

Fan powered VAV terminals

Series type

VFS



BARCOL-AIR (UK) LTD

Application

Barcol-Air series fan VAV terminals, type VFS, mix room- and primary air thoroughly and provide a constant air supply to the room, thus giving very good air distribution even with high turn down of the primary air volume.

The VSF terminals are eminently suitable for low temperature air applications. If the supply air temperature is low, then the fan volume flow rate must be higher than the 100% primary air volume flow rate to ensure suitable air temperature at the diffuser.

Pressure independent control of the primary VAV damper is accomplished by use of a Multi-point flow sensor FloXact® which gives accurate control of air flow even with a 90° bend on the inlet spigot.

The terminals have backward curved blade centrifugal fan with an EBM-PAPST direct drive motor with Green-Tech EC technology. The powerful EC centrifugal fans come standard with continuous speed control via 0-10V input and feature whisper-quiet operation thanks to the optimised control technique.

This fulfils the more stringent requirements for comfort and convenience. In terms of energy efficiency, Green-Tech EC technology is the very first choice, and features a power reduction of up to 70% compared to the previously used fans with split-pole or capacitor motors.

Air flow sensor

- The unique shape, patent pending, creates a linear amplified signal (at least 2.5x P_{dyn}) with a very low pressure drop and noise level.
- Multi point averaging according to the "Log-Tchebycheff" method
- 1% (FS) accuracy with 3x D_{eq} straight duct approach
- 5% (FS) accuracy with 1x D_{eq} straight duct approach
- Stable measuring signal from 0,7 m/s air velocity

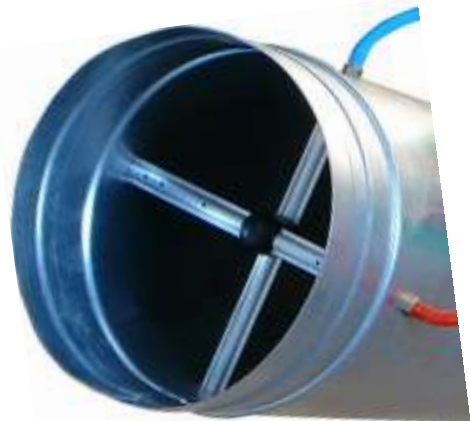
Type VFS-HW2-BAC (2 row coil + BACnet controller)

Design features

Casing

- Ridged galvanised steel construction (1,0mm or 20 gauge).
- Spigots comply with DIN 24145 or DIN 24146.
- Oval shaped damper blade, sandwich construction with synthetic rubber seals. Leakage rate 0.25% of V_{nom} @ 750Pa (3"WG) static pressure drop.
- Air leakage flow complies with Class II, VDI 3803 or DIN 24194, Part 2
- Damper shaft aluminium, \varnothing 12 mm
- Bearings Polyamide (PA6.6)
- Thermal / acoustical insulation 25kg/m³ (1,5lb/cuFt) non-fibrous or fiberglass, fire resistant to BS-476 Class "O". Exposed edges are sealed from the air-stream with solid metal lining.
- Operating temperature +5 to 50°C
- Storage temperature 0 to +70°C, max R.H. 95%
- Other construction available upon request.

