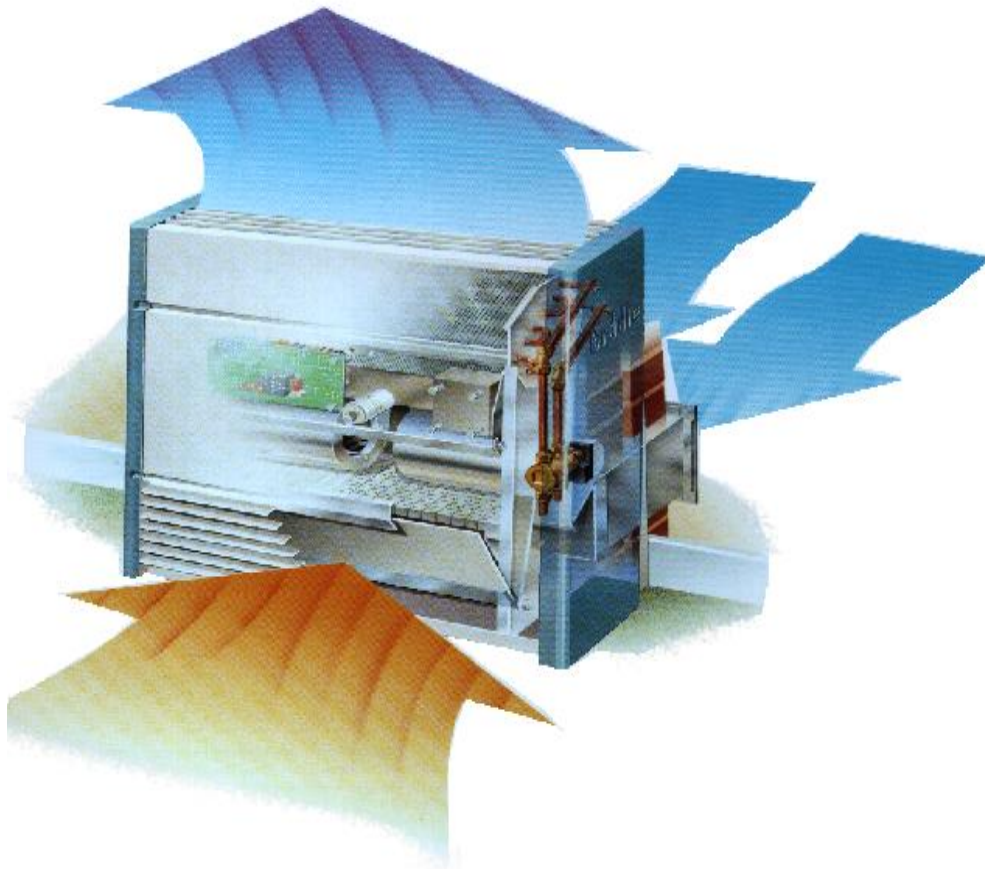




**Innovair Size 3 & Innovair School
Intelligent Fan Convectors**

**INSTALLATION, OPERATION & MAINTENANCE
INSTRUCTIONS**



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Section 1. GENERAL INFORMATION

IMPORTANT!

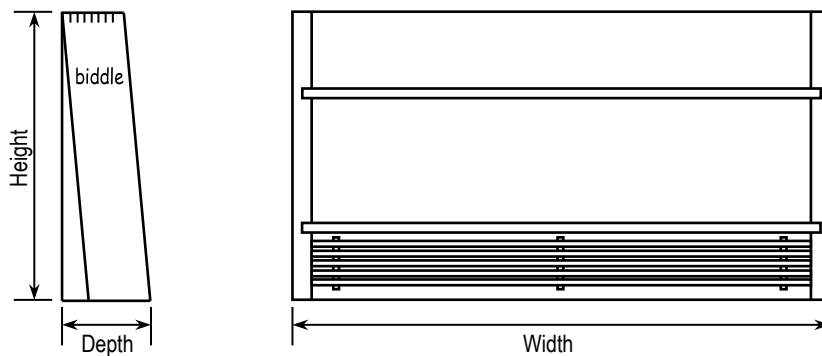
IT IS ESSENTIAL TO ISOLATE THE UNIT FROM THE ELECTRICAL SUPPLY AND THE CONTROL CIRCUIT POWER SUPPLY BEFORE CARRYING OUT ANY MAINTENANCE, AND TO ENSURE THAT THE POWER CANNOT BE ACCIDENTLY RESTORED BY UNAUTHORISED PERSONNEL.

DIMENSIONS & WEIGHTS

Dimension	Cased Unit	Recessed Unit
Width	1808 mm	1764 mm max over fixings
Depth	330 mm	324 mm
Height	860 mm	859 mm
Weight	95 kg	91 kg

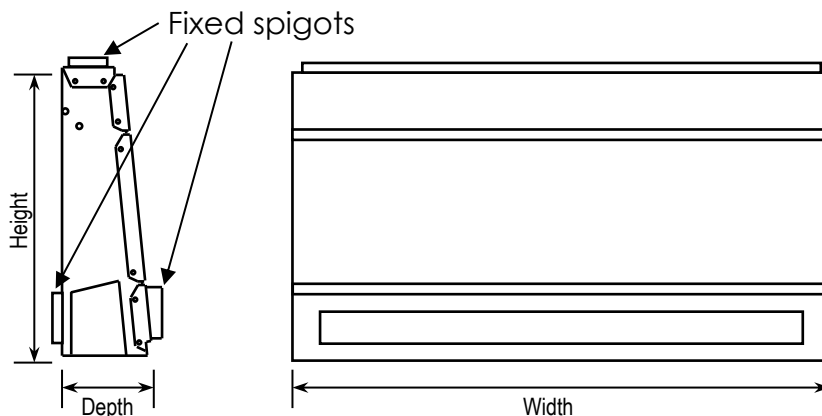
CASED UNITS (with fixed grilles)

Figure 1a



RECESSED/ CHASSIS UNITS (with loose grilles)

