

# Welcome to the world of Sentinel Demand Energy Recovery Ventilation

Sentinel Totus<sup>2</sup> Demand Energy Recovery Ventilation (D-ERV) is a new heat recovery demand ventilation system designed to meet modern building management control principles. It responds to the exact ventilation requirements of a room at any one time providing airflow only when it is required and to the level that is required, therefore using only the energy that is needed; no more no less, whilst recovering maximum energy from the extracted air and transferring it to the fresh supply air. This overcomes many of the issues encountered with a traditional fixed volume ventilation system that is either ON or OFF irrespective of the occupancy of the room, risking over ventilation, burning valuable money and is a wasteful use of energy. There is an additional benefit to this demand controlled lower speed running, one of reduced noise intrusion, something that in today's society is becoming more important to end users.

## Vent-Axia's dedicated HEVAC team offers:

- ✓ Practical advice on HEVAC selection and installation
- ✓ Guidance on solutions to meet legislation requirements
- ✓ Project management and site deliveries
- ✓ After sales support and maintenance information

## The need to recover energy

The high efficiency cell incorporated within the Totus<sup>2</sup> range achieves a market leading 90% efficiency (EN308 independently tested). This enables Sentinel Totus<sup>2</sup> to recover a third more energy than a 70% efficient device. This high efficiency means that heating and cooling loads associated with 'extract to waste' type systems can be reduced by up to 25% in both heating and cooling seasons. This high efficiency also means that expensive after heaters, often required in lower efficiency heat recovery devices, are now not required.

## The need to save costs

Rising fuel prices are placing an increasing burden on organisations as they seek to reduce consumption. Sentinel Totus<sup>2</sup> DERV features:

- ✓ High efficiency heat exchanger - up to 90% energy recovery offering savings of up to 25% on heating and cooling loads
- ✓ Integral automatic summer bypass - providing free cooling during summer
- ✓ Single skin construction with 95kg/m<sup>3</sup> thermal and acoustic foam insulation (Maxi unit double skinned)
- ✓ Low stand by power only 0.6W
- ✓ Energy efficient EC/DC motors - 1/3 less energy lost to heat than a conventional AC motor
- ✓ ERP 2015 compliant fans



### The need for system integration

With the drive towards 'whole building cost' philosophy maintenance schedules and costs are all now essential elements of the project in addition to the initial capital costs. Sentinel Totus<sup>2</sup> D-ERV incorporates a number of integrated features to offer maximum flexibility during design, build and operation including:

- ✓ Air conditioning interlock - to optimise energy recovery
- ✓ Heating system interlock - summer bypass optimisation
- ✓ Interfaces for BMS control and monitoring
- ✓ EC/DC motors with lower maintenance requirements and longer service life
- ✓ Aluzinc casing - suitable for external installations as standard
- ✓ Optional cowl for roof mounting
- ✓ Integral condensate pump - reduces installation costs and space requirements
- ✓ In-built automatic frost protection - prevents heat exchanger freezing at very low temperatures
- ✓ Ability to utilise the frost heaters as top up heat removing the need for additional duct mounted heaters
- ✓ In-built backlit LCD user control interface which can be remotely mounted to suit site requirements
- ✓ Night time purge facility to reduce overheat during warm summer periods

### The need for better health

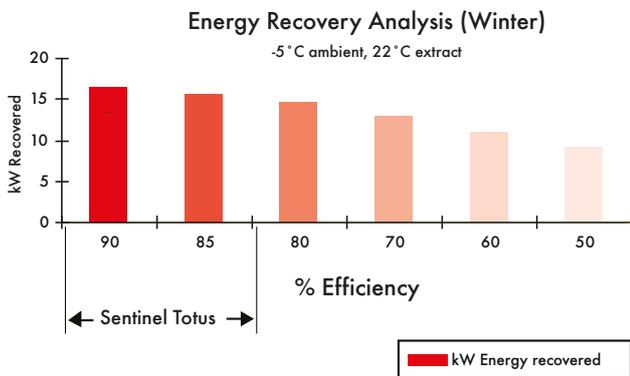
Removal of pollutants, such as moisture, carbon dioxide and external fumes are all important factors in maintaining indoor air quality. Studies within schools have demonstrated that maintaining lower carbon dioxide levels helps create a better learning environment.

- ✓ Hierarchical control maintains CO<sub>2</sub> levels within levels described in Building Bulletin 101
- ✓ Low sound levels meet requirements of Building Design
- ✓ Automatic up to 100% summer bypass providing free summer cooling
- ✓ Demand control optimising indoor air quality
- ✓ Closed loop control system ensures maximum comfort levels at minimum energy levels

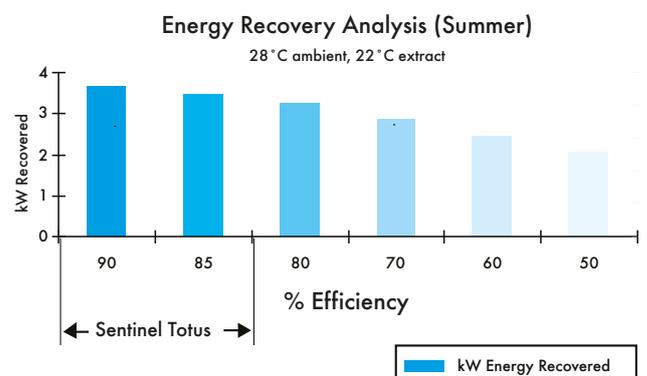
### The need to meet legislation

The Energy Performance of Buildings directive is implemented through the UK building regulations. Sentinel Totus<sup>2</sup> is fully compliant with both Part F and L requirements.

- ✓ Meets the requirement of the Building Services Compliance Guide minimum specific fan power requirements.
- ✓ Market leading 90% heat exchange efficiency independently tested to EN 308
- ✓ Meets carbon footprint reduction targets
- ✓ Lowest Specific Fan Power figures of any high efficiency D-ERV product



Airflow m <sup>3</sup> /s	Efficiency %	kW Heat recovered	Supply temp °C
0.555	90	16.51	19.3
	85	15.59	18.0
	80	14.67	16.6
	70	12.84	13.9
	60	11.00	11.2
	50	9.17	8.5



Airflow m <sup>3</sup> /s	Efficiency %	kW Cool Recovered	Supply temp °C
0.555	90	3.67	22.6
	85	3.46	22.9
	80	3.26	23.2
	70	2.85	23.8
	60	2.45	24.4
	50	2.04	25.0

