



P U M A F A N C O I L U N I T



Welcome
to the
Comfort zone

235mm Deep Vertical · Waterside Control · Wall Mounted

T E C H N I C A L B R O C H U R E

INTRODUCTION

The 'Puma', manufactured by Dunham Bush, is an adaptable, easy to use range of fan coil units, with inherent quality, that will perform quietly and powerfully for many years to come.

'Puma' fan coil units are built to no-compromise engineering standards using only the most modern and reliable components available. Combined with the very latest design and manufacturing technology, the 'Puma' provides the ideal solution to achieve even the most exacting thermal and noise criteria. Careful consideration has been given to safe site handling, fast and simple installation, and ease of access for maintenance. Designed to offer maximum site flexibility, the 'Puma' is one of the most versatile and user friendly products available in today's market.

Flexibility Is The Key

The 'Puma' uses a non handed, dual purpose coil block covered by a stainless steel 'V' formed condensate pan, terminating with a central drain point at the lowest end of the tray. The same components are used on units with both left handed and right handed connections, allowing the complete coil and condensate pan assembly to be reversed on site. The reversible discharge panel is screw fixed to the chassis, enabling the orientation of the supply air spigot to be changed between front and top facing. The access panel and filter are interchangeable, permitting the return air to be drawn from either the front or the bottom of the unit. Modifications to the handing of the connections, and both the inlet and discharge configurations can be completed on site without the need for any additional parts or metalwork. The added facility to relocate the controls box from one side of the unit to the other provides the 'Puma' with the flexibility to accommodate site layout changes and client fit-outs.

Simple Access For Maintenance

Removing large unwieldy access panels secured by 10-20 screws has made life difficult for the maintenance engineer in the past. Special consideration has been given to overcoming these problems and the resultant 'Puma' now brings a 'breath of fresh air' to maintenance tasks. The main unit access panel is retained using quarter turn 'quick release' push fit fasteners and provides access to the fan/motor assemblies and the filter. The panel is merely 219mm in height and is therefore easy to handle as well as simple to remove. Each fan/motor assembly is mounted separately onto the main bulkhead plate and is connected electrically via a quick release connector to facilitate removal. Electrical and controls work can be easily carried out via a large hinged cover, providing access to all components. The discharge panel, which is screw-fixed to the chassis, can be removed, allowing access to the coil. The stainless steel condensate pan can be completely removed from the side of the unit, allowing routine cleaning and maintenance to be carried out.



Quiet, Powerful Operation

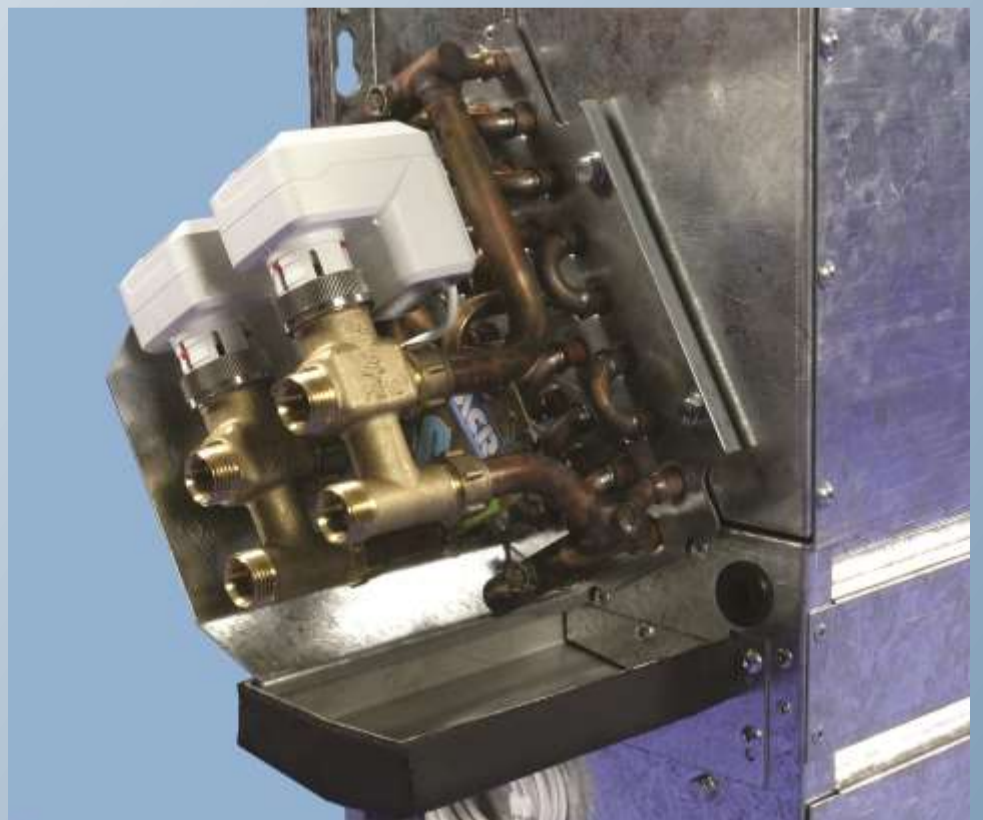
The 'Puma' incorporates high efficiency EC external rotor motor fans as standard. This design concept improves longevity by reducing the mechanical and thermal stress on the 'sealed for life' bearings and provides constant speed at different loads due to the high inertial mass of the motor. Furthermore, the unique integration of both rotating components, the motor and impeller, allows the precision balancing of the assembly. The fan/motor assemblies are individually mounted on a 'floating' bulkhead plate, isolating them from the rest of the unit chassis, reducing resonance and casing breakout noise. Controlling the fans using a 2-10v variable signal ensures greater performance flexibility. Use of the highest quality components available is never more important than in the case of the fan(s)/motor(s) to ensure that quiet and powerful operation is consistently achieved year after year.

Long Life Stainless Steel Condensate Pans

'Puma' fan coil units incorporate stainless steel condensate pans as standard. By using stainless steel, cleaning is made easier whilst the resistance to corrosion is increased, vastly improving the longevity of the pan. The fully welded 'V' formed pan is mounted to provide a positive fall in two directions to the central outlet at its lowest end. The 22mm OD stainless steel outlet is located in a recessed hole in the bottom of the pan, ensuring that condensate drains completely. The externally insulated pan is retained by the unit chassis, removing the need for screw fixings in the pan itself. The inherent strength of the stainless steel pan and outlet offers vital protection against accidental site damage.