Figure 1b

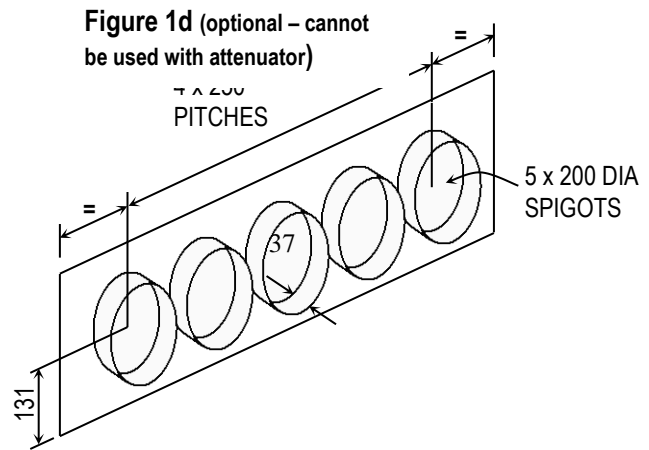
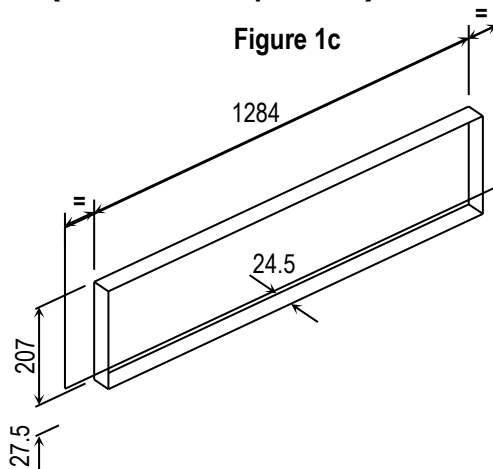


Section 1. GENERAL INFORMATION - continued

DUCT / SPIGOT CONNECTIONS

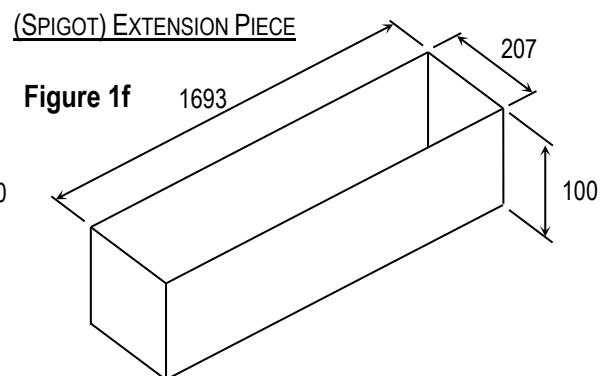
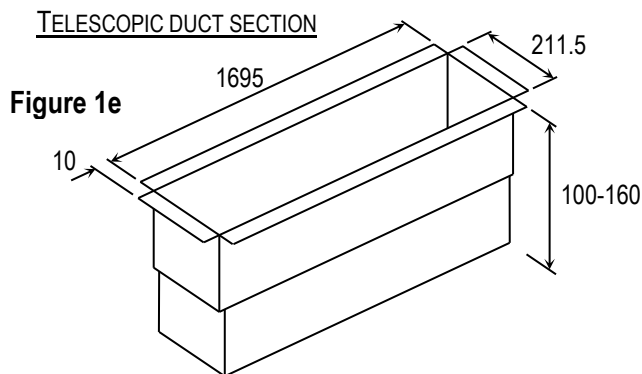
FRESH AIR INLET CONNECTIONS (Back or Base position)

2 Standard Styles



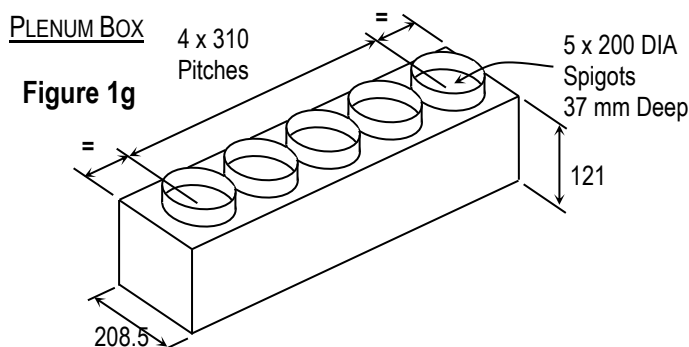
DISCHARGE & RETURN AIR CONNECTIONS Styles (On Recessed / Chassis units only)

3 Optional



Use where an adjustable short duct section is required to connect to the Biddle linear grille. The telescopic duct is sized to accept the standard Biddle Air grille.

Use where the discharge or return air will connect to the Biddle linear grille but the connection needs to be longer than 160mm. The spigot extension piece allows connection of ducting (by others) of a cross-section suitable for the Biddle grille.



Purpose made plenum box for connection of circular ducting. Blanking caps are available for spigots not used but only one or two should be blanked at any one time. Specially sized spigots are available. Contact the sales office.

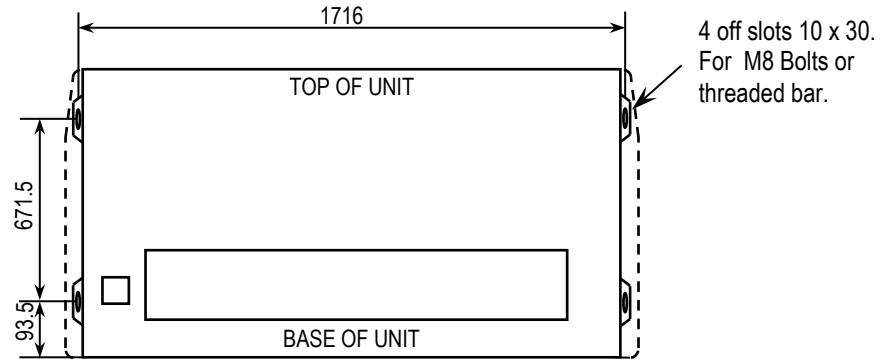
Section 1. GENERAL INFORMATION - continued

FIXING POSITIONS / PIPEWORK ENTRY

FIXING CENTRES (Viewed from back of unit)