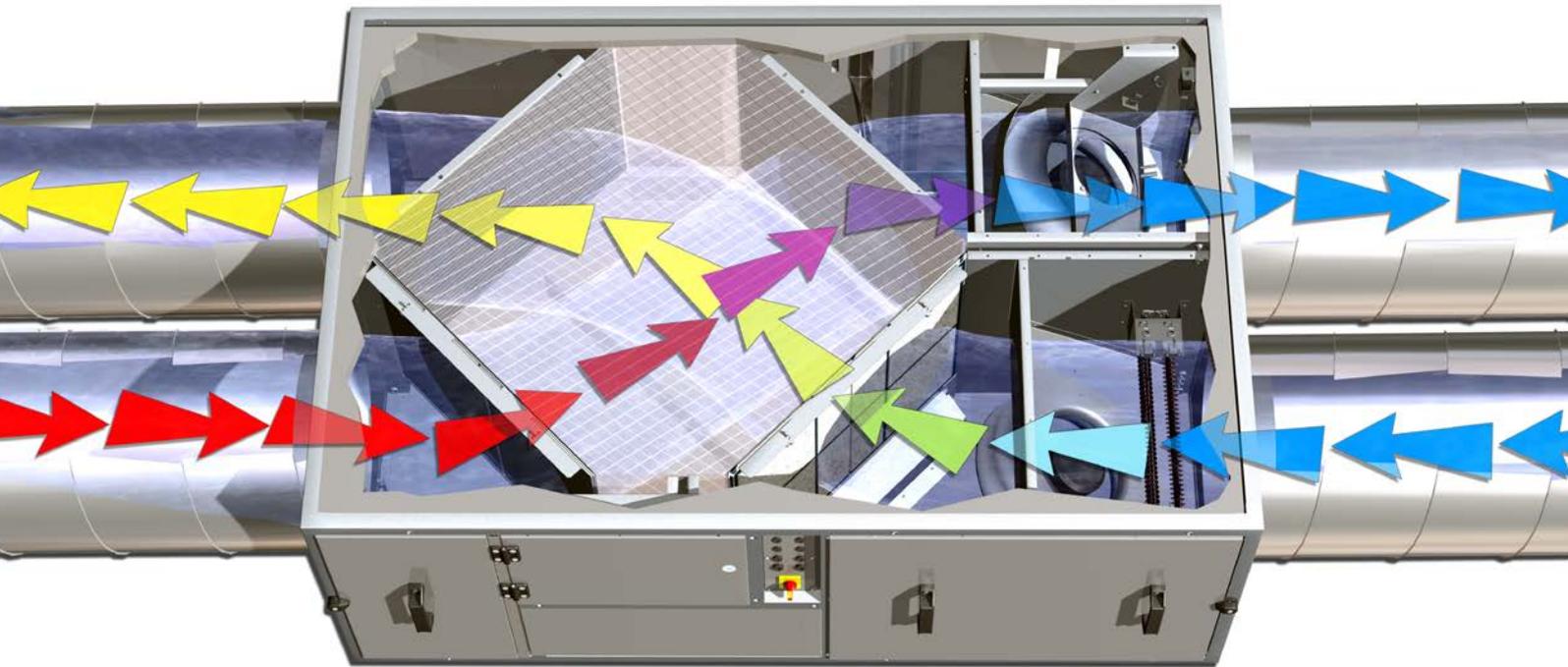
### The need for energy recovery

Rising fuel prices are placing an increased burden on organisations as they seek to reduce consumption.

Sentinel Totus<sup>2</sup> D-ERV incorporates a number of market leading technologies and control strategies to take commercial heat recovery ventilation to the next level and further reduce energy consumption and waste.

- ✓ **Sentinel demand ventilation control** - matching air quality with low power consumption using high efficiency, low energy EC/DC motor technology
- ✓ **Energy saving control functions** -
  - i. Automatic summer bypass - provides free cooling during summer
  - ii. Low standby power - 0.6 Watts
  - iii. Night time purge facility - reducing air conditioning start up loads

- ✓ **System interfaces** - to optimise interface with environmental control systems
  - i. Air conditioning interlock - to maximise energy recovery opportunities
  - ii. Heating system interlock - to optimise summer bypass functionality
  - iii. BMS interfaces - control and monitoring
- ✓ **High efficiency energy recovery cell**
  - i. Up to 90% energy recovery - reducing associated heating and cooling loads by up to 25%
  - ii. High efficiency eliminates the need for re-heaters e.g. typically at -5 °C ambient, 22 °C room conditions the supply air temperature is maintained above 19 °C



The Sentinel Totus<sup>2</sup> D-ERV units incorporate a brand new market leading counterflow heat exchanger.

The Sentinel Totus<sup>2</sup> D-ERV range has been independently tested to EN 308 to achieve energy savings of up to 90% and higher in the case of condensation.

The plate heat exchanger is a true counterflow device, incorporating a special plate edge seal, to enhance air tightness and stability, eliminating the transfer of odours or humidity and ensuring the highest efficiency levels.

The aluminium construction makes it insensitive to frost and heat damage and tolerant to pressure imbalance conditions, unlike equivalent paper or plastic variants.

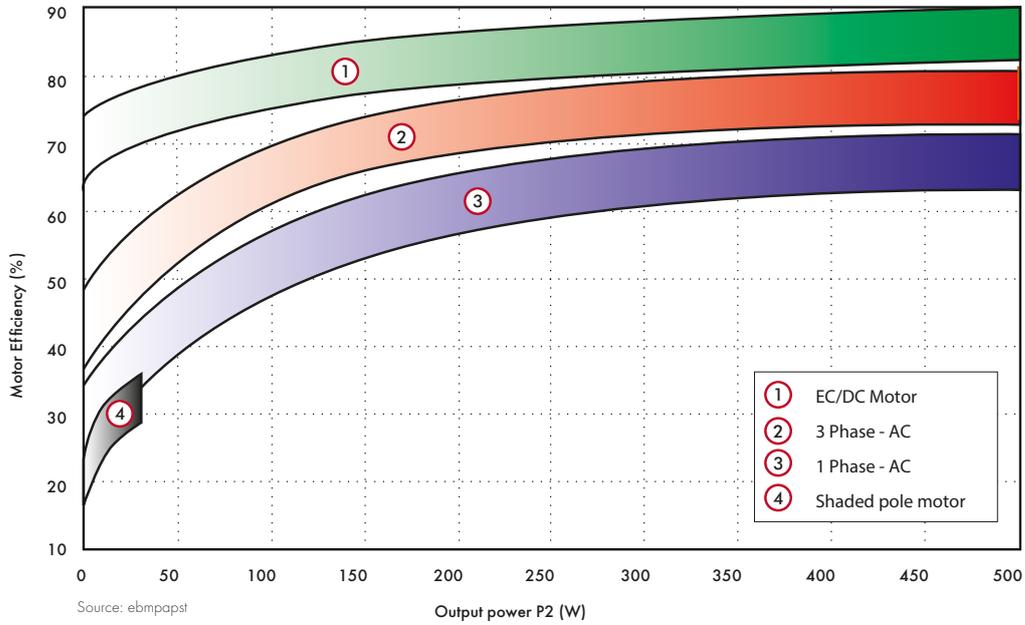
This high efficiency energy recovery ventilation system also includes further functions to reduce energy usage and maintain high levels of indoor air quality.

- ✓ High efficiency EC/DC motors and backward curved impellers with 'Sentinel' demand control logic to optimise IAQ, whilst using the minimum amount of energy
- ✓ Built-in automatic up to 100% summer bypass, to take advantage of free cooling opportunities (with air conditioning interlock)
- ✓ Heating system interlock to ensure free cooling is optimised
- ✓ Low standby power 0.6 Watts (PIR actuation)
- ✓ Night time purge facility to reduce overheat during the operational day and reduce air conditioning start up loads

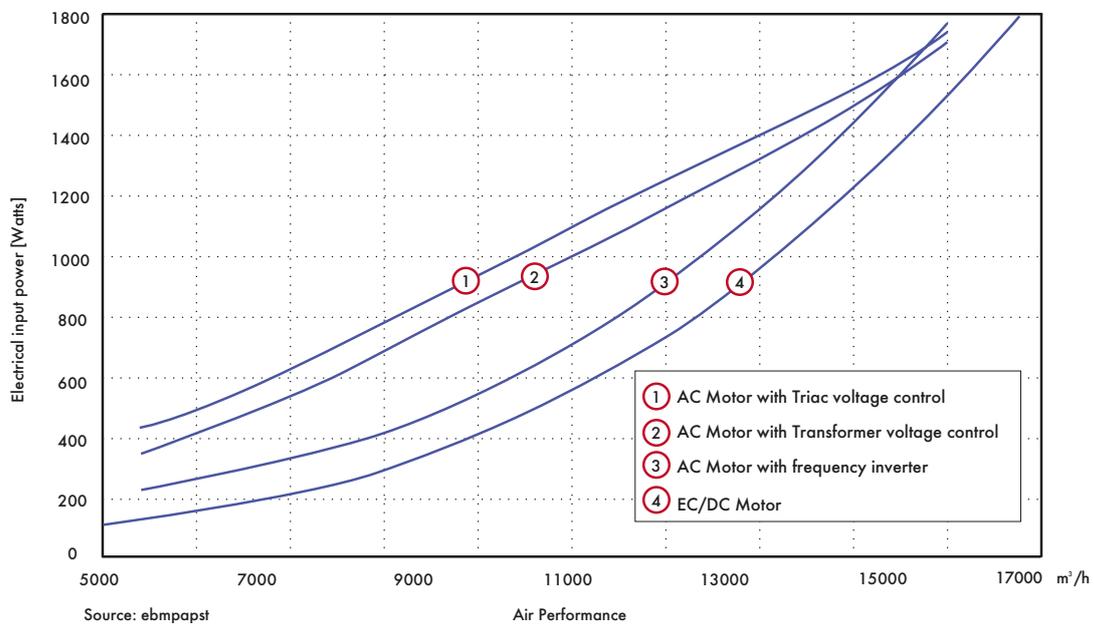
## EC/DC energy saving fan motor benefits

