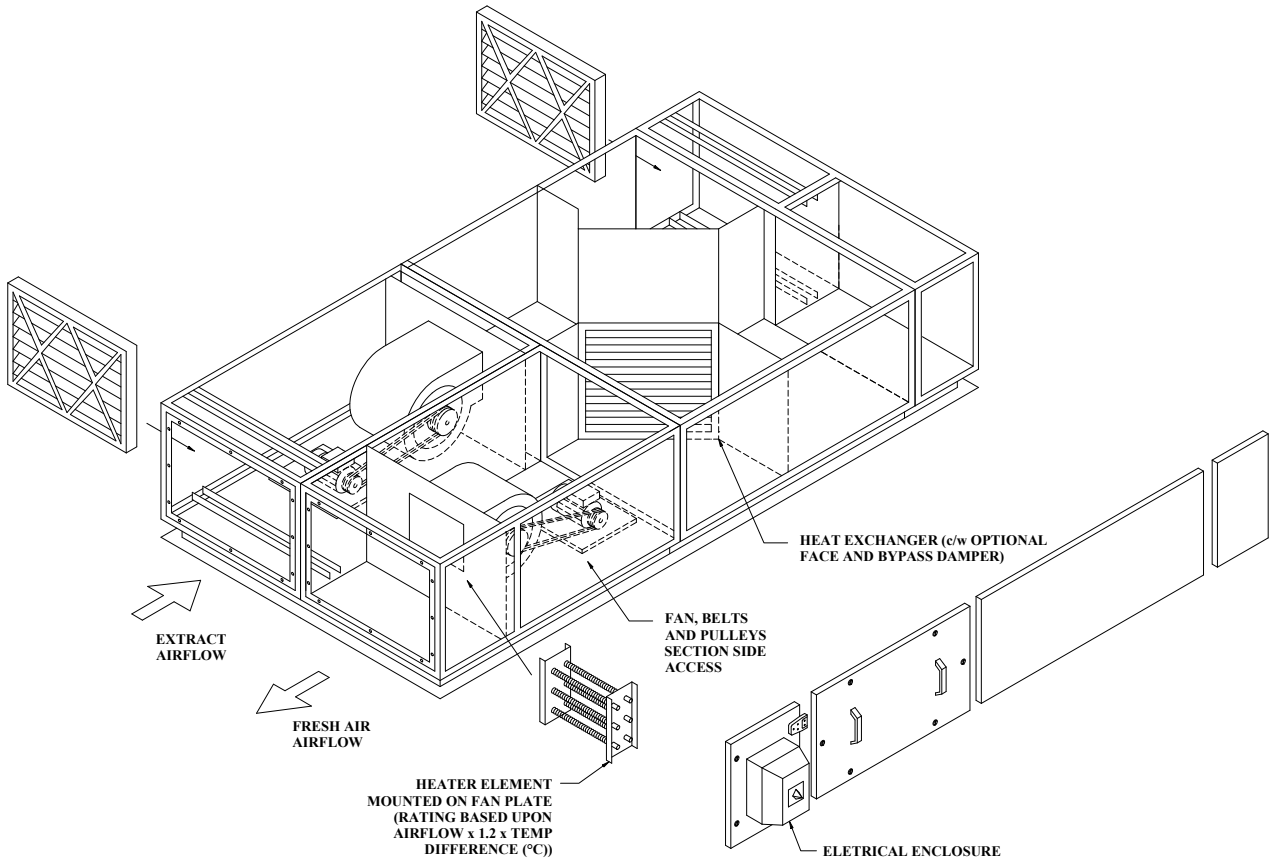
OPERATING AND MAINTENANCE INSTRUCTIONS
SUPPLY AIR AND PERMANENT EXTRACT WITH HEAT RECOVERY (SAPER) BELT DRIVEN

DESCRIPTION

All units are manufactured to a very high standard.

The frame is pre-formed from aluminium extrusion and moulded corners which form a versatile box section. This modular construction allows single skin (SSK) or double skin (DSK) panels to be fitted. Single skin panels are line with Pyrosorb – S foam insulation with low sound and fire retardant properties. Double skin panels are filled with Rockwool slab 60kg/cm2.
The panels, internal fan plates and spigots are manufactured from 18 or 16 SWG Zintec steel.
Weatherproof units are finished in polyester powder coat paint to RAL 5017, gentian blue.
(Other colours are available on request).



