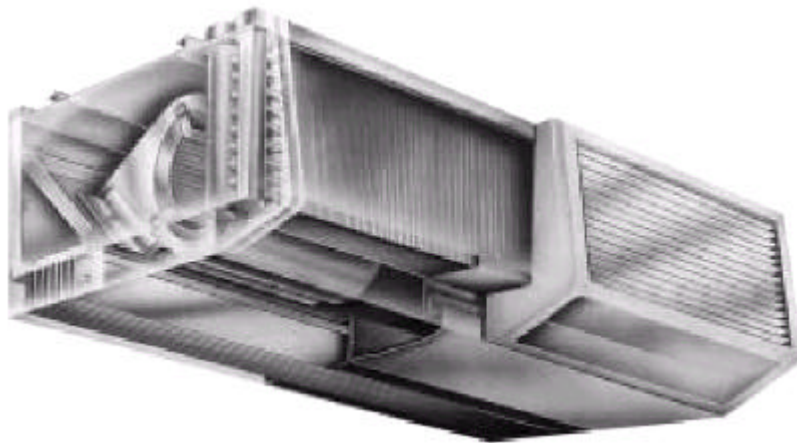


Installer's Guide

Comfort Air Curtains

Model MAC



Version of guide: 1.0



a



biddle

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For more information

If you have any comments or questions about specific topics relating to the device, please do not hesitate to contact Biddle.

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1 . . Introduction

1.1 About this guide

This guide describes the installation and maintenance of the air curtain.

The guide contains information for the proper functioning, operation and maintenance of the device. It also contains instructions for preventing potential accidents and damage while the device is in operation and for ensuring that the device functions as safely as possible. For that reason please read through this guide thoroughly before putting the device into operation.

If you are unfamiliar with the installation and/or maintenance of the air curtain then please read the chapters in sequence.

If you are familiar with the device then you can use this guide as a 'ready reference'. You can easily find the information you are looking for by using the table of contents.

In addition to this guide the following document is supplied with the device:

- Guide: Touch pad controller
- Guide: Control system without touch pad controller
- Wiring diagrams

1.2 Meaning of symbols and abbreviations

In this guide the following symbols and abbreviations are used:



Accessory



Important!



Detail

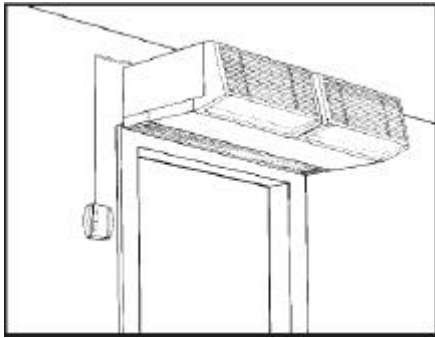
(-E)

Type (page 5)



Not relevant for MACs or MACi (page 5)

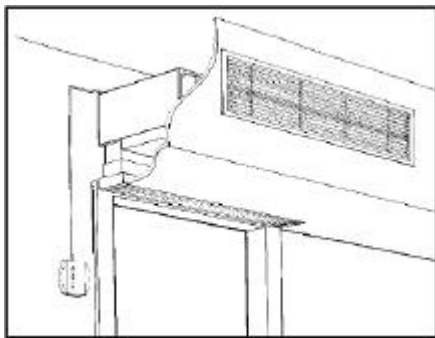
1.3 About the device



The air curtain is intended for the separation of climates between two rooms. The device is placed above the door opening across the full width of the door opening.

Free-hanging model

The free-hanging model MAC F (left) is intended for free, visible installation above the door.



Bulkhead/recessed model

The recessed model MAC R-O (left) is intended to be built in above a suspended ceiling or in a cove, in which case the intake opening can be located at some distance (6-8 m) from the device.

1.4 Mode of operation

The air curtain blows a stream of warm air straight downwards and in doing so achieves two goals:

- The exchange of air between two rooms due to a temperature difference (convection) is counteracted.
- The air which enters at floor-level in the form of draughts is heated.

1.5 Types available

The table below contains an overview of the available types. The type code is composed by selecting one option from each column. For example, the elements can be combined to form: MAC*i* 100-W-F.

Table 1-1 Types available

Type	Control	Discharge width	Heating medium	Model
MAC <i>i</i>	standard with integrated interface	100	- W (water)	-F (free hanging)
		150	- E (electric)	-R-O (recessed/bulkhead)
		200	- A (ambient)	
MAC <i>s</i>	optional: with 3-step switch, without built-in interface	100	- W (water)	-F (free hanging)
		150	- A (ambient)	-R-O (recessed/bulkhead)
		200		

Every combination can be supplied

Delivery includes:

- power cord with power plug (230 V), length 2 m (not for electrical heating)
- ceiling mounting brackets
- filter

Depending on the situation the air curtain can be controlled in two ways:

1. Model MAC*i* is the standard and recommended when coupling to more units may be made or when external control components such as a timer, a BMS-controlled signal or a thermostat, are needed.
2. Model MACs (water heated and ambient units only) can be used in situations in which only one device is installed and when ease of use is less important.

In this guide some parts are not relevant for a specific type of air curtain. In that case the symbol on the left is used. In this case it means that the part of the text is not relevant for the air curtain that comes with 3-step switch, but without built-in interface.



1.6 Type plate

 <small>Biddle by Markweil & NL-9250 HA Koornsterile</small> 	Type	MAC / 150-E-F	
	Code	U 400 V 3N~ 50 Hz	
	N°	30000/ 1-1 03-05	I _{max} L1 19.5 A
			I _{max} L2 18.5 A
	M	54 kg	I _{max} L3 16.7 A
	Medium	Electrical heating	P _{heating} 0.40 kW
	D _{max}		P _{heating} 12.0 kW

You will find the type plate at the bottom of the device, behind the air inlet grilles. The 'type' line shows the full type code (required when, for example, ordering parts).

1.7 Available accessories

The type code of the accessory must correspond to that of the device for which the accessory is intended.

Accessories:

- door contact switch
- wall mounting brackets
- water side control system
- auxiliary module with long-life filter
- curved air discharge grille
- rear panel for devices together with glass facades

Accessories for MAC*i*:

- touch control panel
- low voltage cable with two plugs, in lengths of 5, 15, 25 and 35 m

Accessories for MACs:

- control switch with press buttons
- relay set for banking units

1.8 Safety instructions

Caution:

The following instructions are essential for the safe use of the device:



- Do not insert any objects into the intake and discharge openings.
- Never block the intake and discharge openings.
- Do not touch the upper surface of the device during use; the surface can become hot.

Warning:

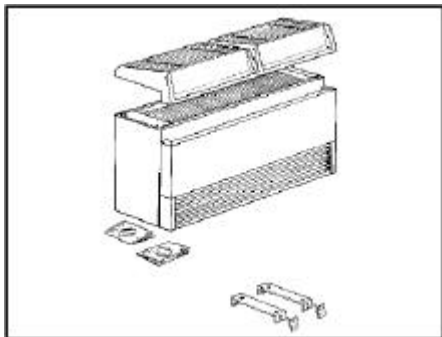
The following instructions are essential for working safely on the device (for installation, maintenance or repair).

