



OPERATING AND MAINTENANCE INSTRUCTIONS

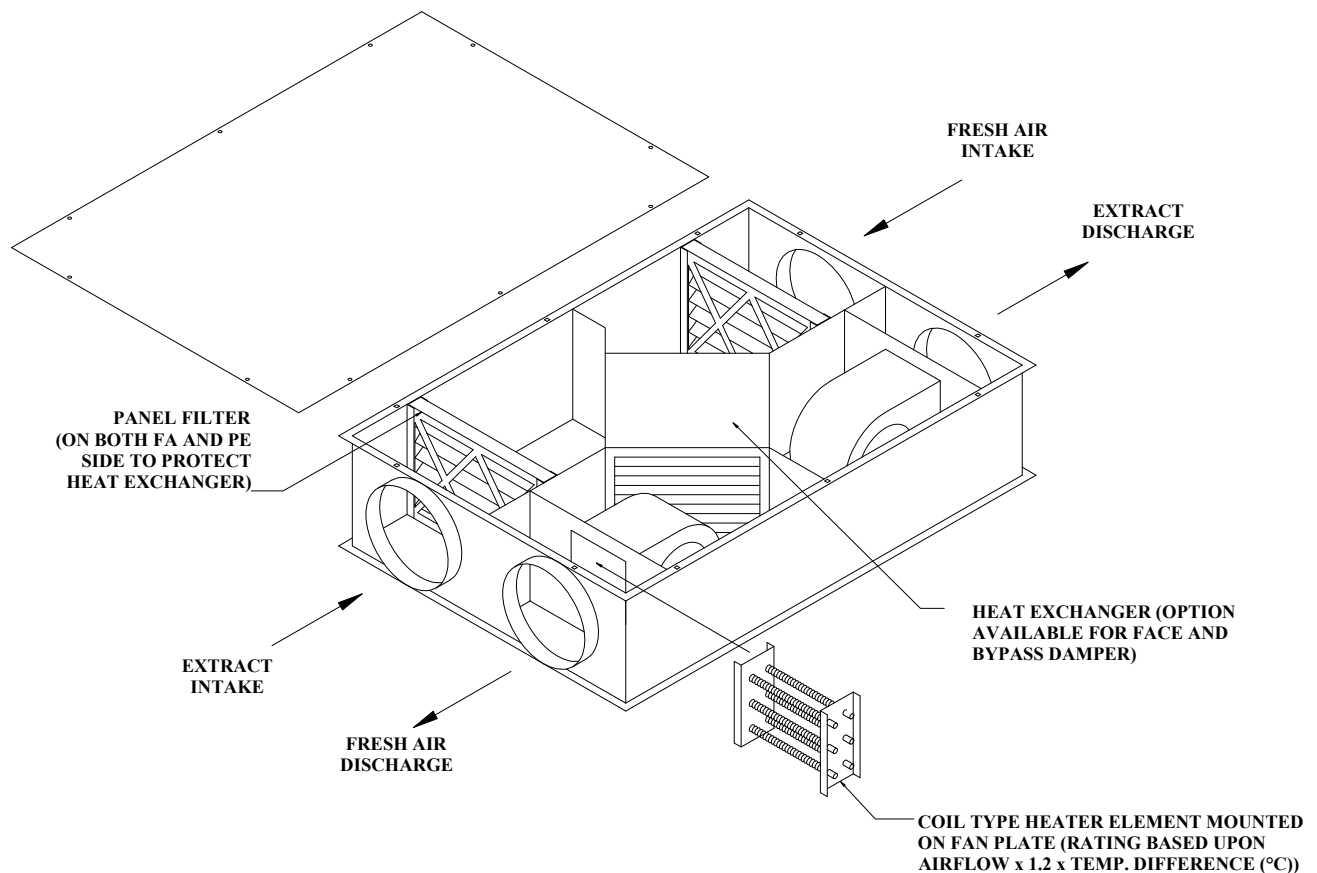
SUPPLY AIR AND PERMANENT EXTRACT WITH HEAT RECOVERY

SAPER UNITS SERIES 250-550 DIRECT DRIVEN CHANNEL & TRAY (CT)

DESCRIPTION

All units are manufactured to a very high standard.

The casing, internal fan plates, lid and spigots are manufactured from 18 SWG or 16 SWG Zintec steel plate. The unit is lined with 25mm Pyrosorb insulation. Access is available top or bottom only. The units come as standard in a galvanised finished, but the weatherproof units are finished in mid blue to RAL 5017. Double skin units are available on request.



General Unit Components

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Supply and extract sections are fitted with double inlet, forward or backward curved centrifugal fans. Single or three phase motors are supplied with thermal overload protection. 2 or 4 pole motors are used, depending upon the speed of the fan. Fan fuses, overloads and contactors are fitted as standard.

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.

The supply and extract sections are insulated with 25mm thick Pyrosorb class O insulation; this has moderate noise absorption qualities and excellent anti-condensation properties. Double skin panels filled with 60Kg/m³ Rockwool for improved attenuation are available.

Optional square or circular ducting is available on request for appropriate applications.

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 a working temperature of -15° to 60°C. A face and bypass damper can be supplied to bypass the heat exchanger during warmer weather. This prevents the room exhaust air, from warming the cooler supply air, by bypassing the plate heat exchanger via an independent thermostat and damper motor.