- ✓ Higher efficiency at full speed - at 50% reduction in motor speed gives an 88% reduction in power usage
- ✓ Continuous speed control across the full operating range giving an increased tolerance to high and low pressure
- ✓ ERP 2015 compliant fans
- ✓ Low noise compared to a step control motor
- ✓ Power input lost as heat is reduced by 1/3 compared to a conventional AC motor
- ✓ Lower maintenance requirements and longer service life

## Highest Motor Efficiency



## Typical EC/AC Motor Speed Control Comparison



As can be seen from above motor comparisons, the EC/DC motor offers higher efficiencies when compared to AC motors, and also consumes less power under speed control, giving both the highest motor efficiency and lowest power consumption across the speed control range.

## Demand control



Precise control of the Sentinel Totus<sup>2</sup> D-ERV system, driven by the ventilation requirements of the room at any one time, means that the system is only running to the level required, using energy when it is needed. A range of sensors are employed to determine the occupancy of the rooms, and manage the system ventilation rates accordingly. This optimises the use of energy whilst meeting the legislation requirements of the building.

This compares to a 'traditional' fixed volume system, which in general is either 'ON' or 'OFF' often using energy to ventilate an empty or half occupied room, over ventilating and wasting energy.

### System overview

The Sentinel Totus<sup>2</sup> D-ERV system is made up of 4 elements:

- ✓ Up to 90% energy recovery (EN 308)
- ✓ Low energy EC/DC motors
- ✓ Sentinel Totus<sup>2</sup> D-ERV, Demand Energy Recovery control
- ✓ Sensors and Controls

The ventilation demands of the room are detected by the wall or ceiling mounted Sentinel Totus<sup>2</sup> D-ERV sensors/switches. These communicate with the Sentinel Totus<sup>2</sup> D-ERV unit, which in turn drives the fan to the required speed to deliver the airflow. As the ventilation is provided to the room, the sensors continuously feedback to the control unit, driving the fan motor to the exact level required in the room at any one time.

### Hierarchical control

The system is controlled by on board electronics, with an LCD display showing fan status and allowing for simple commissioning and installation, whether as a local sensor control unit or linked into a building management system. The LCD display unit can be remotely mounted if required.

1. Switched on/off or minimum/maximum level control. In an environment such as an office, the system is activated and runs between minimum and maximum levels by a choice of sensors:

- PIR Detector
- Thermostat
- Humidistat
- BMS (remote enable)

2. Hierarchical – maximum demand multi sensor input used with a combination of sensors, with a defined level of priorities to simultaneously control a number of atmospheric conditions within a room, such as a meeting room:

- CO<sub>2</sub>/temperature - room mounted
- CO<sub>2</sub> - duct mounted
- Building Management System (0-10V)

### Constant pressure extract

Applied in a discreet central extract system, such as hotel bathrooms or apartment blocks, the system grilles and/or duct dampers are controlled by the presence of a person in the room or by achieving required levels of humidity. The central system will respond to the demand depending on the number of active rooms.

- PIR/Humidity Extract Grille 125mm
- PIR 12 - 70m<sup>3</sup>/h
- Humidity: 12m<sup>3</sup>/h - 30% RH to 70m<sup>3</sup>/h - 75% RH
- Motorised Duct Dampers 100mm - 315mm Dia

Built in end stop adjustment for setting minimum and maximum volume.

24V Min/Max or 0-10V proportional control options. Motorised Duct Dampers – Sensor Control options

Each 24V powered extract damper can be controlled by one of the following sensors:-

#### Min-Max (DVDxxx/MM)

- AQS- Air Quality Sensor – Room (432953)
- PIR Detector – Room (433162)
- Thermostat - Room (563502B)
- Humidistat - Room (432945)
- Proportional 0-10V (DVDxxx/PC)
- Carbon Dioxide Sensor – Room (433257)
- Carbon Dioxide Sensor – Duct (433259)

**Note** Local 24V power supply required to power Dampers & Sensors.

The Sentinel Totus<sup>2</sup> D-ERV units are manufactured from Aluzinc sheet and are suitable for internal or external mounting as standard.

### System technology

Sentinel Totus<sup>2</sup> D-ERV is a closed loop controlled ventilation system. Employing a range of sensors to manage the system, demand is sensed by PIR, temperature, humidity, air quality or carbon dioxide sensors. Depending on the levels in the rooms, Sentinel Totus<sup>2</sup> D-ERV's fan speed is ramped up or down to control the parameters within the required limits. If the room is unoccupied, the system switches off, saving energy and cost to the business.

The unit standby power consumption is only 0.6 Watts.

### The EC/DC energy saving fan motor technology



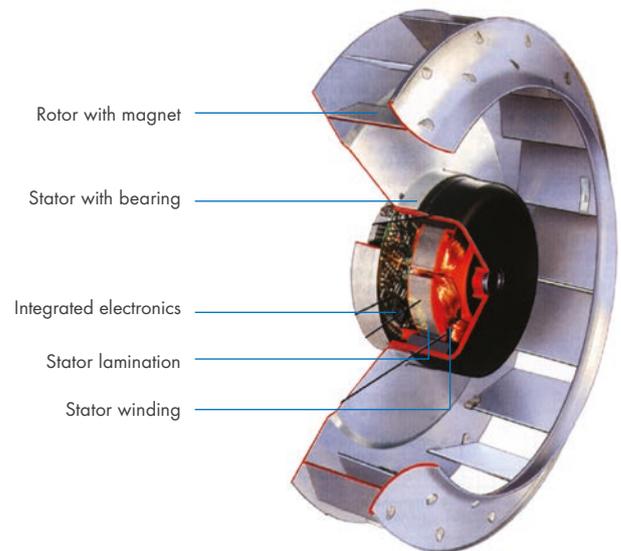
- ✓ Compliant to ERP 2015, future proofed fan and motor assemblies
- ✓ Higher efficiency at full speed - at 50% reduction in motor speed gives an 87.5% reduction in power usage
- ✓ Continuous speed control across the full operating range giving an increased tolerance to high and low pressure
- ✓ Low noise compared to a step control motor
- ✓ Power input lost as heat is reduced by 1/3 compared to a conventional AC motor
- ✓ Lower maintenance requirements and longer service life

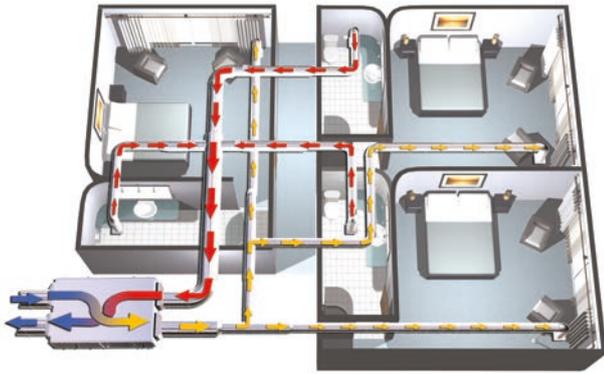
Sentinel Totus<sup>2</sup> D-ERV utilises the latest EC/DC motor technology, which provides energy saving benefits even over DC motors.