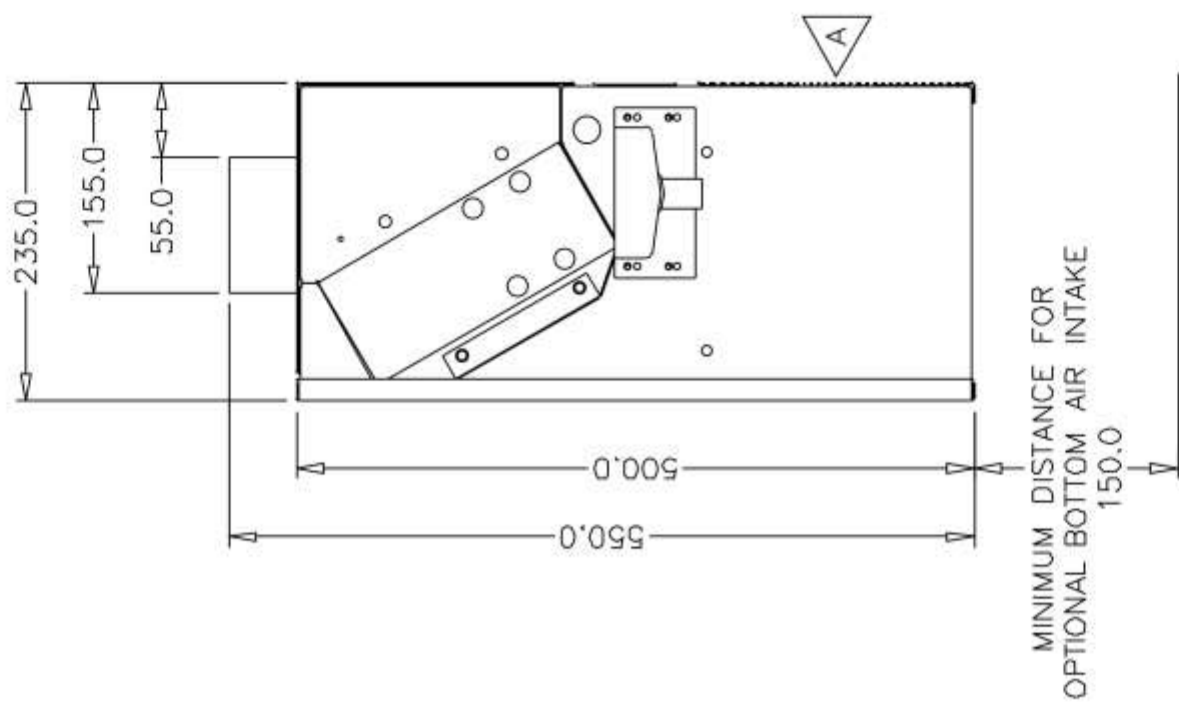
Adaptable Controls Box

'Puma' units are supplied with a well-ventilated controls box complete with a one metre flying lead for connection to an adjacent fused spur. The box has been designed to accommodate most commercially available temperature controllers and associated electrical components. Also housed in the box are the mains fuse holder, complete with a spare fuse, auto transformer and 'Fan Speed' and 'Fine Adjust' switches. The control box features a large hinged lid to provide excellent access to either stand alone or DDC controls. It is electrically connected to the motor(s) via a terminal block, a feature that enables it to be disconnected from the unit for refurbishment or to be retrofitted subsequent to the installation of the unit. For installations either to which access is difficult or space is limited, the controls box is available supplied loose permitting it to be located remote from the unit.