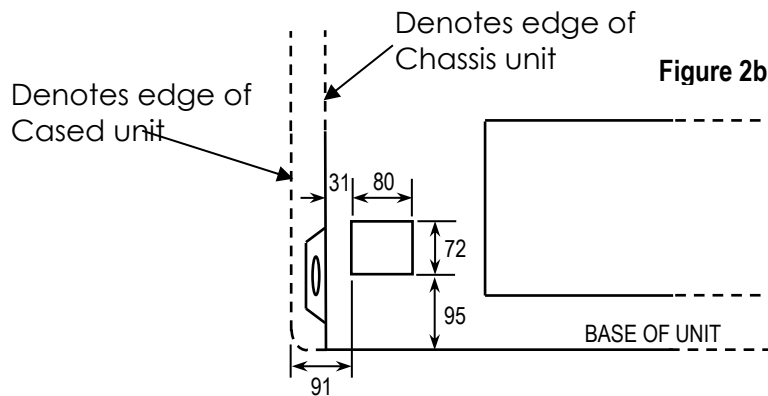
Dimensions in mm

Figure 2a



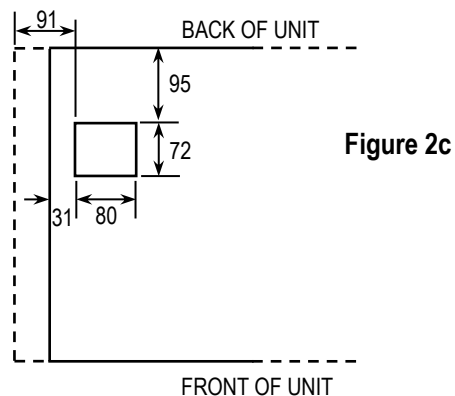
PIPEWORK APERTURE (Viewed from back of unit – RHS Unit shown)

Dimensions in mm



ALTERNATIVE PIPEWORK APERTURE (Viewed from base of unit – RHS Unit shown)

Dimensions in mm



Section 2. INSTALLATION – Typical Cased Unit

IMPORTANT.

PLEASE READ ALL SECTIONS BEFORE PROCEEDING WITH INSTALLATION

STAGES INVOLVED

Figures 3 to 7 show how the unit is dismantled, connected to the fresh air supply and re-assembled. See additional sections within the installation instructions for connection to electrical supply and controls.

Take care not to damage components and accessories when handling them. Before installing the unit check that there will be adequate access space for maintenance (recommended 300mm each side).

The approximate amount of time needed to install the unit is half a day, plus the time needed to make the fresh air duct hole in the building.

Remember! that in order to get heating on water heated units, all the air must be bled from the system including the coil in the unit.

FRESH AIR APERTURE THROUGH OUTSIDE WALL

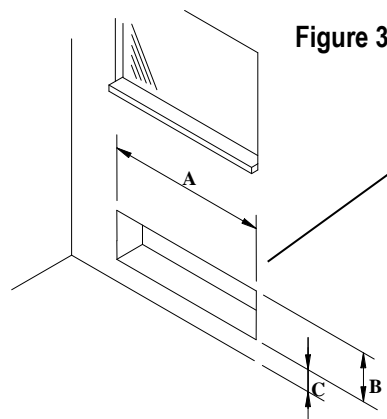


Figure 3

Minimum Aperture Dimensions

Innovair Size 3 & Innovair School Only

A = 1305 mm

B = 225 mm

C = 25 mm (Dimension when Innovair is sitting directly on floor)

CASED UNIT - DISMANTLING

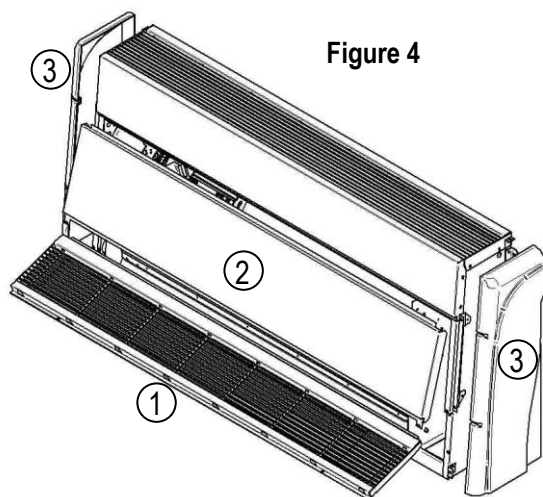


Figure 4

The Innovair Units will be delivered to site pre-assembled. All metal panels will be attached. The moulded end panels will be supplied loose.

Remove casing in following order:

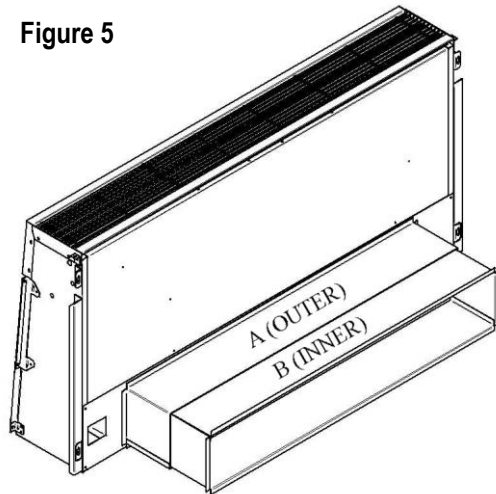
1. Remove recirc grille access panel. Undo 2 screws on bottom edge. Pull bottom edge forward and lower panel away from unit.
2. Remove front access panel. Undo 2 screws on bottom edge and lower panel to clear retaining lip at top.
3. Remove plastic end panels. Undo 3 screws on front edge and 1 screw at top rear. (This only needs to be done if unit already installed and access is required for venting coil (RHS*) or damper motor access (LHS*).

*Handings given for RH unit. Opposite for LH.

