temperatures in cold store excessively high.	Air curtain airflow not reaching ground level.	Try a higher flow rate setting.
	Air curtain flow rate set too high.	Try a lower setting.
	Heating level set too high.	<i>For manual heating control:</i> Try a lower heating setting. <i>For automatic heating control:</i> Try a lower set point.

See also:

- 5.4 "Heating adjustment" on page 49
- 5.3 "Outlet flow rate adjustment" on page 49
- 4.4 "'Advanced' menu settings" on page 42

6.5 Error messages



6.5.1 Error message display

Control panel displays **Er** symbol plus an error code whenever an error occurs.

If display shows an **Er** symbol plus an error code without an **SERVICE**, then error has rectified itself. Error code remains on display to inform you that an error occurred. Press a random button to reset display.

If display shows an **SERVICE** symbol, then error still exists. Error message remains visible until error has been resolved.

It is also possible to view the error history log (Function Nos. 91–95 in 'Expert' menu).

6.5.2 Resetting errors

Most errors resolve themselves once cause has been removed. Some errors however need to be reset.

To reset an error, press **+** and **-** buttons simultaneously for 3 secs.

6.5.3 What to do in event of an error

Depending on error code, follow relevant steps to resolve error using *Error code table*.

If the error persists or reoccurs on a frequent basis, then a fault probably exists. Always contact Biddle.

See also:

- 4.5 "Expert' menu settings" on page 44
- 6.6 "Error codes" on page 55

6.6 Error codes

Error code list

ERROR CODE	MEANING, PROBABLE CAUSE	WHAT TO DO
C5 (only applicable to hybrid models (type H4E))	The temperature sensor behind the water element is faulty.	<ul style="list-style-type: none"> Contact Biddle.
C6 (only applicable to hybrid models (type H4E))	Faulty Airflow 'C' temperature sensor.	<ul style="list-style-type: none"> Contact Biddle.
C7 (only applicable to hybrid models (type H4E))	The pipe sensor for the water temperature is faulty.	<ul style="list-style-type: none"> Contact Biddle.
E1	<p>Communication between control unit and air curtain unit (or one of its components) has failed or is not working properly.</p> <p>Probable cause:</p> <ul style="list-style-type: none"> component not connected to power supply poor connection 	<p>Check following items:</p> <ul style="list-style-type: none"> air curtain unit isolation switch: should be in position 'I'. power supply (or error on one phase) connection between air curtain unit(s) and control unit fuses (in electronics compartment)
	control unit or air curtain unit (or one of its components): replaced	<ol style="list-style-type: none"> Reset control panel (Function No. 98 in 'Expert' menu). Contact Biddle if this does not resolve problem.
E2	Control unit is connected to power supply, but is not communicating properly with electronic components in unit(s).	<ol style="list-style-type: none"> Check connection between air curtain unit(s) and control unit. Reset control unit (Function No. 98 in 'Expert' menu). Contact Biddle if this does not resolve problem.
	Electronic components are incompatible.	Contact Biddle.
E3	A faulty electronic component (rare).	<ol style="list-style-type: none"> Reset error. Contact Biddle if this does not resolve problem.

