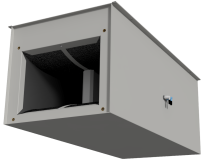




Energy efficient EC
constant volume fan



TSFB Attenuator



VAV Compact controller



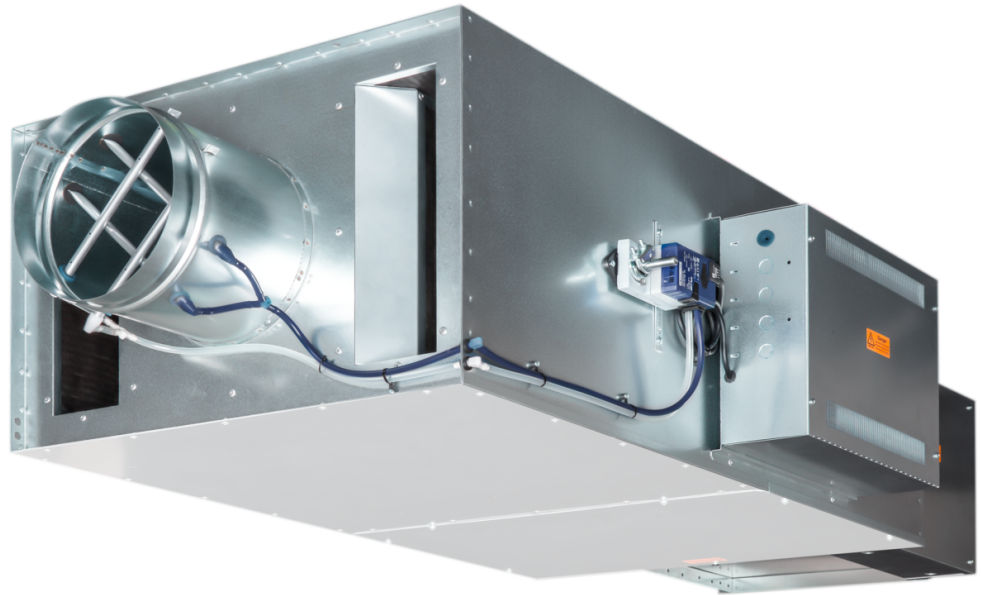
Electric heater



1 Row LPHW reheat coil

Series fan VAV terminal units

SFTB



For supply air systems with constant volume and mixing of primary and induced air

Series fan VAV terminal units take primary and induction air, mix the two thoroughly and provide a constant air supply to the occupied zone of the building.

- ErP2015 compliant fans and Part L 2013 compliant
- High control accuracy even with upstream bend ($R=1D$)
- Discharge and case radiated sound pressure levels of NR35 can be achieved in the occupied zone

Equipment and accessories

- Secondary silencer Type TSFB for the reduction of air-regenerated noise
- Hot water coil or electric heater for reheating the airflow

General information	2	Order code	8
Function	3	Variants	9
Technical data	5	Dimensions and weight	11
Quick sizing	6	Product details	15
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General information

Application

- VARYCONTROL fan assisted VAV terminal units of Type SFTB for supply air control in constant air volume systems
- Demand-based mixing of cold primary and warm induced air
 - Closed-loop volume flow control using an external power supply
 - For maximum acoustic and thermal comfort
 - Shut-off by means of switching (equipment supplied by others)

Special characteristics

- Integral differential pressure sensor with 3 mm measuring holes (resistant to dust and pollution)
- Factory set-up or programming and aerodynamic function testing
- Volume flow rate can later be measured and adjusted on site; additional adjustment device may be necessary

Nominal sizes

- 110, 210, 310, 410

Variants

- SFTB: Fan VAV terminal unit
- SFTB-E: Fan VAV with electric reheat
- SFTB-1: Fan VAV with LPHW coil

Construction

- Galvanised sheet steel

Parts and characteristics

- Ready-to-commission unit which consists of mechanical parts and control components
- Averaging differential pressure sensor for volume flow rate measurement
- Damper blade
- Integral attenuator
- Access door for EC fan
- Factory assembled control components complete with wiring and tubing
- Aerodynamic functional testing on a special test rig prior to shipping of each unit

- High control accuracy (even with upstream bend $R = 1D$)

Attachments

- Compact controller: Compact unit consisting of controller with differential pressure transducer and actuator
- TSFB secondary attenuator
- Hot water coil
- Electric heater battery

Materials and surfaces

- Casing and damper blade made of galvanised sheet steel
- Damper blade seal made of TPE plastic
- Lining is mineral wool & 50mm thick PU foam
- Differential pressure sensor made of aluminium
- Plastic bearings

Mineral wool

- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Standards and guidelines

- Casing air leakage tested to EN 1751, class C

Closed blade air leakage:

NW 125 – 160

- EN 1751, Class 3

NW 200 – 315

- EN 1751, Class 4

Maintenance

- Maintenance-free as construction and materials are not subject to wear

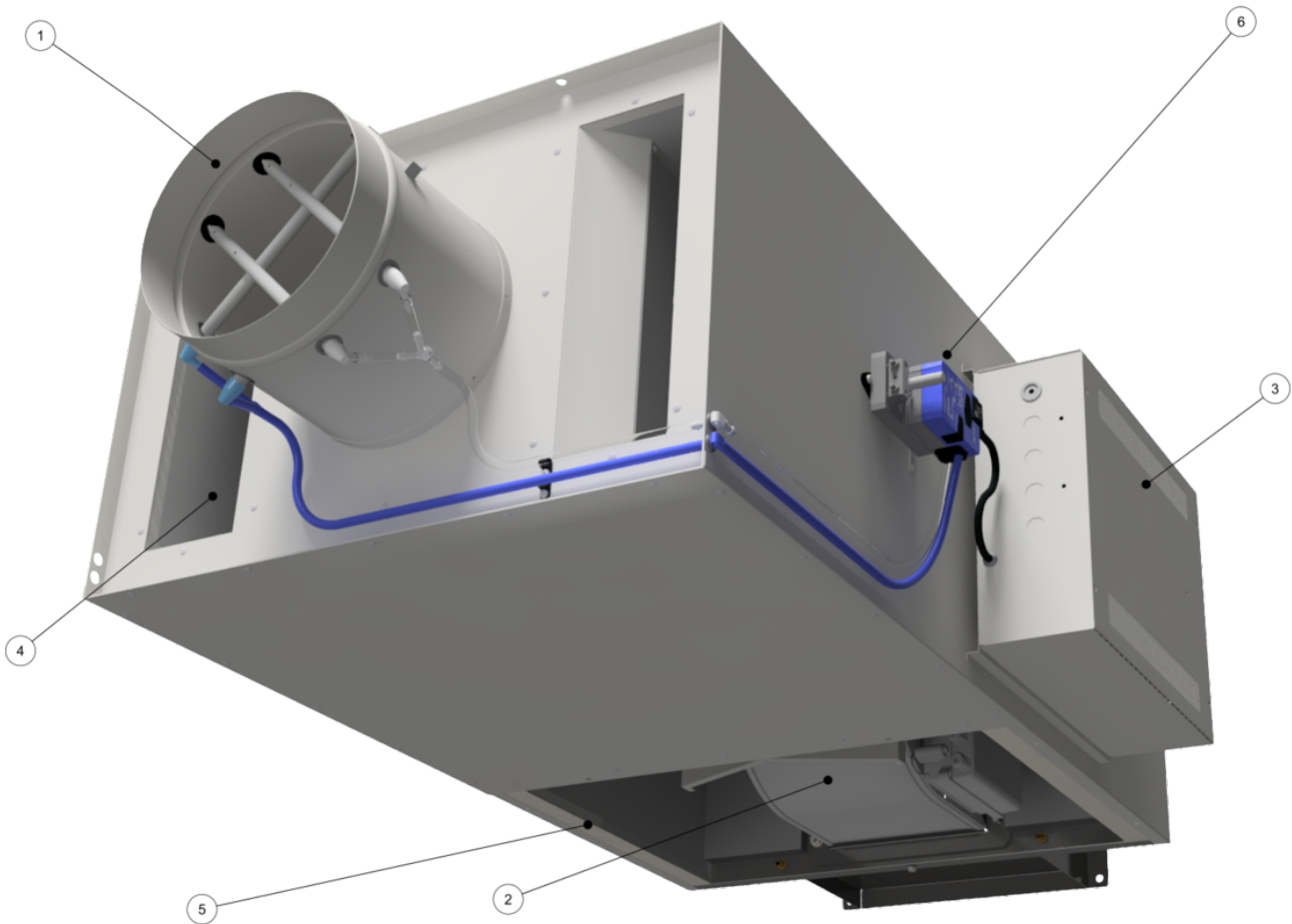
Useful additions

- Total volume flow grid in TSFB
- For horizontal installation only
- The SFTB requires site commissioning by a competent person

Function

The fan assisted VAV terminal unit has a fan running at a constant design air volume and draws a mixture of primary air and induction air through the unit. By adjusting the amount of primary air supplied to the unit the ratio of primary to induced air is changed. The primary air VAV terminal unit is fitted with a differential pressure sensor for measuring the volume flow rate. The control component (attachments) consists of a VAV compact