Before opening the device:

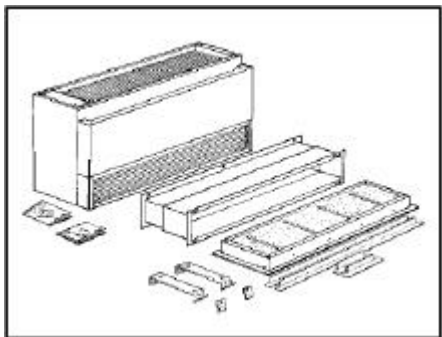
- Switch off the device.
- Switch off the mains voltage (pull out the plug or invert the main switch).
- Close the LPHW supply (if possible).
- Wait until the fans have stopped.
- Allow the device to cool down. The heat exchanger of a device with water heating reaches a temperature of up to 90°C, whereas electrical heating elements reach a temperature of up to 175°C.
- Take great care when working in the vicinity of the heating elements. The fins can be sharp.

1.9 Delivery check

1. On delivery, check the device and packaging. Report any transport damage to the supplier immediately.
2. Make sure that all ordered parts have been delivered.



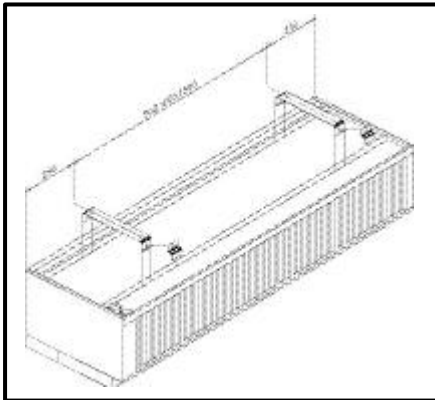
MAC Free-hanging model.



MAC Recessed / bulkhead model.

2 . . Installation

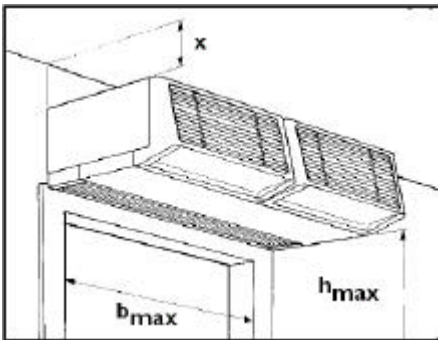
2.1 Preparations for installation



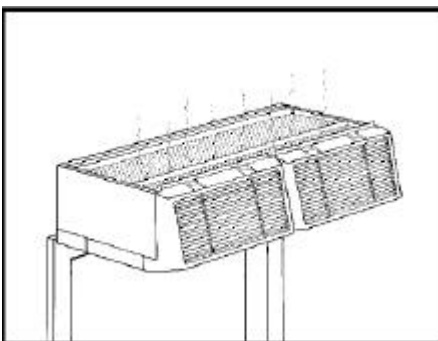
2.1.1 Device

- Make sure that the structure on which the device will be suspended is capable of supporting the weight of the device. The weight is shown on the type plate (see section 1.6).

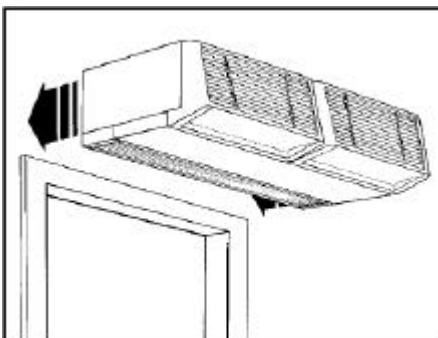
Measurements for mounting the suspension brackets.



- Check the following dimensions:
 - The device must be at least as wide as the door opening (measurement b). Biddle recommends an overlap of 25 cm on both sides of the door opening.
 - The suspension height of the device (measurement h) is measured from bottom of the unit to the floor. Maximum suspension height = 2.6 m.



- The upper part of the device can get hot. The device must therefore be kept 2 cm of the ceiling (measurement x).



- Place the device as close to the door as possible.

2.1.2 Control panel

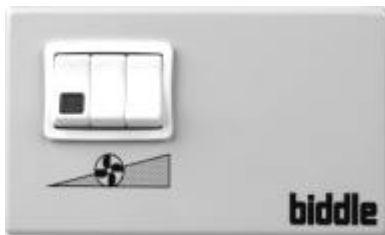


1. Touch control panel - MACi

The air curtain comes as a standard with an interface and a touch pad control panel. This control panel has 3 keys each of which regulates the desired speed. The control panel that comes with an electrically heated unit has 2 additional keys for controlling the electrical element.

- A maximum of 10 devices can be controlled from the control panel. The settings on the control panel will then apply to all connected devices.
- The total length of the control cables in the system should not exceed 100 m .
- Keep the control cables away from electromagnetic fields/ interference sources, e.g. high-voltage cables and TL starters.
- Use Biddle control cables. A standard modular telephone cable is not suitable. The connectors are of the RJ-11 type, and the connections are 'straight through', i.e. the wire must be connected to the same pin at both ends of the cable.

For installation of the touch pad control panel for MACi we refer to 2.3.5 on page 17 and the guide included!



2. Control switch – MACs

The control switch has 3 press buttons for the following functions: off-low-medium-high. The switch has a neon indication light.

For installation of the control switch for MACs see 2.3.6 on page 17.

2.2 Installation

During the installation period protect the device against damage and against infiltration by dust, cement, etc. For example, the packaging can be used for this purpose.

2.2.1 Suspension of device

Insert four threaded end screws M8. Make sure that the threaded ends are hanging perpendicular.

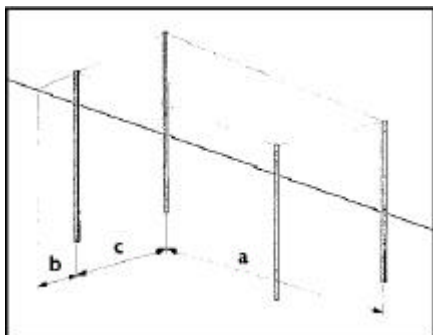
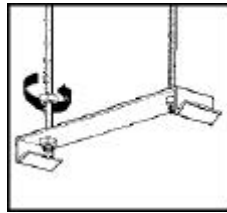
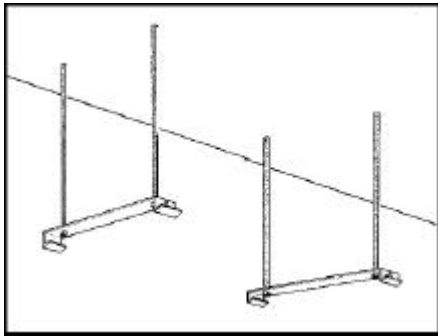
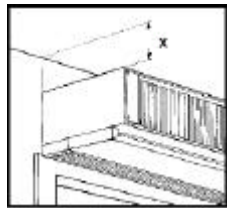
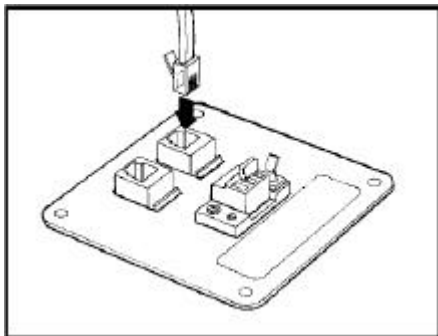


Table 2-1 Dimensions for hanging the unit

Type	MAC 100	MAC 150	MAC 200
a	500	1000	1500
b	80	80	80
c	288	288	288

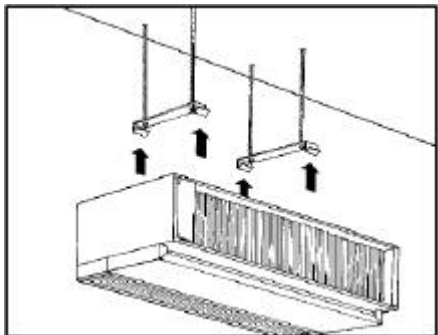


Screw a nut onto each threaded end. Slide the suspension brackets onto the threaded ends and make them secure. Make sure that the suspension brackets run horizontally and hang at the same height.