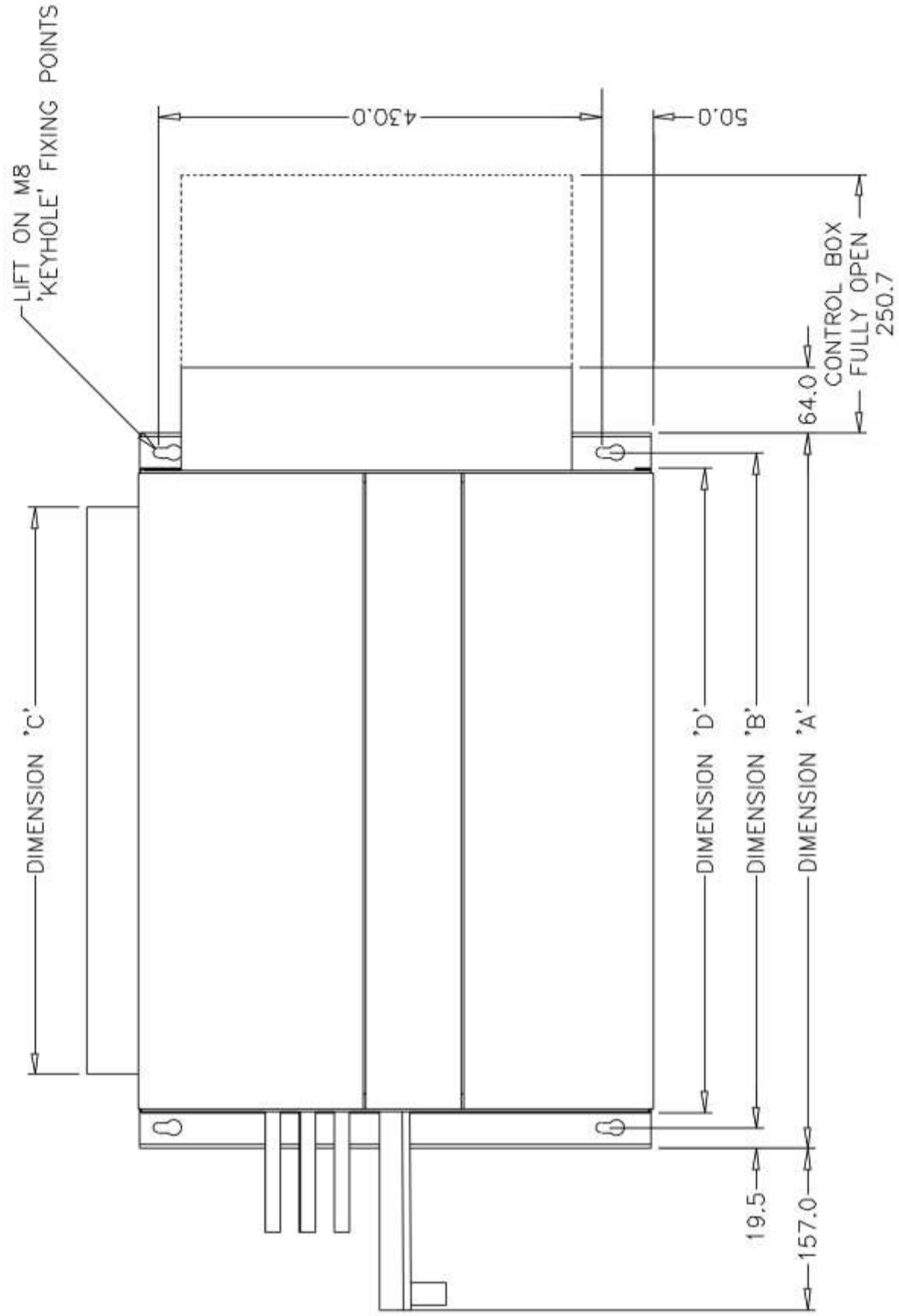


DIMENSIONS

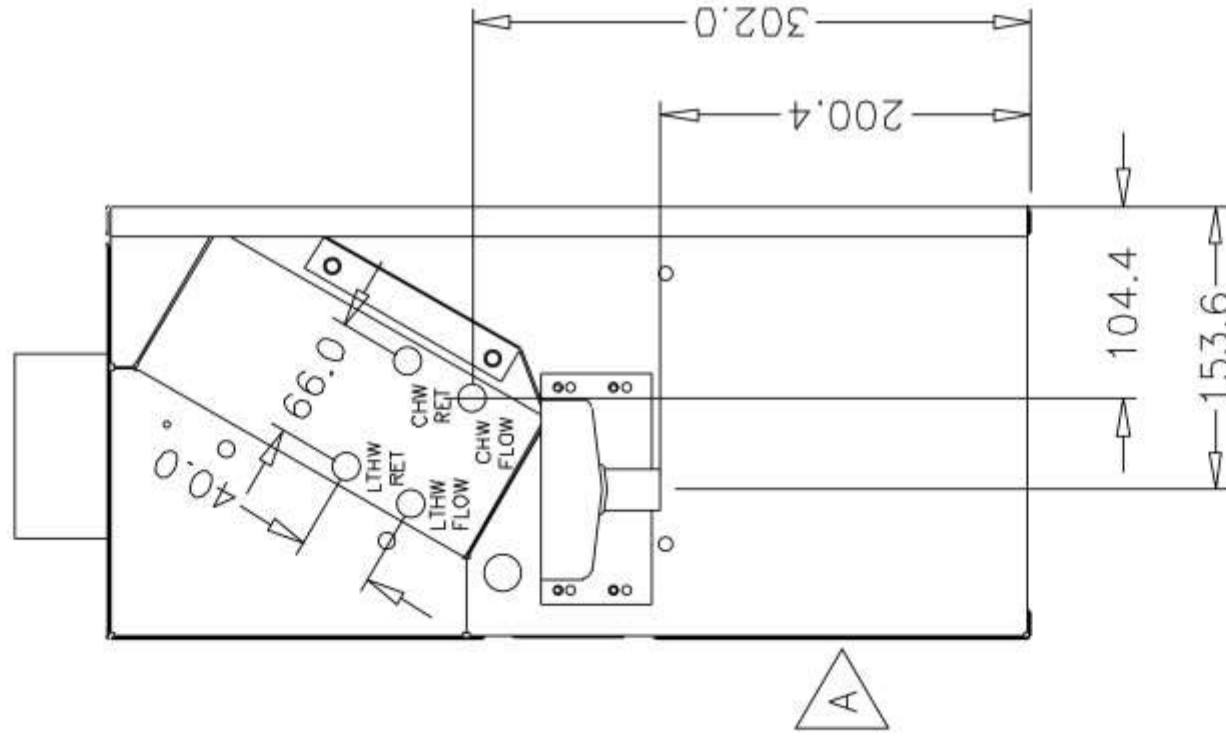
MODEL	DIMENSION 'A'	DIMENSION 'B'	DIMENSION 'C'	DIMENSION 'D'
01	695.0	655.0	550.0	625.0
02	1095.0	1055.0	950.0	1025.0
03	1095.0	1055.0	950.0	1025.0
04	1495.0	1455.0	1350.0	1425.0
05	1495.0	1455.0	1350.0	1425.0
06	1895.0	1855.0	1750.0	1825.0
07	1895.0	1855.0	1750.0	1825.0



 AIR INTAKE
 LH UNIT SHOWN
 RH OPPOSITE
 UNIT HANDINGS ARE VIEWED LOOKING
 AGAINST DIRECTION OF AIR FLOW
 MODEL 1 SHOWN
 ALL DIMENSIONS IN mm

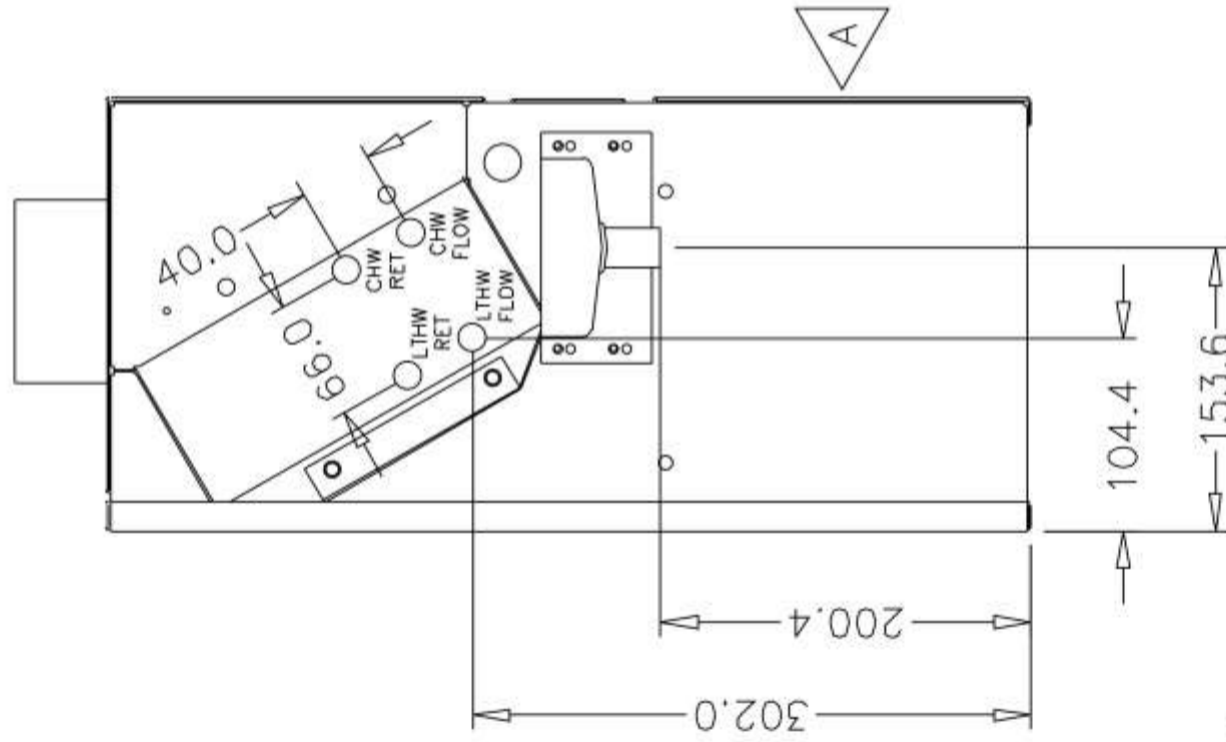


RIGHT HAND UNIT



RH Pipework detail

LEFT HAND UNIT



LH Pipework detail

A AIR INTAKE

LH UNIT SHOWN
 RH OPPOSITE
 MODEL 1 SHOWN
 ALL DIMENSIONS IN mm
 ALL COIL CONNECTIONS 15mm OD
 DRAIN CONNECTION 22mm OD
 COOLING SECTION AND HEATING SECTION COIL
 CONNECTIONS SPACED ON 40mm CENTRES
 TO ACCEPT MOST STANDARD 4-PORT VALVES
 FACTORY FITTED 2-PORT OR 4-PORT VALVES AVAILABLE
 IT IS NOT POSSIBLE TO FACTORY FIT 3-PORT VALVES