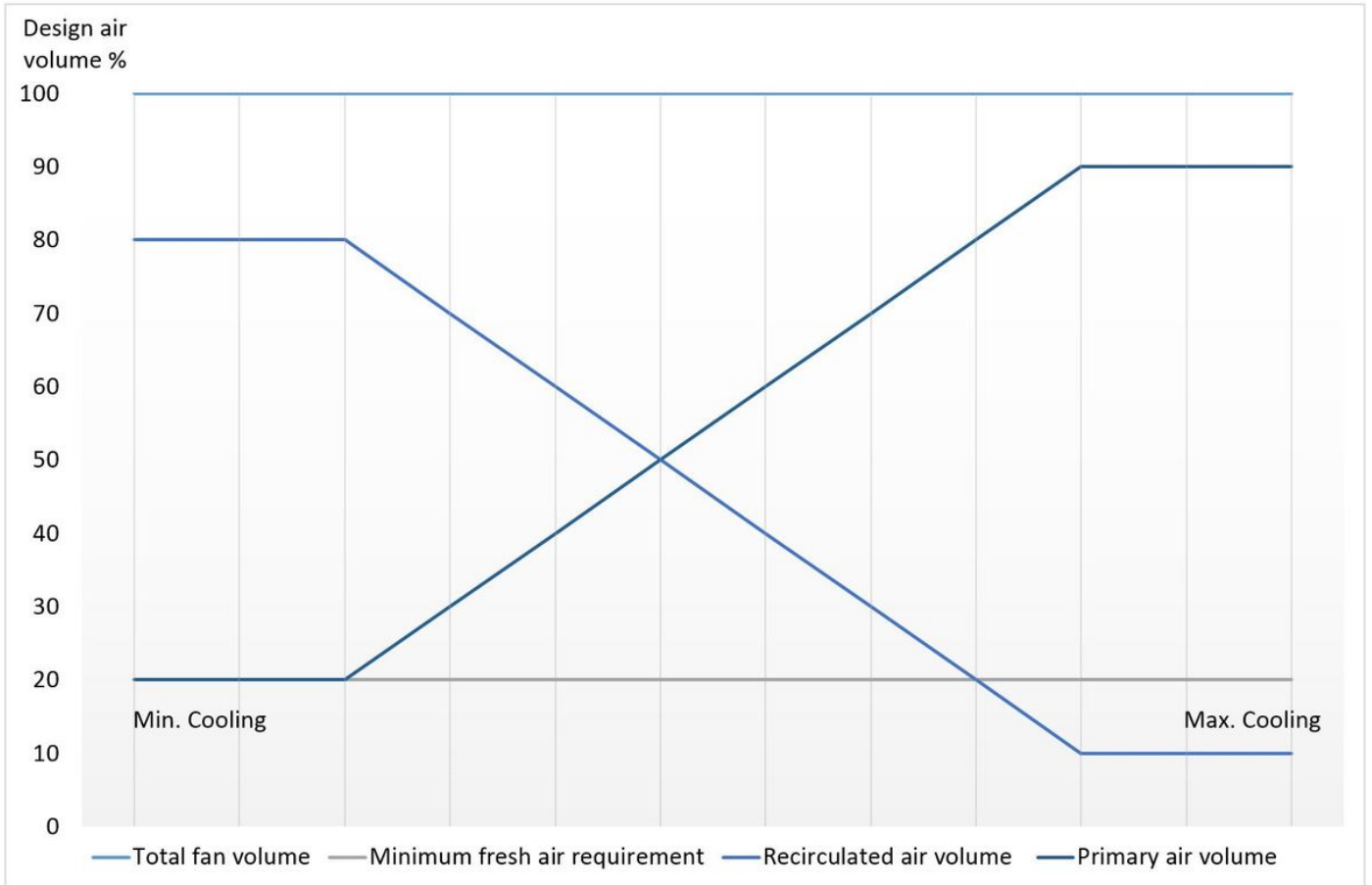
controller which includes a differential pressure transducer that transforms the differential pressure (effective pressure) into an electronic signal, a volume controller, and an actuator. For most applications, the setpoint value comes from a room temperature controller. The VAV compact controller compares the actual value with the setpoint value and alters the position of the actuator if there is a difference between the two values.



1. Primary air spigot with flow grid
2. EC fan
3. Controls enclosure

4. Induction ports for recirculated air
5. Fan access panel

Functional graphic for the SFTB



Technical data

Nominal Sizes	110	210	310	410
Volume flow rate range	50 - 200 l/s	170 - 460 l/s	300 - 720 l/s	500 - 800 l/s
Primary air volume flow rate control range*	Approx. 10 to 90 % of the nominal volume flow rate	Approx. 10 to 90 % of the nominal volume flow rate	Approx. 10 to 90 % of the nominal volume flow rate	Approx. 10 to 90 % of the nominal volume flow rate
Minimum inlet static pressure	5 – 65 Pa	5 – 65 Pa	5 – 65 Pa	5 – 65 Pa
Maximum inlet static pressure	1000 Pa	1000 Pa	1000 Pa	1000 Pa
External static pressure	10 - 50 Pa	10 - 50 Pa	10 - 50 Pa	10 - 50 Pa
Operating temperature	10 - 50 °C	10 - 50 °C	10 - 50 °C	10 - 50 °C
Supply voltage	230 V AC, 50/60 Hz	230 V AC, 50/60 Hz	230 V AC, 50/60 Hz	230 V AC, 50/60 Hz
Fan running current	0.5 A	1 A	1.7 A	1.5 A
Fan peak inrush current	5.5 A	5.8 A	5.8 A	5.8 A
Fan peak inrush current duration	10 ms	10 ms	10 ms	10 ms
Weight	55 kg	75 kg	130 kg	160 kg

