

## Series 600 Cassette Fan Convactor

### Installation Operation & Maintenance Instructions

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**INSTALLER: Please leave these instructions, heater wiring diagram & access panel keys with the user.**

#### INTRODUCTION

This booklet provides guidance to identify, handle, install and commission Series 600 cassette fan convectors. The instructions refer to standard models only. Please study the instructions carefully before commencing installation.

The fan convactor serial number, model and figure number (size) are displayed on the heater name plate, located on the inner cover, behind the access panel. A fan convactor description code is used to identify heaters and accessories.

If identification references were given to us when the heaters were ordered, they will have been marked on the heater cartons and the delivery note, for site identification.

#### DESCRIPTION

Each Series 600 comprises a sheet metal casing fitted with extruded aluminium alloy recirculation and discharge grilles and lockable access panel. The casing contains a fan/motor, auto transformer (AC motors) or speed control PCB (EC motors), air filter and hot water heating coil.

Series 600 fan convectors are 250mm high x 590mm wide, with nominal lengths 590mm, 1190mm or 1790mm.

Heaters are supplied for single or dual fan speed operation. Single speed heaters are set to low, medium or high speed. Dual speed heaters are set to low/medium, low/high or medium/high speeds. Fan control is by means of manual switches and/or air thermostats, depending upon accessories specified.

