INTRODUCTION
This booklet provides guidance to identify, handle, install and commission Dunham-Bush Puma fan coil units as well as guidance for operation and maintenance.

These instructions are to be read in conjunction with the wiring diagram supplied with the unit.

The instructions apply to units from the standard range only. Please study the instructions carefully before commencing any installation work.

IDENTIFICATION
The fan coil unit serial number, description, figure number (size) are displayed on a label found on the fan coil discharge plenum. If specified, a stencil reference may also be marked on the discharge plenum for on-site identification.

DESCRIPTION
Dunham-Bush Puma fan coil unit comprises a galvanised sheet steel casing with access to each part of the unit; fan/motor assemblies, air filter, dual purpose heating/cooling coil and electrical connections box, via panels retained using either quarter-turn push fit quick release fasteners or self-tapping screws. Fan coil units are designed for up to nine fan speed operation, with fan control provided by means of an autotransformer with fan speed switches.

STANDARD RANGE MODELS & SIZES
Puma is a vertical basic chassis fan coil unit, available in seven sizes, Figures 1 to 7 inclusive. Each size is supplied complete with a rectangular discharge plenum.
Diagram 2: Range of standard sizes with rectangular discharge plenum

ACCESSORIES

Standard controls

Dunham-Bush Puma fan coil units are available with accessories for remote control. These include remote setpoint adjusters, remote room air sensors and remote fan speed controllers. Refer to the wiring diagram included with the fan coil unit for details on installation and wiring of remote controls.

Discharge/Inlet Configuration

The standard discharge configuration comprises a rectangular discharge plenum fitted with a single upward facing rectangular spigot, the size of which is dependent upon the model number. The spigot can also be fitted facing forward and can be repositioned on site without the need for any additional or replacement components.

The standard inlet configuration comprises a downward facing rectangular aperture, into which the filter is located. The filter can also be fitted facing forward and can be repositioned on site without the need for any additional or replacement components.

CONSTRUCTION

Delivery

The purchaser is responsible for off-loading, and must examine the fan coil units promptly upon receipt. Any claims for damage will only be accepted if, at the time of delivery, the consignment note is endorsed with the details and counter signed by the transport driver. Each fan coil unit is marked to show the model, figure number, serial number and stencil reference if specified.

Handling and Storage

Fan coil units are individually packed and two/three persons can usually handle the heaviest unit. When a significant quantity of fan coils is delivered, they may be palletised and shrink-wrapped, so a fork-lift or similar will be required for lifting. The fan coil unit must not be dropped or suffer impact in any circumstances and should never be lifted or handled by their coil connections.

Fan coil units should be stored in clean, dry conditions. Any packaging should not be removed until the fan coil unit is required for installation. Packaging should only be removed if damage is suspected at the time of delivery.
**WARNING:** Puma fan coil units are designed with minimal sharp edges on the chassis. Some internal components on the fan coil may have sharp edges. Care must be taken when handling the product; protective gloves should be worn.

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry mass of basic unit with discharge spigot plenum only (kg)</td>
<td>29</td>
<td>40</td>
<td>44</td>
<td>56</td>
<td>61</td>
<td>71</td>
<td>75</td>
</tr>
</tbody>
</table>

Table 1: Approximate masses of Puma fan coil units

### INSTALLATION

**General**
Before removing any packaging, check the identity of the fan coil unit against the stencil reference marked on the access panel. Packaging should be retained to protect the fan coil unit from damage by other works after installation.

**Fitting**
1. Prepare wall fixings to accept the fan coil unit. M8 bolts, complete with appropriate washers, are suitable. Refer to Diagram 2 for positions of fixings.
2. Suspend the fan coil unit and ensure it is level in both directions. Use a spirit level on the casing, not the drip tray (The drip tray is graded to ensure drainage of condensate).
3. Connect ductwork to the fan coil unit. Flexible duct connections are recommended where sheet metal ductwork is used. Do not suspend any ductwork from the fan coil unit alone. Refer to Diagram 2 for spigot position.
4. Connect pipework as shown in Diagram 4.
5. Connect a suitable drain to the drip tray.
6. Connect electrical supply and control accessories as shown in wiring diagrams enclosed with the fan coil unit.
7. After filling the hot and chilled water systems, check for leaks (refer to Commissioning).
8. Ensure condensate pump is installed in accordance with manufacturers requirements and see diagrams 3a and 3b below.