This technology is also infinitely speed controllable and offers increased energy savings across the complete speed control range when compared with conventional inverter drive solutions. The result is higher efficiency, reduced noise, accurate controllability, better speed control drawing less power and as a result better overall system performance. Volume reduction also increases energy recovery efficiency beyond the published figures.

Sentinel Totus<sup>2</sup> D-ERV can be used in a hierarchical system where maximum demand, for example temperature and/or CO<sub>2</sub> gives priority control of the fan speed or a constant pressure system with room mounted PIR/grilles or in-line damper control.

### Heart of EC/DC motor





Typical network of hotel bathrooms/flats/apartments



Typical school classroom

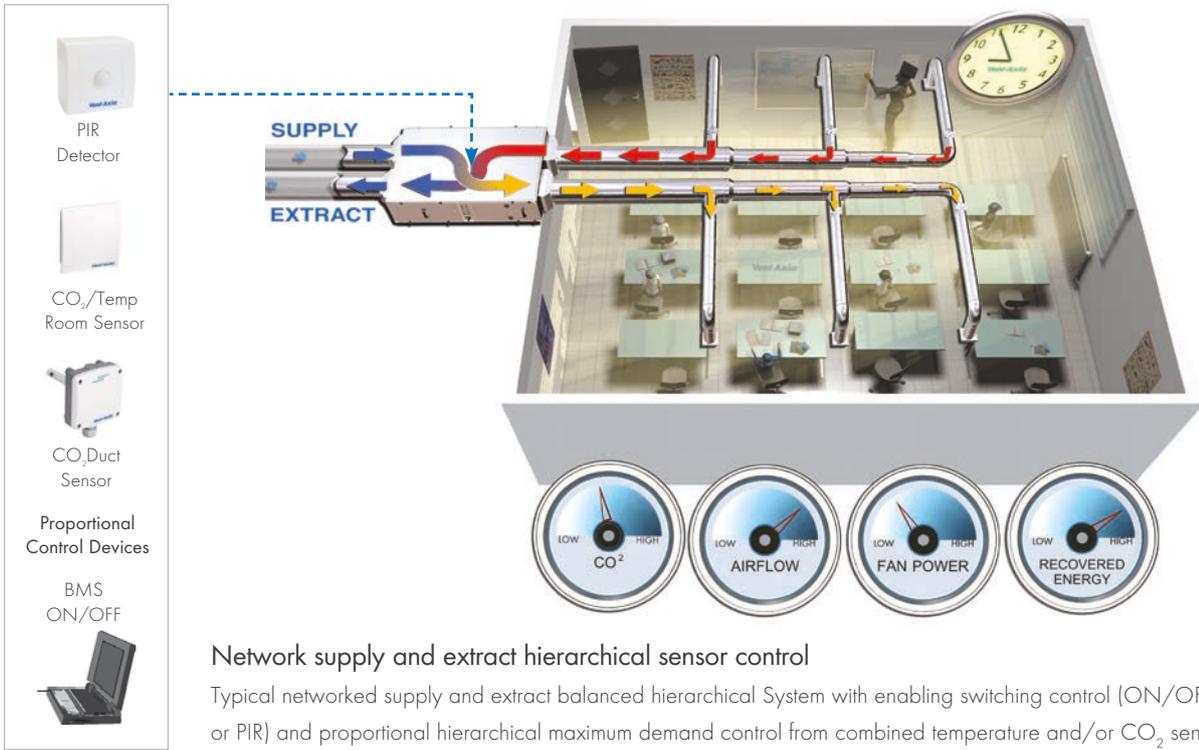
Sentinel Totus<sup>2</sup> D-ERV is a new range of energy recovery ventilation systems for multi occupancy and variable demand rooms. Using energy efficient EC/DC fans, 90% heat recovery with intelligent sensing and control, the system meets the ventilation requirements of both new builds and refurbishment projects.

Ideal for applications where the rooms are used at different times of the day by a variable number of people, the Sentinel Totus<sup>2</sup> D-ERV system will monitor occupancy, ventilation rate and air quality, and respond accordingly to maintain the atmosphere within preset limits, recovering up to 90% of extracted energy.

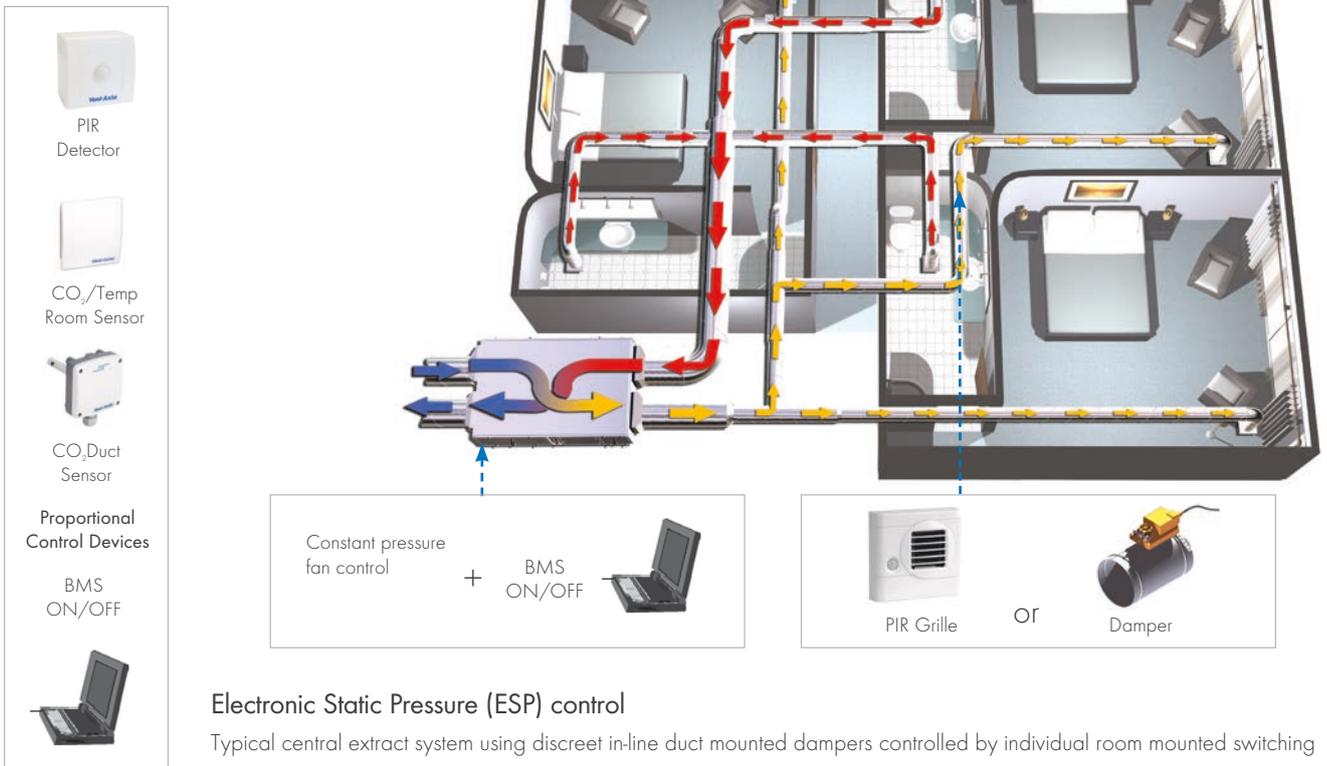
**Typical applications include:**

- ✓ A network of hotel bathrooms, flats or apartments which require ventilation but are only used for limited periods particularly in the morning and evening
- ✓ School classrooms and lecture theatres which are only occupied during lesson time by a variable number of students, but when used must keep CO<sub>2</sub> levels within prescribed limits
- ✓ Office meeting rooms or open plan areas which again are used periodically during the day by a variable number of staff and visitors, but when occupied must meet required airflow rates

Automatic sensing and control runs the system according to the maximum demand requirements of the building zone, whether it be carbon dioxide levels, temperature, humidity or air quality - triggered by people entering or leaving the rooms. Common configurations include Electronic Static Pressure (ESP) controllers for constant pressure systems.