Section 2. INSTALLATION – Typical Cased Unit Continued

FIXING CASED UNIT TO OUTSIDE WALL & ATTACHING WALL SLEEVE/ATTENUATOR

Figure 5



View on rear of unit

1. Before fixing the unit to the external wall. Attach the outer section (Part A) of the telescopic wall sleeve/attenuator to the fixed spigot on the back (or rear) of the Innovair unit. The sleeve should be attached using self tapping screws No.8 or duct tape.
2. Offer the unit up to the fresh air aperture (already cut into the external wall) making sure that the outer section (Part A) freely slides inside of the wall aperture. Fix the unit to the wall via 4 off fixing lugs with suitable screws.
3. From outside, slide the inner section of the telescopic wall sleeve/attenuator (Part B, flange on outside of wall) as far into part A as the wall thickness will allow. Seal the joint inside of the two halves of the sleeve using 'duct tape' or similar.
4. **Before fitting the external weatherproof grille, un-wind the cable of the fresh air sensor, located within the Innovair unit (fresh air aperture) and position the sensor just inside of the external weatherproof grille. Failure to position the sensor behind the grille may prevent accurate operation of the unit.**
5. Fix the weatherproof grille (usually supplied by others) to the outside wall.
6. Feed the water pipework (if applicable) through either of the two apertures provided in the back or base of the unit casing. Connect pipework to the 2 open ports of the control valve. Ensure flow and return pipework corresponds to the flow and returns on the valve.
7. Ensure that both pipework and heating coil is fully vented.

SEE PAGE 13 FOR ELECTRICAL CONNECTIONS.

Section 2. INSTALLATION – Typical Cased Unit Continued

CASED UNIT - ASSEMBLING

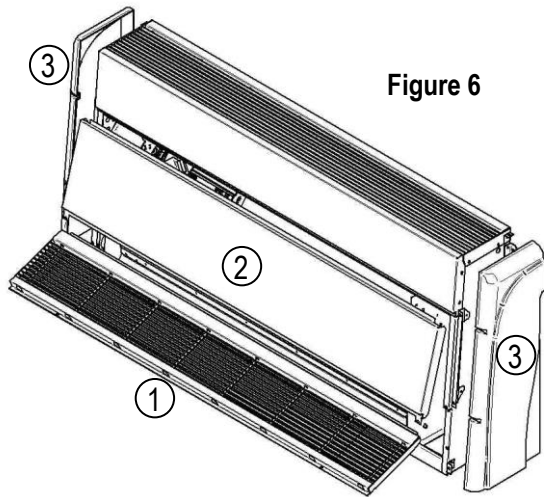


Figure 6

Assemble casing in following order:

1. Attach plastic end panels using screws on front edge.
2. Attach front access panel. Locate lip on top edge of panel into retaining channel on upper casing (A) Push home access panel into channel and fix using two screws supplied.
3. Attach recirc grille access panel. Locate top edge of recirc grille access panel beneath bottom edge of main access panel. Push home grille panel in an upward direction at the same time turning the panel vertically. Fix using the two screws provided on bottom edge.

COMPLETED ASSEMBLY CASED UNITS

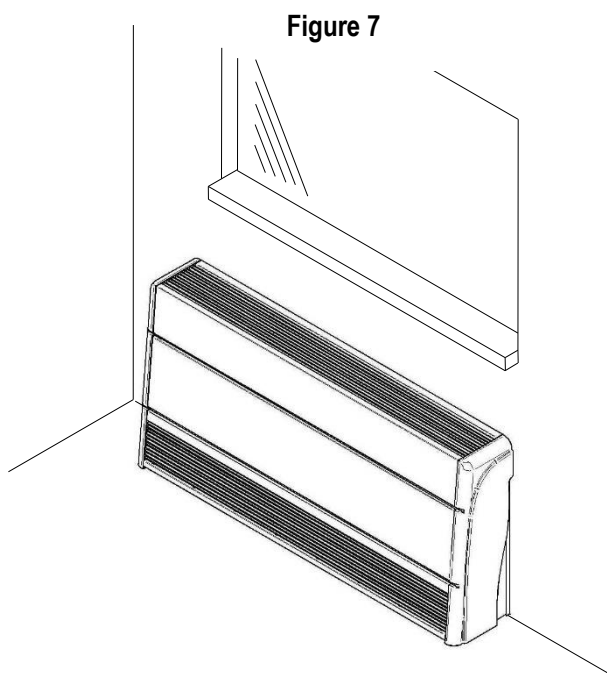


Figure 7

Unit installed and ready to operate.

Make sure all debris is removed from the unit and surrounding area.

Section 2. INSTALLATION – Typical Chassis Unit

IMPORTANT.

PLEASE READ ALL SECTIONS BEFORE PROCEEDING WITH INSTALLATION

STAGES INVOLVED

Figure 8 shows a typical chassis type unit suitable for mounting within a ceiling void. The following notes give instruction on how the unit is dismantled, connected to the fresh air, return air and supply air ducts and re-assembled. See additional sections within the installation instructions for connection to electrical supply and controls.

Most components used in the manufacture of the chassis unit are the same as the cased unit. The main exception being that there are no moulded end panels and that the return air & discharge apertures have fixed spigots (not grilles).

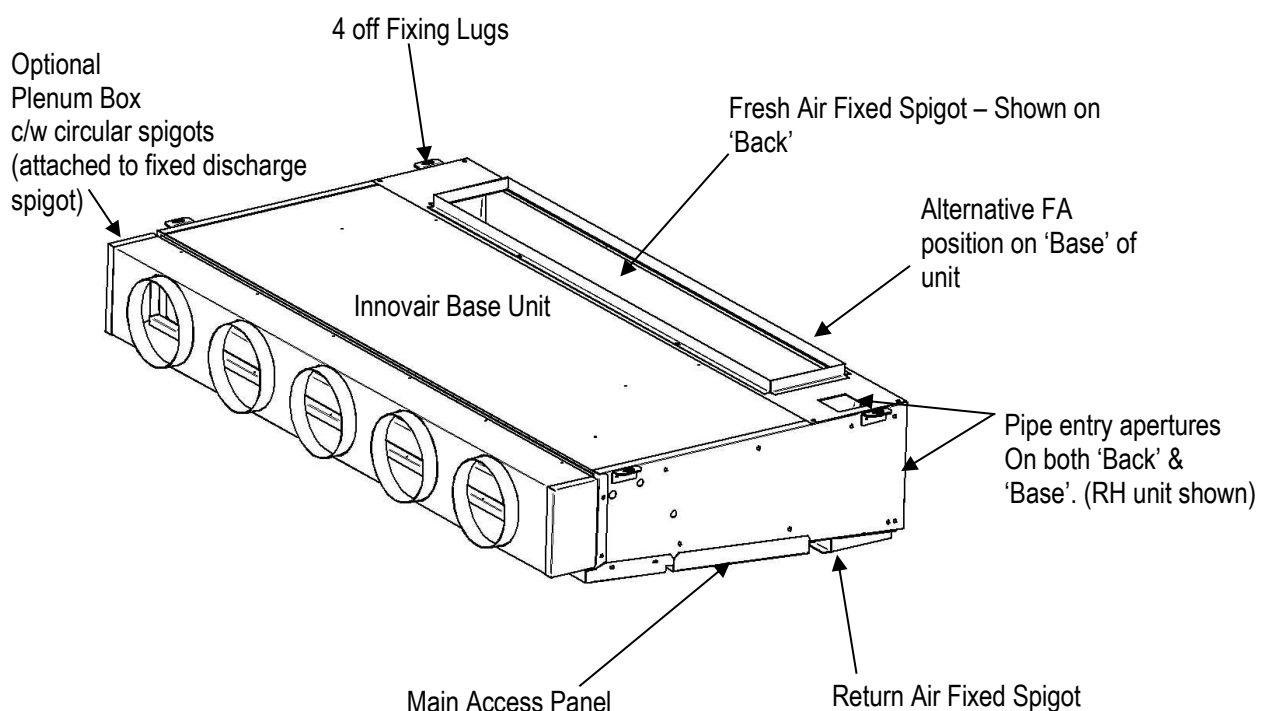
Care should be taken not to damage components and accessories when handling them.