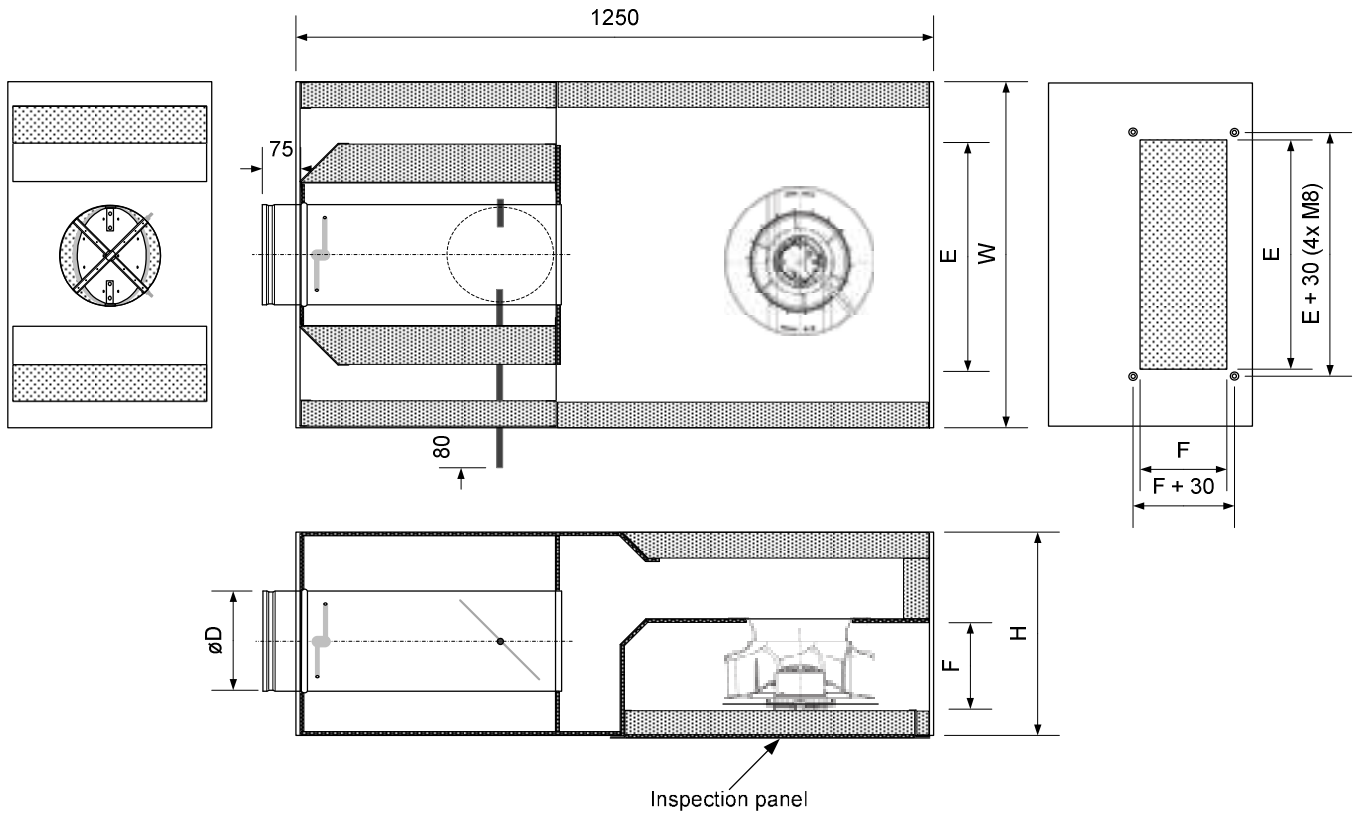
Type VFS-SA with sound attenuator



Detail FloXact-X® multipoint, averaging air flow sensor

Kv Values FloXact-X®

	units	125	160	200	250	315
Kv Value	l/s/Pa	8,89	15,6	25,5	41,3	67,5
	m ³ /h/Pa	32,0	56,2	91,9	148,8	243,0
Vnom @ 150Pa	l/s	109	191	313	506	827
	m ³ /h	392	688	1.125	1.822	2.976
Vnom @ 250Pa (1"WC)	l/s	141	247	404	653	1.067
	m ³ /h	506	888	1.453	2.352	3.842



Type VFS

Dimensions and weight (without controls)

Unit size	$\varnothing D$	E	F	H	W	Kg
1	123, 158, 198	400	150	370	600	56
2	158, 198, 248	480	170	410	680	67
3	198, 248, 312	650	200	450	850	82

Type SA (sound attenuator)

Dimensions and weight

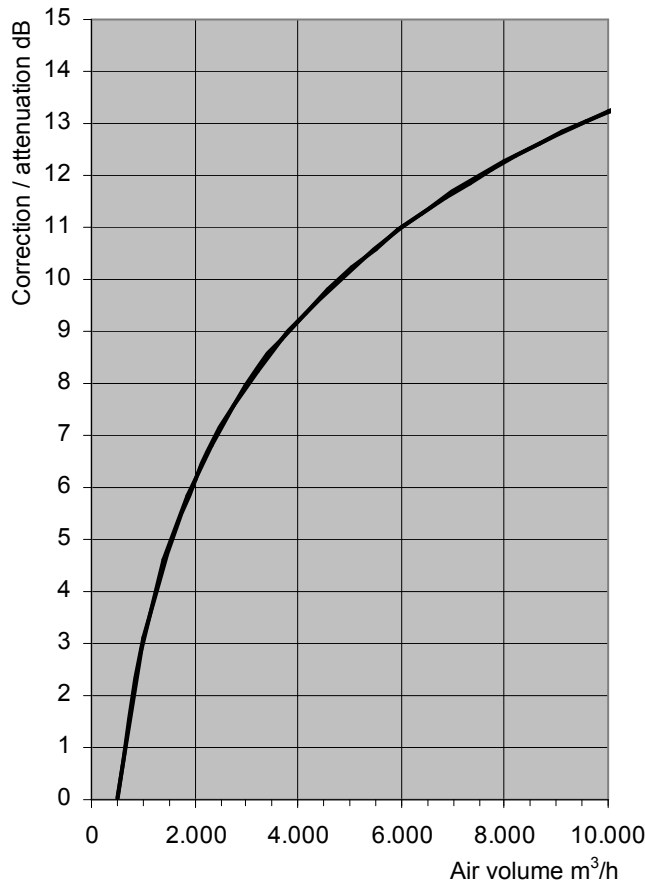
Unit size	E	F	H	L	Kg
1	400	150	300	1250	
2	480	170	350	1250	
3	650	200	450	1250	