STANDARD SIDE BY SIDE CONFIGURATION

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General Unit Components

Supply and extract sections are fitted with double inlet, forward or backward curved centrifugal fans. Single or three phase motors are supplied with automatic reset overload protection, (2 or 4 pole motors are used, depending upon the speed of the fan). They are sized to suit, with allowances for internal pressure drop within the unit. Fan fuses, overloads and contactors are fitted as standard.
Power transmission drive arrangements are via twin groove pulleys with appropriate belt section and taperlocks.

Two disposable panel filters are fitted to supply air and extract air sections. All filters are manufactured to BS EN 779 : 2012. G4 grade panel filters are fitted as standard. Medium grade filters M5-M6, Fine grade bag filters F7 - F9, and HEPA filters grade H10 - H14 are available on request. Carbon filters are also available.
High grade filters will affect airflow performance due to increased pressure drop. Please consult sales department.

Optional square or circular, intake and discharge spigots are available on request.

Air to Air Plate Heat Exchanger

The heat exchanger fitted is manufactured from 100% composite materials, generally sized to give at least 50% heat recovery at the following conditions - extract air + 21°C 50% RH, ambient air - 1°C saturated. Heat exchangers must operate within -15° to 60°C working temperatures. Face and bypass damper can be supplied to bypass the heat exchanger during warmer weather. This prevents the room exhaust warm air in the summer season from warming the cooler supply air by bypassing the plate heat exchanger, and is controlled via an independent thermostat and damper motor.

Electric Heaters

An electric heater battery is fitted, if required, to either 'Top Up' the heating requirement or provide tempered air if the internal and external temperatures dictate a low efficiency through the heat exchanger.

All electric heater batteries are fitted with an Element Over-heat Protection Circuit (EOPC). The circuit incorporates a manual Element Overheat Thermostat, (EOT), working in conjunction with the Airflow Indication Switch, (AFS).

The primary heating protection comes from the AFS. If very low or no airflow passes the AFS, the electric heater will be turned off. The AFS also provides volt free contacts for fan run / fail indication, wired to terminals located inside the electrical enclosure.

The secondary protection comes from the EOT. If the electric heater element exceeds a certain temperature, the EOT will trip. This device has a manual reset push button located on or adjacent to the electric heater. All Puma units with heating controls will include heater fuses, heater relays or contactor, and EOT.

There are three options for heating controls:

Integral Thermostats – One thermostat is supplied for each stage of heating required. These are located inside fan unit, sensing air intake temperature. Each thermostat switches up to 4kW per stage. The adjustable 0-30° C dial on the thermostat is factory set at 5° C or 10° C steps. The switching differential + or - 2° C.

Electronic Multistage Thermostat - The EMT is supplied with a duct sensor that is pre-wired to terminals inside the electrical enclosure. This device turns the heating load on in 3 or 4 steps until required temperature is achieved. The duct sensor must be fitted into the duct air stream on the discharge side in order to read the 'Off Coil' temperature and achieve the programmed set point temperature.

Thyristor Controller - Close control and constant set point temperature is achieved by pulse switching the heating load via Triac device. This device can be supplied with either a duct or room sensor, or a remote 0–10V dc signal. The duct sensor must be fitted into the duct air stream on the discharge side, in order to read the 'Off Coil' temperature.

LPHW Heating Coil

Low pressure hot water (LPHW) coils are constructed from galvanised casing, copper tubes and aluminium fins, and either 1 or 2 row, depending on selection. They are suitable for typical water temperatures at 82°C flow and 72°C return, but can vary on design selection, (consult sales office for details). Copper/copper coils, blygold coating or stainless steel coils are available.

It is important that LPHW coils are protected in the winter season against damage from water freezing. A safety thermostat is recommended to open the heating valve and start up the boiler, if the air intake temperature falls below 5°C.

Installation of pipework and heating valve to the LPHW coil must be carried out by a competent engineer. If a three way valve controls package has been supplied by Puma, the valve will be supplied loose and must be fitted with the pipework installation on-site by others. Attention must be given to positioning of the duct sensors from the temperature controller, (see document '3WV 001' for details).

Inverter Speed Controllers

Inverter speed controllers can be fitted to most three phase fans for commissioning purposes. Great care must be taken when reducing airflow when electronic heater batteries are fitted.
A sufficient amount of air should pass across the elements to prevent overheating. This is normally 30 to 40% of maximum fan speed. Safety is provided by the Airflow Failure Switch which will drop out the heating relay/contactor when the airflow is too low. The element overheat thermostat will act as a fail-safe.