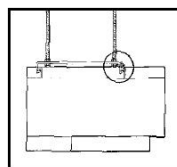
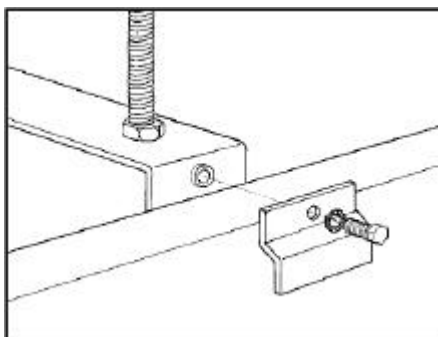


If the space between the device and the ceiling is too small to enable you to reach the connections after you have hung the device ($x < 50$ mm) (see page 11):

- connect the control cable,
- if the control is being daisy chained: connect the second control cable,
- if external controls are being used: connect the cables for external controls.

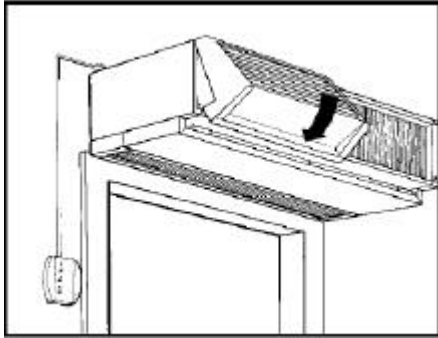


Hook the device into the mounting brackets, with at least 2 people. The weight is shown on the type plate (see 1.6).



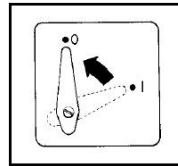
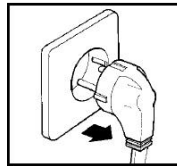
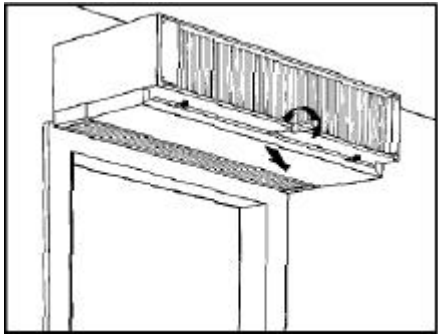
Fix the two locking plates. The device can fall if the suspension brackets are not locked.

2.2.2 Supply air grille suspension (-F)

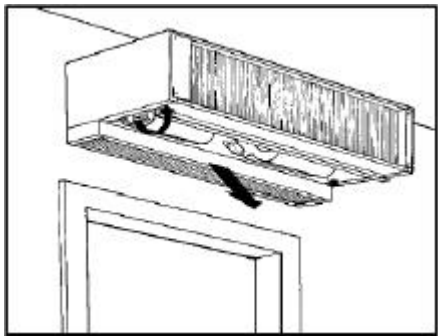


Place grille on edge of device.

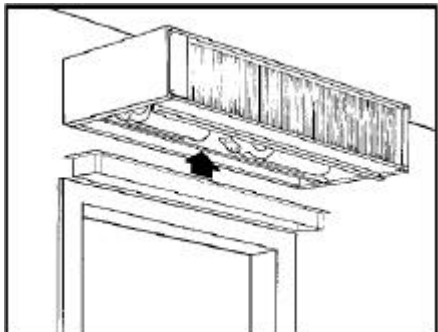
2.2.3 Preparations for recessed model (-R-O)



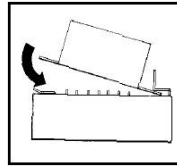
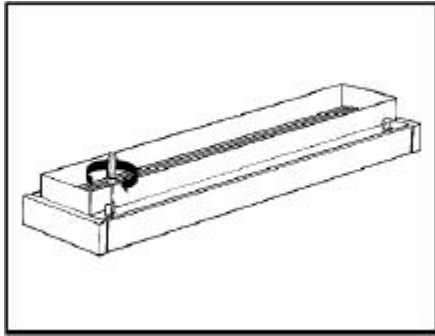
Remove inspection panel.



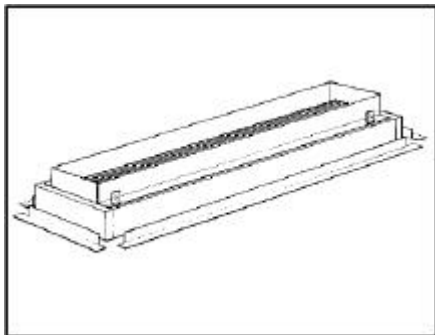
Remove discharge grille.



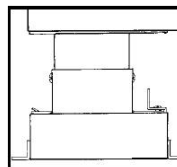
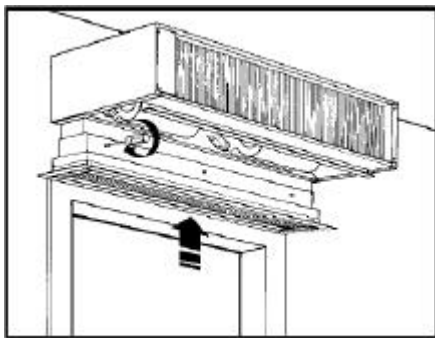
Mount inner duct extension onto the location where the discharge grille is normally mounted.



Mount outer duct extension to discharge grille.



Mount strips to discharge grille.



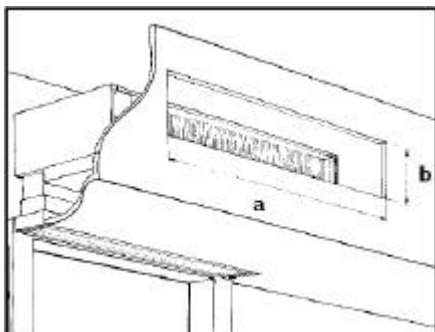
Telescope both ducts into each other and fix.

Make sure that the device is still accessible after installation (e.g. via an inspection hatch) for maintenance and repair.