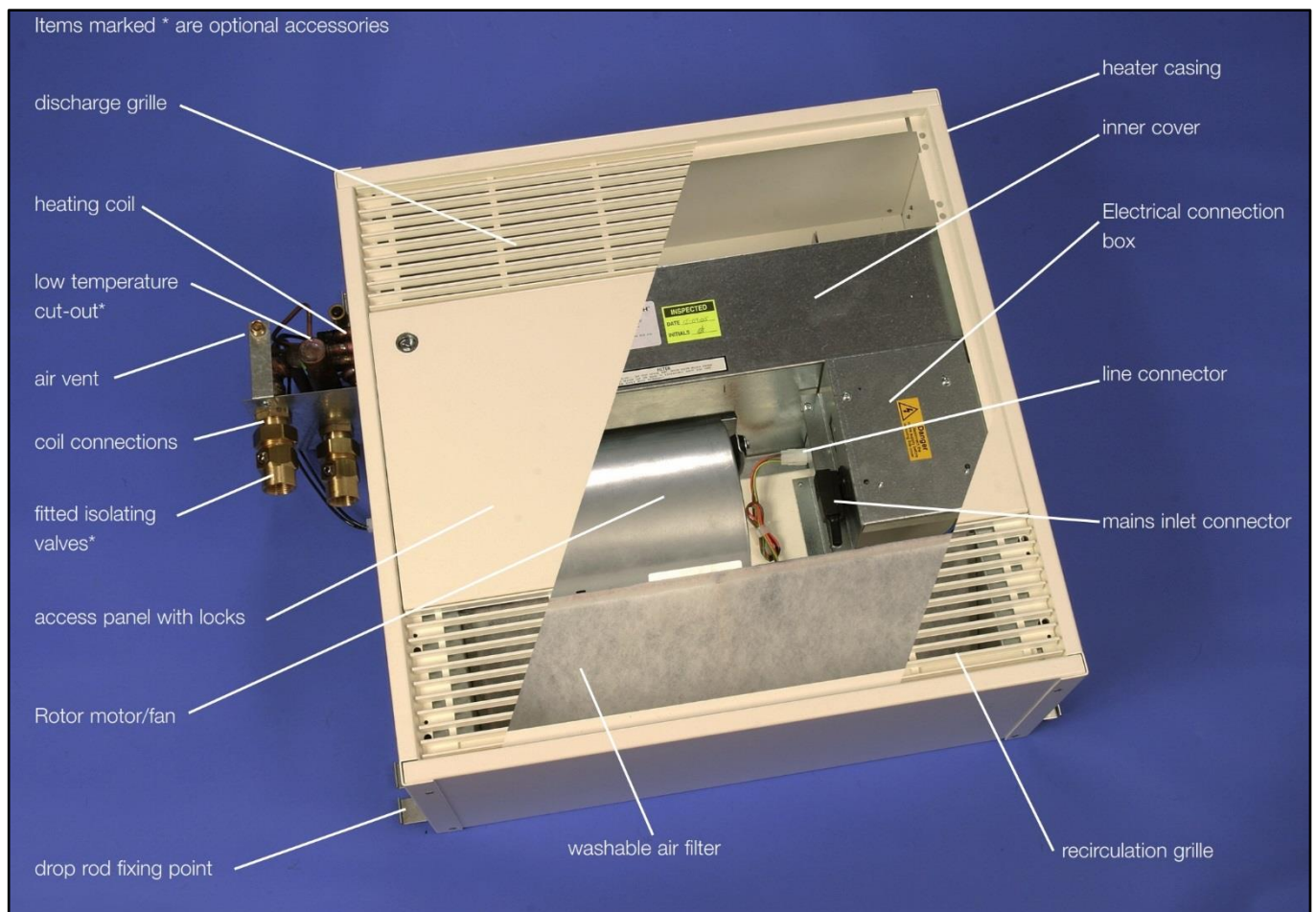


Diagram 1: Series 600 Model W Size 6 cassette fan convector

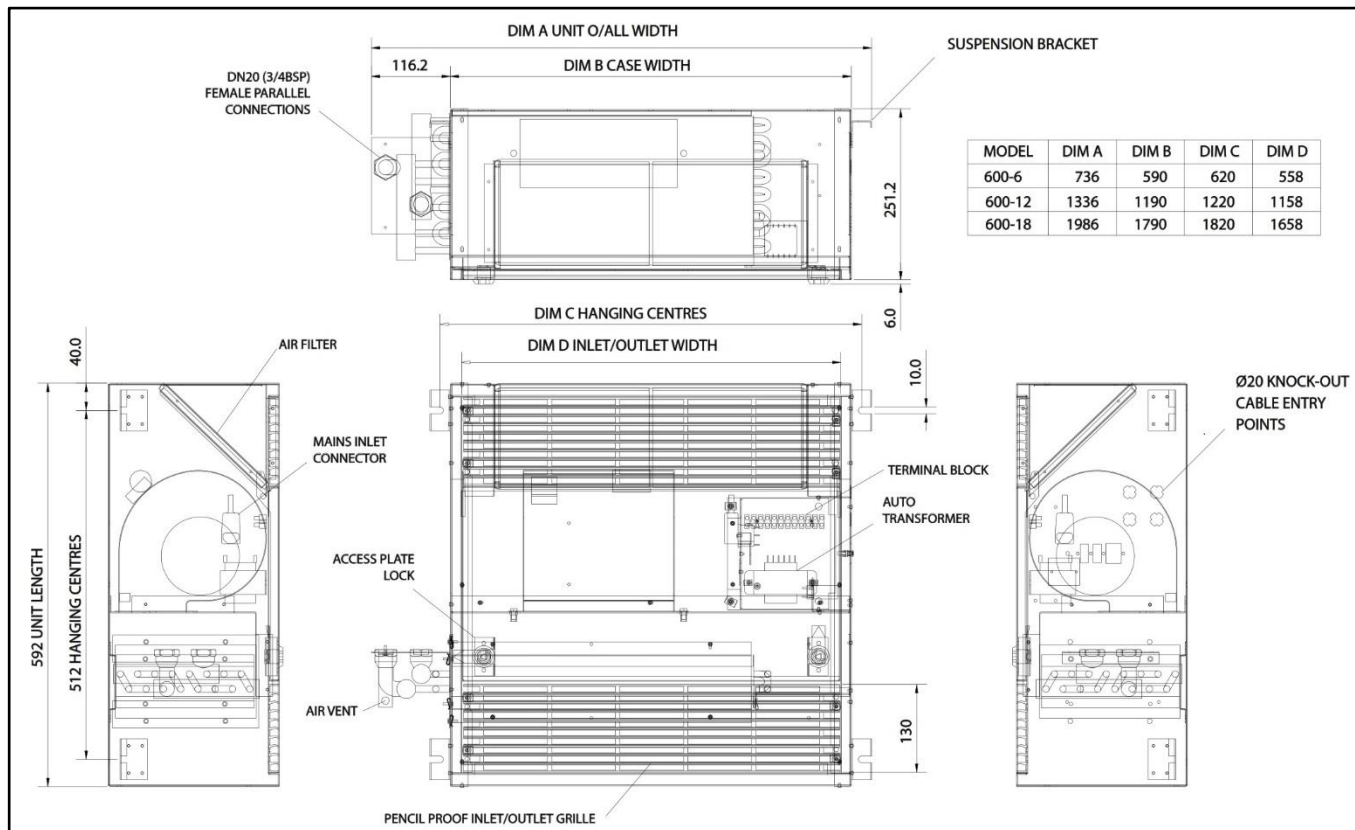


Diagram 2: Dimensions of Series 600 fan convector

## RANGE & ACCESSORIES

Series 600 models are offered in a range of sizes which relate to the output and length.