Before installing the unit check that there will be adequate access space for maintenance (recommended 300mm each side).

Remember! that in order to get heating on water heated units, all the air must be bled from the system including the coil in the unit.

TYPICAL CEILING VOID MOUNTED CHASSIS UNIT.

Figure 8



Section 2. INSTALLATION – Typical Chassis Unit – cont.

CHASSIS UNIT – DISMANTLING.

The Innovair Units will be delivered to site pre-assembled with all panels attached. The various duct connections (Telescopic, Spigot Extension & Plenum Box) will be loose and will require attaching to the relative fixed spigot on site.

It will only be necessary to remove the main access panel to enable the unit to be installed.

To remove the access panel undo the 2 retaining screws and slide the panel towards the return air spigot to release the panels retaining lip from a support channel.

FIXING CHASSIS UNIT & ATTACHING EXTERNAL DUCTING.

Locate and fix the Innovair unit into position using the 4 fixing points provided. (10 x 30mm slots). Fix using suitable screws, bolts or threaded drop rods.

Fresh Air Connection.

If fresh air connection is directly against a double skin outside wall:

Use the telescopic wall sleeve/attenuator provided by Biddle (see Figure 5 and associated notes on page 7)

If fresh air connection is remote from Innovair unit:

Fix fresh air duct (by others) directly to the fixed spigot provided at either the back or base position.

Before fitting the external weatherproof grille, un-wind the cable of the fresh air sensor, located within the Innovair unit (fresh air apperture) and position the sensor just inside of the outside face of the wall. This may involve extending the sensor cable if the ducting is sizable.

Fix the weatherproof grille (usually supplied by others) to the outside wall.

Return Air Connection.

It is not necessary to have a ducted return air if the ceiling void is being used as a return air plenum. However if a solid ducted connection is required then there are 4 options available. Using the fixed spigot supplied as standard with the unit or one of the 3 connection options shown on page 4 of the manual.

Option 1. Fixed spigot.

Connect suitable sized ducting (by others) directly onto the fixed spigot supplied with the unit.

Option 2. Telescopic duct section by Biddle.

Attach outer section to return air spigot using screws provided, the inner section of the duct with external bends fits against the rear of builderwork apperture. Adjustment of the duct is between 100mm and 160mm.

Option 3. Spigot Extension Piece by Biddle.

Attach to the unit using screws provided. If the ducting needs to be longer than 100mm, attach suitable ducting (by others) to the extension piece.

Option 4. Discharge Plenum by Biddle.

Attach to the unit using screws provided. Allows connection of circular ducting.

Section 2. INSTALLATION – Typical Chassis Unit – cont.

Supply Air Connection.

Chassis units should always have a ducted discharge to the outlet grille to prevent 'short circuiting' of the conditioned air back into the unit. The connection options are the same as the return air with 4 options available. Using the fixed spigot supplied as standard with the unit or one of the 3 connection options shown on page 4 of the manual.

Option 1. Fixed spigot.

Connect suitable sized ducting (by others) directly onto the fixed spigot supplied with the unit.

Option 2. Telescopic duct section by Biddle.

Attach outer section to return air spigot using screws provided, the inner section of the duct with external bends fits against the rear of builderwork aperture. Adjustment of the duct is between 100mm and 160mm.

Option 3. Spigot Extension Piece by Biddle.

Attach to the unit using screws provided. If the ducting needs to be longer than 100mm, attach suitable ducting (by others) to the extension piece.

Option 4. Discharge Plenum by Biddle.

Attach to the unit using screws provided. Allows connection of circular ducting.

Position Of CO2 Sensor.

The chassis Innovair unit is supplied with a factory wired CO2 sensor located within the return air void. During installation the CO2 sensor need to be removed from the Innovair unit and located above the nearest ceiling return air grille to enable accurate measurement of the CO2 level within the room. The CO2 sensor is provided with a 3m long flying lead.

Section 3. ELECTRICAL CONNECTIONS

CONNECTING THE UNIT TO MAINS POWER

Installation cable sizing should always be done by a qualified electrician in accordance with current regulations.