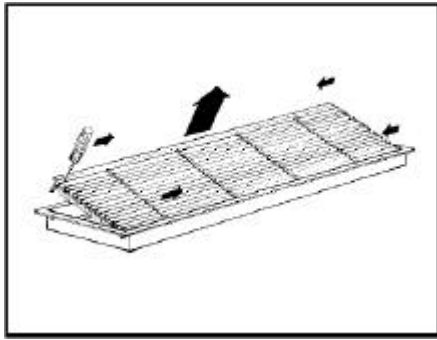
2.2.4 Inlet grille mounting (-R-O)

Table 2-2 Measurements of the aperture for the inlet grille

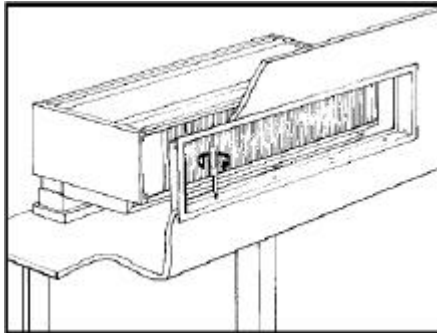
Type	MAC 100	MAC 150	MAC 200
a	965	1465	1965
b	265	265	265



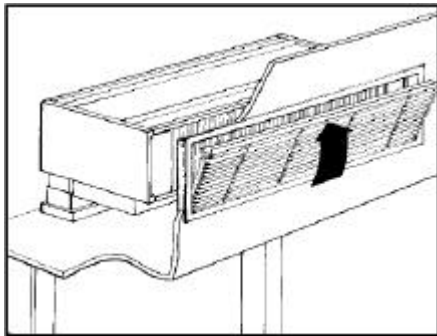
Make opening in bulkhead.



Move catches and take grille out of frame.



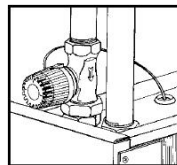
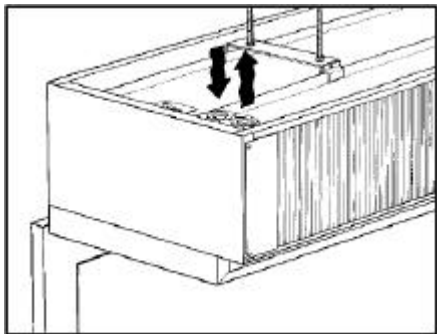
Mount frame in hole in bulkhead.



Hook grille in frame.

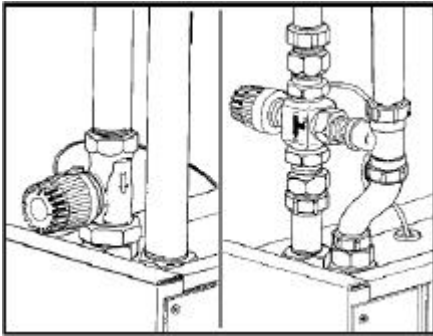
2.3 Connections

2.3.1 LPHW connections (-W)

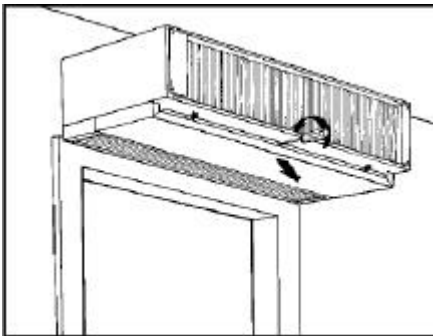


Connect the pipe work to inlet and outlet (G1"). If the control is not already connected (see page 11): connect the control cable, if the control is being daisy chained: connect the second control cable.

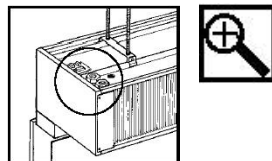
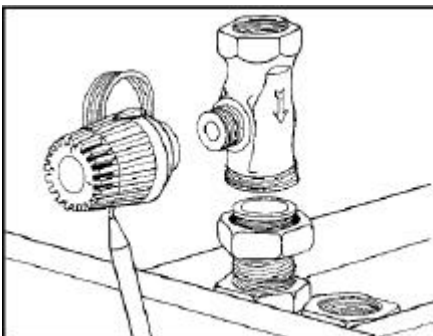
2.3.2 Thermostat connection (-W)



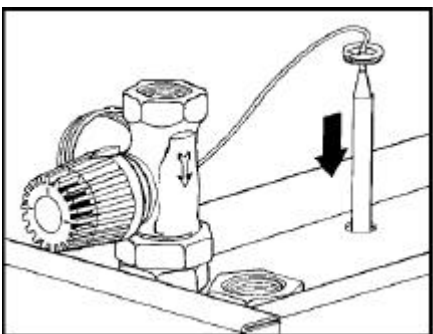
It is advised to control the discharge temperature of the unit with a thermostat. You can either use a 2-way or a 3-way valve.



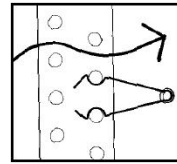
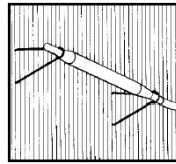
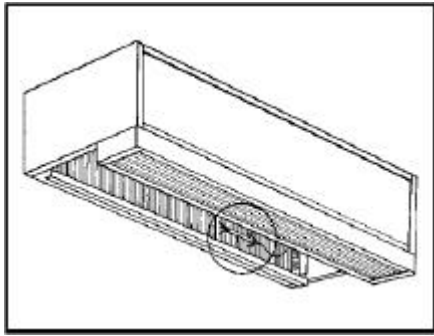
Remove inspection panel.



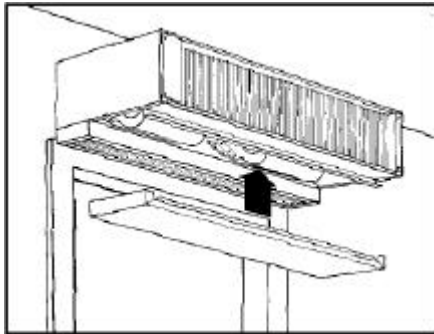
Mount valve body & head.



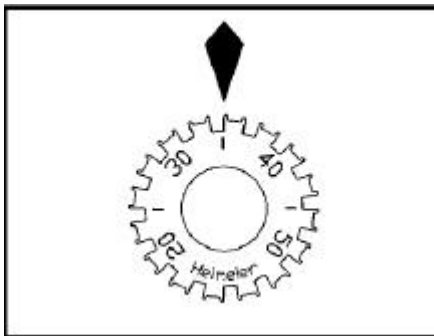
Fit sensor to device.



Secure sensor to element with spring clips.

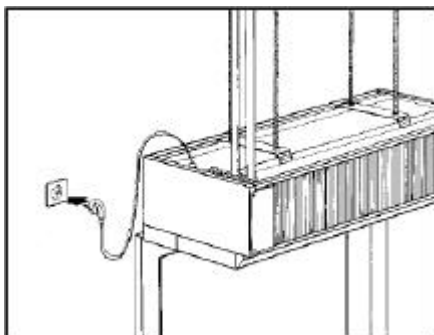


Replace inspection panel.



Set dial to $\pm 35^{\circ}\text{C}$.

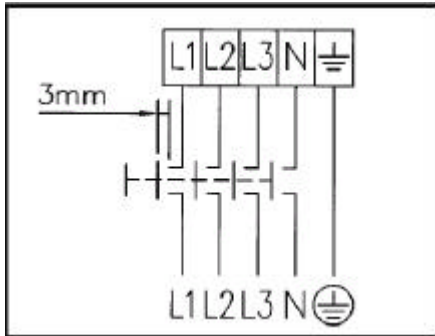
2.3.3 Electrical connections (-W)



Connect to power supply.

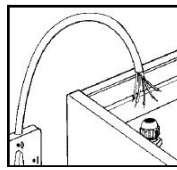
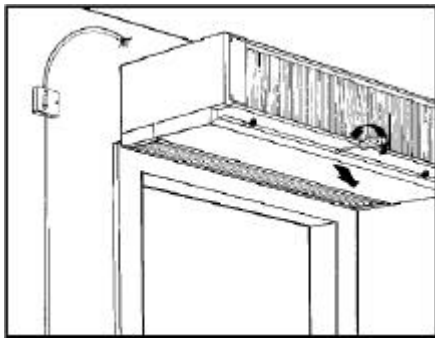
The device must be earthed.
Make sure that there is an (earthed) wall socket no more than 1.5 m from the left-hand side of the device.