**Central extract controlled system - hotels or apartments**



## Operation

The supply and extract ventilation unit shall be as Sentinel Totus<sup>2</sup> D-ERV, as manufactured by Vent-Axia and shall be sized as indicated on the drawings and shall be in accordance with the particular specification.

Supply air to the room shall be pre-heated by the extract air via the integrated aluminium counterflow heat recovery cell. The Sentinel Totus<sup>2</sup> D-ERV unit shall automatically vary the ventilation rate via EC/DC motors as it receives signals from one of the optional interconnected sensors. When a signal is received, the fans shall either vary their speed proportionally or on a trickle and boost principle.

The unit shall have the facility to commission the supply and extract fans individually via in-built minimum and maximum speed adjustment. The fans themselves shall have infinitely variable speed control.

## Unit specification

The unit shall be manufactured with a frameless construction, and incorporate single skinned Aluzinc panels (Maxi unit double skinned) with a high thermal and acoustic efficiency internal insulating foam. The unit shall be suitable for internal or external mounting as standard.

The unit shall have a high efficiency aluminium counterflow heat exchanger, supply and extract filters, automatic summer bypass on up to 100% of airflow, integral minimum and maximum infinitely variable speed controls with fascia mounted failure indication.

The unit shall have low energy, high efficiency EC/DC fan/motor assemblies with sealed for life bearings. The impellers shall be high efficiency backward curved centrifugal type fully compliant with ERP 2015.

The unit shall have a heat exchanger cell with a thermal efficiency of up to 90% when tested to EN 308. This shall be protected by G4 grade synthetic filters on supply and extract. Complete with a condensate drip tray, internal condensate pump and drain connection.

The unit shall incorporate 2 stage electric frost heaters to protect the cell from freezing under low ambient conditions. The frost heaters shall be programmable to allow operation as a 'top up' heating source, without the need for additional duct mounted heaters.

The unit shall be constructed with removable top and bottom access panels, or side panels for the Maxi unit allowing full maintenance access.

The removable panels shall provide access to the following:

- ✓ Supply or extract fan
- ✓ Supply and extract filter
- ✓ Heat exchanger
- ✓ Frost heater

Within a separate side access section access shall be provided for wiring termination and set-up/commissioning. The backlit LCD user interface therein shall be within a separate viewing and access panel allowing commissioning without the need to access the wiring section. This controller can be demounted for remote installation if required.

Units shall be as manufactured by Vent-Axia Ltd.

## Standard controls

All Sentinel Totus<sup>2</sup> D-ERV units shall incorporate the following functions integrally mounted, pre-wired and factory fitted by the manufacturer:

- ✓ Integral infinitely variable fan speed control on supply and extract
- ✓ Integral min/max ventilation control/set point
- ✓ Integral BMS interfaces - control and status indication
- ✓ Cooling and heating interlocks (summer/winter)
- ✓ 0-10V speed adjustment
- ✓ Integral on/off or trickle boost function from remote switch, e.g. PIR occupancy detector
- ✓ Automatic frost protection by in-built electric frost heaters
- ✓ User settable night time purge function to purge the room automatically over night to reduce morning start up loads within the space during hot summer periods
- ✓ The unit shall be controlled by the 'Sentinel' control devices (enablers and sensors) as detailed in the schedule or on the drawings

## Frost protection and control

The control for the in-built electric frost coils shall be 2 stage fully integrated and automatic and will ensure the energy recovery cell does not freeze up under low ambient conditions. The frost protection system will switch in each of the 2 stages as required when ambient temperature falls below 0°C.

# Sentinel Totus<sup>2</sup> D-ERV

- 3 unit sizes covering 500-2000m<sup>3</sup>/h
- Sentinel demand ventilation control
- Low energy EC/DC motors
- Internal or external mounting IPX4
- Up to 90% energy recovery cell
- Independently Tested to EN 308
- Proportional or constant pressure control
- Performance tested to BS848 Parts 1 & 2
- Manufacture controlled to BS EN ISO 9001



Mini and Midi Models are manufactured with a frameless construction from single skinned Aluzinc panels, internally lined with 90kg/m<sup>3</sup> high efficiency acoustic and thermally insulating foam (fire retardant to BS476 Part 7 Class 1 & Part 6 Class O). Aluzinc panels allow for all units to be mounted either internally or externally as standard (IPX4). An optional inlet cowl is available for roof mounting applications if required.

Maxi units are manufactured with an aluminium frame construction with double skinned Aluzinc panels fitted with 60kg/m<sup>3</sup> thermal acoustic insulation.

The casing includes an inclined inlet and bellmouth entry which directs the incoming air to the impeller with minimal turbulence. The result is better air management through the unit, less noise, higher efficiency and an increased performance.

The housing is designed to be as compact as possible for concealed false ceiling applications and Sentinel Totus<sup>2</sup> D-ERV, Demand Energy Recovery casings incorporate top and bottom access panels for maintenance (note Maxi unit is side access). Access panels are sized to enable single man maintenance.

## Impellers

All Sentinel Totus<sup>2</sup> D-ERV units feature low energy, Class 1, EC/DC external rotor motor and backward curved impeller assemblies specifically chosen for performance and non-overloading characteristics. The assembly is dynamically balanced to DIN ISO 1940 Grade 6.3. Ball bearings are greased for life. Insulation is Class 'B' (from -25°C to +60°C). All models incorporate internal electronic overload protection and soft start function.

## Filters

All Sentinel Totus<sup>2</sup> D-ERV units are complete as standard with G4 replaceable synthetic filters, complete with filter change warning. High grade F6 filters are available as an option.

## Performance/Sound

Extensively tested to BS848 parts 1 & 2. Published dB(A) figures are free field sound pressure levels at 3m with spherical propagation at reference level of 2 x 10<sup>-5</sup> Pa. The inlet/outlet sound power level spectra figures are dB with a reference of 10<sup>-12</sup> watts.

## Electrical

Every Sentinel Totus<sup>2</sup> D-ERV unit is fitted with integrated controls and a purpose designed common user interface controller incorporating a 16 character backlit alpha numerical 2 line display with 4 button membrane keypad for fan status and commissioning set up. As standard this is mounted behind a removable perspex viewing pane allowing commissioning without accessing the wiring compartment. The user interface can be removed and remotely fixed if required. The unit also incorporates an isolator that is suitable for fitting a locking device to prevent accidental operation.

Motors are single phase 230V +/- 10% / 50/60Hz / 1ph.

24V DC power is provided from the unit for powering the matched range of Sentinel Demand Ventilation switches and sensors.