Model	Nominal Output kW	Width mm
600-6	2.94	590
600-12	7.02	1190
600-18	8.81	1790

### Air thermostats

Remote air thermostats can be provided to automatically switch the fan motor on/off and to change speed, in response to a fall or rise in ambient air temperature. Standard or tamper resistant room thermostats can be provided for on/off and speed change.

### Switches

Fitted external/internal or remote switches can be provided to switch the fan motor on/off, to change speed and to override thermostats.

#### Fitted switches

- 1) on/off, 2) high/off/low, 3) manual/off/auto,
- 4) manual/off/auto and high/low.

#### Remote switches-(surface or flush mounting)

- 1) on/off, 2) high/off/low, 3) manual/off/auto,
- 4) manual/off/auto and high/low.

### Low-limit thermostat

A low limit thermostat can be provided to prevent the fan motor operating until the heating water temperature is hot enough for the heater to work effectively. This thermostat will automatically stop the heater at the end of the normal operating period, when the boiler plant closes down.

Type 1 fixed setting low limit thermostat, break circuit  $43^{\circ}\text{C}\pm 3\text{K}$ , make circuit  $54^{\circ}\text{C}\pm 3\text{K}$ .

*If fitted, type 1 is wired into the control circuit and clamped to the coil tube nearest to the LTHW flow connection.*

Type 2 adjustable setting low limit thermostat, range  $30^{\circ}\text{C}$  to  $90^{\circ}\text{C}$ .

*If supplied, type 2 is wired into the control circuit and are stored inside the heater casing, for clamping to the LTHW flow pipe by the installer, (set at approximately 20K below the mean water temperature).*

### Fitted isolating valves

DN20 (3/4" BSP. (F)) isolating ball valves can be provided.

### Ceiling Trim

An optional ceiling trim can be supplied for flush mounting the heater into solid or plasterboard ceilings.

## HANDLING

Large consignments are usually palletised. Appropriate lifting equipment, such as a fork lift or crane may be required for off-loading. Care should be taken to ensure Series 600 heaters are not dropped or knocked under any circumstances.

## STORAGE

Heaters should be stored under clean, dry conditions. The cartons should not be removed until heaters are required for installation, unless damage in transit is suspected.

Note - the purchaser must examine the heaters promptly upon receipt and any claims for damage will only be accepted if at the time of delivery, the consignment note is endorsed with a note detailing the damage and counter signed by the transport driver.

## APPLICATIONS

It is recommended that heaters are selected to operate at medium speed for general use or at low speed for rooms where noise levels are particularly important. Heaters should only be selected at high speed for non critical applications, such as entrance foyers, corridors etc. or for initial rapid warm up.

It is recommended that wherever possible, the total volume of the room should be circulated through the sum of the heaters a minimum of three to four times per hour and ideally four to five times per hour.

Whenever possible, heaters should be located near windows or in areas of disproportionately high heat loss. By design, Dunham-Bush fan convector heaters have moderate leaving air temperatures, low outlet velocities and low air throws.

Comfortable conditions throughout the heated space are achieved by good air circulation.

## PREPARATION

Each heater is marked to show the model, figure number, serial number and any reference given on the order for site identification. This information also appears on the consignment note.

Make proper provision for fixings. The structure to which heaters are to be fixed must be fit for purpose and capable of accepting the appropriate fixings. Do not support the unit from the ceiling grid or ceiling fabric unless adequate provision has been included to support the load.

Heater casings are supplied with left or right hand coil connections. Knockouts are provided in the side and back for conduit entry. It is assumed that prior to lifting heaters into position, pipework and electrical supply will, as far as possible, have been completed.

Model - Size	Approx. dry mass (kg)	Coil capacity (l)
W-06	26	0.63
W-12	47	1.03
W-18	57	1.25

Approximate masses and coil capacities for models with LPHW heating

Model - Size	Electric Heating Element	Output (kW)	Load (A)
E-06, E-12, E-18	E11	1.0	4.3
E-06, E-12, E-18	E21	2.0	8.6
E-06, E-12, E-18	E31	3.0	13.0
E-12, E-18	E41	4.0	17.4
E-12, E-18	E51	5.0	21.7
E-12, E-18	E61	6.0	26.0

Heat outputs and current loads for models with electric heating (230V/1ph/50Hz)

For electric heating, leaving air temperature can be calculated from the equation:

Leaving air temperature (°C) = Entering air temperature (°C) + [815 x heat output (kW) / air flow rate (l/s)]

Leaving air temperatures greater than 60°C are not recommended; select higher air flow rate

### WARNING

Some internal components may have sharp edges. Care must be taken when installing this product and it is recommended that protective gloves are worn.