2.3.4 Electrical connections (-E)

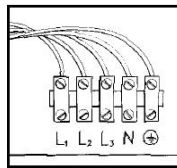
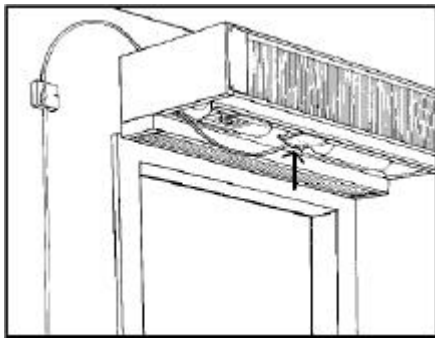


Make sure that the mains supply group on which you are working is switched off.

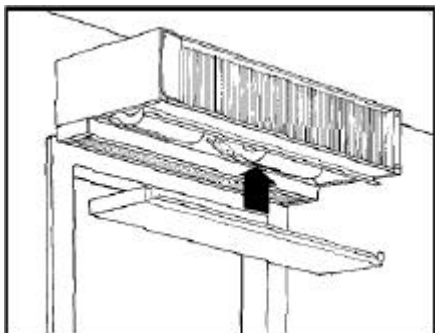
Fit an all-pole switch with a minimum contact separation of 3 mm.



Remove inspection panel and bring cable in device.

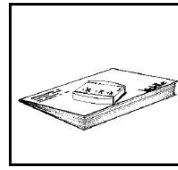
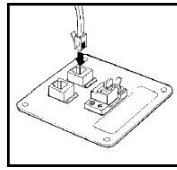
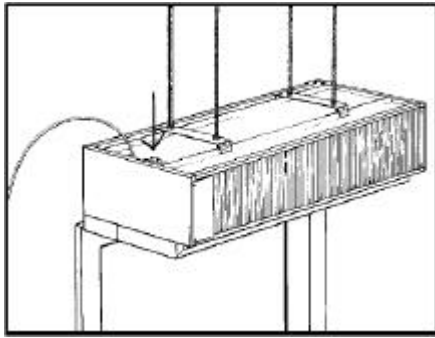


Connect supply cable to terminal block.



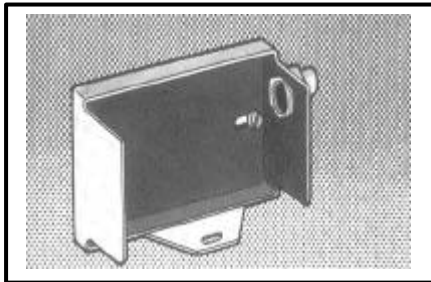
Replace inspection panel.

2.3.5 Remote control pad connection MAC*i*

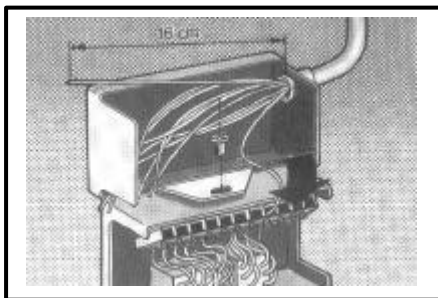


Insert cable in connector (see guide touch pad controller).

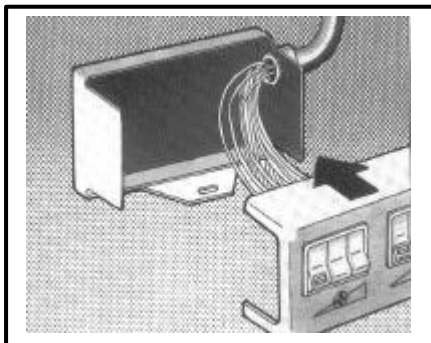
2.3.6 Remote control pad connection MAC*s*



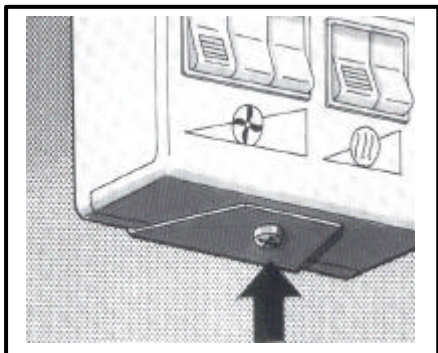
Take off the front panel of the control switch and mount the back panel on the wall.



The free length of the electrical wiring should be at least 16 cm.



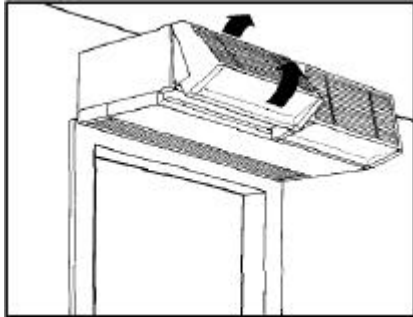
Connect the wiring to the terminal block in the front panel.



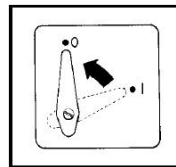
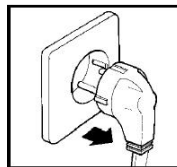
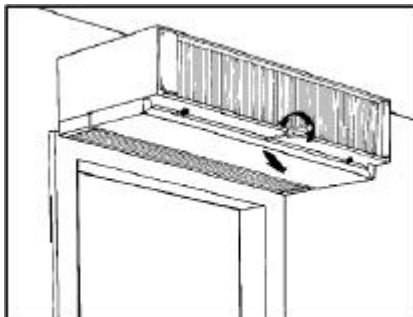
Fix the front panel with the screw at the bottom of the control switch.

3 . . Modifications

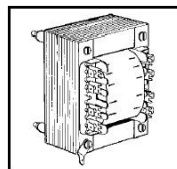
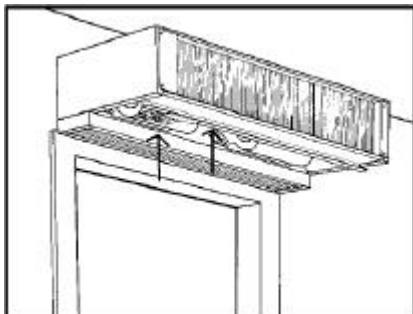
3.1 Transformer modification



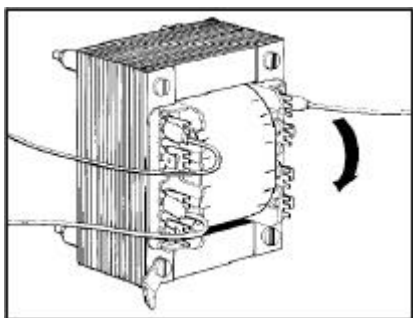
Before opening the device: follow the instructions in section 1.8.
Remove air inlet grilles (-F).



Switch off the device.
Switch off the mains voltage (pull out the plug or invert the main switch).
Remove inspection panel.

