

E-STACK (S-SERIES) ROOF BASED VENTILATION SYSTEMS

LOW ENERGY NATURAL VENTILATION SOLUTIONS DESIGNED FOR
LARGE CLASSROOMS, HALLS AND THEATRES.



BENEFITS

Designed for large classrooms as well as for halls and theatres, the square plan S-Series is ideal for rooms with 35 or more occupants (per unit), and which have access to the outside via the roof.

SUMMER

When it's warm outside, the system operates most effectively if air is allowed to enter the space through low level openings. Pre-heating is not required, and the system operates in upflow displacement mode. The damper in the S-Series unit opens as temperatures in the space rise, to maximise airflow and minimise heat build-up. If low level vents are not available, the S-Series units still allow the supply of fresh air to the space, and the removal of warmer stale air.

Even on hot, wind-free days the system ventilates the space as e-stack makes use of natural buoyancy-driven upwards displacement of air, so natural ventilation is continuously provided. Low-energy fan assistance is used only when required.

WINTER

With the S-Series unit accessing the exterior air through the roof of the room or hall, the system uses a mixing ventilation strategy when the external air is too cool to bring in directly on to occupants.

Fresh air is brought in through the internal annulus in a divided shaft above the S-Series unit and mixed.

At the same time the warm, polluted air is drawn out of the room and vented to the outside through the other section of the divided shaft.

By using this strategy, the heat gains which arise in the room through the use of lights, computer equipment and body heat, are used to heat the incoming air.

The system uses far less energy than conventional radiator-based systems which heat cold air as it enters the room at low level.

By avoiding the need to pre-heat incoming air, the heat gains within heavily occupied spaces, typically classrooms, are such that additional heating is not needed until the external temperature falls to below approximately 5°C depending on the building.

KEEPING CONTROL

The ventilation system is fully controlled with dedicated temperature and CO₂ sensors in the space allowing optimal ventilation for comfort and minimal energy consumption.

NIGHT COOLING

After periods of warmer temperatures, the S-Series unit automatically cools the space overnight without compromising building security. After the designated occupied day, the damper in the unit opens, allowing the space to naturally exchange air with the cooler exterior. The low energy fans in the unit will assist the night cooling if required.

ATTENUATION

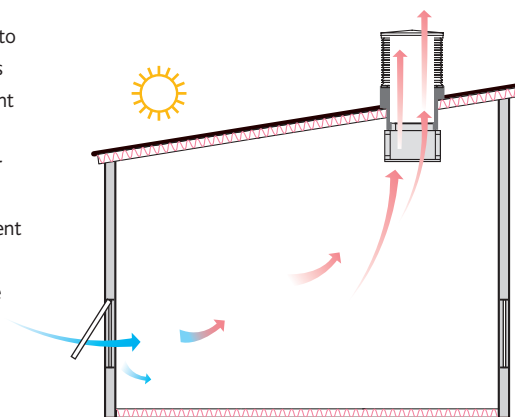
Attenuation can be provided to suit individual site requirements. Contact Nuaire for details.

WARRANTY

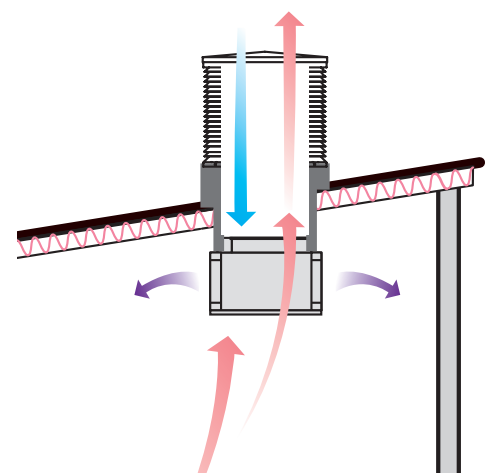
The S-Series has a 3 year warranty.

TYPICAL INSTALLATION OF E-STACK S-SERIES UNIT & ROOF TERMINAL

The S-Series units are suited to spaces with higher heat gains from sources such as occupant body heat, lighting, and equipment such as computer terminals. In large spaces multiple units provide sufficient ventilation and improve the distribution of fresh air in the room.