* unit with dynamic differential pressure measurement

Fan volume SFTB-E* with TSFB ΔP_{esp} 10, 30 & 50 Pa

SFTB-Size	Fan speed	Total Fan Volume, SFTB with TSFB
		[l/s]
110	Min	50
110	Max	200
210	Min	170
210	Max	460
310	Min	300
310	Max	720
410	Min	500
410	Max	800

* with or without electric heater

Primary Air Volume Range

Spigot Code	Spigot Code	Primary airflow [l/s]	$\Delta P_{st min}$
125	Min	15	5
125	Max	125	63
160	Min	25	5
160	Max	200	52
200	Min	40	5
200	Max	310	47
250	Min	60	5
250	Max	490	51
315	Min	105	5
315	Max	780	46

Electric Heaters

Size	Supply Voltage [Q kW]	
	230V / 1 ph 50Hz	400V / 3 ph 50Hz
110	1, 2, 3	-
210	1, 1.5, 2, 3, 4	6
310	2, 3, 4, 5	6, 7.5
410	3, 4, 5	6, 7.5, 9

Quick sizing – one row coil

Coil Size	VD [L/s]	Q [kW]	wM [kg/s]	Δpw [Pa]
110	100	2.313	0.029	1.9
110	125	2.252	0.028	1.8
110	170	2.175	0.029	1.9
210	220	4.29	0.054	2.4
210	250	4.29	0.055	2.6
210	305	3.71	0.048	2.0
210	360	4.12	0.055	2.6
310	450	6.47	0.83	4.5
310	500	6.47	0.083	4.5
410	616	9.93	0.129	10
410	722	9.93	0.129	10
410	800	9.67	0.126	9.6

The maximum coil output is shown in kW for water temperatures of 82°C flow and 71°C return and based on primary air at V_{min} and with a supply air temperature leaving the coil of 30°C. The water pressure drop is shown in kPa and the water rate in kg/s. Other water/air temperatures available on request.

Fan motor details

SFTB-Size	W2 Watts	W1 Watts	Ar Amps	As Amps	PF	SFP [W/l/s]
110	95	66	0.49	0.86A	0.53	0.33
210	1000	226	1	2A	0.61	0.49
310	1000	384	1.69	2A	0.76	0.53
410	1000	330	1.46	2A	0.88	0.42

Quick sizing

SFTB Unit Size	Inlet Spigot	Secondary Supply Volume	P. Air VMIN	P. Air VMAX	Nominal Running Current	Fan Control Voltage	Power Factor	SFP @50Pa	Motor Power	Guide Room NR	Total Air
	[mm]	[l/s]	[l/s]	[l/s]	[A]	[Vdc]	[PF]	[W/l/s]	[W]	[NR]	[l/s]
110	125	50	15	45	0.08	2.12	0.53	0.2	9.9	22	50
110	125	100	15	90	0.14	4.16	0.58	0.18	18.4	29	100
110	160	150	25	135	0.26	6.37	0.57	0.24	35.5	33	150
110	160	200	25	180	0.49	8.74	0.57	0.33	66.0	38	200
210	160	170	25	153	0.32	0.8	0.61	0.28	46.9	29	170
210	200	246	40	221	0.38	1.72	0.73	0.27	66.9	32	246
210	250	353	60	318	0.58	3.14	0.9	0.35	123.9	33	353
210	250	460	60	414	1	4.66	0.96	0.49	225.9	39	460
310	200	300	40	270	0.39	0.72	0.76	0.22	66.9	25	300
310	250	424	60	382	0.59	2.69	0.89	0.28	117.6	30	425
310	315	573	105	516	1	4.84	0.96	0.38	218.4	34	573
310	315	680	105	612	1.47	6.24	0.98	0.49	330.7	35	680
310	315	720	105	648	1.69	6.73	0.98	0.53	383.9	40	720
410	250	500	60	450	0.57	2.61	0.88	0.24	119.8	30	500
410	315	617	105	555	0.84	3.90	0.94	0.3	183.6	32	617
410	315	734	105	661	1.2	5.13	0.97	0.37	270.5	36	734
410	315	800	105	720	1.46	5.79	0.98	0.41	329.4	39	800

Quick selection data for 200 Pa inlet static pressure and 50 Pa external static pressure

Specification text

This specification text describes the general properties of the product.

Specification text

Series fan VAV boxes type SFTB for constant room air supply volume combined with VAV primary air control having high turndown by use of a multi-point flowgrid. Induction of warm air from the ceiling void by forward curved blade centrifugal fan with direct drive motor. Single blade control damper with seal for shut off. Stepless speed controller to enable fan duty to be set to match the downstream duct system pressure.

Construction

- Galvanised sheet steel
- Rectangular casing
- Spigot connection on the fan end suitable for circular ducts to EN 1506 or EN 13180
- Connection on the room end suitable for air duct profiles
- Position of the damper blade indicated externally at shaft extension
- Thermal and acoustic insulation (lining) minimum 50mm Mineral wool PU foam Class O rated and splitters from polymer foam.