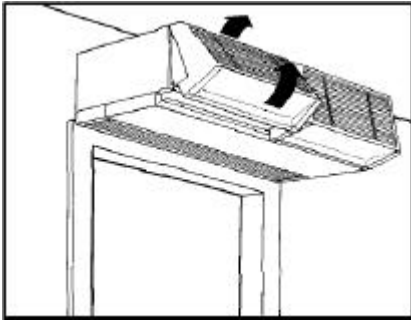


Locate transformer.

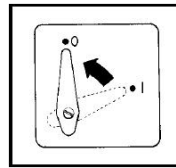
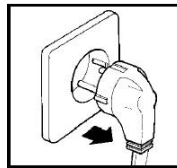
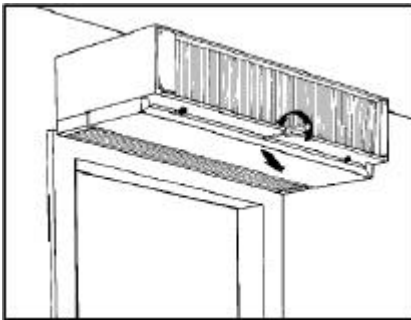


Move required spade connectors.

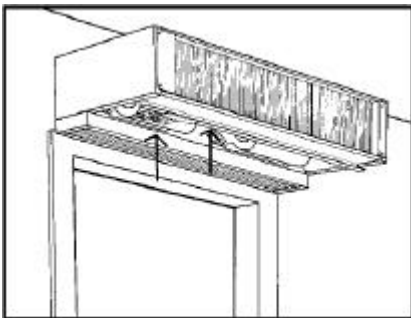
3.2 Interface modification MAC*i*



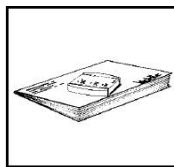
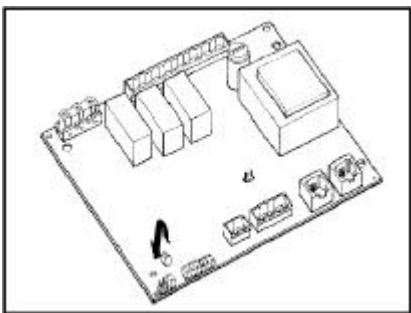
Before opening the device: follow the instructions in section 1.8.
Remove air inlet grilles (-F).



Switch off the device.
Switch off the mains voltage (pull out the plug or invert the main switch).
Remove inspection panel.



Locate transformer.



Move required jumpers (see touch pad controller guide).

3.3 Function check

1. Check the hanging:

Is the device well-secured and hanging safely? Check this trying to push the device out of the suspension bracket or by rocking it gently backwards and forwards. Do not stand underneath the device while you do this. Also make sure that the device, if it falls, will not crash into the ladder you stand on.

2. Check the electrical connections:

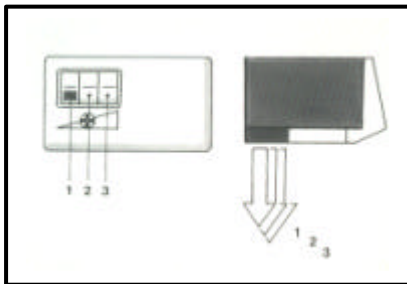
- Is the power properly connected?
- Is the communications cable (between the control panel and the device) properly connected?
- Are the external control components properly connected?



3. Check the waterside connections:

For water heated devices: has the heating element been properly connected? Check this by feeling whether the discharged air stream becomes warm (after some time). The boiler must, of course, be switched on and the heating must not be switched off on the control panel.

3.4 Control switch MACs



Fan speed MACs.

3.5 Placing of relay for banking units MACs



See wiring diagram

4 . . Maintenance

4.1 Filter cleaning / replacing (-F)

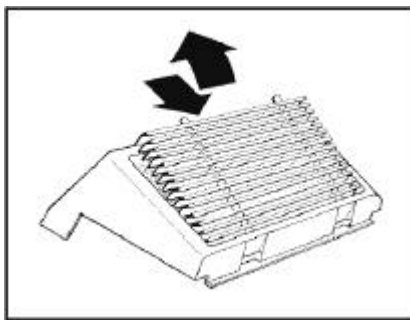
Before opening the unit: follow the instructions in section 1.8.



The filter must be cleaned regularly. A dirty filter can cause draught,, insufficient heating and a high noise level.

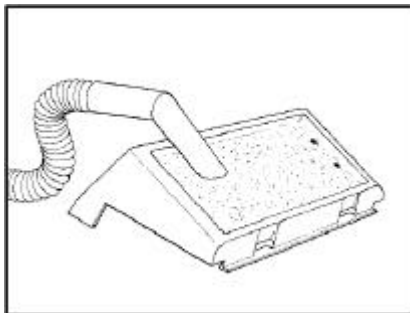
The environment determines how long a filter will last before it needs changing or cleaning.

A new filter can be ordered from Biddle. You can also clean the filter material with, for example, a vacuum clear. However, after a few cleanings the filter will still need to be replaced.

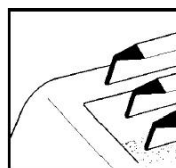
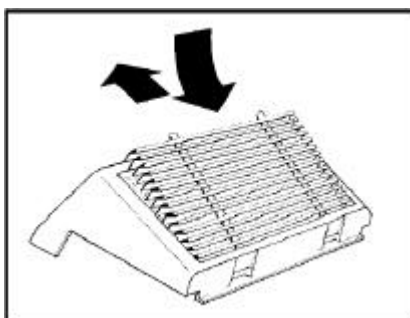


Free-hanging unit (-F)

1. Remove the caps: tilt the cap upwards and unhook it.
2. Slide the grille upwards, lift it, and take it out of the casing.



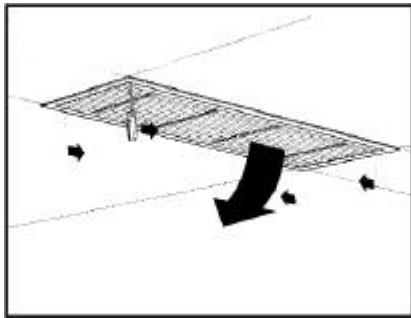
3. Clean or replace filter.



4. Replace grille.

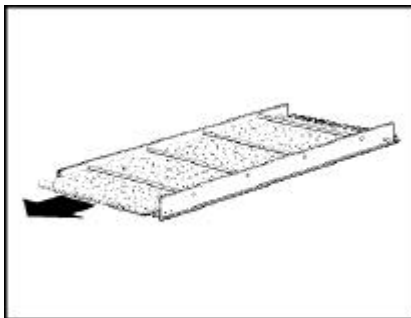
4.2 Filter cleaning / replacing (-R-O)

Before opening the unit: follow the instructions in section 1.8.

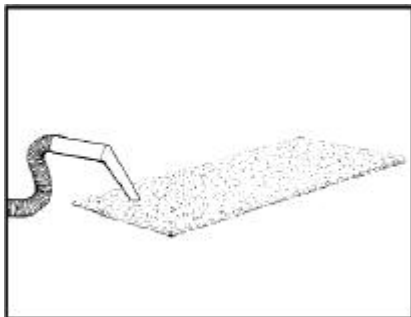


Bulkhead / recessed unit (-R-O)

Remove the grille out of the frame.



Slide filter material out of the grille.



Clean or replace filter.

4.3 Cleaning the unit

The outside of the unit can be cleaned with a damp cloth and a household detergent. Do not use solvents.