COOLING DATA

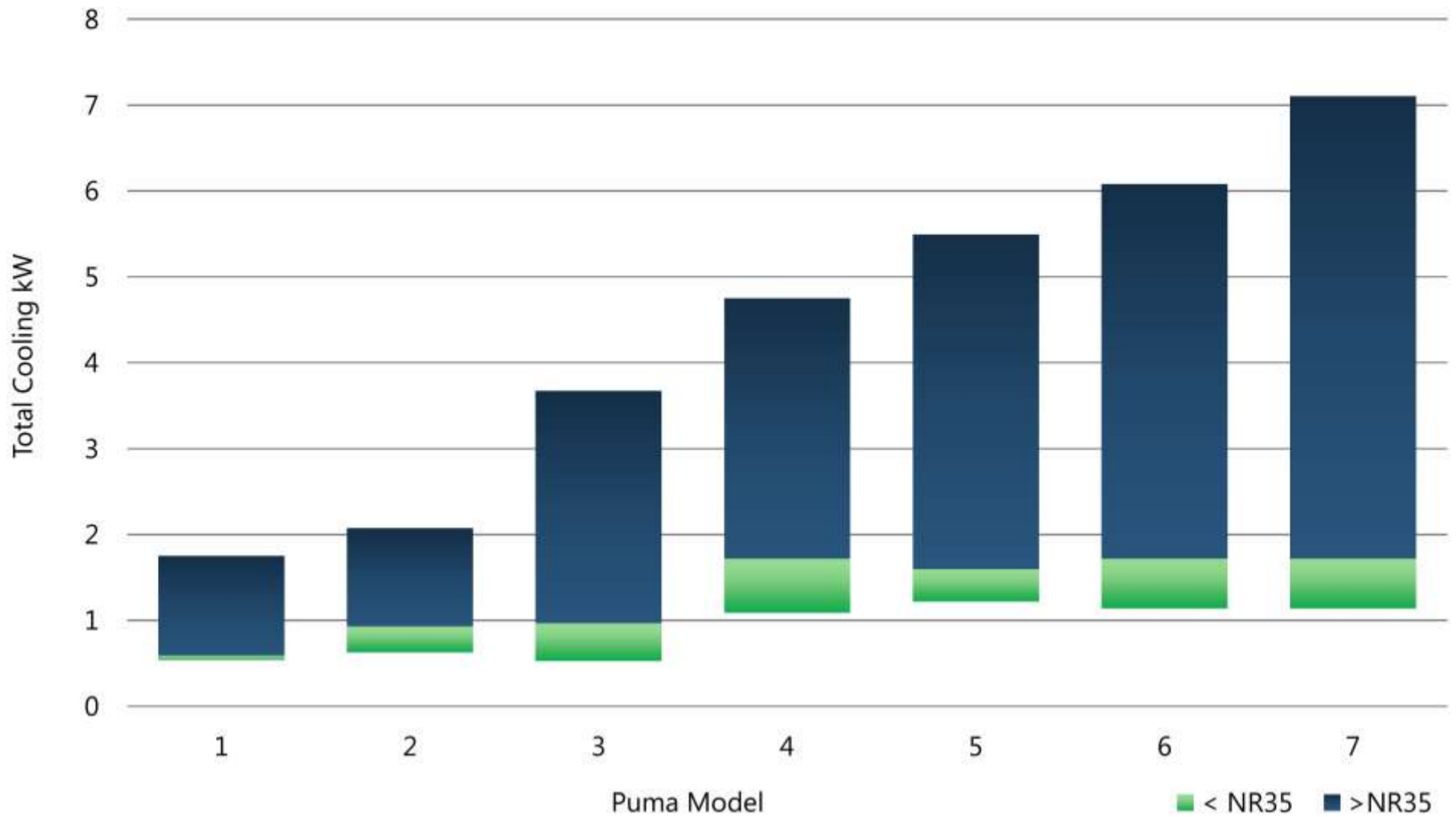


Table and chart contents are for guidance only

Maximum cooling performance data is based on an entering air condition of 23°C dry bulb and 16°C wet bulb, and a System pressure of 12Pa.

HEATING DATA

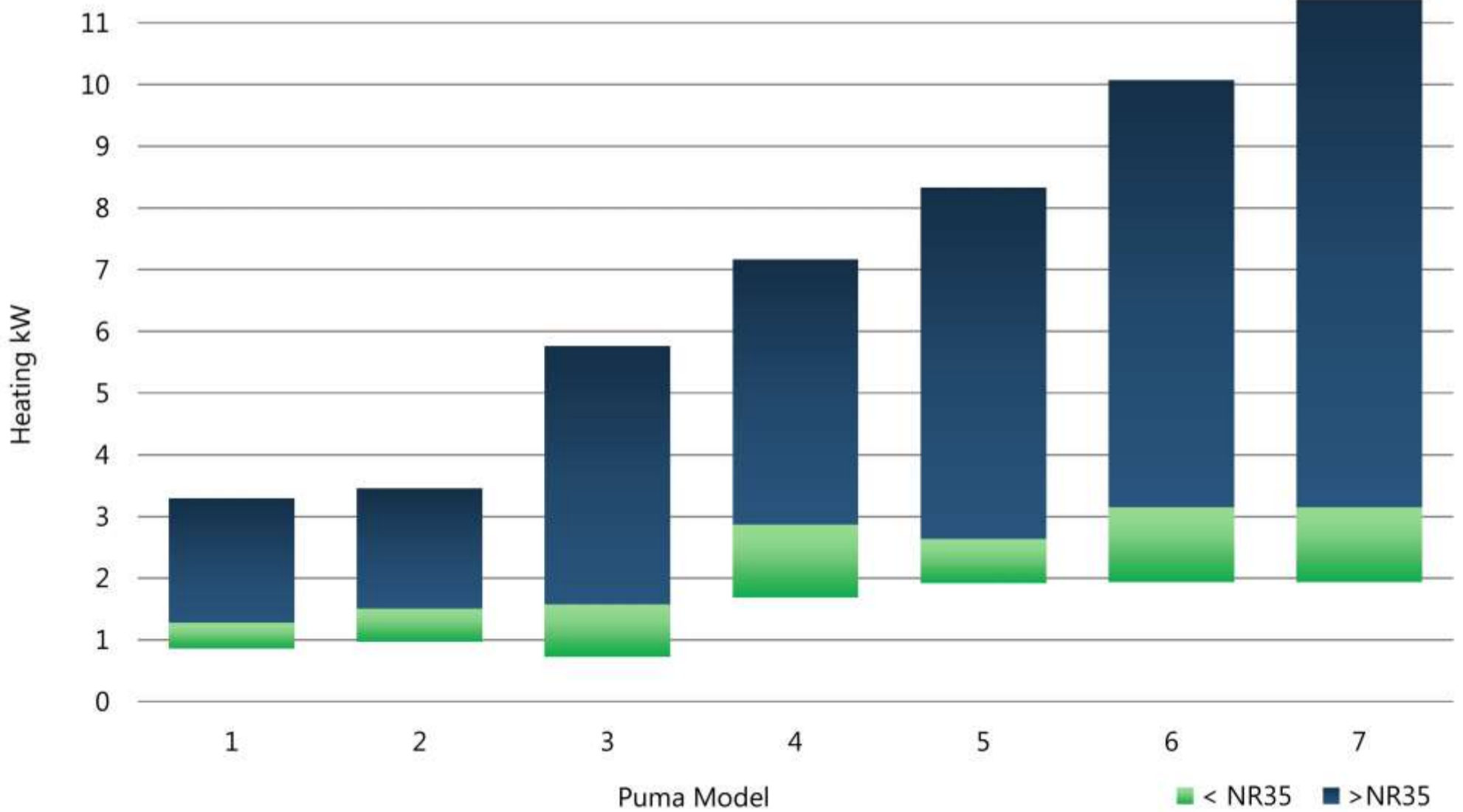


Table and chart contents are for guidance only

Maximum heating performance data is based on an entering air condition of 20°C and a system pressure of 12Pa.