## Models

Sensor Control

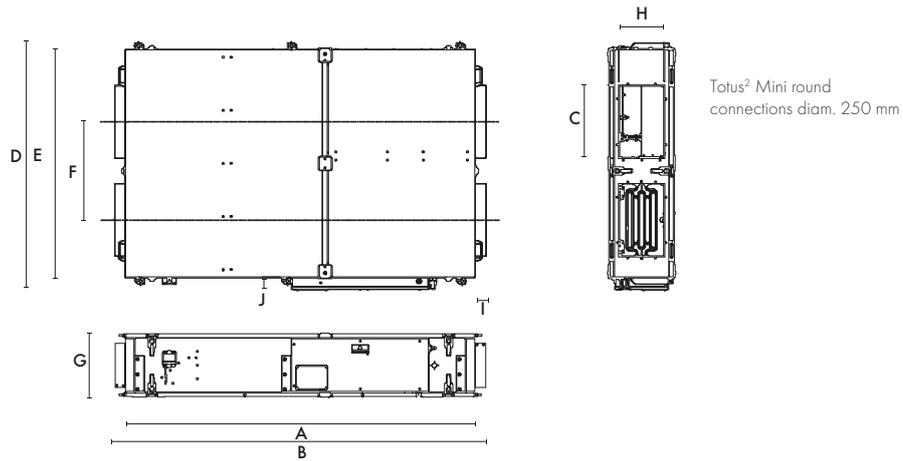
Model	Stock Ref
Mini	TOTUS2MINI
Midi	TOTUS2MIDI
Maxi	TOTUS2MAXI

Constant Pressure

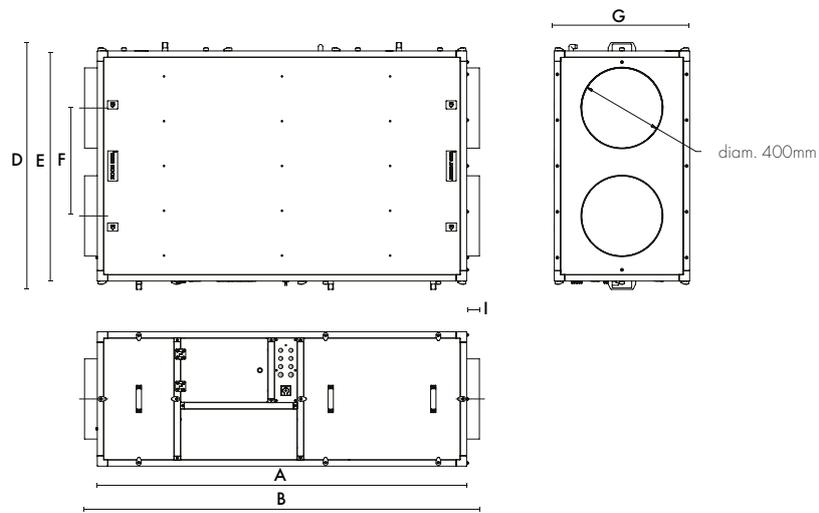
Model	Stock Ref
Mini/CP	TOTUS2MINI/CP
Midi/CP	TOTUS2MIDI/CP
Maxi/CP	TOTUS2MAXI/CP

## Dimensions (mm)

Sentinel Totus<sup>2</sup> Mini/ Midi

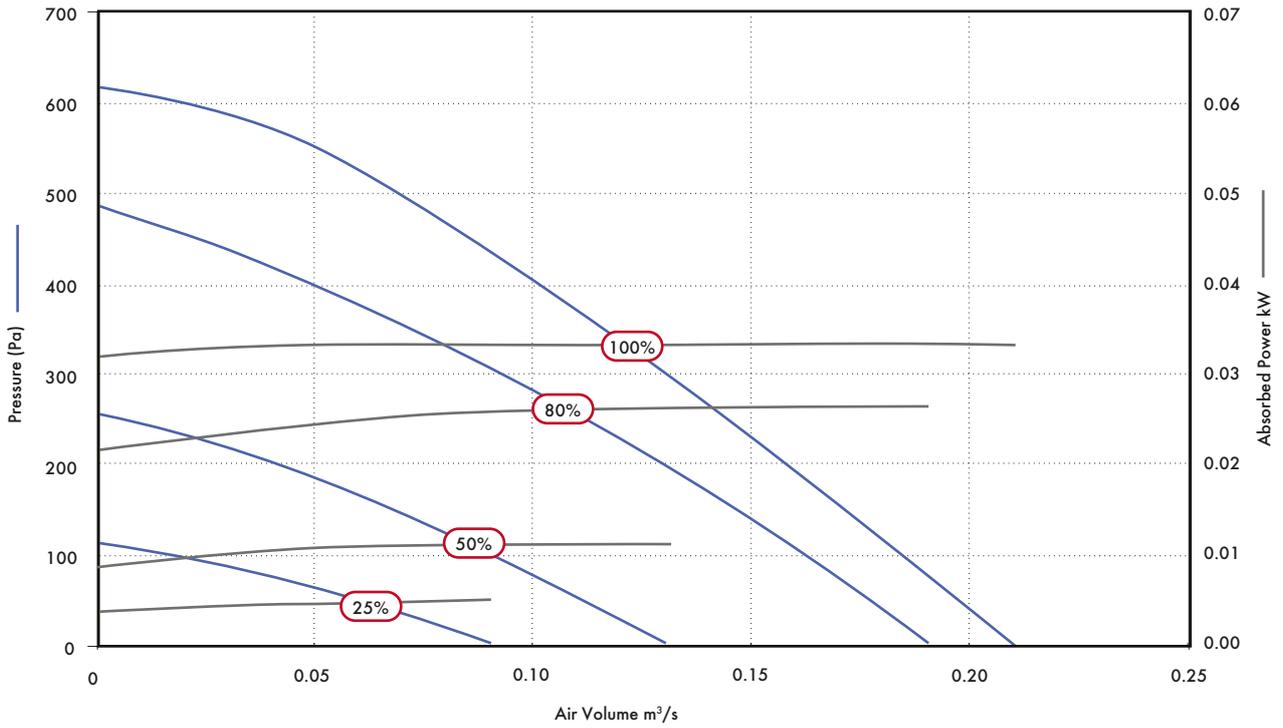


Sentinel Totus<sup>2</sup> Maxi



Model	a	b	c	d	e	f	g	h	i	j
Mini	1800	1910	-	970	900	450	350	-	55	70
Midi	1900	2020	400	1320	1250	538	350	250	60	70
Maxi	1800	1924	-	1212	1130	530	660	-	60	-