OPERATION

The SAPER units generally require a 240 V ac single phase supply, Where specified, a 380/415 V ac 3 phase and neutral supply may be required (check serial plate on side of unit or sales literature).

Each unit is provided with M16 cable entry glands to IP65 and suitable terminal block. This is wired to the mains isolator which electrically isolates both supply and extract fans, and the heater battery, where fitted. Speed control devices for each fan are available to commission fan airflow duties when required. Fan fuses are fitted to each fan.

All SAPER units require a suitable fused switched spur, or isolator sized to suit the individual running current. This must be located within 1½ metres of the unit and comply with the latest edition of the IEE regulations.

Switching the mains isolator to the 'On' position, will energise both fans. The heater operation is automatically controlled via the chosen controls package. Filter pressure switches are available when required.

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 reset 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 isolated. The airflow switch also provides volt free contacts for fan run / fail indication, wired to terminals located inside the electrical enclosure.

The secondary protection comes from the element overheat switch. If the electric heater element exceeds a certain temperature, the element overheat switch 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 element overheat thermostat.

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. Adjustable 0-30° C dial, factory set at 5° C steps per thermostat. 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 a 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 rows 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 on Puma controller).

Speed Controllers

Speed controllers can be fitted to most single 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 (AFS) which will drop out the Heating Relay (HR) when the airflow is too low. The element overheat thermostat will act as a fail safe.

Remote wall mounting speed controllers are available on request.

Three phase speed control can be provided by inverters (details on request).

When internal fan speed controllers are supplied loose or as a retrofit, please refer to data sheet OSI 002 which gives details of on site installation.

Damper and Motor Controls

If a Volume Control Damper (VCD) and motor are fitted, the damper motor is wired in parallel with the fan start 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.

INSTALLATION

The unit must be installed allowing sufficient access to the lid of the unit, as access to the serviceable components is via the lid.

The units are suitable for floor mounting on 'TICO' pad or anti-vibration isolators, if required. Flexible connections may be required between spigot and solid ductwork to prevent vibration transmission to the building structure.

All units are available as ceiling mounted versions, (denoted CM), after the model number. Care and attention must be given to unit location for suitable access.

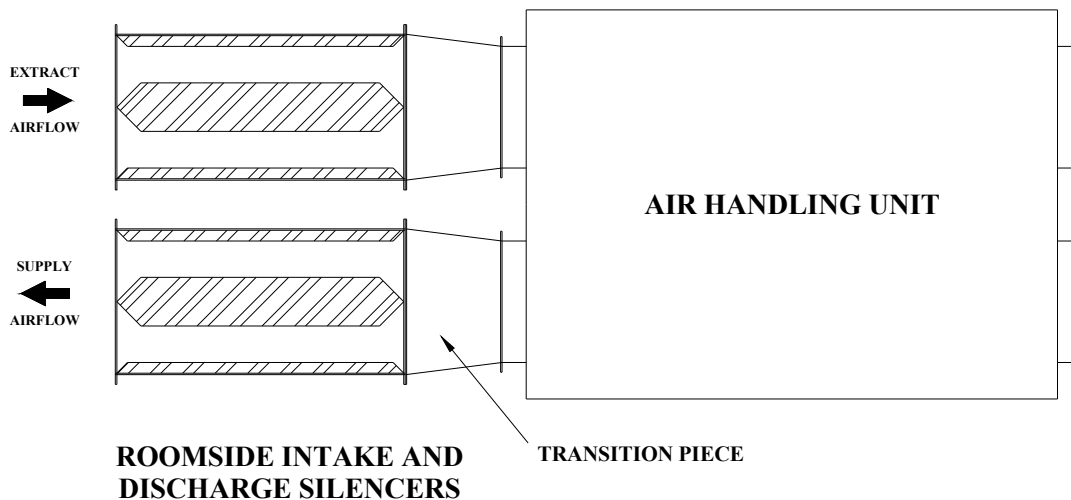
Silencer Installation

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 with a density of 60Kg/m³, tissue faced to eliminate fibre shedding.

The SAPER unit will be fitted with either circular or square silencers depending on duct connections required.

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 long sections added to the silencer, to help establish static regain, steady airflow and reduce air turbulence throughout the ductwork.

TYPICAL ARRANGEMENT



SERVICE & MAINTENANCE

The mains supply to all units must be disconnected at source before removing the lid.

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. If Airflow Failure Switches are fitted they should be checked for free movement and electrical conductance. Failure to change the filters at the recommended intervals will invalidate the warranty.

Fans are fitted with 'sealed for life' bearings that require no maintenance.

Refer to Puma technical sales leaflet for further information regarding dimensions, weights and unit performance and fan curves.

FAULT FINDING

FAN/MOTOR FAILS TO RUN

1. Check the unit is connected correctly, as per the wiring diagram supplied.
2. Check the mains supply, fuses/circuit breakers and the On/Off isolator
3. Check the Shutdown Relay link (SR) fitted between terminals L1 & L2 or SR1 SR2.
4. Check the control circuit fuse.
5. Check the fan fuse/s, located below the isolator, (single phase fans only).
6. Three phase fans and belt driven units 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. If the airflow is being restricted, or preventing the Airflow Failure Switch from operating correctly, check if the filter is dirty, and 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 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 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 approximately 10k Ω will be measured across the sensor (disconnected).
9. If a 4/8 stage electronic thermostat is fitted, check the parameters are correct in accordance with the separate instructions supplied with the thermostat.

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



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