AIR VOLUME DATA

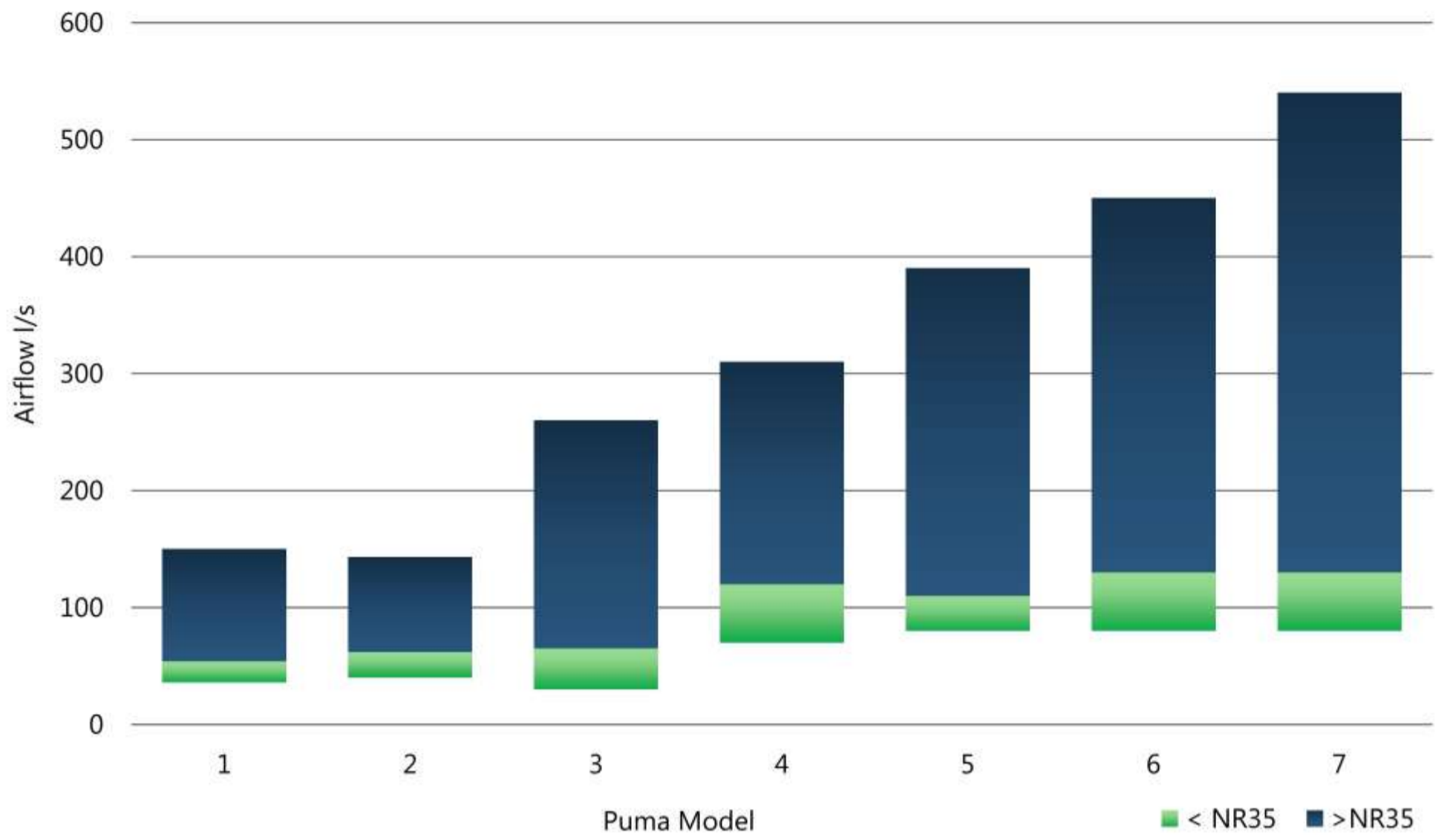


Table and chart contents are for guidance only

SPECIFIC FAN POWERS

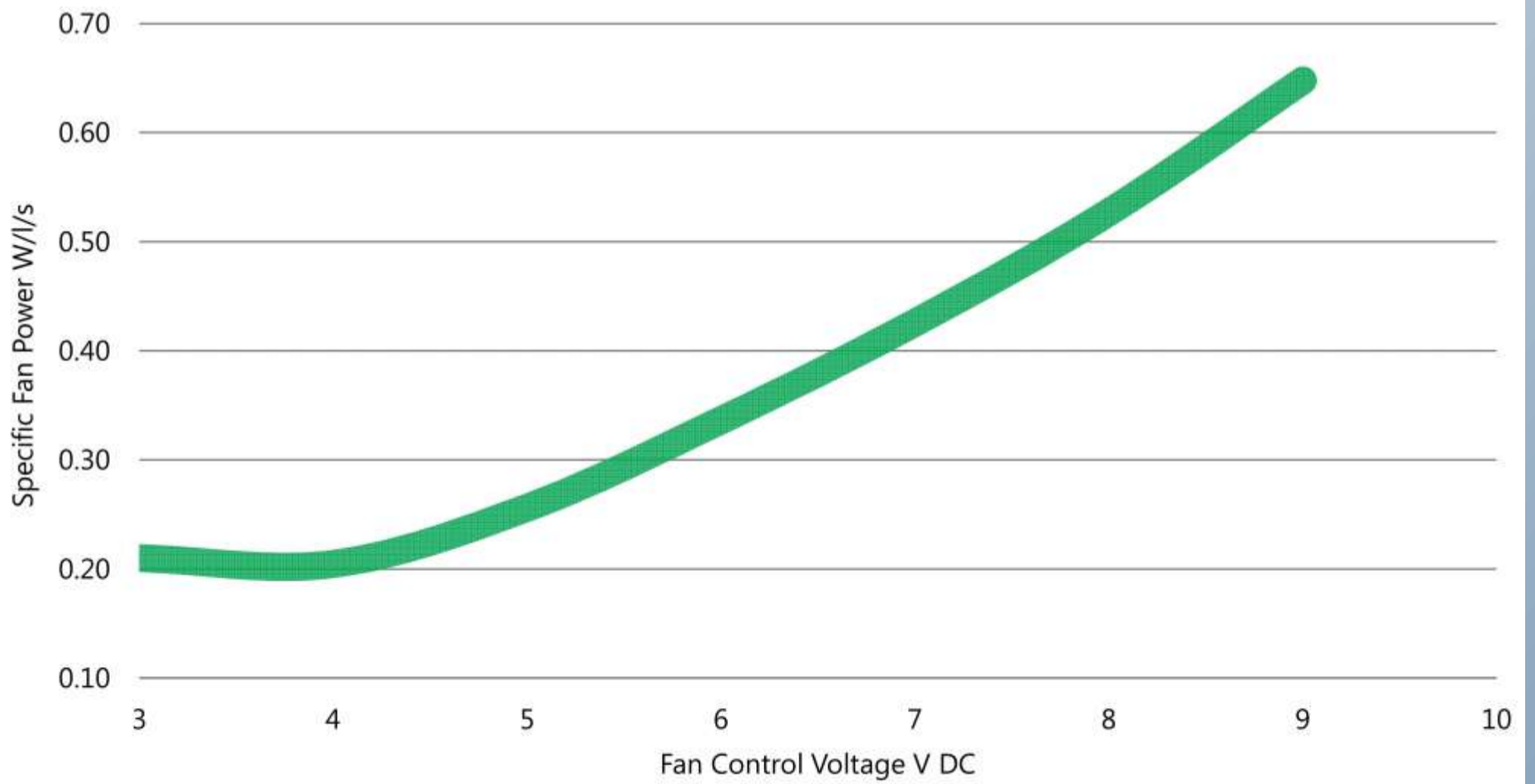
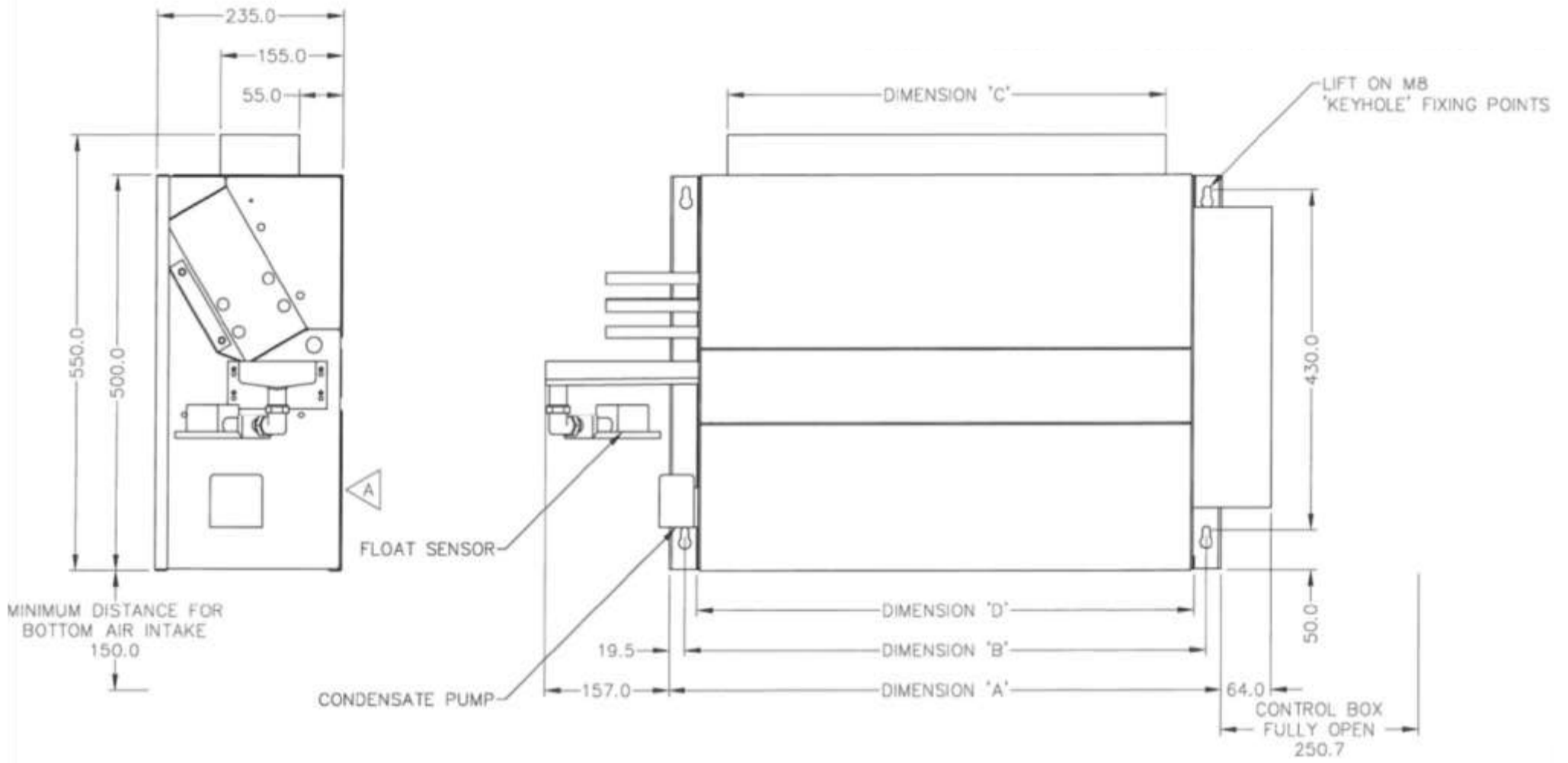