### Pipework Connections
1. The coil is a dual purpose coil with OD15mm copper tube tails at 40mm centres between flow and return connections. Always observe the correct direction of flow. (see diagram 4)
2. Local isolating and regulating valves are recommended, as well as strainers to filter out foreign matter in the water.
3. The installer must provide any fittings to connect pipework to fitted 2 or 4 port valves.
4. The drip tray has a OD22mm tube connection, suitable for a compression fitting or similar, to be supplied by the installer.

### Electrical connections and controls
1. The electrical connections box is located on the side of the fan coil unit, and incorporates a hinged access door, fastened with a self-tapping screw.
2. Connect a 230V/1ph/50Hz supply to the flying lead fitted to the electrical connections box.
3. Fit any remote accessories in their appropriate locations and connect terminal block inside the electrical connections box.

*Refer to the wiring diagram enclosed with the fan coil unit for specific wiring details.*

1. All wiring should comply with IEE regulations (BS 7671) and local bye-laws.

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![Diagram 3a](image1.png)

![Diagram 3b](image2.png)
Diagram 4: Pipework connections, as viewed on header/connection end of coil

Diagram 5: Electrical connections box

Diagram 6: Valves, actuators and drip tray
Diagram 7: Fan/motor access panel removal (bottom inlet shown)

COMMISSIONING

1. Ensure that the fan coil unit is clean, and the filter especially is clean and free from dust. Check the fastness of all access panels and ductwork connections.
2. Check that all electrical connections are correct and comply with BS7671 and local bye-laws. Refer to the wiring diagram supplied with the fan coil unit.
3. Check the coil connections and drip tray connections for leaks. Refer to Table 3 for coil test and working pressures.
4. Purge air from both heating and cooling sections of the coil using the manual air vents fitted.
5. Balance the water flow rate through both hot and chilled water systems following accepted practice to achieve the specified flow rates.
6. On AC motor units, there are two fan speeds switches - one to give three main speeds, and the other to provide a ‘fine-adjust’ to each speed. Set the switches to the specified design settings, as highlighted on the label fixed the plenum access panel. (Refer to diagram 10 for fan switch settings)
7. On EC motor units, adjust potentiometer to ensure air volume to design specification. If using a BMS controller with a 0-10V output, adjust the fan via the remote interface to ensure air volume and external static resistance are both to design specification.
8. If fitted, set any remote switches and/or controls to the specified settings. Check the operation of controls in accordance with control manufacturer’s instructions.
9. Check the operation of any remote fan speed or remote thermal controls.
10. If supplied/fitted, check the operation of the condensate pump by pouring a small quantity of water into the drip tray; ensure the pump clears any water and operates any alarms etc.
11. Leave this document and the wiring diagrams with the end user.

For further information on any fan coil unit - contact Dunham-Bush, quoting the serial number on the label on the access panel.
Table 2 - 4 port valves; recommended Kv values to match coils

<table>
<thead>
<tr>
<th>Size</th>
<th>Cooling coil valve Kv</th>
<th>Heating coil valve Kv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>1.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Figure 2 &amp; 3</td>
<td>1.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Figure 4 &amp; 5</td>
<td>1.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Figure 6 &amp; 7</td>
<td>1.6</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Table 3 - Maximum test and working pressures

<table>
<thead>
<tr>
<th>Coil Section</th>
<th>Maximum test pressure</th>
<th>Recommended working pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>20 barg</td>
<td>7 barg</td>
</tr>
<tr>
<td>Heating</td>
<td>20 barg</td>
<td>7 barg</td>
</tr>
</tbody>
</table>

WARNING
Air vents should not be operated during pressure tests. Recommended working pressure is limited to 7 barg to ensure safe operation of manual air vents.

Table 4 - Water content of cooling and heating sections of coil

<table>
<thead>
<tr>
<th>Size</th>
<th>Cooling section content</th>
<th>Heating section content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>1.70</td>
<td>0.20</td>
</tr>
<tr>
<td>Figure 2 &amp; 3</td>
<td>2.55</td>
<td>0.28</td>
</tr>
<tr>
<td>Figure 4 &amp; 5</td>
<td>3.68</td>
<td>0.40</td>
</tr>
<tr>
<td>Figure 6 &amp; 7</td>
<td>4.53</td>
<td>0.51</td>
</tr>
</tbody>
</table>

Diagram 8: Fan switch speed settings; also shown as label affixed to fan coil unit (AC motor units only)
OPERATION
Puma fan coil units provide cooling and heating of air when used in conjunction with chilled water and/or low temperature hot water systems. They are designed for either high level wall mounting or low level floor mounting, connected to a discharge grille.