Unit shown in summer operation.



Unit shown in winter operation.

NATURAL VENTILATION

E-STACK S-SERIES

TECHNICAL INFORMATION

INSTALLATION OF THE S-SERIES UNITS

Whilst Nuair provide recommendations for the installation of supports for the units, the sizing and detailed design of the load-bearing supports must be specified and signed off by the structural engineers for the project.

Two fixing methods are suggested:

1. Vertical support studding attaches to either side of a cradle which supports the e-stack unit. The cradle can be formed from two unistrut channels.

2. e-stack mounting brackets supplied and used in conjunction with drop-rods to support the units. The ventilation unit hangs from 4no. pieces of M12 studding of maximum length 1200mm. The drop-rods are attached to the S-Series unit using welded brackets. The bracket length is 69mm to the centre of the fixing hole. The unit is lifted into place and four M12 Studding (drop-rods) are brought through the holes on the end of the welded brackets, positioned and secured in place using a pair of M12 full nuts per bracket.

Casing



Code description (Example)

NVS - 1200

1 2 3

1 = Natural Ventilation range
2 = S-Series
3 = Size: 1200 or 1500

S-SERIES 1500 FRESH AIR FLOW RATE & SOUND POWER LEVELS FOR ONE UNIT

Winter Mode Mixing - Slow

| Octave Band (Hz) | 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K | Overall (dBA) |
|------------------------|------|------|------|------|------|------|------|------|---------------|
| Sound Power Level (dB) | 40.9 | 42.3 | 39.2 | 37.7 | 34.1 | 23.6 | 19.3 | 24.1 | 38.7 |

Winter Mode Mixing - Fast

| Octave Band (Hz) | 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K | Overall (dBA) |
|------------------------|------|------|------|------|------|------|------|------|---------------|
| Sound Power Level (dB) | 46.3 | 46.5 | 43.5 | 42.1 | 39.8 | 29.5 | 20.3 | 24.1 | 43.5 |

Summer Fan Assist

| Octave Band (Hz) | 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K | Overall (dBA) |
|------------------------|------|------|-----|------|------|------|------|------|---------------|
| Sound Power Level (dB) | 40.5 | 40.6 | 40 | 39.5 | 37.9 | 27.9 | 20.7 | 24.3 | 41.1 |

S-SERIES 1200 FRESH AIR FLOW RATE & SOUND POWER LEVELS FOR ONE UNIT

Winter Mode Mixing - Slow

| Octave Band (Hz) | 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K | Overall (dBA) |
|------------------------|------|------|-----|------|------|------|------|------|---------------|
| Sound Power Level (dB) | 41.2 | 46.5 | 38 | 35.3 | 30.3 | 25.5 | 20.2 | 24.3 | 36.8 |

Winter Mode Mixing - Fast

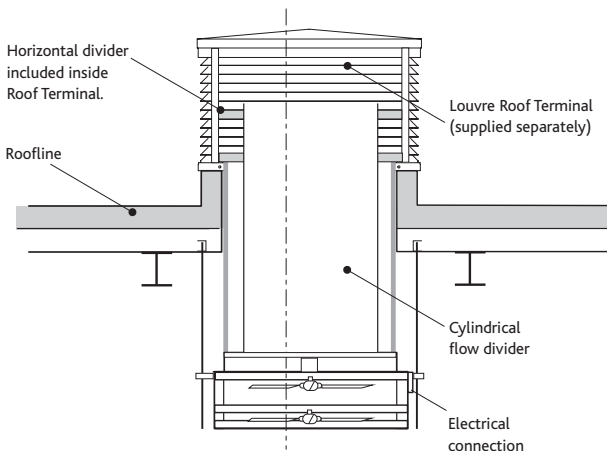
| Octave Band (Hz) | 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K | Overall (dBA) |
|------------------------|------|------|------|------|------|------|------|------|---------------|
| Sound Power Level (dB) | 43.5 | 49.7 | 40.9 | 37.5 | 33.9 | 27.9 | 18.0 | 24.4 | 39.6 |