Table and chart contents are for guidance only

S132-022-A PUMA C-W CONDENSATE PUMP

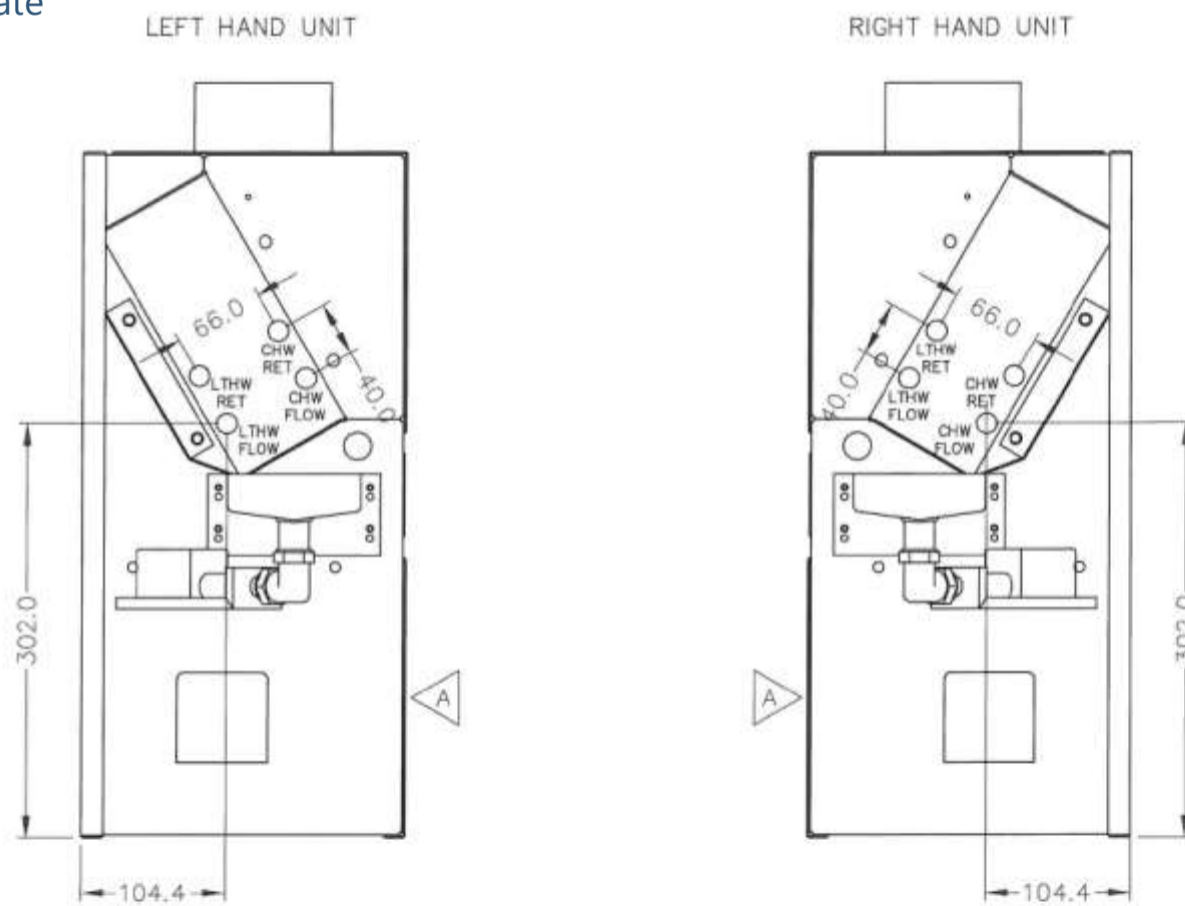
Part Puma FCU Condensate Pump



LH Unit shown
RH Opposite
Size 3 Shown
Condensate pump wiring
and interconnecting tubes
not shown

Size	Dimension "A"	Dimension "B"	Dimension "C"	Dimension "D"
01	695.0	655.0	550.0	625.0
02	1095.0	1055.0	950.0	1025.0
03	1095.0	1055.0	950.0	1025.0
04	1495.0	1455.0	1350.0	1425.0
05	1495.0	1455.0	1350.0	1425.0
06	1895.0	1855.0	1750.0	1825.0
07	1895.0	1855.0	1750.0	1825.0

Part Puma FCU Condensate Pump



ACOUSTICS

Fan Coil Unit Acoustics

To predict Noise Rating (NR) levels of installed fan coil units, Dunham-Bush use the following assumptions for horizontal fan coil units installed above a false or suspended ceiling:

- Room acoustic characteristics are taken as medium or average, with a typical reverberation time of 1.0s.
- Room construction would typically be contract carpet, fibreboard lay-in ceiling tiles in a ceiling grid, wall surface areas comprising glazing and conventional wall finishes, room furnished with office equipment and occupied.
- Room dimensions typically taken as 8m x 8m with a ceiling height of 2.7m and the listener is assumed to be 1.5m from all noise sources.
- Supply/return air paths are via typical ceiling grilles/diffusers, installed within the ceiling at least 1.0m from any wall surfaces
- Sound pressure levels are determined with fan coil units installed above the ceiling, with return air from the ceiling void; fan coil units are installed at least 6.0m apart in all directions.