When running, the fan draws air from the room and/or primary source, through an inlet filter. The air is then discharged over the heating/cooling coil, through the spigot, along ductwork and through the grille to the room space.

Alternative options include chilled water cooling only, either top or front discharge and either bottom or front inlet.

Fans normally run continuously, with control provided via an automatic control system varying the flow rates of chilled water and hot water through the coil (waterside control). Depending upon the particular type of controls fitted, user control is provided by fan speed switches and/or temperature control. Fan speed switch settings are shown on a label affixed to the discharge plenum.

CLEANING
Cleaning and maintenance must be carried out by competent persons

Inspection
The frequency of cleaning and inspection depends upon the conditions in which the fan coil unit operates. Initially, it is suggested that the air filter and drip tray are inspected after 6-8 weeks normal operation.

Access
There are two access panels – discharge plenum and fan/motor access. All access panels can be opened by either removing self-tapping screws or turning quarter-turn fasteners.

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 allowed 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. The drip tray can be cleaned with warm, soapy water. Ensure the drip tray drains freely.

3. If a condensate pump is fitted, check any sensors are clean and wiped dry. Test the operation of the pump by pouring clean water into the drip tray.

Because the air filter retains most of the dusty particles, it will only be necessary to clean the fans, motors and coil annually. An industrial vacuum cleaner can be used to clean the inside of the fan coil, in particular the coil and fans, with the air being sucked through the coil in the opposite direction to normal air flow. All accessible surfaces can be cleaned with a cloth.

CONTROLS
Puma fan coil units are fitted with a waterside control system, which typically comprises the following elements:
- Fitted fan on/off
- Fan speed change switches (AC motor units)
- Fan speed potentiometer (EC motor units)
- Fan coil controller
- Return air sensor
- Valve actuators (Two or four port valves)

Additional optional accessories include:
- Remote room air sensor
- Remote setpoint adjuster
- Remote fan on/off and speed switches
- Fitted relays for master/slave or BMS control

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Dunham-Bush also fit non-standard controls supplied by others; refer to the wiring diagram supplied with the unit.

Additional optional accessories include:
- Remote room air sensor
- Remote setpoint adjuster
- Remote fan on/off and speed switches
- Fitted relays for master/slave or BMS control

Access
There are two access panels – discharge plenum and fan/motor access. All access panels can be opened by either removing self-tapping screws or turning quarter-turn fasteners.
MAINTENANCE
1. Purge any air from both cooling and heating sections of the coil using the manual air vents (using a suitable key).
2. The fan motor has ‘sealed for life’ bearings which do not require any maintenance, other than visual inspection.
3. The electrical connections box incorporates a 5A fuse.
4. Refer to page 2. Each fan coil unit is supplied with a wiring diagram applicable for the particular controls and accessories. Further copies are available on request. Please quote the serial number on the label on the main access panel.
5. Check the operation of all controls by varying their settings to achieve the desired effect on the fan.

⚠️ WARNING
1. Prior to undertaking any cleaning or maintenance, ensure that the fan coil unit and any controls are disconnected from the electrical supply at the local isolator.
2. Some internal components may have sharp edges. Care must be taken when working on the fan coil unit, and protective gloves should be worn.
Declaration of Conformity

We, Dunham-Bush Ltd. of Downley Road, Havant, Hampshire, England, PO9 2JD, hereby declare conformity of the 'Puma' and 'Puma EC' Fan Coil Unit product with the following European Union Directives: -


The Low Voltage Directive 2006/95/EC.

The Energy Related Products Directive 2009/125/EC

In addition, we declare that the 'Puma' and 'Puma EC' Fan Coil Unit product complies with the following standards: -

EN 61000-6-3:2007 Electromagnetic Compatibility - generic emission standard

EN 61000-6-1:2007 Electromagnetic Compatibility - generic immunity standard

EN61000-3-2:2006 Electromagnetic Compatibility – Harmonic emissions


EN 60 335-1:2002 A14:2010 Household and Similar Electrical Appliances. Safety General Requirements


For and on behalf of Dunham-Bush Ltd.

David Shuttleworth B.Sc., C.Eng. MCIBSE.
Technical Director

Date 11/2/13
PLEASE WRITE THE DETAILS OF THE UNIT HERE.
These details will be required when ordering spares for your Dunham-Bush Puma Fancoil Unit

UNIT TYPE AND MODEL INFORMATION

SERIAL NUMBER

DATE OF INSTALLATION

Spare parts/service – Please contact our office, contact information shown below.

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