### INSTALLATION

1. Before removing the carton, check the identity of the heater marked on the outside of the carton. It is suggested that the carton is saved to protect the heater from damage by other trades, after installation is completed.
2. The access panel can only be opened with the special key provided (attached to the heater). With the heater in the horizontal position, unlock the access panel and swing into the open position.
3. Re-check the identity of the heater, from the serial number on the nameplate, which is on the inner cover.
4. Remove casing knockouts, as necessary.
5. Place the heater into position and secure with suitable fixings to the building structure. Do not support the unit from the ceiling grid.
6. Pipe up as detailed in Pipework Connections.
7. Wire up as detailed in Electrical Connections and Controls.
8. If supplied, fit type 2 adjustable low-limit thermostat to the LPHW flow pipe (set at approximately 20K below mean water temperature).
9. After filling the system, check for leaks (see commissioning).
10. Replace the access panel and lock into position.

### PIPEWORK CONNECTIONS

Coil connections are DN20 (3/4" BSP.) female parallel. Local isolating and regulating valves are recommended.

Observe the correct flow and return positions, to ensure the rated heat output. Fill the system and check for leaks.

Coils fitted with	Cold test pressure (bar g)	Working pressure (bar g)
Type M air vent	10.5	7.0
Type A air vent	9.0	7.0