The suggested mains supply cables for Innovair are as follows:

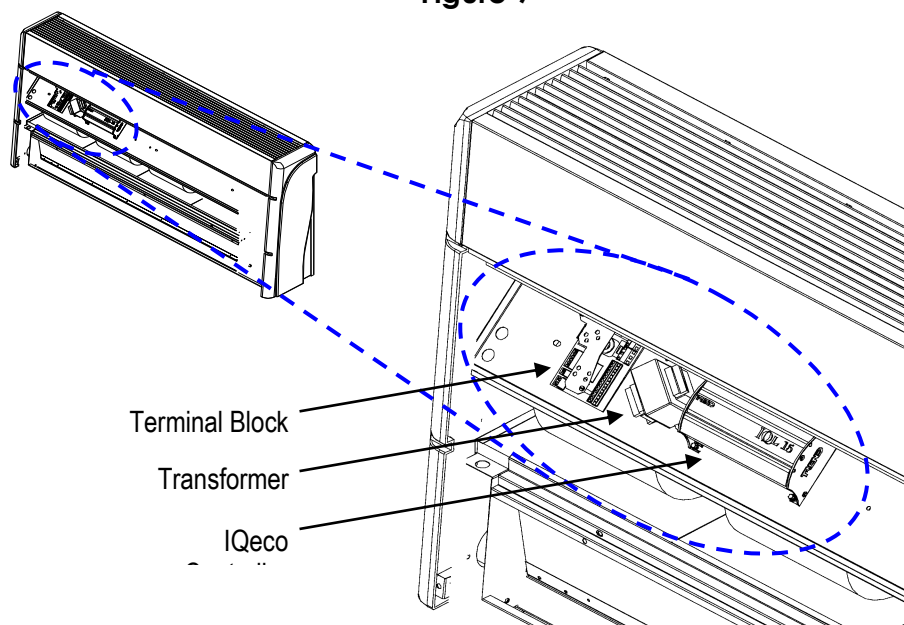
- water heated units, 3-core mains cable (Cu/PVC/PVC) size 1mm²

	Mains Supply	Running Current (Amps)	Starting Current (Amps)
Water Heated	230v/1/50Hz	1.5	4.5

The electric's control panel is located directly behind the main access panel.

Water - Thread the mains power cable through the cable gland on the LHS (RHS on LH units). Wire to terminals L N E on the terminal block located at the LH end of the electric control panel (RH end on LH units). See figure 9. Use cable ties provided to secure cables and ensure they are not trapped when panel is replaced.

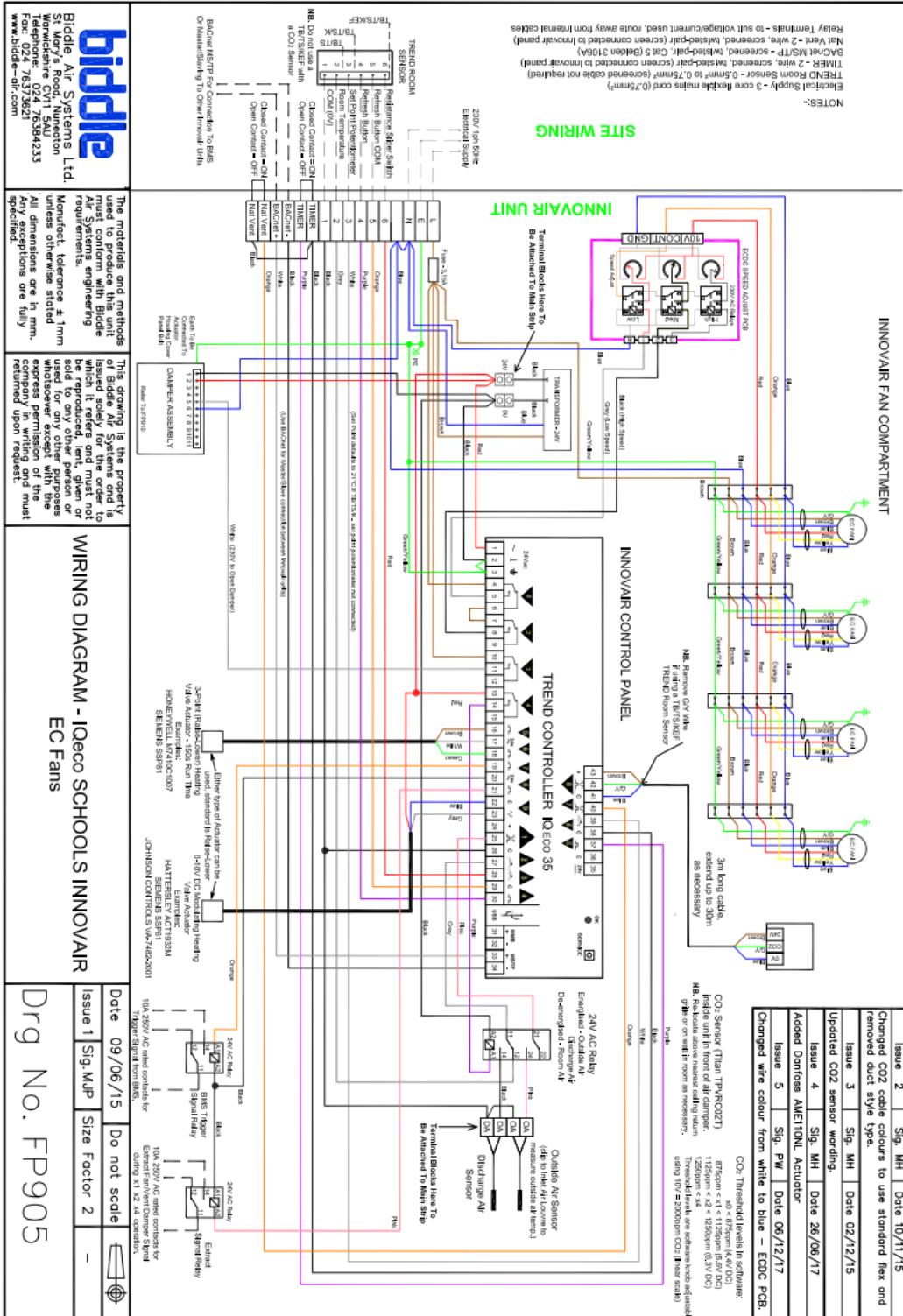
Figure 9



The connection of on site wiring should be restricted to the designated connection points, i.e. the provided terminal block etc. No electrical connection should be made directly with the IQeco controller. Always read the wiring diagram.

Section 3. TYPICAL WIRING DIAGRAM EC WATER HEATED UNIT

TYPICAL WIRING DIAGRAM – (Check with the supplied diagram that comes with the unit).



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 Fax: 01927 6534231
 www.biddle-air.com

The notations and methods used in this drawing must conform with Biddle Air Systems engineering requirements. Manufacturer's tolerance must be stated unless otherwise stated in mm. Any exceptions are fully specified.