The following corrections can be used to provide an approximate adjustment to predicted NR levels for different room conditions:

- Good quality suspended ceiling; medium dead room acoustics -2dB
- Medium live room acoustics +1dB
- Poor quality suspended ceiling; medium live room acoustics +4dB
- No suspended ceiling; live room acoustics +9dB

HYDRAULIC DATA

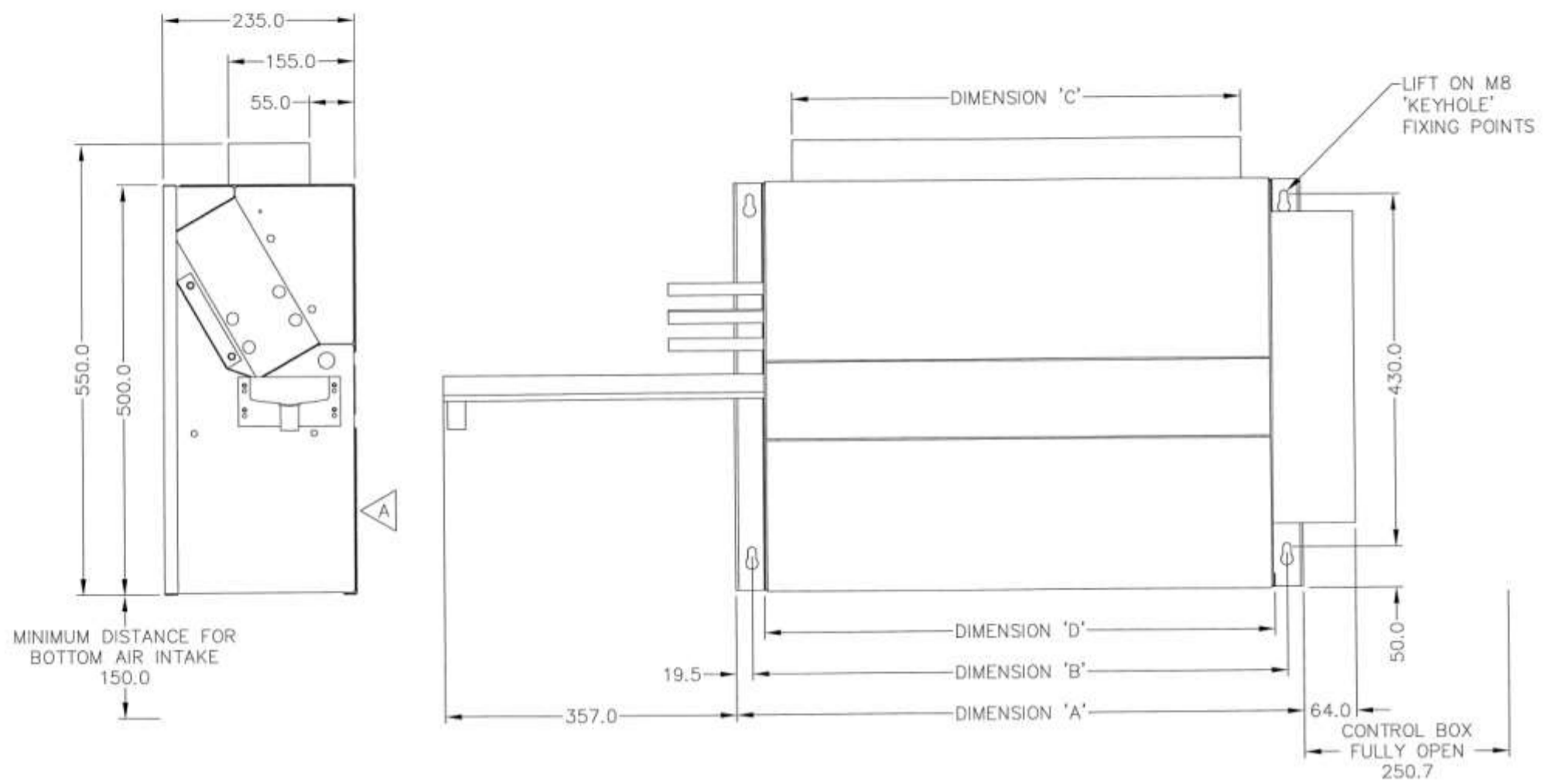
Model	Water Content of Coil (litres)		Nominal Valve kV	
	Clg	Htg	Clg	Htg
Puma 1	1.32	0.20	1.00	0.63
Puma 2 & 3	1.98	0.28	1.00	0.63
Puma 4 & 5	2.86	0.40	1.60	1.00
Puma 6 & 7	3.52	0.51	1.60	1.00

Table contents are for guidance only

Model	Dry Weight (kg)
Puma 1	29
Puma 2	40
Puma 3	44
Puma 4	56
Puma 5	61
Puma 6	71
Puma 7	75