Summer Fan Assist

| Octave Band (Hz) | 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K | Overall (dBA) |
|------------------------|------|------|------|------|------|------|------|------|---------------|
| Sound Power Level (dB) | 43.6 | 45.8 | 41.7 | 39.6 | 36.7 | 28.7 | 21.4 | 24.4 | 41.1 |

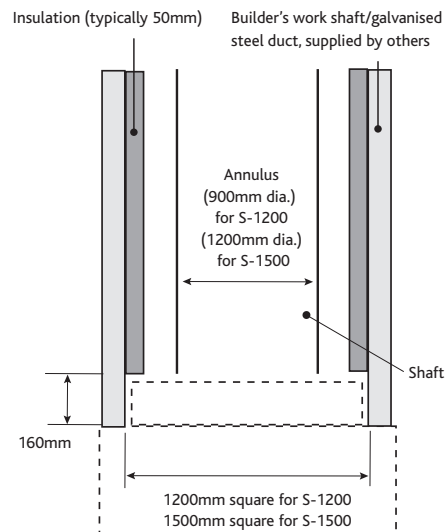
SHAFT DETAIL S-SERIES

Typical installation section through an S-Series unit visible in the space. In some projects it can be possible to locate the unit within ceiling voids/bulkheads.

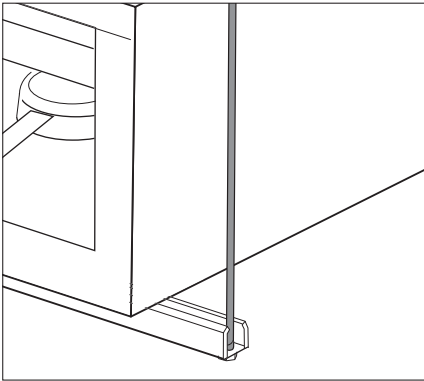


Typical square shaft detail.

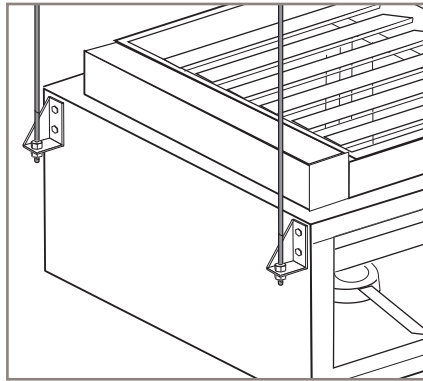
A square shaft with an annulus between each S-Series unit and roof termination is required.



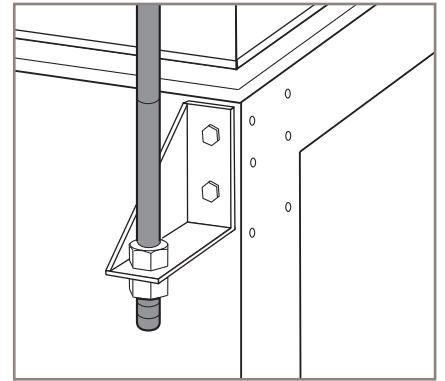
TYPICAL INSTALLATION METHODS FOR AN E-STACK UNIT



Option 1. Unistrut channel cradle.



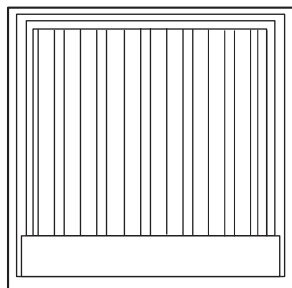
Option 2, showing drop rods attached to unit.



Option 2, close up of bracket.