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WIRING DIAGRAM - IDECO SCHOOLS INNOVAR EC Fans

Issue 1 Sig. MJP Date 09/06/15
Issue 2 Sig. MJP Date 09/06/15
Issue 3 Sig. MJP Date 09/06/15
Issue 4 Sig. MJP Date 09/06/15
Issue 5 Sig. MJP Date 09/06/15

Drng No. FP905

Section 3. ELECTRICAL CONNECTIONS - continued

For further details regarding control please consult Innovair Engineering guide, available on request.

All Units

Recessed Units Only

230V 1ph 50Hz Electrical Supply

NB: Do not use a TB/TS/KEF with a CO2 Sensor

See RHS Of Drawing For Timer Connections

BACnet MS/TP For Connection To BMS Or Master/Slaving To Other Innovair Units

24VAC Supply Not For Customer Use

0V

24V

Link Wire Can Be Used Here To Permanently Enable Nat Vent Feature If Needed

(Optional) Relays For Connecting To Equipment By Others

10A 250V AC rated contacts for Trigger Signal from BMS over the BACnet connection.

10A 250V AC rated contacts typically for Extract Fan. Operates when damper is in x1, x2, or x4 operation.

Low Water Temperature Cutout Thermostat

If not fitting a LWTC Thermostat, add a link wire across TIMER terminals

Innovair Site Connection Diagram All Models

Issue	2	Sig. MH	Date	26/02/18
LWTC Thermostat wiring detail row shown				
Date	15/12/16	Do not scale		
Issue 1	Sig. MH	Size Factor 1	MS081	
Drg No. FP950				

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The materials and methods used to produce this unit must conform with Biddle Air Systems engineering requirements unless otherwise stated. All dimensions are in mm. All drawings are in full specification.

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CONNECTING THE REMOTE CONTROL PAD TO THE UNIT

The remote room controller supplied with the unit should be connected to the designated connection points on the provided terminal block on the control panel using Non Screened 16/0.2mm (0.5mm²) cable. Cable ties and cable glands are provided to secure cables. The number of cable cores will depend on the type of room controller as detailed below.

THIS CONNECTION IS VOLTAGE FREE AND SHOULD NOT BE CONNECTED TO ANY OTHER VOLTAGE SOURCE.

The Model TB/TS-BIDDLE wall mounted controller for temperature sensing only, requires 2 cores connected to terminals numbered 1 – 2.

The Model TB/TS/K-BIDDLE for manual heating & automatic / no ventilation adjustment requires 3 cores connected to terminals 1, 2 & 3 only.

Cables must be connected to both the terminal block located inside the unit control panel and the remote control pad using the identically numbered terminal.

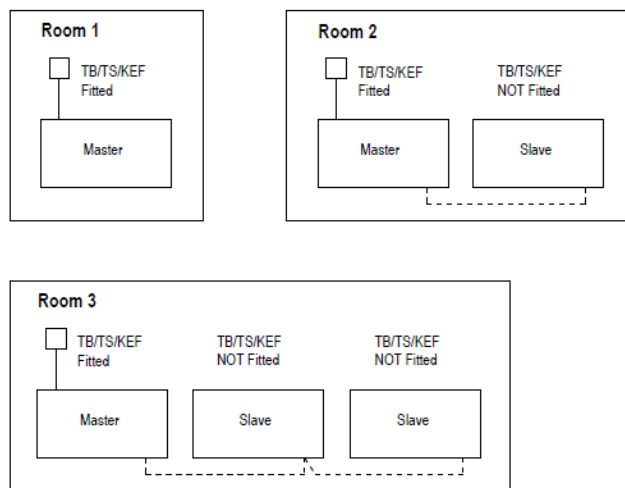
See the unit wiring diagrams (page 13/14) and installation instructions supplied with the control pad for details.

Connecting Units As Master/Slave

Connect the remote control pad to the unit designated as the Master unit as described above (this unit will automatically detect it when powered up and configure as the master). Units without a control pad will assume a slave status when no room pad can be found.

Master and slave units should be connected via a Belden 9841 (or equivalent) cable to the terminals labelled BACnet. Please daisy chain all positive terminals together and all negatives together.

Do not connect units to a BMS network or another master/slave setup using this configuration. Up to 10 slaves can be linked to a single master.



Section 3. ELECTRICAL CONNECTIONS - continued

CONNECTING THE UNIT TO A BMS

Please refer to the Innovair Engineering Guide for details on how the unit can be connected to a BMS network.

CONNECTING THE UNIT TO A TIMER CLOCK OR P.I.R. Sensor

Unless using a BMS (or other supervisory system) to enable the unit, the unit is controlled by linking across the Timer terminals on the main terminal strip in the unit where linked = 'on/occupied'.

Connections should be made on site to either a PIR, low water temperature stat (used in conjunction with a Summer/Winter switch) or other volt free contacts.

When connecting a low water stat, follow the below instructions. You should include a summer/winter switch in the design to allow the unit to operate in Summer when there is no hot water available.

- Using the typically supplied Siemens RAM1 – connect terminals 1 and 3 to the Timer connections (note polarity doesn't matter).
- Connect the summer/winter switch in parallel across the T4. It is recommended that in public spaces, this switch is located discretely so it isn't tampered with.
- Fix the RAM1 to the supply side of the pipework - not the unit side.
- Tidy all wiring up

When connecting a PIR sensor:

- Please refer to the PIR sensor manufacturer's documentation – the contacts **MUST** be volt free.

Section 3. ELECTRICAL CONNECTIONS - continued

CONNECTING THE UNIT TO AN EXTRACT & OR SUPPLY FAN SYSTEM (Single phase supply & running current no greater than 8amps)

Where an extract fan or additional supply fan is required in the system, the on/off control of this device can be enabled via the Innovair units. This is achieved using the extract fan relay controlled via the IQeco. The relay will stay energised for as long as the damper is cycling – note that it won't just energise when the damper is open. The relay is provided mounted and wired inside of the Innovair control panel for connection on site using 3 core mains cable size 1.0mm² cable.

Important:

The maximum electrical ratings for the external device (i.e. Extract Fan) are as follows:

8A	250V	AC1
3A	250V	AC11
8A	24V	DC1

INTEGRAL CO₂ SENSOR

The Biddle supplied CO₂ sensor comes fitted to the front of the unit behind the recirculation inlet. For installations where the unit is to be exposed to the room air, this is sufficient. However for installations where the unit isn't directly exposed (such as a recessed unit above a suspended ceiling) the sensor is supplied on a 3m flexible lead to allow for remote positioning in the space's air.