Site test and working pressures

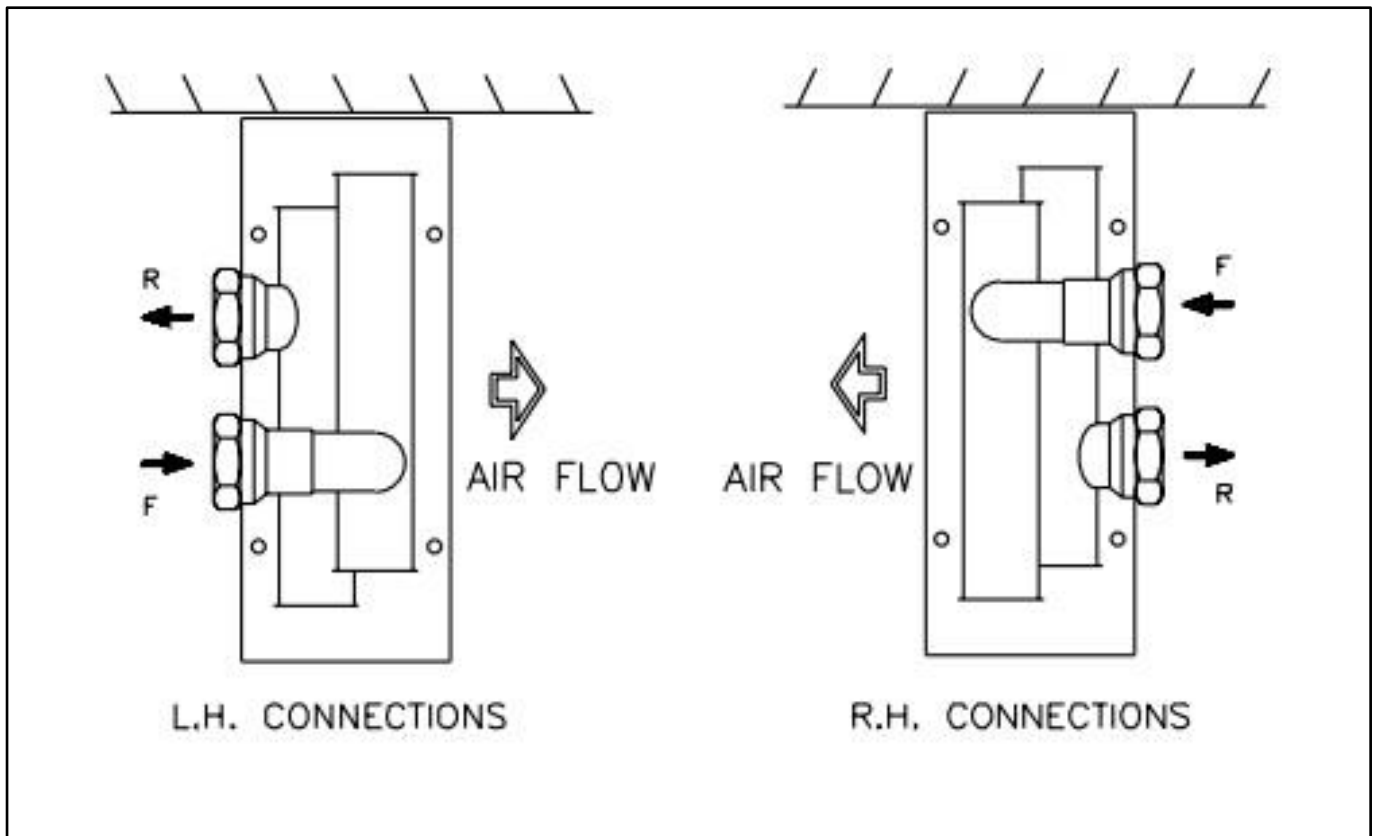


Diagram 3: Pipework flow (F) and return (R) connections

## CEILING TRIM

If ordered, an optional ceiling trim can be supplied with the heater. The trim can be supplied either fitted or loose for assembly on site.

Openings within the ceiling should be prepared to accept the heater; refer to Diagram 2 for heater dimensions and Diagram 4 below for dimensions of the ceiling trim. The trim can be removed and re-fitted to conceal gaps between heater and ceiling fabric.