Technical data

- Nominal Sizes 110 - 410
- Volume flow rate range 50 - 800 l/s
- Volume flow rate range 180 - 2880 m³/h
- Approx. 10 – 100 % of the nominal volume flow rate
- Inlet static differential pressure 5 – 1000 Pa
- Operating temperature 10 – 50 °C

Attachments

- Variable volume flow control with electronic Compact controller to connect an external control signal; actual value signal can be integrated into the central BMS.
- Supply voltage 24 V AC/DC
- Signal voltages 0 – 10 V DC
- Possible override controls with external switches using volt-free contacts: CLOSED, OPEN, V_{min} and V_{max}
- Option to factory set the primary air volume flow rates V_{min} and V_{max}

- The actual value signal relates to the nominal volume flow rate such that commissioning and subsequent adjustment are simplified
- Volume flow rate approx. 10 – 100 % of the nominal volume flow rate
- Electrical connections with cable
- 1 Row Hot water coil
- Electric heater battery 1Phase or 3 Phase

Special characteristics

- Integral differential pressure sensor with 3 mm measuring holes (resistant to dust and pollution)
- Factory set-up or programming and aerodynamic function testing
- Volume flow rate can later be measured and adjusted on site; additional adjustment device may be necessary

Materials and surfaces

- Casing and damper blade made of galvanised sheet steel
- Damper blade seal made of TPE plastic
- Lining is mineral wool & 50mm thick PU foam
- Differential pressure sensor made of aluminium
- Plastic bearings

Mineral wool

- To EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Biosoluble and hence hygienically safe according to the German TRGS 905 (Technical Rules for Hazardous Substances) and EU directive 97/69/EG
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Sizing data

- V₀ Discharge (fan) volume flow rate ----- [l/s]
- V₁ Primary air volume flow rate ----- [l/s]
- Δp_{SD} Down stream static pressure ----- [Pa]
- Δp_{SI} Inlet static pressure ----- [Pa]
- NR Guide room NR -----[NR]

Order code

SFTB - R - E1/1 - V / 110 x 125 / BCO / E2 / 120 - 100 - 50 / 00B479

| | | | | | | | | | |
 1 2 3 4 5 6 7 8 9 10

1 Type

SFTB Series fan VAV terminal box

2 Handing

L Left
R Right

3 Reheat

No entry: none

1 1 row LPHW

- E1/1** Electric reheat 1 ph 1 kw
- E1/1.5** Electric reheat 1 ph 1.5 kw
- E1/2** Electric reheat 1 ph 2 kw
- E1/3** Electric reheat 1 ph 3 kw
- E1/4** Electric reheat 1 ph 4 kw
- E1/5** Electric reheat 1 ph 5 kw
- E3/6** Electric reheat 3 ph 6 kw
- E3/7.5** Electric reheat 3 ph 7.5 kw
- E3/9** Electric reheat 3 ph 9 kw

4 Electric reheat control signal

No entry: none

- V** Control by 0-10 Vdc signal
- C** Control by 4-20 mA signal

5 Case size

110, 210, 310, 410

6 Spigot size

125, 160, 200, 250, 315

7 controller

Example

BCO Compact controller

8 VAV Control signal

- E0** BMS 0-10v
- E2** BMS 2-10v

9 Volume flow rates

Fan vol. l/s - max. primary vol. l/s - min. primary vol. l/s

10 Control diagram

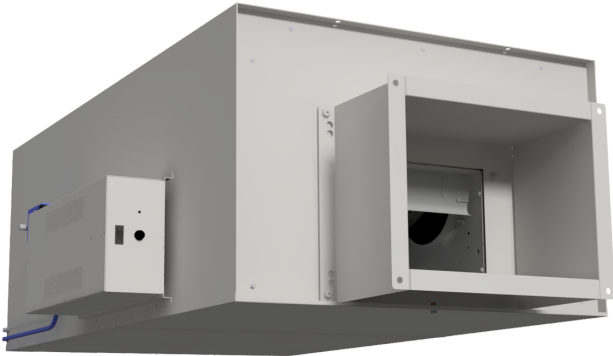
Refer to TROX

Order example: SFTB-R-1/110x125/BCO/E2/120 - 100 - 50/00B479

Handing	Right
Reheat	1 row LPHW
Case size	110
Spigot size	125
Controller	BCO
Control signal primary air	E2
Volume flow rates	120-100-50
Control diagram	00B479

Variants

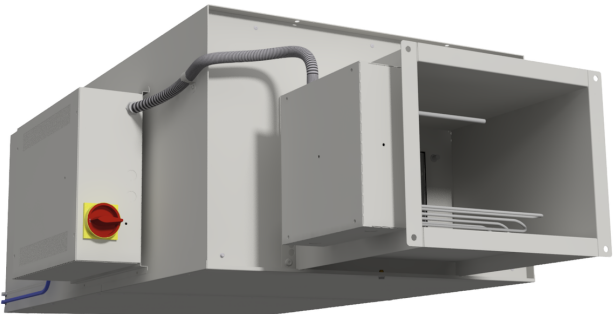
SFTB: Fan VAV terminal unit



Application

- Fan VAV terminal unit for constant volume supply with mixing of primary and induced air for cooling or demand controlled ventilation
-