Damper and Motor

If a Volume Control Damper (VCD) and motor are fitted, the damper motor is wired in parallel with the fan controls, and proceeds to open when power is supplied to the unit. The motor takes approximately 40-75 seconds to fully open, and will spring return on power failure in approximately 20 seconds.

OPERATION

The unit will require, either a 220/240 V ac 1 phase or a 380/415V ac 3 phase supply & neutral, (check serial plate on side of unit or sales literature).
Each unit is provided with gland and suitable terminal block for mains cable entry. This is wired to the mains isolator which electrically isolates both supply and extract fans and the heater battery, where fitted. All units require a suitable fused switched spur or isolator, sized to suit the running current. This must be located within 1½ metres of the unit and comply with the latest edition of the IEE regulations.

INSTALLATION

The unit must be installed with sufficient space for access to removable panels, to allow access to the serviceable components i.e. filters belts and pulleys.

When unit is delivered, it will come in sections (see diagram on page 1), usually the fan section, (which incorporates controls), heat exchanger section and panel filter section.. If the heat exchanger has a face and bypass damper, the fan unit will require simple wiring into the heat exchanger unit. This will require wiring a red and black cable into the terminals located on the base of the heat exchanger section.

Pentapost units are available as weatherproof versions, (denoted WP). Anti-vibration isolators are recommended when installed on flat roofs.

Set up for Belt and Pulley Alignment

Belts and pulleys have been pre-set at factory for correct belt tension and pulley alignment. After the unit has been positioned, check that the impeller is smooth running and belts and pulleys have not moved during transit. Ensure correct pulley alignment as indicated in *fig.1* below. To check the tension of the drive belt, apply a force perpendicular to the centre of the belt span sufficient to deflect the belt 16mm for every metre of span length, as indicated in *fig.2*. The force required to deflect the belt should be from 0.5 to 0.8kg. Do not over tighten the belts as this will damage the bearings in both fan and motor. If belts or pulleys need to be replaced or changed, use same procedure as above.

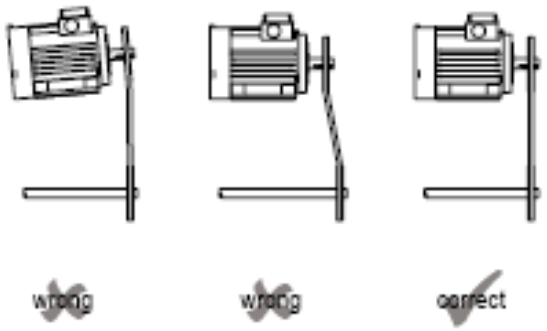


Fig.1 Pulley Alignment

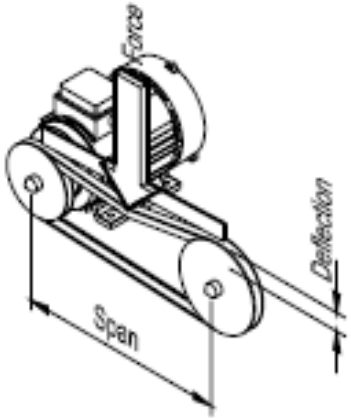
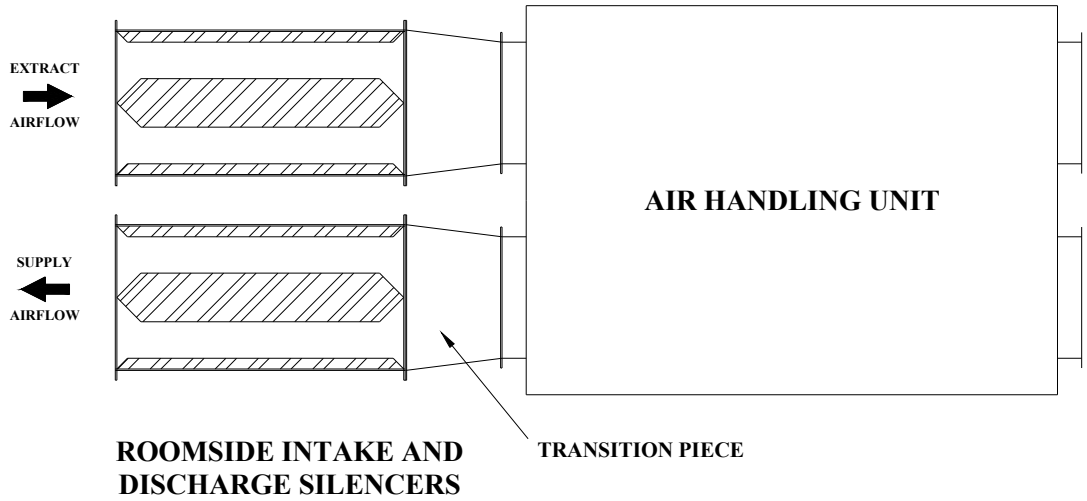