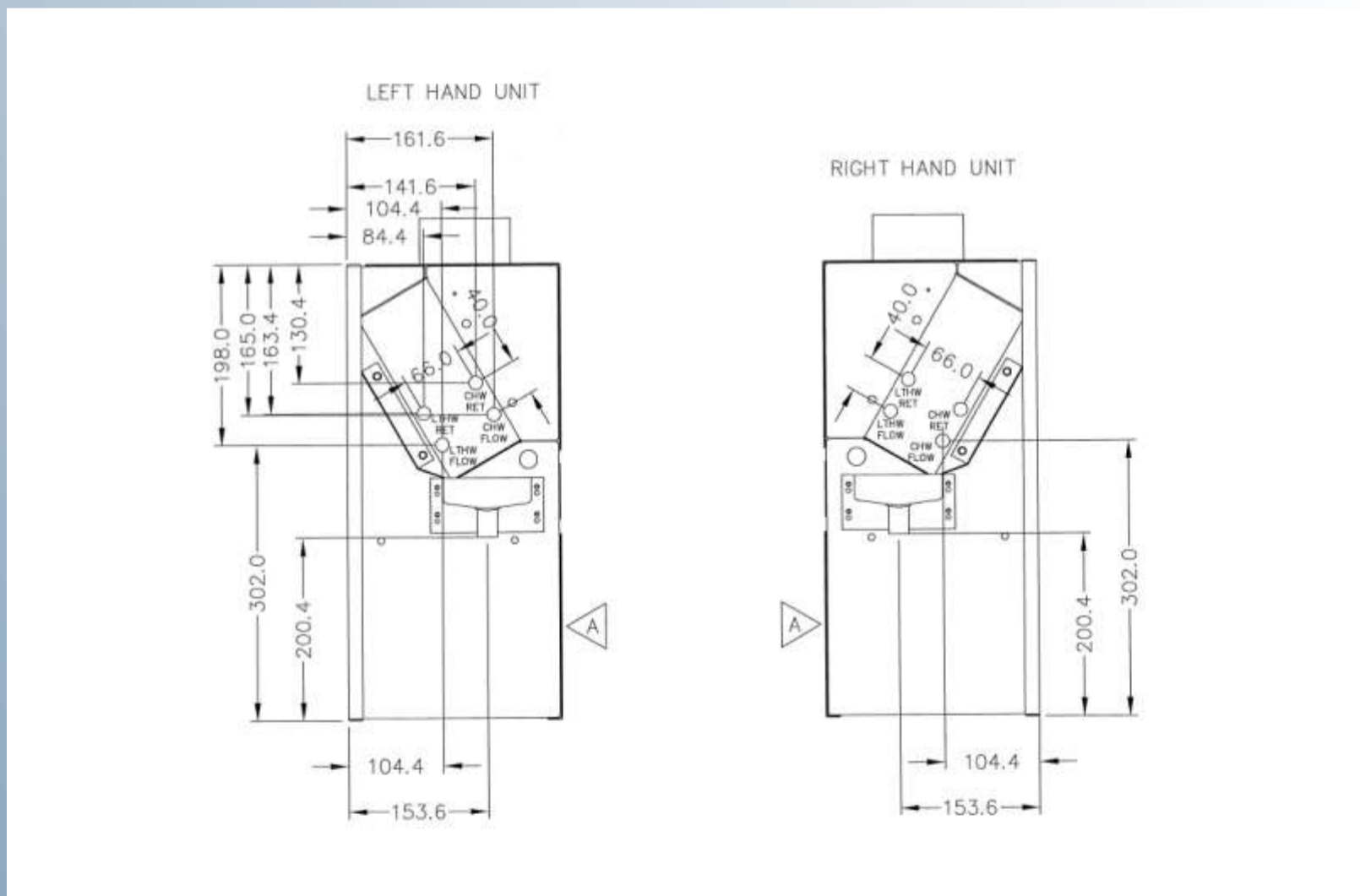
Table contents are for guidance only

S132-037-A PUMA DISCHARGE 200MM EXTENDED DRIP TRAY



LH Unit shown
RH Opposite
Size 01 Shown

Size	Dimension "A"	Dimension "B"	Dimension "C"	Dimension "D"
01	695.0	655.0	550.0	625.0
02	1095.0	1055.0	950.0	1025.0
03	1095.0	1055.0	950.0	1025.0
04	1495.0	1455.0	1350.0	1425.0
05	1495.0	1455.0	1350.0	1425.0
06	1895.0	1855.0	1750.0	1825.0
07	1895.0	1855.0	1750.0	1825.0



SPECIFICATION

The 'Puma' Series Fan Coil Units shall be manufactured by Dunham Bush Limited, Downley Road, Havant, Hampshire, PO9 2JD. Units shall be selected to achieve the required performance whilst operating against the specified design parameters. 'Puma' units shall be of a blow through design and comprise of a washable air filter, dual purpose coil with separate connections for cooling and heating, stainless steel condensate pan, low noise external rotor motor(s)/fan(s), integral multi-outlet discharge plenum and an electrical/controls enclosure.

Unit Chassis - Chassis shall be of a riveted construction manufactured from a minimum thickness of 1.2mm galvanised steel; stiffener's and strengthening folds shall be used to form a solid robust structure. Keyhole mounting slots able to accept M8 mounting bolts are provided for installation whilst the panel design and use of 'Dutch folds' produce a flush external finish with no sharp edges. Fan/Motor assemblies shall be mounted on a 1.6mm 'floating' bulkhead plate, isolated from the rest of the unit to prevent noise resonance through the unit casing. Panels shall be designed to allow separate unhindered access to the serviceable items, namely filters, condensate pan, coil, fan (s)/motor(s) and controls.

Discharge (Supply Air) Plenums - An integral acoustically lined discharge plenum shall form part of the unit chassis with either a front or top mounted rectangular spigot to suit most installations. Use of a reversible discharge panel, secured to the plenum by screws, allows the outlet position to be easily moved in the event of a site layout changes or client fit-out.

Access - Access for inspection and service to the fan(s)/motor(s) and filter shall be via an insulated panel secured with ¼ turn captive quick release push fit fasteners. Access to the condensate pan/coil and discharge plenum is via a separate insulated panel retained by self tapping screws. All access panels form a positive airtight seal against the main unit chassis.

Insulation - Unit chassis and panel work shall be both thermally and acoustically insulated with 95kg/m³, CFC & HFC free, Class 'O' open cell expanded foam insulation, having a maximum thermal conductivity of 0.047 W/mK, fully complying with London Borough and CAA flammability and toxicity requirements. The adhesive is a modified acrylic, light and ageing resistant synthetic resin with high temperature tolerance.

Coils - Coils shall be single block, dual purpose, divided into two sections to provide both cooling and heating. To be constructed from 3/8" seamless copper tube mechanically expanded into aluminium fins and brazed into copper headers. Aluminium fins shall be spaced at 12 FPI and have die formed collars to provide maximum contact and optimised heat transfer. Coils shall be circuited to provide low hydraulic pressure drops under normal operating conditions whilst being designed to prevent air locks, ensuring positive venting and draining via easily accessible slotted vent and drain plugs. Coils to terminate with 15mm copper tails, spaced at 40mm centres to accept most standard 4-port valves. Tails are to terminate within a restraining plate providing adequate support to the control valves and adjoining pipework. Coils shall be tested by dry air under water to 30bar.

Controls Box - Each unit shall be provided with a well-ventilated electrical box complete with two hinged lids for ease of access.

Air Filters - The filter mat shall be formed from synthetic polyester fibres and rated to Coarse 30% to ISO 16890, with a dust holding capacity of 450g/m² and fire rated to class F1 to DN 53 438. The washable media shall be thermally bonded over a copper coated mild steel wire frame.

Condensate Pan - The condensate pan shall be of a one piece construction manufactured from 1.2mm stainless steel with fully silver soldered corners. Pans to be 'V' formed and mounted to provide a positive fall in two directions ensuring the free flow of condensate to the 22mm outside diameter stainless steel bottom connection. Pans shall be externally insulated with 3mm closed cell class 'O' thermal insulation.

Fan Motor Assemblies - Fan motor assemblies shall be mounted separately onto a 'floating' bulkhead to isolate noise resonance from the rest of the unit and facilitate easy removal of an individual fan motor for replacement. Alternatively the complete 'floating' bulkhead can be removed from the unit for major attention.

Fan Motor Speed Control - Fan speed control shall be affected by a 2-10VDC control signal to the motor(s). An infinitely adjustable potentiometer fitted within the controls box, or supplied loose for remote mounting, enabling selection of the desired fan speed to be achieved. Alternatively the motors can be controlled directly by a BMS signal, or other source.

Fan Motor Speed Control - Speed control shall be fully variable effected by means of a 2-10v DC control signal.

EC Motors - The Puma incorporates high efficiency EC (electronically commutated) motors. Speed adjustment is by an infinitely adjustable potentiometer fitted on the control box, or continuously variable fan speed is affected by a 2-10v DC control signal.

Controls Box - Each unit shall be provided with a well-ventilated electrical box complete with a hinged lid for ease of access. The control box shall contain a speed control potentiometer (if not supplied loose for remote fitting), harmonic filter, on/off switch (if not supplied loose for remote fitting) and terminal connection block. Each will also contain a mains fuse whilst also providing space to accommodate most available temperature controllers along with any associated relays (if required). The control box shall be provided with a 1 metre flying lead for site connection to an adjacent fused spur outlet. The complete control box shall be provided with a terminal block attaching the box to the motor (s), allowing the box to be simply removed from the unit for any major refurbishment work or retro-fitting of DDC controls.

Temperature Controls - Temperature controls shall be provided in accordance with the project specification and will comprise of modulating 4 port valves and actuators acting in conjunction with a stand alone (analogue) or DDC temperature controller wired to a return air or room sensor. A wide variety of controls packages are available, either, supplied and fitted by Dunham Bush, or 'Free Issued' to Dunham Bush for factory fitting only.



Service Support

Dunham-Bush offers a range of services from installation and commissioning to aftercare and routine maintenance to suit all your needs. Our Service Team has a wide range of experience and knowledge of all refrigeration equipment, which includes split A/C VRV or VRF air and water cooled chillers and heat pumps. Continued support and regular maintenance will help prevent any down time of your equipment. All our engineers are fully trained and hold current Skill Cards and F-Gas qualifications.

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PRODUCTS THAT PERFORM... BY PEOPLE WHO CARE



Made in GB



Dunham-Bush reserves the right to change any specification without notice.

132-000-000-A

Jan 2021