## Performance Guide - Mini Model

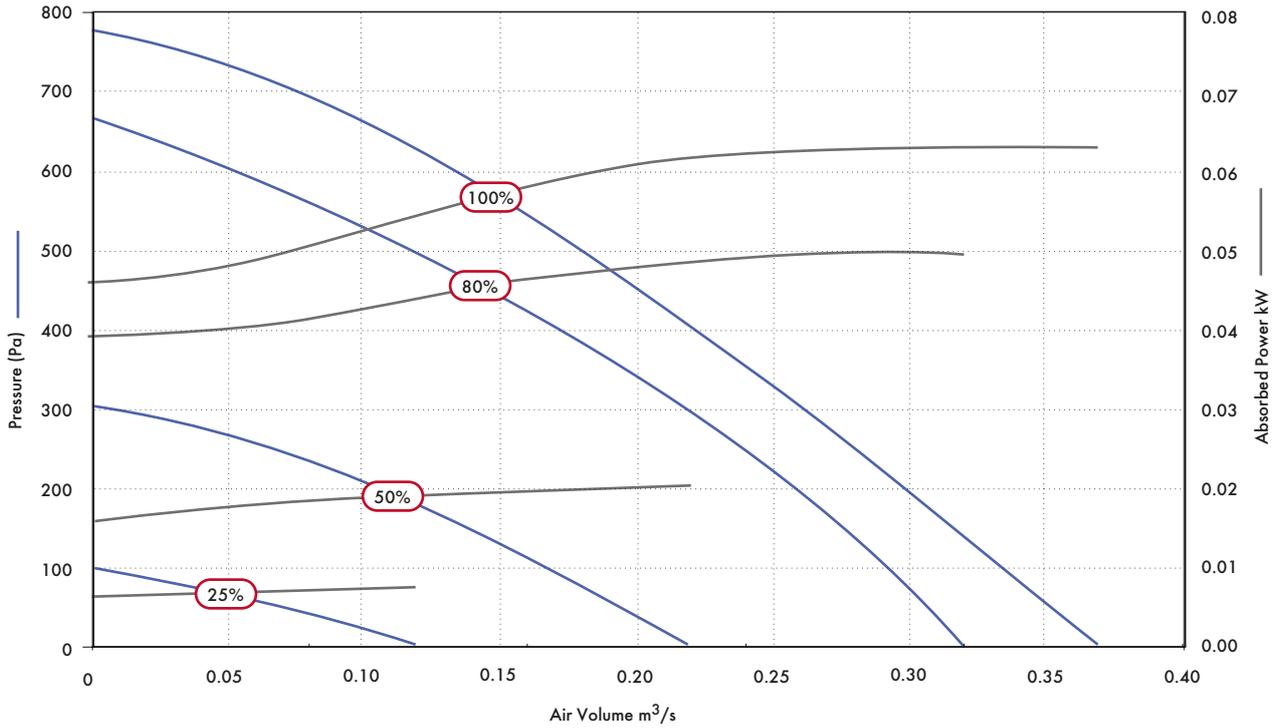


Speed	Airflow, m³/s @ Pa									Fans F.I.C.	Supply Voltage	Frost Heater	Unit Rated Current
	0	50	100	200	300	400	500	600					
100%	m³/s	0.21	0.20	0.19	0.16	0.13	0.10	0.07	0.03	2.5	230V/ 1/ 50Hz	2kW	12A
	SFP	1.59	1.68	1.77	2.10	2.57	3.33	4.76	11.00				
	kW	0.33	0.34	0.34	0.34	0.33	0.33	0.33	0.33				
80%	m³/s	0.19	0.18	0.16	0.13	0.09	0.05			1.85			
	SFP	1.38	1.46	1.66	2.05	2.88	4.90						
	kW	0.26	0.26	0.27	0.27	0.26	0.25						
50%	m³/s	0.13	0.11	0.09	0.04					0.8			
	SFP	0.85	1.02	1.23	2.63								
	kW	0.11	0.11	0.11	0.11								
25%	m³/s	0.09	0.06	0.02						0.35			
	SFP	0.51	0.77										
	kW	0.05	0.05	0.04									

## Sound Data - Mini Model

Speed	Test Mode	Octave Band Frequency SWL								Breakout dB(A) @ 3m
		63	125	250	500	1K	2K	4K	8K	
100%	Intake	58	65	69	54	53	54	48	46	33
	Supply	55	59	55	50	49	53	37	36	
	Discharge	59	68	74	66	63	67	55	57	
	Exhaust	55	60	63	52	50	55	37	36	
	Breakout	55	53	55	47	43	46	33	31	
80%	Intake	58	63	69	54	53	52	45	45	31
	Supply	53	58	55	46	48	50	34	33	
	Discharge	59	67	74	64	62	65	53	55	
	Exhaust	55	59	60	50	48	52	34	34	
	Breakout	53	52	53	44	42	44	31	30	
50%	Intake	54	58	64	49	47	42	35	36	25
	Supply	49	53	53	39	40	38	26	29	
	Discharge	54	62	69	56	55	53	43	43	
	Exhaust	50	54	56	41	41	39	25	29	
	Breakout	50	48	49	38	35	33	24	27	
25%	Intake	47	52	48	39	37	30	26	29	17
	Supply	48	48	38	33	31	27	22	28	
	Discharge	49	59	51	48	44	41	30	30	
	Exhaust	48	50	39	34	31	28	23	29	
	Breakout	44	45	33	32	28	25	23	26	

## Performance Guide - Midi Model

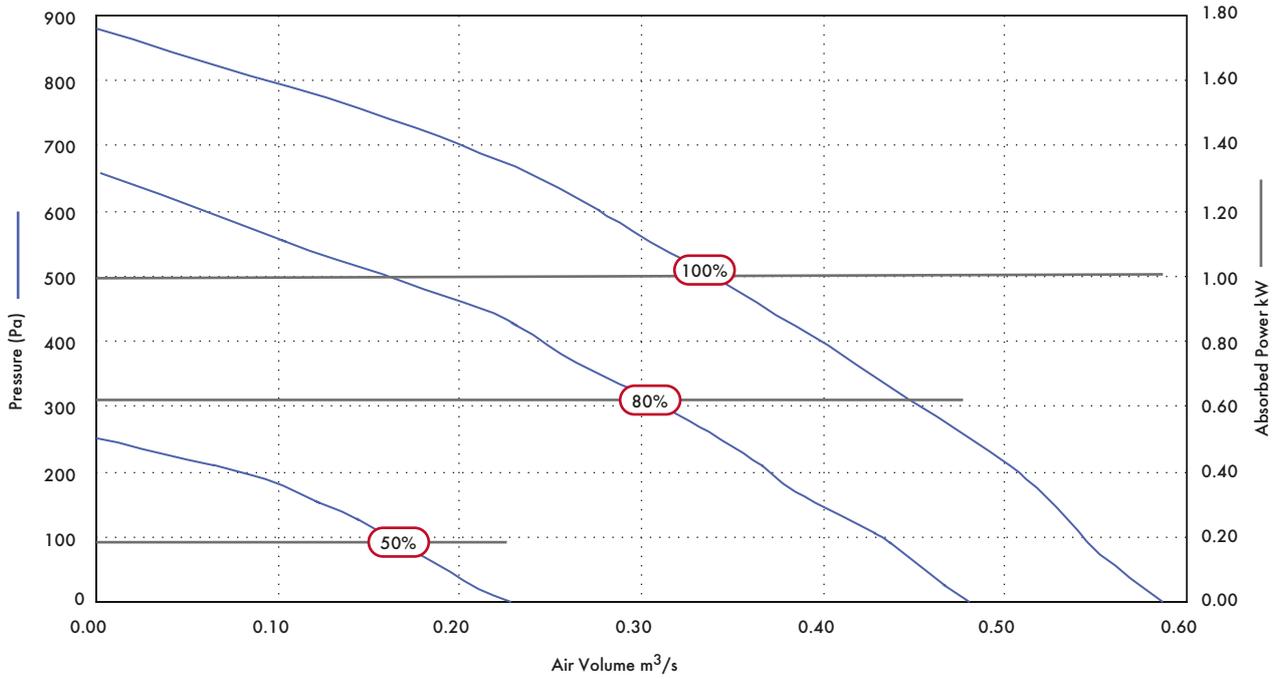


Speed	Airflow, m <sup>3</sup> /s @ Pa									Fans F.L.C.	Supply Voltage	Frost Heater	Unit Rated Current
	0	50	100	200	300	400	500	600					
100%	m <sup>3</sup> /s	0.37	0.35	0.33	0.30	0.26	0.22	0.18	0.13	3.0	230V/ 1/ 50Hz	2kW	12A
	SFP	1.70	1.79	1.89	2.09	2.41	2.81	3.31	4.28				
	kW	0.63	0.63	0.63	0.63	0.63	0.62	0.60	0.56				
80%	m <sup>3</sup> /s	0.32	0.31	0.29	0.26	0.21	0.17	0.11	0.05	2.5			
	SFP	1.55	1.60	1.71	1.93	2.29	2.74	3.95	8.04				
	kW	0.50	0.50	0.50	0.50	0.48	0.47	0.44	0.40				
50%	m <sup>3</sup> /s	0.22	0.19	0.17	0.10					1.0			
	SFP	0.91	1.04	1.19	1.78								
	kW	0.20	0.20	0.20	0.18								
25%	m <sup>3</sup> /s	0.12	0.07							0.5			
	SFP	0.62	0.97										
	kW	0.07	0.07										