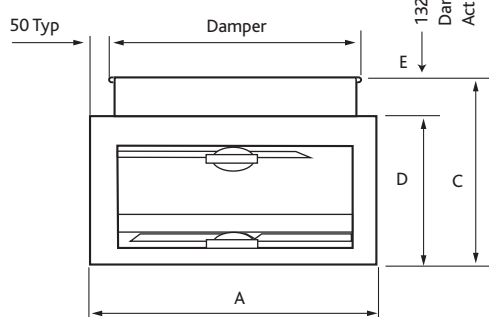
DIMENSIONS (mm) - S-SERIES

Plan view

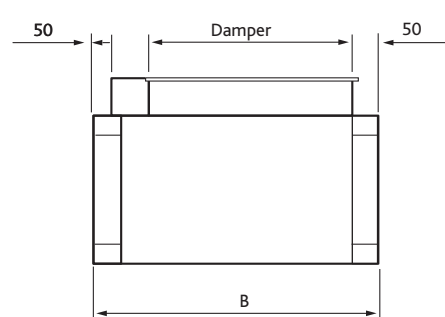


| Unit | A | B | C | D | E |
|-------|------|------|-----|-----|-----|
| S1200 | 1275 | 1275 | 630 | 500 | 130 |
| S1500 | 1575 | 1575 | 630 | 500 | 130 |