**N.B. Separate access must be provided for coil connections, pipework and cable entry through the casing.**

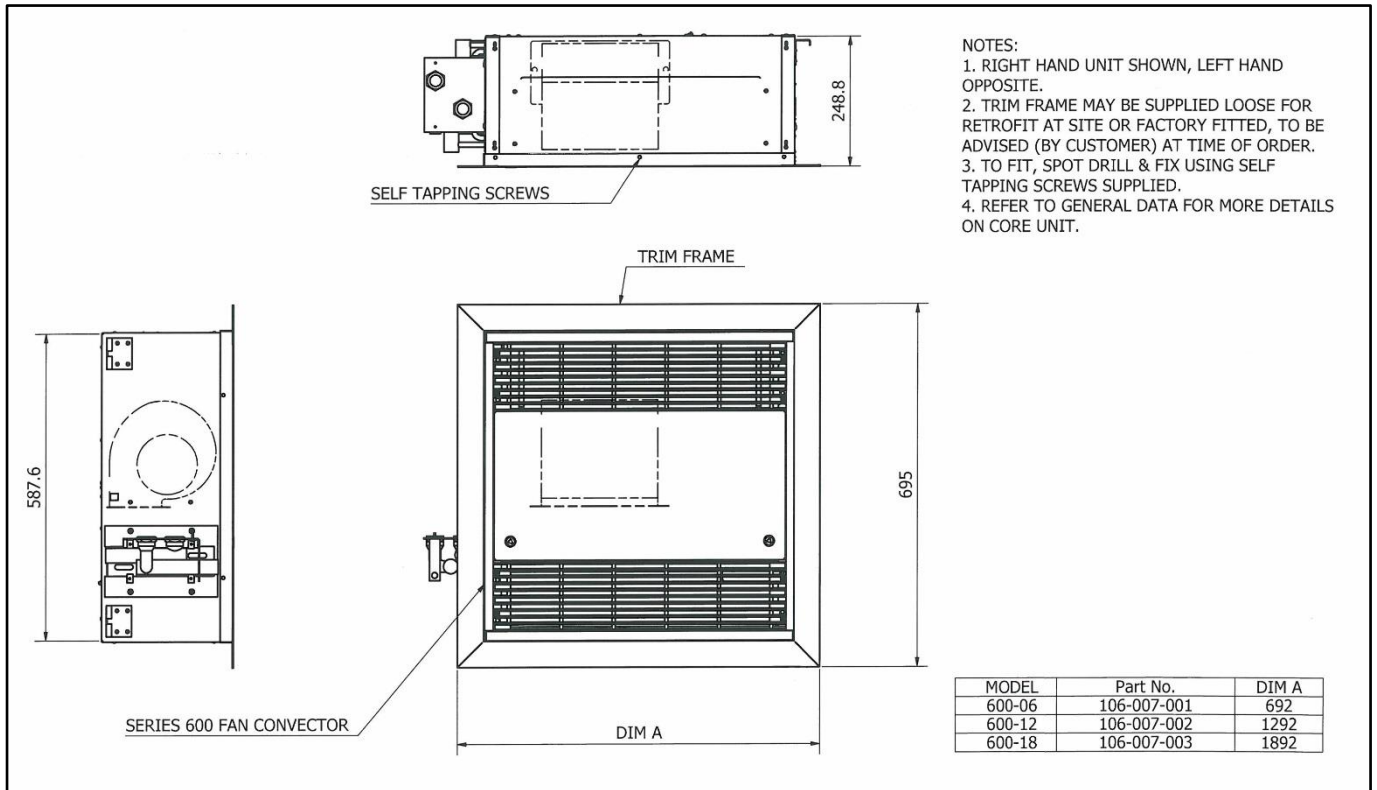


Diagram 4: Dimensions of optional trim for solid or plasterboard ceilings

## ELECTRICAL CONNECTIONS AND CONTROLS

Remove the IEC mains inlet connector from the fuse panel mounted mains inlet and connect a 230V/1ph/50Hz supply to the inlet connector. Fix any remote accessories, switches or thermostats in the appropriate locations and connect to the 12 way terminal block, as shown on the wiring diagram supplied with the unit. When supplied the terminal block is located behind the plate on which the mains inlet connector is fitted.

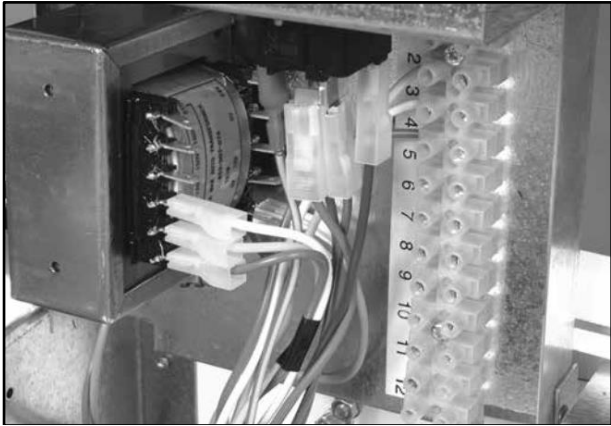


Diagram 5: Terminal block for connection of remote accessories

## COMMISSIONING

1. Purge air from the coil using the manual or automatic air vent provided. Balance the water mass flow rate with the regulating valve. (Supplied by others)
2. If a LTC thermostat fitted, the fans will run when water in the flow pipe reaches the required temperature. For a type 1 (fixed setting)  $54^{\circ}\text{C} \pm 3\text{K}$  or for type 2 (adjustable setting)  $30\text{-}90^{\circ}\text{C}$ . A setting of 20K less than the mean water temperature is recommended). In the absence of hot water, a temporary link can be used).
3. The setting of an adjustable low limit thermostat will depend upon the system design conditions but for a normal LTHW system,  $55^{\circ}\text{C}$  is usually acceptable.
4. Control thermostats must be wall mounted and set to the specified temperatures. If no settings are specified, set an on/off thermostat at  $20^{\circ}\text{C}$  and a speed change thermostat at  $16^{\circ}\text{C}$ . Check the operation of all thermostats.
5. If fitted or remote switches are being used, check that they operate correctly. Note: if a manual/off/auto switch is provided, all thermostats are by-passed in the manual position, which allows the fans to circulate room air, when the boiler plant is shut down, during the summer

## FAN SPEED ADJUSTMENT (AC MOTORS)

1. Heaters fitted with AC motors are supplied with factory-set fan speeds, fed from tapplings on the autotransformer.
2. In the unlikely event that fan speeds require adjustment, refer to the wiring diagram supplied with the heater. Contact Dunham-Bush for guidance on selecting appropriate tapplings on the autotransformer.
3. The autotransformer is located behind the plate on which the mains inlet connector is fitted (see Diagram 5 above).
4. Cables should be disconnected from the autotransformer carefully; ensure that the male spade connectors not pulled from the autotransformer.