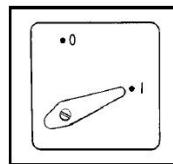
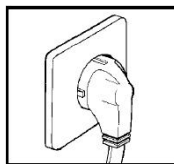
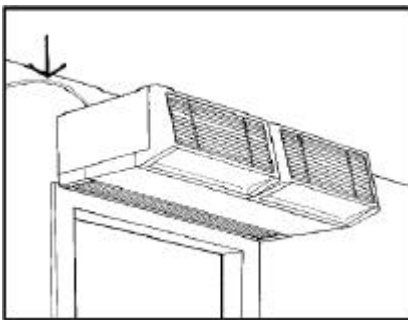
5. . Failures

5.1 General

Go through the next actions step by step until the occurring problem is resolved. In case of doubt please consult your installer or Biddle. See also touch control booklet.

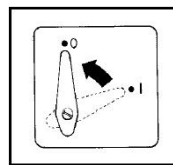
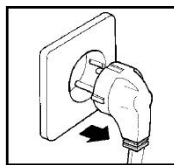
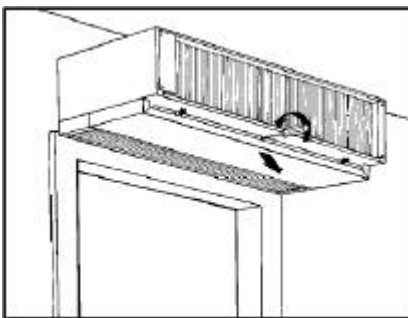
5.2 Appliance does not work

1



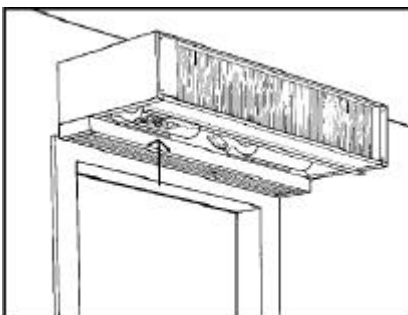
Check power supply.

2a



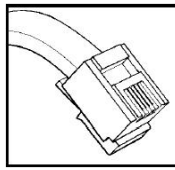
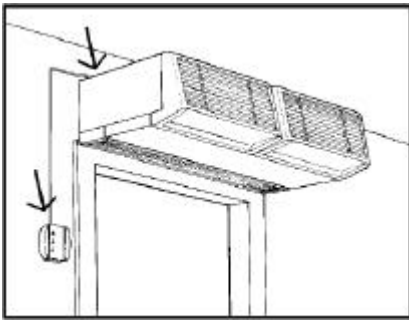
Switch off the device.
Switch off the mains voltage (pull out the plug or invert the main switch).
Remove inspection panel.

2b



Check fuses.

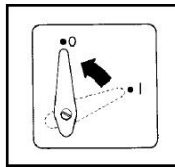
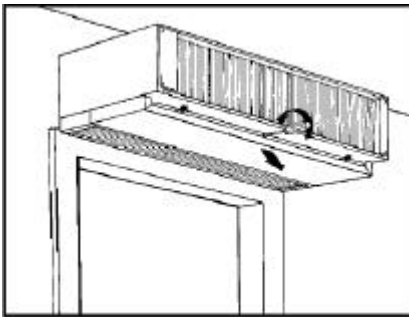
3



Check modular plugs.

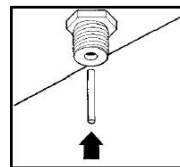
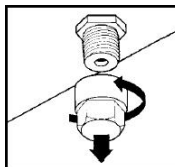
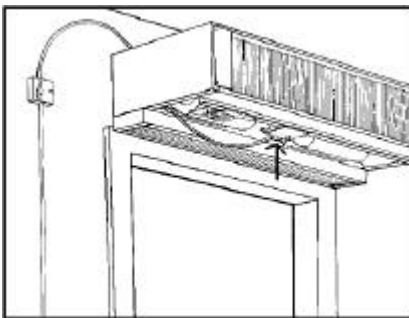
5.3 Appliance does not heat (-E)

1a



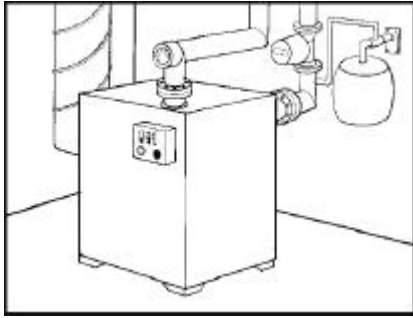
Switch off the device.
Switch off the mains voltage (pull out the plug or invert the main switch).
Remove inspection panel.

1b

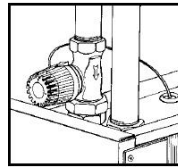
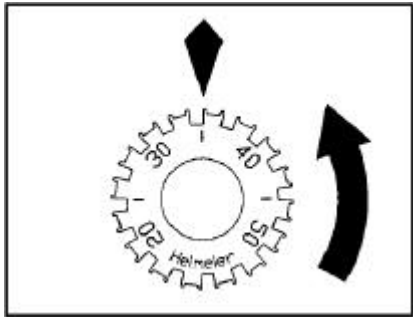


Check (and reset) high limit thermostat.

5.4 Appliance does not heat (-W)

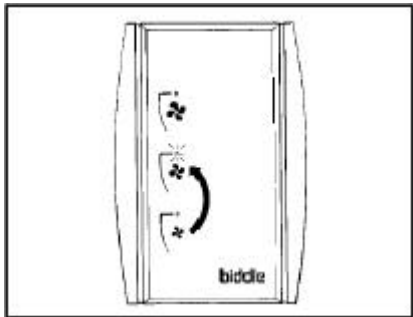


Check boiler installation.

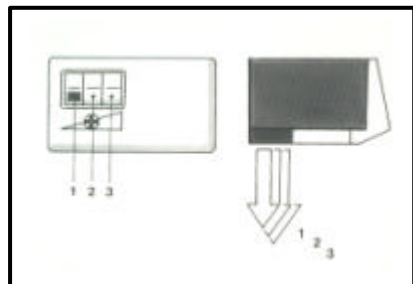


Adjust thermostat dial.

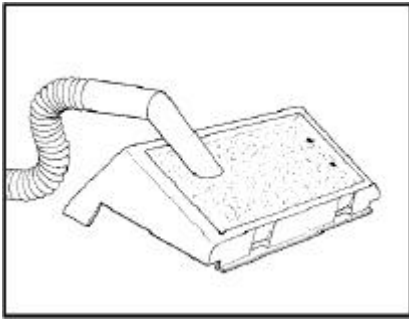
5.5 Appliance does not function correctly



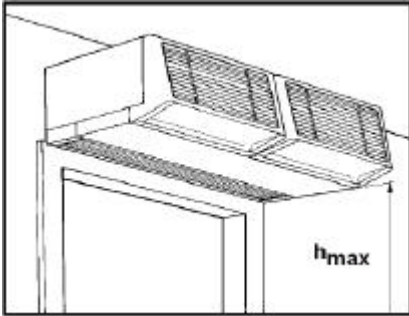
Switch unit one speed higher (see touch pad controller guide).



Switch unit one speed higher.