Sound data NR

1. The discharge sound pressure levels **Lp(A)**, are determined with a room absorption of 7dB/oct and the following assumption for downstream ductwork, diffuser(s) and end reflection:

125	250	500	1k	2k	4k	Hz
-3	-5	-10	-15	-15	-12	dB

2. The discharge sound pressure levels **Lp(A)** also include a correction for air volume :



3. The radiated sound pressure levels **Lp(A)** are determined with a room absorption of 7dB/oct and the following assumption ceiling attenuation:

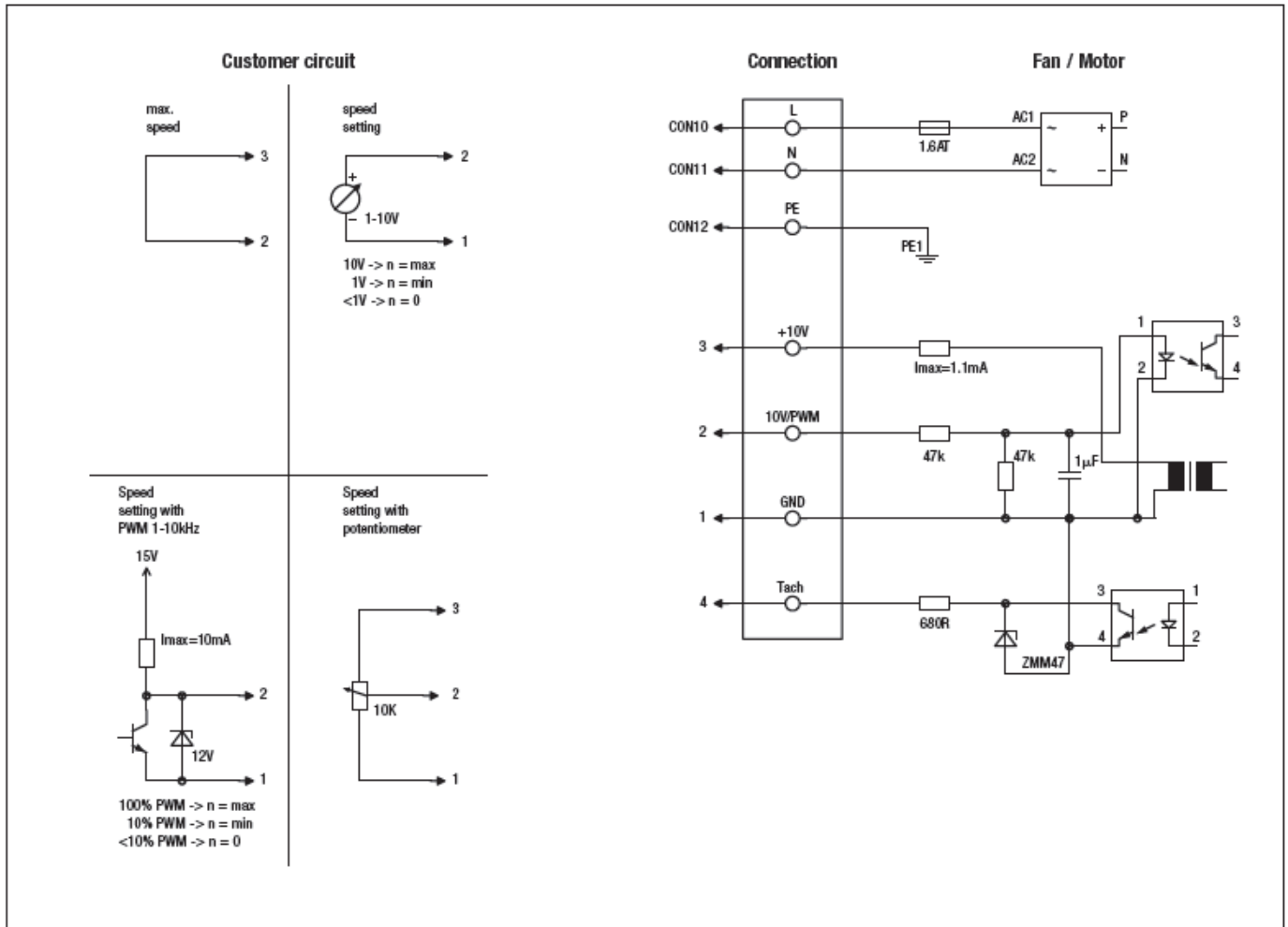
125	250	500	1k	2k	4k	Hz
-1	-3	-5	-7	-7	-10	dB