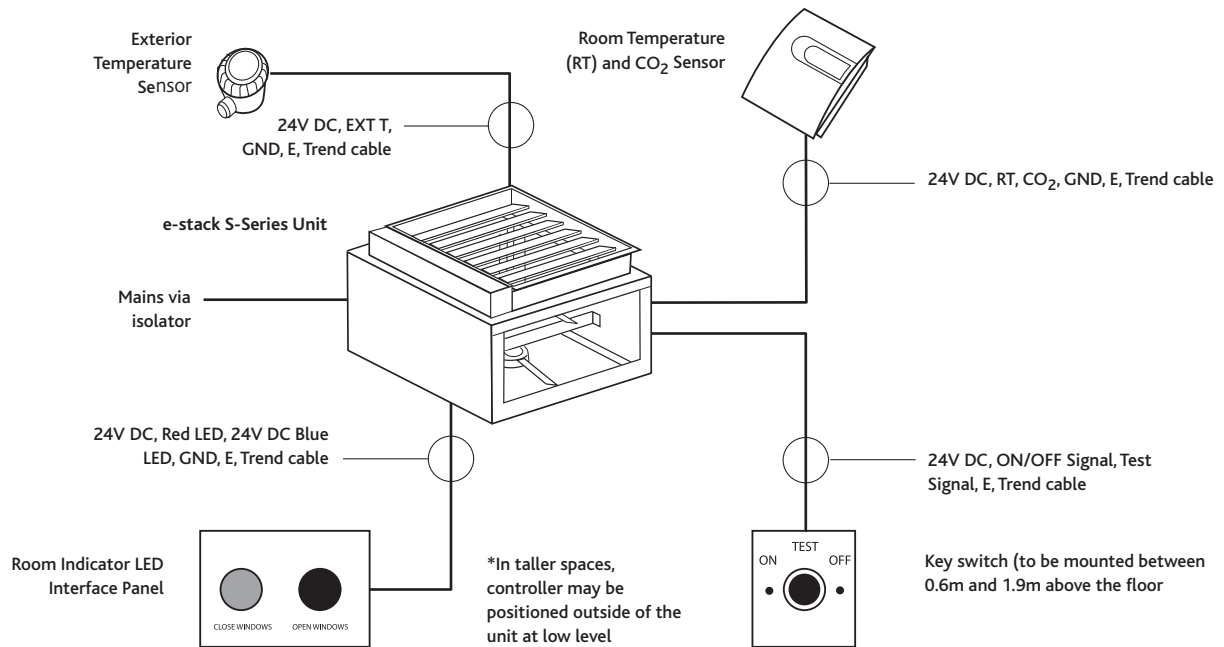
Side view



End view



TYPICAL S-SERIES WIRING LAYOUT



Note: Trend cable = TP/2/2/22/HF/200

MECHANICAL AND ELECTRICAL SPECIFICATION S-SERIES

| | |
|-----------------------------|--|
| Dimensions: | S-1500: 1575mm (L) x 1575mm (W) x 500mm (H). S-1200: 1275mm (L) x 1275mm (W) x 500mm (H). (both 630mm high incl. damper housed in shaft). |
| Shaft requirements: | S-1500: Shaft aperture 1500mm x 1500mm with cylindrical flow divider (1200mm). S-1200: Shaft aperture 1200mm x 1200mm with cylindrical flow divider (900mm). |
| Nominal Weight: | S-1500: 200kg. S-1200: 150kg. |
| Construction: | Galvanised steel or Zintec. |
| Recommended fixing methods: | Via drop rods and cradle arrangement (by others) or brackets. Rubberised seal on top flange provides airtightness to shaft. |
| Colour: | Standard galvanised finish or Zintec powder coated to RAL9010 at additional cost. (other RAL and BS colours available). |
| Dampers: | Actuated insulating low-leakage volume control dampers with fully modulating rotary actuator. |
| Controller: | Internal controller to operate fans and dampers in response to sensed environmental conditions. Additional control signals for automated high / low level openings can be supplied if required. |
| Sensors: | Combined interior temperature / CO ₂ sensor. External temperature sensor. |
| User interface: | Key switch (on/off/test mode). Red / blue "Open/Close Windows" indicator panel. (for low level manually opening windows). |
| Voltage: | 230V single phase, 50Hz. |
| Power Consumption: | 0.1kW. |
| Full load current: | 0.43A. |
| Short circuit rating: | N/A, Control circuits only. |
| Earth leakage: | <3.5mA. |

CONSULTANTS SPECIFICATION

SYSTEM DESCRIPTION

The spaces shall be provided with an automatic ventilation system to meet fresh air ventilation requirements in line with the BB101 or CIBSE Guide A guidelines for ventilation. The system shall be designed to prevent summertime overheating and shall maintain a daily average of 5l/s/person (BB101) or 10l/s/p (CIBSE Guide A) of fresh air all year round.

The system shall include a ventilation unit incorporating insulated dampers, an internal mixing system, induction fans and an integral controller.

The unit shall be connected to grilles in the room and to a shaft leading to an external weatherproof penthouse louvre unit above. The ventilation shaft from the room to the weatherproof penthouse louvre is to be provided by others and is a builders work requirement.

The penthouse louvre units shall incorporate weatherproof louvres with the required aerodynamic effective area to ventilate the rooms.

SYSTEM OPERATION

In winter - the ventilation shaft shall be used for fresh air intake & exhaust. The unit at the base of the shaft shall mix the incoming cold air with sufficient hot interior air prior to the fresh air entering the occupied space in order to minimize the risk of cold draughts, and the requirement for pre-heating of air using hot water coils or similar.

In summer - the unit will operate as a buoyancy-driven natural ventilation system. It shall have the ability to automatically induce buoyancy to the direction of desired airflow via an integrated induction fan.

The fan shall operate automatically as the conditions within the space vary.

Once the fan has induced the airflow it shall return to its standby mode, allowing the system to function entirely under the relative buoyancy. The unit will work in conjunction with openable windows on the external façade of the space, providing a crossflow ventilation effect with air being drawn through the room into the unit and discharged to atmosphere via the builders work shaft.

The roof mounted units shall incorporate a bird guard, plus a section designed to attenuate rain noise, and polyester powder paint finish to the required standard RAL colour if required.

CONTROL SPECIFICATION

Each ventilation unit shall be automatically controlled via a combined temperature / CO₂ sensor located in each room together with a common external temperature sensor to determine the operation of the unit. The ventilation unit shall be capable of providing automatic, secure night cooling, allowing cool air to enter the space via the unit, utilizing the integrated fan to induce the flow if the conditions in the space require it.

A 2-gang switch plate with lamps to indicate when windows should be open/closed together with key switch for activating On / Off / Test mode will be located in each room. Position of the indicator lamps and key switch to be as indicated on the tender drawings and co-ordinated with any other electrical components required in the space.

The S-Series has a 3 year warranty comprising of first year parts and labour with remaining two years parts only.

The equipment shall be the e-stack S-Series as supplied by Nuair.