## Sound Data - Midi Model

Speed	Test Mode	Octave Band Frequency SWL								Breakout dB(A) @ 3m
		63	125	250	500	1K	2K	4K	8K	
100%	Intake	66	70	75	60	57	52	50	45	37
	Supply	61	62	65	54	52	46	42	41	
	Discharge	67	80	81	74	68	64	60	54	
	Exhaust	59	68	69	58	52	49	41	39	
	Breakout	61	62	63	51	46	42	37	37	
80%	Intake	64	68	72	57	53	49	45	42	34
	Supply	58	61	60	52	49	43	38	39	
	Discharge	66	79	80	73	65	62	57	50	
	Exhaust	58	67	68	54	48	44	37	38	
	Breakout	58	60	58	48	43	40	35	36	
50%	Intake	59	64	57	46	45	40	35	32	25
	Supply	54	56	48	42	40	34	30	31	
	Discharge	62	71	65	62	56	53	46	41	
	Exhaust	53	65	53	45	41	37	32	38	
	Breakout	55	56	44	38	35	31	26	27	
25%	Intake	58	53	46	37	37	29	25	29	18
	Supply	49	46	40	33	32	25	23	30	
	Discharge	56	56	53	49	44	39	31	30	
	Exhaust	50	48	43	35	31	26	23	29	
	Breakout	48	46	35	29	27	24	22	28	

## Performance Guide - Maxi Model



Speed	Airflow, m <sup>3</sup> /s @ Pa								Fans F.L.C.	Supply Voltage	Frost Heater	Unit Current	
	0	50	100	200	300	400	500	600					
100%	m <sup>3</sup> /s	0.59	0.57	0.55	0.51	0.46	0.40	0.34	0.27	5	230V/ 1/ 50Hz	4kW	20A
	SFP	1.71	1.77	1.84	1.98	2.20	2.53	2.97	3.74				
	kW	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01				
80%	m <sup>3</sup> /s	0.48	0.45	0.43	0.38	0.31	0.24	0.16		3	230V/ 1/ 50Hz	4kW	20A
	SFP	1.31	1.40	1.46	1.66	2.03	2.62	3.93					
	kW	0.63	0.63	0.63	0.63	0.63	0.63	0.63					
50%	m <sup>3</sup> /s	0.23	0.19	0.16	0.07					1	230V/ 1/ 50Hz	4kW	20A
	SFP	0.82	0.99	1.18	2.69								
	kW	0.19	0.19	0.19	0.19								

## Sound Data - Maxi Model

Speed	Test Mode	Octave Band Frequency SWL								Breakout dB(A) @3m
		63	125	250	500	1k	2k	4k	8k	
100%	Intake	67	72	75	72	73	71	68	62	41
	Supply	62	65	75	66	65	61	53	46	
	Discharge	67	70	83	72	75	73	70	65	
	Extract	62	64	74	63	60	54	44	39	
	Breakout	66	67	70	53	48	49	41	39	
80%	Intake	64	71	79	70	69	68	65	58	40
	Supply	60	64	77	63	62	57	49	43	
	Discharge	65	69	82	69	72	70	67	59	
	Extract	59	63	75	60	57	51	42	38	
	Breakout	64	63	68	50	53	44	38	36	
50%	Intake	56	68	57	57	57	53	49	40	30
	Supply	52	66	57	51	50	44	35	31	
	Discharge	56	64	61	56	59	57	50	41	
	Extract	52	62	52	46	43	37	28	28	
	Breakout	54	62	52	41	39	38	34	32	
25%	Intake	48	47	40	37	35	29	23	29	20
	Supply	46	43	39	33	31	25	23	29	
	Discharge	46	45	42	40	41	34	25	29	
	Extract	48	41	37	31	26	23	23	29	
	Breakout	46	44	40	32	30	28	26	30	

### CO<sub>2</sub> + Temp Room Sensor \*



HVAC temperature and carbon dioxide room sensor for proportional ventilation control. Sensor will monitor both CO<sub>2</sub> and temperature levels between the set points, the air flow rate following the higher of the 2 outputs.

24V DC SELV. 0 - 2000ppm CO<sub>2</sub> working range. 0 - 50°C working range. Auto-calibrating NDIR CO<sub>2</sub> absorption sensor. Dimensions: 100 x 84 x 25mm (H x W x D).

**Stock Ref**  
**433257**

### CO<sub>2</sub> Duct Probe



Sensor monitors CO<sub>2</sub> level in extract ducts from conference areas, offices, theatres etc. In proportional control mode, air flow rate tracks the CO<sub>2</sub> level to improve indoor air quality.

24V DC SELV. 0 - 2000ppm CO<sub>2</sub> working range. Auto-calibrating NDIR absorption sensor. Adjustable probe length. MAX. IP Rating 65. Dimensions: 80 x 80 x 38mm (H x W x D).

**Stock Ref**  
**433259**

### Vent-Axia PIR \*



A wall or ceiling mounted presence detector for use with Sentinel Totus<sup>2</sup> D-ERV. Can be used in MIN - MAX mode or for direct damper control.

Fits any UK single gang mounting box. Adjustable timer overrun (5-25 minutes). Range of detection up to 10 metres. Designed to meet IP43. Ambient operating temperature range 0°C to +50°C. Supply voltage 24V DC SELV. Dimensions: 87 x 87 x 40mm (H x W x D).

**Stock Ref**  
**433162**

### Vent-Axia ThermoSwitch®



Automatically switches on fans on either a rise or fall in air temperature.

Used for Trickle/ Boost operation. Setting range: +6°C to +30°C. IP20 rated. Sealed sensing mechanism. Mounting direct on surface only. Dimensions: 80 x 104 x 36mm (H x W x D). Volt free switch connection to Sentinel Totus<sup>2</sup> D-ERV, Demand Energy Recovery.

**Stock Ref**  
**563502**

### Power Supply \*



For those situations where a separate 24V DC SELV supply source is required to power duct dampers. 24W output capacity. See F & W for connection details.

**Stock Ref**  
**433193**

### F6 Filter



Replacement filter to grade F6. Replaces standard G4 filter.

Model	Stock Ref
Mini	445852
Midi	407882
Maxi	445946

### PIR Grille\*



PIR grille is on extract grille with an integral flap damper. Suitable for bathrooms and WCs. The PIR function fully opens the damper when a person presence is detected. The opening time is fixed at 20 mins. Spigot size is 125mm.

12V AC SELV unit using the main transformer unit supplied. Integral PIR person presence sensor controlling damper. Auto-humidity control damper response at all times. 100° viewing angle. Temperature range 0 - 50°C. Dimensions: 158 x 150 x 35mm (H x W x D). MAX airflow 70m<sup>3</sup>/hr @100 Pa.

**Stock Ref**  
**434184**

### Dampers \*



Two types available:

- a) MM type - opening shut/MIN to open/MAX controlled by switches and
- b) PC type - opening proportionally when controlled by sensors.

Duct sizes available: 100, 125, 150, 200, 250 and 315. Industry standard actuators.

**Typical ordering designation: DVD size MM or PC**

### Inlet Cowl



For these situations where there is no ducted inlet or extract and the unit is roof mounted. Offers weather protection to ensuring air paths do not recirculate.

Model	Stock Ref
Mini	445832
Midi	446591
Maxi	441366

### Midi Duct Transformation Piece



To convert rectangular duct spigot to 315mm dia circular ducting.

**Stock Ref**  
**449645**

### Duct Mounted LPHW Coils

Top up heating LPHW coils to suit the duct connection size for each Totus. Sized to give 18 to 25°C temperature rise at maximum airflow with water 80/60 as standard. For full details contact Technical Support.

Model	Stock Ref
Mini	449642
Midi	449643
Maxi	449644

\* PLEASE NOTE: These sensors/controls are unique to Sentinel Totus<sup>2</sup> D-ERV and CANNOT be used with any other product.