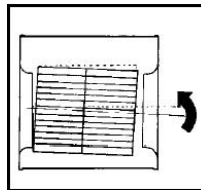
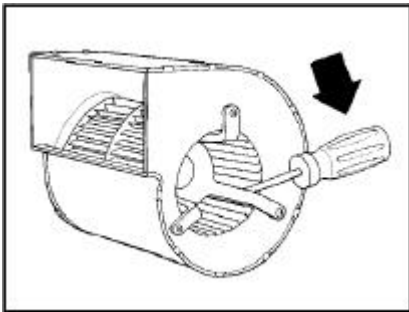


Clean filters (page 21/22).



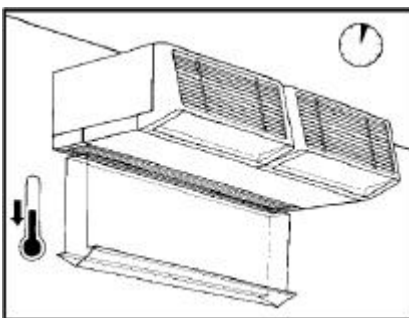
Is appliance suspended at the correct height? (see page 8)

5.6 Noisy appliance



Check and correct if necessary impeller alignment.

5.7 Unit is switched off but fans run on (-E)



No failure: appliance is cooling down (temporary).



6. . Technical data

Type W and E		MAC 100	MAC 150	MAC 200
Maximum mounting height	m	2.6	2.6	2.6
Maximum door width	m	1.0	1.5	2.0
Maximum air displacement	m ³ /h	2000	2900	4000
Motor rating	kW	0.3	0.4	0.6
Full load current, motors	A	1.32	1.76	2.64
Maximum noise level at 3 m	dBA	47.1	48.7	50.0
Type W				
Maximum heating output (90/70°C; 20°C)	kW	18.7	26.9	38.2
Supply voltage	V	230	230	230
Weight	kg	42	54	73
Type E				
Maximum heating output	KW	9.0	12.0	18.0
Supply voltage	V	400	400	400
Heating element rating	KW	9.0	12.0	18.0
Maximum current (3x)	A	15.4	20.5	30.7
Weight	kg	42	54	73

Subject to change without notice.

- NL EG-verklaring van overeenstemming voor machines (richtlijnen 98/37/EG, bijlage II A, 89/336/EEG en 73/23/EEG)**
 Middels dit schrijven verklaren wij, Biddle BV, dat het hieronder genoemde product in overeenstemming is met de bepalingen van de Machinerichtlijn 98/37/EG, de EMC-richtlijn 89/336/EEG en de Laagspanningsrichtlijn 73/23/EEG zoals laatstelijk gewijzigd. Voorts verklaren wij dat de normen EN55014-1 en EN55014-2 zijn toegepast. Door te voldoen aan deze richtlijnen is het product ook in overeenstemming met de nationale wetgeving.
- D Richtlinie des Rates zur Änderung der Rechtsvorschriften der Mitgliedstaaten für Maschinen (Richtlinie 98/37/EWG, Anlage II A, Richtlinie 89/336/EWG und Richtlinie 73/23/EWG)**
 Hiermit erklären wir, Biddle BV, daß unterstehendes Produkt die Bestimmungen der Richtlinie des Rates vom 14.06.1989 zur Änderung der Rechtsvorschriften der Mitgliedstaaten für Maschinen 98/37/EWG, der EMC-Richtlinie 89/336/EWG und der Niederspannungsrichtlinie 73/23/EWG in ihrer momentan gültigen Fassung erfüllt. Außerdem erklären wir, daß die Normen EN55014-1 und EN55014-2 angewendet worden sind. Mit der Erfüllung dieser Richtlinien entspricht das Produkt auch der nationalen Gesetzgebung.
- GB EC declaration of agreement for machines (directive 98/37/EC, appendix II A, directive 89/336/EC and directive 73/23/EC)**
 Please take this form as a formal declaration that the product listed below conforms to the regulations of the directive for machines 98/37/EC, the EMC-directive 89/336/EC and the low voltage directive 73/23/EC, including recent changes. Moreover, we declare that the standards EN55014-1 and EN55014-2 have been applied. By complying with these directives, the products are also in accordance with the national law.
- F Déclaration CE, de conformité relative au machines (directive 98/37/CEE, annexe II A, directive 89/336/CEE et directive 73/23/CEE)**
 Veuillez considérer ce document comme la déclaration formelle que le produit listé ci-dessous est conforme à la législation CE 98/37/CEE relative aux machines, à la législation EMC 89/336/CEE et à la législation voltage basse 73/23/CEE, ayant récemment modifié la législation sur la sécurité et la santé. De plus nous déclarons que les standards EN55014-1 et EN55014-2 ont été appliqués. Du fait qu'ils respectent ces exigences, les produits sont aussi conformes à la législation nationale.
- E Declaración de la CEE sobre contratos de maquinas (directiva 98/37/CEE, anexo II A, directiva 89/336/CEE y directiva 73/23/CEE)**
 Rogamos sirvanse encontrar este documento como una declaración oficial de que los productos abajo citados cumplen con las normativas de la directiva para máquinas 98/37/CEE, la directiva EMC 89/336/CEE y la directiva bajo voltage 73/23/CEE, de acuerdo con la reciente modificación de las normativas de esta ley. Además certificamos que las normas EN55014-1 y EN55014-2 han sido observadas. Al dar cumplimiento a lo anteriormente expuesto, los productos están de acuerdo con la ley nacional.
- I Dichiarazione di conformità direttiva macchine (direttiva 98/37/EC, allegato II A, direttiva 89/336/EC e direttiva 73/23/EC)**
 Vogliate considerare questo scritto come una dichiarazione formale che i prodotti sotto indicati sono conformi alla Direttiva Macchine 98/37/EC, la Direttiva EMC 89/336/EC e la Direttiva bassa tensione 73/23/EC e successive modifiche. Inoltre dichiariamo che le normative EN55014-1 e EN55014-2 sono state rispettate. Rispettando queste direttive i prodotti sono in accordo con la legge nazionale.
- S EG-försäkran om överensstämmelse för maskiner (direktiv 98/37/EEC, bilaga II A, direktiv 89/336/EEC och direktiv 73/23/EEC)**
 Härmed försäkras vi, Biddle BV, att nedannämnda produkt överensstämmer med bestämmelserna i Maskindirektivet 98/37/EEC, i EMC-direktivet 89/336/EEC och i Lågspänningsdirektivet 73/23/EEC, inklusive de senaste ändringarna. Fortsättningsvis försäkras vi att standarderna EN55014-1 och EN 55014-2 har tillämpats. Genom att uppfylla dessa direktiv överensstämmer produkten även med den nationella lagstiftningen.
- DK EU-erklæring maskindirektivet (98/37/EEC app.dix. II A, 89/336/EEC og 73/23/EEC)**
 Denne erklæring bedes opfattet som en formel bekræftelse af, at det anførte produkt er i overensstemmelse med forskrifterne i maskindirektivet 98/37/EEC, EMC-direktivet 89/336/EEC og lavspændingsdirektivet 73/23/EEC, som følge af en nylig ændring i loven om regulativerne. Endvidere erklærer vi, at normerne EN55014-1 og EN55014-2 er den standard vi har brugt. Ved at

Brand: Biddle
 Type: MACi 100, MACi 150, MACi 200, MACs 100, MACs 150, MACs 200
 P. Stoelwinder, Managing Director

Biddle BV, Markowei 4, 9288 HA Kootstertille, THE NETHERLANDS