SFTB-E: Fan VAV terminal unit with electric reheat



Application

- Fan VAV terminal unit with electric reheat for constant volume supply with mixing of primary and induced air for cooling or demand controlled ventilation and heating

Materials and surfaces

Electric Heaters

- The electric heater is available as an integral unit complete with controls including fuses and interlocks
- Integral air heater has elements designed for black heat operation and consists of 80/20 nickel chrome wire in a stainless steel tube (grade 312) filled with magnesium oxide
- Automatic and manual reset high temperature cut out are fitted and a brass earth stud included.
- Manufactured to British Standards/Codes as applicable and fully factory tested.
- Heater elements are wired back into the control enclosure, including the earth, and heater fuses are supplied.

- Control of the heater for stepless control is by solid state relay.

Technical data

- When heating is required it is recommended that the primary air should be at V_{min} .
 - ! It is strongly recommended that the BMS is used to monitor the state of the high temperature cut outs.
 - ! Run-on Time: The control strategy for the heater must allow a minimum of 10 minutes fan run-on time to allow the heater to cool safely. During this time the V_{min} heating cycle air volume must be maintained for the 10 minute duration after the heater control signal is switched off.
 - It is recommended that the heater output is limited by a supply air temperature sensor to prevent overheating and room supply air stratification.
-

SFTB-1: Fan VAV terminal unit with LPHW coil



Application

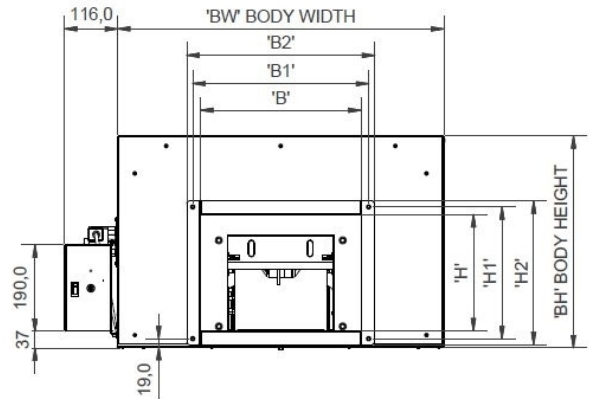
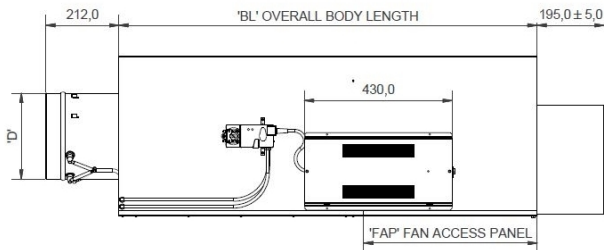
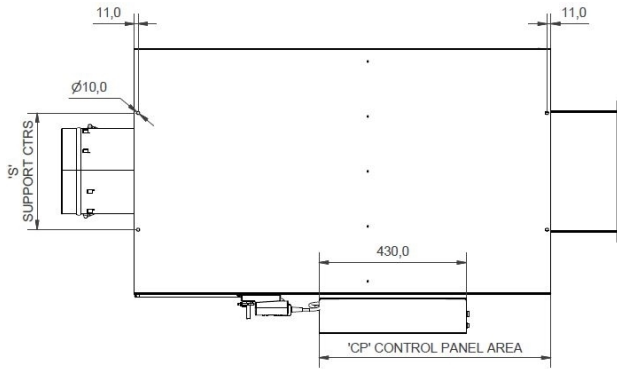
- Fan VAV terminal unit hot water heat exchanger for constant volume supply with mixing of primary and induced air for cooling or demand controlled ventilation and heating

Materials and surfaces

- Hot Water Coils
 - Hot water heating coil is manufactured from 3/8 inch diameter copper tube with aluminium fins spaced at 1.8mm (14 fpi)
 - Tubes are formed into circuits to limit water velocity and mounted in a galvanised sheet steel flanged frame with copper headers
 - Heating coils meet the requirements of British Standards/Codes as applicable
 - Coil connections are 1/2 inch BSPT as standard.
 - Plugged air vent and drain points are provided
-

Dimensions and weight

SFTB



12mm dia. holes in duct flange (4 off)
 recommended duct size - 'FW' - 30mm x 'FH' - 30mm