Fig.2 Belt Tension

Silencer Installation

Ducted units are available with silencers for intake and discharge sections. These are manufactured from 18 SWG Zintec steel plates and 20 SWG 30% free area perforated plates. Sound absorption material is Rockwool slab to a density of 60Kg/m^3, tissue faced to eliminate fibre shedding. The SAPER unit will be fitted with either circular or square silencers, depending on duct connections required. As standard, silencers would be room side.

If unit is supplied with silencers, please be aware that there are different discharge silencers to intake silencers. All of our discharge silencers are fitted with Air Spacer Diffusers (ASD), these are 300-500mm sections added to the silencer to help establish steady airflow and reduce air turbulence throughout the ductwork.



ROOMSIDE INTAKE AND DISCHARGE SILENCERS

Face and Bypass Damper

If face and bypass dampers are fitted to the heat exchanger, the thermostat will require setting up. The thermostat is located after the heat exchanger on the fresh air intake side. This needs to be set at a temperature that does not exceed the maximum acceptable fresh air intake temperature. For example, if the thermostat is set at 20°C, and the fresh air input temperature is at 22°C, the louvres on the heat exchanger will close, the louvres on the bypass duct will open, and the extract air will bypass the heat exchanger.

SERVICE & MAINTENANCE

The mains supply to all units must be disconnected at source before removing access panels. The panel filter must be replaced as frequently as is necessary, depending on ambient conditions. This should coincide with a three monthly visit for a standard service for the main air conditioning plant or, if manometers are fitted, when the pressure difference exceeds the marked set point. Airflow Failure Switches, (AFS), should be checked for free movement and electrical conductance.
Failure to change the filters at the recommended intervals will invalidate the warranty. The AFS should be checked for free movement and electrical conductance.
Fans are fitted with belt driven motors with ‘sealed for life’ bearings up to a frame size of 132 (11kW) that require no maintenance. Motors of frame size 160 (15kW) and above have open bearings with “flush through” re-greasing facilities. It is recommended these motors are checked and re-greased every 3 months.

FAULT FINDING

FAN/MOTOR FAILS TO RUN

1. Check the unit is connected correctly, as the wiring diagram supplied.
2. Check the mains supply, fuses/circuit breakers and On/Off isolator.
3. Check the Shutdown Relay link (SR) fitted between terminals L1 & L2 or SR1 & SR2).
4. Check the control circuit fuse (where fitted).
5. Check the fan fuse/s, located below the isolator, (single phase fans only)
6. Check the MCB is on, and the fuses are ok. Check the fan overloads are on by pushing the manual reset button/s, (red), on the fan contactor. This is usually fitted to the left or right hand side of the fan, on the fan plate itself.
7. Is there a voltage at the fan? Yes would indicate motor failure or a neutral/phase problem.
8. If the MCB/fuses keep tripping, check the phases are ok. On belt drive units, check the belt tension is correct and the fan motor overload is set to the rating of the motor. See motor serial plate for size/rating.

NO HEATING

1. Is the airflow being restricted, or preventing the Airflow Failure Switch from operating, check if the filter is dirty, and the status of the manometer or filter pressure switches.
2. Check the overheat switch, press the manual reset button located next to the heater battery.
3. Check the heating supply fuses.
4. Check the heating contactor for correct operation.
5. Check the Airflow Failure Switch, (located on the side of the fan body), for correct operation and electrical continuity. An audible click, should be heard when operating the switch.
6. Check the individual thermostats are set to the desired temperature/s and they are working correctly. Again, an audible click should be heard when turning the dial up or down.
7. Where an electronic thermostat is used, check the supply to the thermostat from the AFS.
8. Check the sensor. A resistance of approx 10kΩ should be measured across the sensor (disconnected).
9. If a 4/8 stage electronic thermostat is fitted, check the parameters are correct with the separate instructions provided.

Most faults/problems can be resolved by following the above. If the unit still fails to run, please contact Puma Products Ltd for technical assistance.

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