ERROR CODE	MEANING, PROBABLE CAUSE	WHAT TO DO
E4	The high-limit thermostat has deactivated heating. This is a safety precaution. This situation may arise if power supply has been disconnected. If not, then it is probably a result of a serious fault.	<ol style="list-style-type: none"> 1. Allow air curtain unit to cool off. 2. Reset error. <p>If the error persists or reoccurs on a frequent basis, then a serious fault probably exists.</p> <ol style="list-style-type: none"> 3. Turn unit OFF immediately at isolation switch by turning it to '0'. Repeat for both units if two air curtains have been installed. 4. Contact Biddle.
E5	Heating does not turn OFF – probably a serious fault. This may pose a hazard to persons and may cause damage to unit.	<ol style="list-style-type: none"> 1. Reset error. <p>If the error persists or reoccurs on a frequent basis, then a serious fault probably exists.</p> <ol style="list-style-type: none"> 2. Turn unit OFF immediately at isolation switch by turning it to '0'. Repeat for both units if two air curtains have been installed. 3. Contact Biddle.
E6	The pressure from Airflow B is too high. This may indicate a risk of freezing up.	<ol style="list-style-type: none"> 1. Check whether there is ice formation in the unit. 2. Check whether a continuous flow of heated water is passing through the unit. 3. Contact Biddle if the error persists.
E7	Faulty Airflow 'B' fan detected by thermal contact.	<ol style="list-style-type: none"> 1. Reset error. 2. Contact Biddle if this does not resolve problem.
E8	Faulty Airflow 'C' fan detected by thermal contact. Contact broken on Airflow 'A' control circuit board.	<ol style="list-style-type: none"> 1. Reset error. 2. Contact Biddle if this does not resolve problem.
F2	The control valve remains open and is providing too much heat	<ol style="list-style-type: none"> 1. Check the control valve. 2. Contact Biddle if this does not resolve problem.
F3	The water heating does not work properly – probably a fault.	<ol style="list-style-type: none"> 1. Check the hot water supply. 2. Check the control valve. 3. Contact Biddle if this does not resolve problem.
F5	Faulty Airflow 'B' temperature sensor.	<ul style="list-style-type: none"> • Contact Biddle.
F6	for non-hybrid models (types E and EE): Faulty Airflow 'C' temperature sensor. for hybrid models (type H4E): The temperature sensor of Airflow B after the water element and before the electrical element is faulty.	<ul style="list-style-type: none"> • Contact Biddle.

ERROR CODE	MEANING, PROBABLE CAUSE	WHAT TO DO
F7	Faulty Airflow 'A' temperature sensor.	<ul style="list-style-type: none">• Contact Biddle.
F8	Faulty humidity sensor.	<ul style="list-style-type: none">• Contact Biddle.

See also:

8.3 "Fuses" on page 62

4.5 "'Expert' menu settings" on page 44

1.3.3 "MAT air curtain operation" on page 8

7. . Maintenance

7.1 Scheduled maintenance

This section explains how to perform scheduled maintenance that Biddle recommends be carried out to ensure safe and proper operation and to prolong the MAT air curtain's lifespan.

7.1.1 Weekly inspection

Biddle recommends that the following inspections be carried out every week:

- Check whether door contact switch is working properly by opening and closing door to see if door indicator lamp turns ON and OFF.
- Check control panel display – no error messages should be displayed.
- Check air humidity on display. A realistic value should be displayed. If a value of '99' is shown, then a fault probably exists.
- If two air curtain units have been installed, examine and compare the state of Airflows A, B and C. Any differences between the two units should be minimal in real terms.
- Check whether each fan is working properly by placing your hand in front of the air outlets.
- Inspect exterior of all MAT air curtain components.

7.1.2 Quarterly inspection

Biddle recommends that the following inspections be carried out quarterly:

- Test and inspect corridor framework and air curtain unit suspension. No play (movement) or rust formation may exist.
- Inspect electrical connections. Cables should be properly connected and cable sleeves should be intact.
- Inspect corridor. No insulation leaks may exist.

7.1.3 Annual maintenance

Biddle recommends that the following inspections be carried out annually:



Danger:

Only perform maintenance work if technically qualified to do so.

- Clean air curtain unit interior(s) and fans.



Note:

Fan motors do not require lubrication.

- Visually inspect electronic components and unit electronics compartment wiring.

See also:

4.3 "Heating level control" on page 40

8.2 "Access to air curtain unit interior" on page 60

8. . Service

8.1 Safety instructions



Warning:

Servicing activities may only be carried out by personnel who are technically qualified to do so.



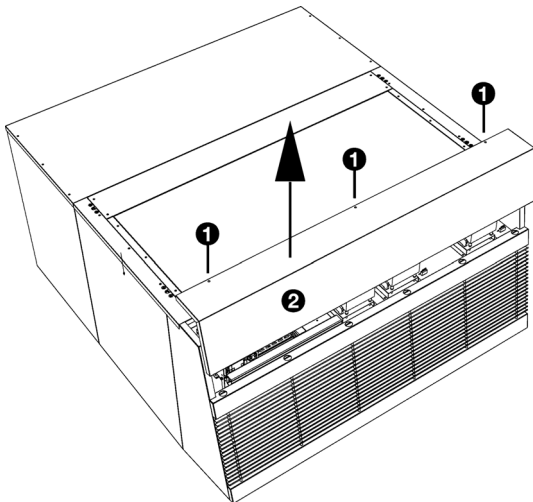
Warning:

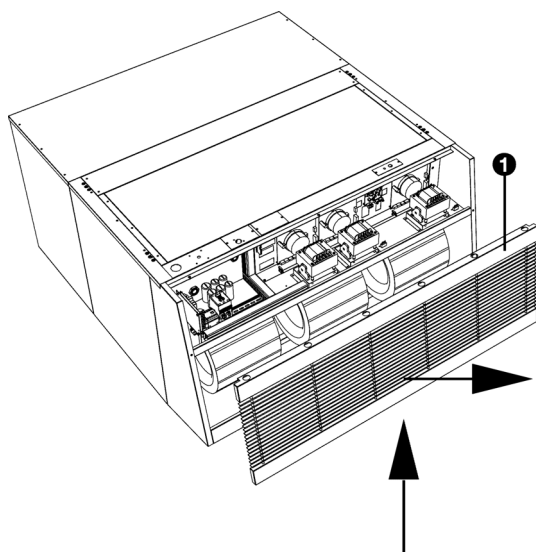
Before you begin: read the safety instructions.

8.2 Access to air curtain unit interior

8.2.1 Access to electronics compartment

1. Remove bolts ❶.
2. Slide up and remove front panel ❷.

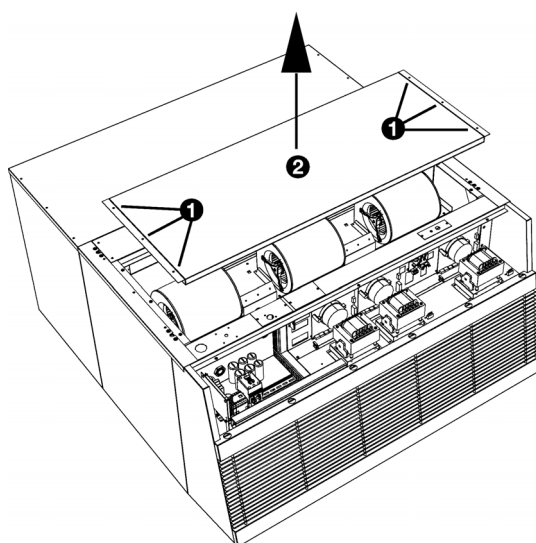




8.2.2 Access to Section 'A'

Section 'A' contains fans for Airflow 'A'.

1. Remove front panel as previously described.
2. Slide up and remove front grille section ❶.



8.2.3 Access to Section 'B'

Section 'B' contains fans and heating elements for Airflow 'B'.

1. Remove bolts ❶.
2. Lift off top cover ❷.

8.2.4 Access to Section 'C'

Section 'C' contains fans for Airflow 'C'.

1. Slide up and remove grille ❶ at rear (this may require some force).

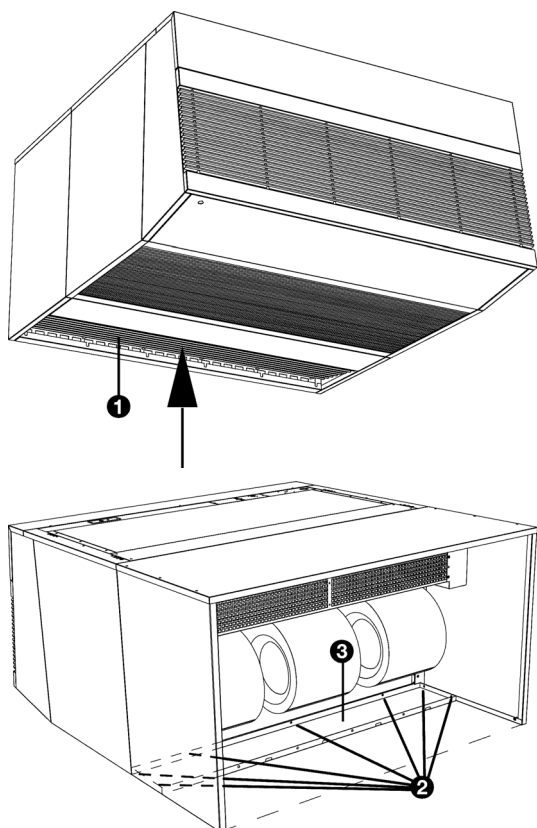
For convenience sake, also remove cover plate ❸:

2. Remove bolts ❷ on both sides.
3. Remove cover plate ❸.

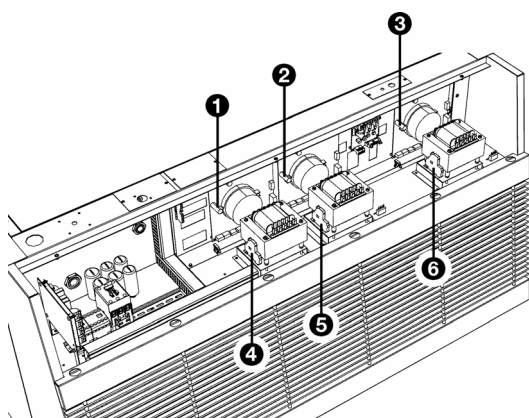
See also:

1 "Safety instructions" on page 1

1.3.3 "MAT air curtain operation" on page 8



8.3 Fuses



All fuses are located in electronics compartment. Section [Access to electronics compartment](#) details how to access this compartment.

- ❶ Airflow 'A' electronics
- ❷ Airflow 'B' electronics
- ❸ Airflow 'C' electronics
- ❹ Airflow 'A' transformer
- ❺ Airflow 'B' transformer
- ❻ Airflow 'C' transformer

See also:

8.2 "Access to air curtain unit interior" on page 60

8.4 Disconnecting the RCM module

Only for hybrid models (type H4E):

To prevent freezing up, warm water must always be available when the unit is operating. The RCM module is used to monitor this. After the test period, the module can be disconnected.



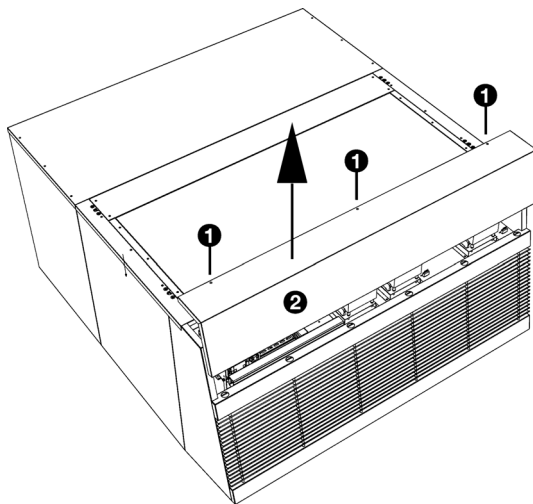
Warning:
Shut off the mains supply

Detach the RCM module from the control unit

1. Open control unit cover.
2. Detach the cable from the connection.
3. Remove the cable from the cable gland.
4. Close off the cable gland to protect against water and dust.
5. Close the lid.

Detach the RCM module from the unit

1. Detach the module's mains power cable from the female plug of the cord attached to the unit.
2. Open the unit:
 1. Remove bolts ❶.
 2. Slide up and remove front panel ❷.
3. Detach the internal mains power cable from the connection.
4. Remove the internal mains power cable.
5. Plug the resultant hole in the cabinet of the unit.
6. Close the unit.
7. Remove the RCM module.



9. . Dismantling

The dismantling of the installation and the handling of the coolant, oil and other components must be carried out by a qualified fitter in accordance with the relevant local and national legislation and regulations.

Pursuant to EU legislation, used electrical and electronic appliances must be collected for recycling. By ensuring that this product is disposed of in the correct manner, you are helping to prevent potential negative consequences for the environment and public health. For more information about this, please contact your supplier or the relevant government authority.

10. Addresses

If you have any comments or queries relating to this product, please do not hesitate to contact your Biddle branch.

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N°Vert 0 800 BI DD LE

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Although great care has been taken to ensure the correct and, where necessary, complete description of the relevant components, Biddle shall not be held liable for damages as a consequence of errors and/or imperfections in this manual.

Biddle reserves the right to alter the specifications as mentioned in this manual.

Should you nevertheless discover any errors or ambiguities in the manual, we shall be glad to learn that from you. It helps us to improve the documentation still further.

For more information

If you have any comments or queries relating to this product, please do not hesitate to contact Biddle. You will find the contact information for your Biddle branch in chapter [10 Addresses](#).

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