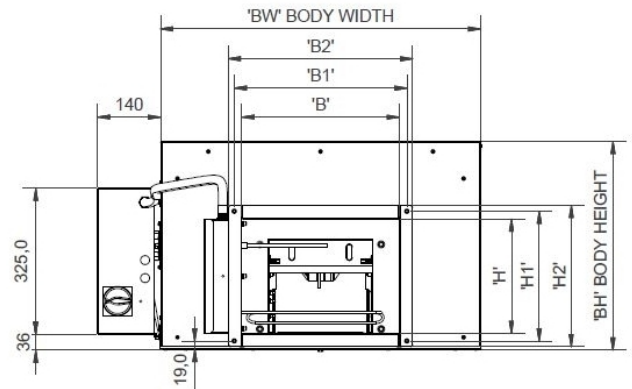
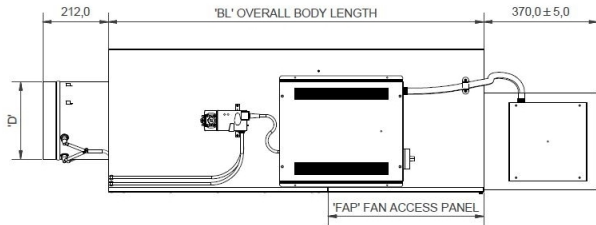
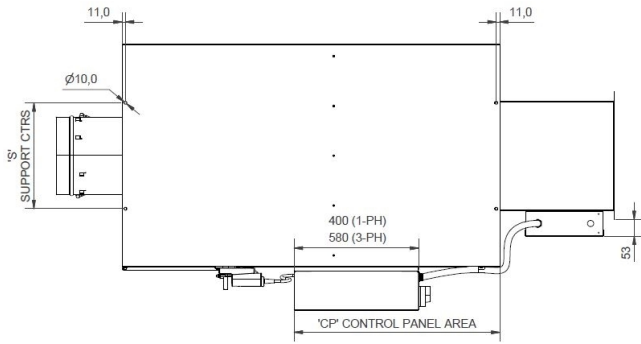
SFTB dimensions [mm] and Weight [kg]

Unit	Spigot	D	BL	BW	BH	B	B1	B2	H	H1	H2	FAP	CP	S	weight
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
110	125	1mm smaller than spigot size	1015	582	433	250	284	310	203	237	263	450	475	260	50
110	160	1mm smaller than spigot size	1015	582	433	250	284	310	203	237	263	450	475	260	50
210	160	1mm smaller than spigot size	1215	712	463	350	384	410	254	288	314	505	675	340	70
210	200	1mm smaller than spigot size	1215	712	463	350	384	410	254	288	314	505	675	340	70
210	250	1mm smaller than spigot size	1215	712	463	350	384	410	254	288	314	505	675	340	70
310	160	1mm smaller than spigot size	1415	802	503	450	484	510	305	339	365	565	580	400	120
310	200	1mm smaller than spigot size	1415	802	503	450	484	510	305	339	365	565	580	400	120
310	250	1mm smaller than spigot size	1415	802	503	450	484	510	305	339	365	565	580	400	120
310	315	1mm smaller than spigot size	1415	802	503	450	484	510	305	339	365	565	580	400	120



Unit	Spigot	D	BL	BW	BH	B	B1	B2	H	H1	H2	FAP	CP	S	weight
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
410	250	1mm smaller than spigot size	1665	992	543	600	634	660	356	390	416	600	600	500	150
410	315	1mm smaller than spigot size	1665	992	543	600	634	660	356	390	416	600	600	500	150

SFTB-E

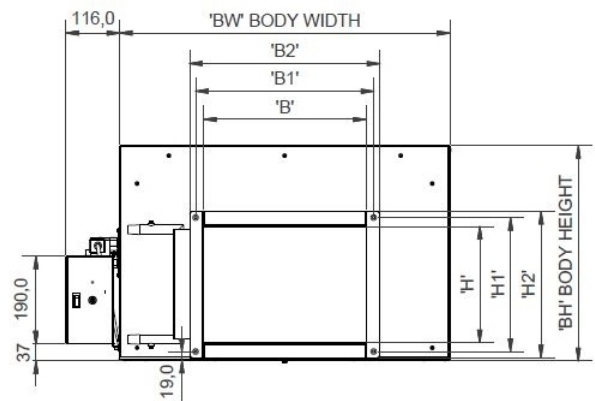
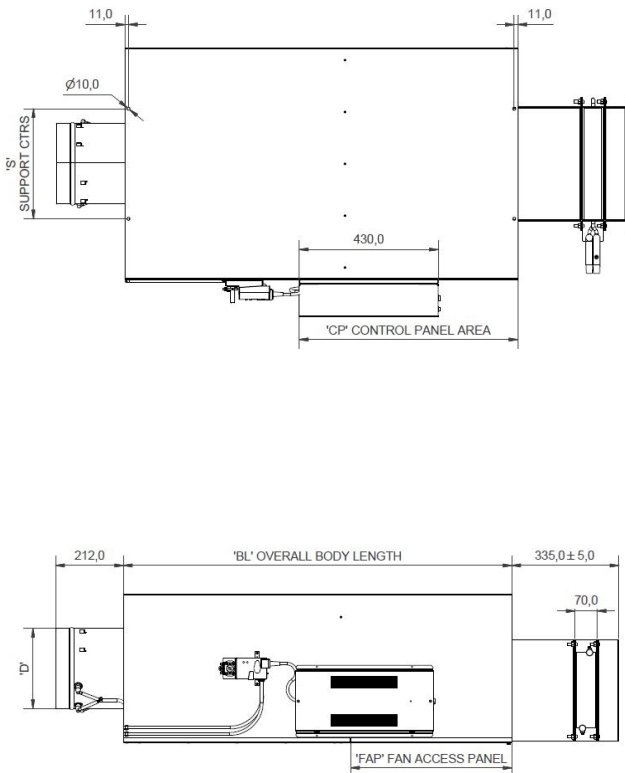