Model/ Size	Low speed				Medium speed				High speed			
	Fan voltage (VAC)	Airflow (l/s)	Running current (A)	SFP (W/l/s)	Fan voltage (VAC)	Airflow (l/s)	Running current (A)	SFP (W/l/s)	Fan voltage (VAC)	Airflow (l/s)	Running current (A)	SFP (W/l/s)
W-06	110	81	0.4	0.62	120	91	0.4	0.66	150	117	0.6	0.77
W-12	90	160	0.8	0.44	100	174	0.8	0.48	120	219	0.9	0.55
W-12	100	176	0.8	0.48	110	197	1.0	0.52	150	281	1.2	0.65

Electrical data for AC motors



**FAN SPEED ADJUSTMENT (EC MOTORS)**

1. Heaters fitted with EC motors are available as one of two standard options:-  
 EC1 - variable fan speed with speed control by an external 2-10VDC signal (e.g. from BMS)  
 EC2 - single or dual fan speed with speed control using switches or thermostats via a fitted speed controller.
2. In the unlikely event that fan speeds require adjustment, refer to the wiring diagram supplied with the heater. Contact Dunham-Bush for guidance on adjusting fan speeds and selecting appropriate DC signal voltages.
3. The EC2 speed controller is located underneath the fan/motor platform and comprises electronic controls with inputs from thermostats and/or switches and a single analogue 2-12VDC output signal to the motor(s).
4. Refer to Diagram 6; three fan speeds are available. Single speed heaters will use one speed and dual speed heaters will use two speeds, which can be varied by adjusting the appropriate potentiometers; signal voltage can be measured across 0V and CTRL terminals.
5. Avoid setting fan speeds too low:-  
 a) low fan speeds can cause stratification of heated air within the room, reducing effective comfort  
 b) low fan speeds with electric heating can cause false tripping of high-temperature safety cut-outs in the heater.
6. All connections to the EC fan controller shown in Diagram 6 are safe low voltage of 10VDC or less.

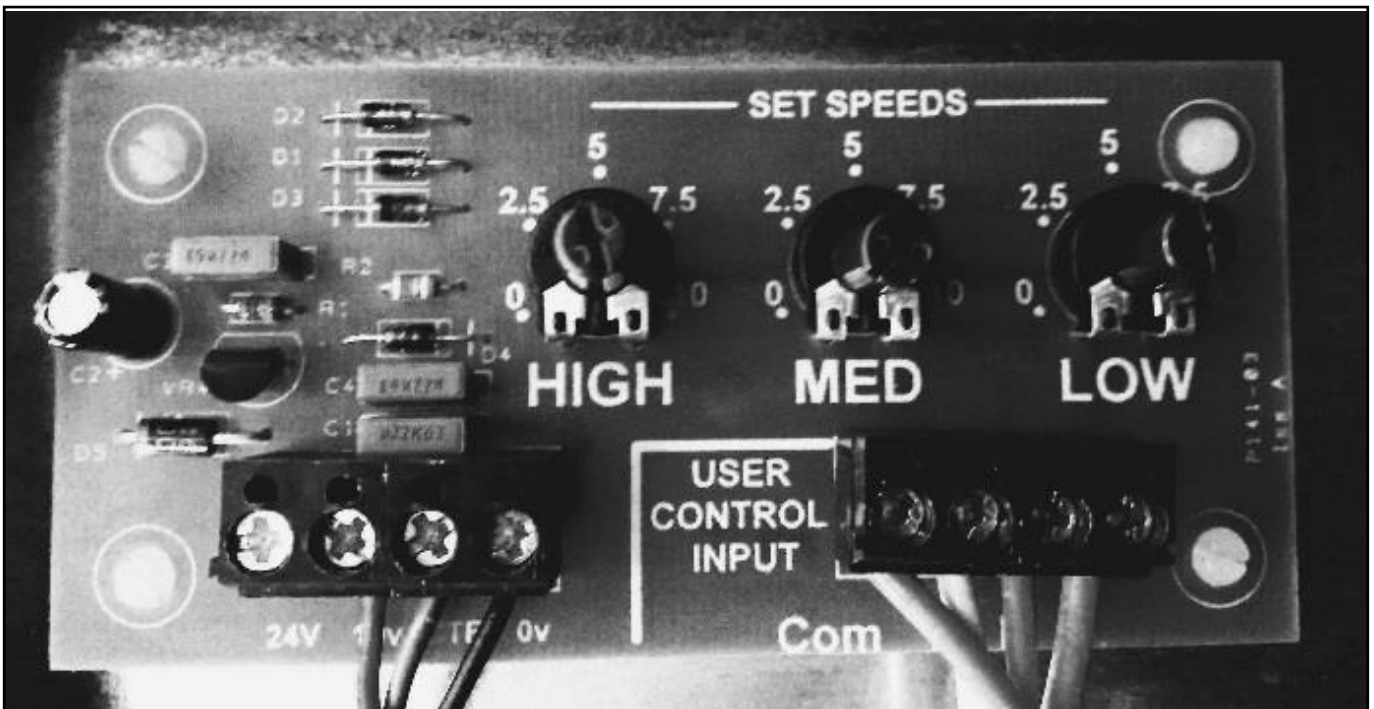


Diagram 6: Fitted 3 speed EC fan controller (EC2 fan motor option only)