THE CO₂ SENSOR CONNECTIONS ARE VOLTAGE FREE AND SHOULD NOT BE CONNECTED TO ANY OTHER VOLTAGE SOURCE.

Section 4. CONTROL & OPERATION

SUMMARY OF STANDARD CONTROLS AND OTHER CONTROL OPTIONS

1. Manual / Stand Alone Type

Standard External Controls Hardware (Supplied by Biddle)

1a. Remote Wall Mounted Controller Ref: TB/TS/K-BIDDLE

Manual On/Off Control

Manual Room Temperature Control

Additional Control Functions

1b. Remote On/Off Control Via. Volt Free Contacts
ie. Timer, BMS or PIR

1c. Extract Control Via. Additional Relay Circuit

1d. Master / Slave group control via.BACnet Terminal Connection

2. Manual Heat / Automatic Ventilation

Standard External Controls Hardware (Supplied by Biddle)

2a. Remote Wall Mounted Controller Ref: TB/TS/K-BIDDLE

Manual Room Temperature Control Only

2b Remote Wall Mounted CO₂ Sensor (Supplied by Biddle to order)

Automatic control of ventilation levels based on CO₂

concentration.

IMPORTANT: With this arrangement there is no provision for Manual On/Off Control. This must be done via. a remote device ie. Timer or BMS enabling signal.

Additional Control Options Available

2c. Extract Control Via. Additional Relay Circuit (Not Standard Supply)

2d. Master / Slave group control via. BACnet Terminal Connection
(Supplied as standard)

3. Automatic BMS Control.

Standard External Controls Hardware (Supplied by Biddle)

3a. Remote Wall Mounted Controller Ref: TB/TS/K-BIDDLE

Manual Room Temperature Control Only

Additional Control Options Available

3b. Automatic control of ventilation levels based on CO₂
concentration Via CO₂ sensor (Supplied and fitted by others, wired
through the BMS).

3c. PIR Occupancy sensor for On/Off Control (Supplied and fitted by
others, wired through the BMS).

3d. Master / Slave group control Via. Direct Connection to BMS

Section 4. OPERATION – Automatic Ventilation

Room Control type: TB/TS/K-BIDDLE for manual Temperature & Automatic Ventilation.

Also incorporates a room temperature sensor

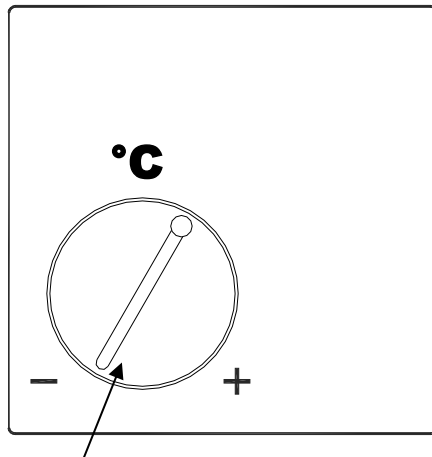


Figure 12

Set point adjuster -
(Shown at approx 21.5°C)

DO NOT SWITCH UNIT OFF AT THE MAINS except in times of emergency

Unit Functionality:

In this format of operation the unit is effectively switched ON or OFF by the use of an external timer, PIR sensor or BMS. See individual connection information.

All ventilation rates are controlled automatically and there is no manual control. A CO₂ sensor is required in the unit with this form of control. This limits the quantity of fresh air to just that required for the occupancy of the room for increased energy efficiency. The Sensor is supplied built into the units and should be removed and mounted remotely on chassis units.

See section headed 'Connection to CO₂ Sensor' for more information.

Manual adjustment of **Room temperature** is controlled by the set-point adjuster, which can be rotated between the 18°C and the 24°C settings. BMS control can also be used to remotely re-scale the minimum and maximum set point positions (e.g. 19°C min / 23°C max) for increased energy efficiency.

The unit will operate in either **Normal 'occupied' operating mode** or **'Unoccupied' set-back mode**, exactly as the Manual / Stand Alone unit does. In Unoccupied set-back mode the unit operates to satisfy the set back temperature or 'night time cooling requirement only.

Section 5. MAINTENANCE

TOOLS REQUIRED:-

7mm A/F nut spanner
PoziDrive 2pt Screwdriver

FILTER

Filters are of the 'Replaceable Cartridge Type' with cardboard frame. The filters are located behind the main access panels (4 screws) and retained with a metal channel (2 Screws).

A vacuum cleaner or gentle beating may be used to clean the filter. Badly impregnated filters should be replaced.

The period between cleaning is dependent on operating conditions. In a very dirty atmosphere the filter will require frequent cleaning (maybe every few weeks) whereas in a clean environment it may only be necessary every few months.

ACCESS PANEL

To remove the main access panel it is first necessary to remove the re-circulation grille. The grille and its frame are held in place by 2 off M5 hexagonal headed screws. Once the grille is removed the main access panel retaining screws, also 2 off M5 hexagonal headed screws are exposed allowing the access panel to be removed. (Refer to figure 4).

END PANELS

Each plastic end panel is located along its rear edge by a vertical channel and then secured by five M5 hexagonal head screws. Three screws at the front and two at the top rear. (refer to figure 4).

FANS & MOTORS

Providing the filter is regularly cleaned the fans and motors will require no attention. They can be accessed however by removing the re-circulation grille access panel and the main access panel. Clean using a soft brush and vacuum cleaner.

HEATING COIL

Providing the filter is regularly cleaned the heating coil will require little or no attention.

However if the filter is allowed to get very dirty some dust will percolate through and become entrained in the coil. In this case it can be cleaned by removing the front access panel, the discharge grille, the discharge access panel and the coil access panel and applying a jet of air to the air leaving face.

DAMPER AND ACTUATOR

The damper requires no maintenance, other than to brush clean occasionally. Located on the left hand side of the unit the damper actuator requires no maintenance and should not be removed from its mounting panel.

CASING

The interior of the unit should be cleaned occasionally with a soft brush and a vacuum cleaner.

On cased units periodically check that the paint is in good condition and repair when necessary.



Biddle Air Systems

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