12mm dia. holes in duct flange (4 off)
recommended duct size - 'FW' - 30mm x 'FH' - 30mm

SFTB-E dimensions [mm] and Weight [kg]

Unit mm	Spigot mm	D mm	BL mm	BW mm	BH mm	B mm	B1 mm	B2 mm	H mm	H1 mm	H2 mm	FAP mm	CP mm	S mm	weight kg
110	125	1mm smaller than spigot size	1015	582	433	250	284	310	203	237	263	450	475	260	50
110	160	1mm smaller than spigot size	1015	582	433	250	284	310	203	237	263	450	475	260	50
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310	315	1mm smaller than spigot size	1415	802	503	450	484	510	305	339	365	565	580	400	120
410	250	1mm smaller than spigot size	1665	992	543	600	634	660	356	390	416	600	600	500	150
410	315	1mm smaller than spigot size	1665	992	543	600	634	660	356	390	416	600	600	500	150

SFTB-1



Coil connections are 1/2" BSPT

12mm dia. holes in duct flange (4 off)
recommended duct size - 'FW' - 30mm x 'FH' - 30mm

SFTB-1 dimensions [mm] and Weight [kg]

Unit mm	Spigot mm	D mm	BL mm	BW mm	BH mm	B mm	B1 mm	B2 mm	H mm	H1 mm	H2 mm	FAP mm	CP mm	S mm	weight kg
110	125	1mm smaller than spigot size	1015	582	433	250	284	310	203	237	263	450	475	260	50
110	160	1mm smaller than spigot size	1015	582	433	250	284	310	203	237	263	450	475	260	50
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310	250	1mm smaller than spigot size	1415	802	503	450	484	510	305	339	365	565	580	400	120
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410	250	1mm smaller than spigot size	1665	992	543	600	634	660	356	390	416	600	600	500	150
410	315	1mm smaller than spigot size	1665	992	543	600	634	660	356	390	416	600	600	500	150

Product details

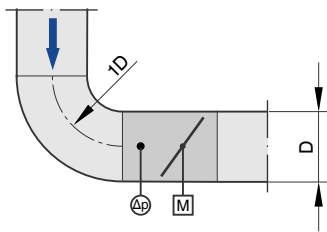
Installation and commissioning

- For horizontal installation only
- The SFTB requires site commissioning by a competent person
- Return edges of the casing with drilled holes suitable for M10 threaded rods

Upstream conditions

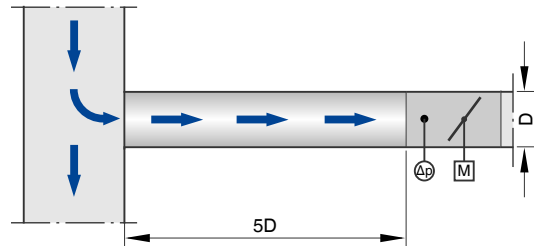
The effective pressure, which is decisive for the volume flow rate, is recorded and averaged on the control damper blade. Therefore, the volume flow rate accuracy Δq_v is dependent of the upstream section. Duct connections, e.g. branches off the main duct, must comply with EN 1506 and EN 13180.

Bend



A bend with a centre line curvature radius of at least $1D$ – without an additional straight duct section upstream of the VAV terminal unit – has only a negligible effect on the volume flow rate accuracy.

Junction



A junction causes strong turbulence. The stated volume flow rate accuracy Δ can only be achieved with a straight duct section of at least $5D$ upstream. Shorter upstream sections require a perforated plate in the branch and before the VAV terminal unit. If there is no straight upstream section at all, the control will not be stable, even with a perforated plate.

Explanation

Guide Room NR [kg]

A guide room NR sound pressure level based on the combined direct discharge, the reverberant discharge and the case and inlet reverberant noise level

 ΔP_{esp} [Pa]

Downstream static pressure

 ΔP_{st} [Pa]

Inlet static pressure

 $\Delta P_{st\ min}$ [Pa]

Minimum inlet static pressure

 q_{vmax} [l/s]

Primary air volume flow rate

 q_v [l/s]

Maximum primary air volume flow rate

 q_{vmin} [l/s]

Minimum primary air volume flow rate

 V_D [l/s]

Discharge(fan)volume flow rate

 W_1 [W]

Input power to motor at maximum fan volume flow rate

 W_2 [W]

Output power of motor

 A_s [A]

Motor inverter inrush current at power on

 A_R [A]

Motor running current

 m_w [kg/s]

mass flow rate of water

 Q_h [kW]

heat output

 Δp_w [kPa]

Water pressure drop