Model/ Size	Low speed				Medium speed				High speed			
	Fan voltage (VDC)	Airflow (l/s)	Running current (A)	SFP (W/l/s)	Fan voltage (VDC)	Airflow (l/s)	Running current (A)	SFP (W/l/s)	Fan voltage (VDC)	Airflow (l/s)	Running current (A)	SFP (W/l/s)
W-06	4.6	81	0.1	0.16	5.4	91	0.2	0.20	7.6	117	0.4	0.34
W-12	5.2	160	0.3	0.19	5.8	174	0.4	0.22	7.5	219	0.7	0.34
W-12	4.4	176	0.3	0.15	4.9	197	0.3	0.17	7.3	281	0.8	0.31

Electrical data for EC motors

**CLEANING AND MAINTENANCE**

**WARNING:**

**Prior to undertaking any cleaning or maintenance, ensure that all electrical supplies are disconnected from the heater via local isolators. Some internal components may have sharp edges. Protective gloves should be worn.**

*Inspection*

Frequency of cleaning and inspection depend upon the operating conditions. Initially, it is suggested that the air filter is inspected after 6-8 weeks and cleaned as required at regular intervals. Cleaning the air filter ensures that the heater delivers the required air flow rate and heat output. The heater should not be operated without a filter, since the heater coil fins will become clogged with fluff and dust particles, resulting in reduced performance.

*Filter access and removal*

To gain access to the air filter, unlock and remove the access panel with the special key provided..

*Cleaning*

1. Air filters can be cleaned by tapping out excess dust and washing in warm water (up to 40°C), using detergent if necessary. The filter must be rinsed and allow to dry naturally before replacing. Do not use a vacuum cleaner, as it can damage the filter media. Filters should be replaced after approximately 20 washes.
2. Because the air filter retains most of the dusty particles, it will only be necessary to clean the fan/motor assemblies and heater coil annually. An industrial vacuum cleaner can used to clean the inside of the heater, in particular the heater coil(or electric element) and fans, with the air being sucked through the heater coil in the opposite direction to normal air flow. All accessible surfaces can be wiped with a dry cloth.

*Maintenance*

1. Coil - Purge any air from the coil using the manual air vent (using a suitable key) or by turning the knurled thumbwheel on the automatic air vent if fitted. Automatic air vents have a built-in check valve which allows the head to be removed without draining the system.
2. Motors - The fan motor has 'sealed for life' bearings which do not require any maintenance, other than visual inspection.
3. Fuse - The mains inlet connector on the electrical connections box incorporates a 2A anti-surge fuse. A spare fuse is supplied in a slide out fuse holder next to the socket.
4. Controls - see accessories . A wiring diagram is supplied with each heater. Further copies are available on request, please quote the serial number from the nameplate, located inside the heater.

*Please note :*

1. If fitted, the LTC thermostat will switch power to the fan only when the thermostat reaches the required temperature. For a type 1 (fixed setting) approx. 50°C ± 3K or for type 2 (adjustable setting) 30-90°C (the recommended setting is 20K less than the mean water temperature)
2. If air thermostats are fitted (either to the heater or remote mounted on a wall), adjust to the specified temperatures.  
Typical settings are:  
a) on/off thermostat - set to 20°C  
b) high/low thermostat - set to 16°C.
3. If fitted or remote switches are being used, check that they operate correctly. Note : if manual/off/auto switch is provided, all thermostats are by-passed in the manual position, which allows the fans to circulate room air when the boiler plant is shutdown.

**SPARES/SERVICE**

PLEASE WRITE THE DETAILS OF THE UNIT HERE.

These details will be required when ordering spares for your Dunham-Bush Series 600 fan convector.

UNIT TYPE AND MODEL INFORMATION

.....  
SERIAL NUMBER

.....  
DATE OF INSTALLATION

Manufacturer reserves the right to change any product specification without notice.