4. Sound data is measured in a reverberation room at an independent sound laboratory, according to ISO-3741 and ISO-5135 standards.
5. L_w in dB/Oct are sound power levels (re $10^{-12}W$) per octave band in dB for discharge sound and radiated sound. Values less than 17 dB are indicated by "-".
6. **n/a** Not applicable, static pressure < unit resistance
7. **min ΔPs**. Unit resistance with fully opened damper blade

Model (Fan)	Air Volume (Fan)		Discharge sound (Duct borne sound)										Radiated sound (Break out sound)							
			Lw (dB/oct) re 10 ⁻¹² W							Quick Sel. L _p			Lw (dB/oct) re 10 ⁻¹² W							Quick Sel. L _p
			125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	Lw dB	NR ₁	NR ₂	NR ₃	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	Lw dB	NR ₄
mm	m ³ /h	l/s																		
1	180	50	49	48	41	33	26	26	52	38	26	19	27	26	20	19	13	13	30	19
	270	75	49	48	41	33	26	26	52	39	27	20	27	26	20	19	13	13	31	19
	360	100	50	49	42	34	27	27	53	40	28	21	28	27	21	20	14	14	32	20
	450	125	51	50	43	35	28	28	54	41	29	22	29	28	22	21	15	15	33	21
	540	150	52	51	44	36	29	29	55	42	30	22	30	29	23	22	16	16	34	22
	630	175	53	52	45	37	30	30	56	42	30	23	31	30	24	23	17	17	35	23
	720	200	55	54	47	39	32	32	58	43	31	24	33	32	26	25	19	19	36	25
2	360	100	50	49	42	34	27	27	53	40	28	19	28	27	21	20	14	14	32	20
	540	150	52	51	44	36	29	29	55	42	30	20	30	29	23	22	16	16	34	22
	720	200	54	53	46	38	31	31	57	42	30	21	32	31	25	24	18	18	35	24
	900	250	56	55	48	40	33	33	59	43	31	22	34	33	27	26	20	20	37	26
	1080	300	58	57	50	42	35	35	61	45	33	24	36	35	29	28	22	22	39	28
	1260	350	60	59	52	44	37	37	63	46	34	25	38	37	31	30	24	24	41	30
	1440	400	61	60	53	45	38	38	64	47	35	26	39	38	32	31	25	25	43	31
3	900	250	56	55	48	40	33	33	59	43	31	23	32	31	28	26	20	20	36	24
	1080	300	58	57	50	42	35	35	61	45	33	24	34	33	30	28	22	22	38	26
	1260	350	60	59	52	44	37	37	63	46	34	26	36	35	32	30	24	24	40	28
	1440	400	61	60	53	45	38	38	64	47	35	27	37	36	33	31	25	25	41	29
	1620	450	63	62	55	47	40	40	66	48	36	28	39	38	35	33	27	27	43	31
	1800	500	64	63	56	48	41	41	67	50	38	30	40	39	36	34	28	28	44	32
	1980	550	66	65	58	50	43	43	69	51	39	31	42	41	38	36	30	30	46	34
	2160	600	67	66	59	51	44	44	70	52	40	32	43	42	39	37	31	31	47	35
	2340	650	68	67	60	52	45	45	71	53	41	33	44	43	40	38	32	32	48	36
	2520	700	69	68	61	53	46	46	72	54	42	34	45	44	41	39	33	33	50	37
	2700	750	71	70	63	55	48	48	74	54	42	35	47	46	43	41	35	35	51	39
2880	800	72	71	64	56	49	49	75	55	43	36	48	47	44	42	36	36	52	40	

Sound data NR

- NR₁ NR rating of sound power levels for duct borne generated noise at the outlet of the terminal.
- NR₂ NR rating of sound power levels for duct borne generated noise including the insertion loss for downstream duct, diffuser(s) and end reflection as specified on page 3.
- NR₃ NR rating of sound power levels for duct borne generated noise including the insertion loss for a sound attenuator type (VFSA) downstream duct, diffuser(s) and end reflection as specified on page 3.
- NR₄ NR rating of sound power levels for radiated noise noise and induction port noise including ceiling attenuation and room absorption as specified on page 3.



Line	Connection	Colour	Assignment / function
CON10	L	black	Power supply 230 VAC, 50 - 60 Hz, see type plate for voltage range
CON11	N	blue	Neutral conductor
CON12	PE	green/yellow	Protective earth
1	GND	blue	GND - Connection for control interface
2	0-10V PWM	yellow	Control input 0 - 10 V or PWM, electrically isolated
3	10V/max.1.1mA	red	Voltage output 10V / 1.1mA, electrically isolated, not short-circuit-proof
4	Tach	white	Tach output: Open Collector, 1 pulse per revolution, electrically isolated

Impellor material : PP-TD20
 Fire rating : UL 94-HB

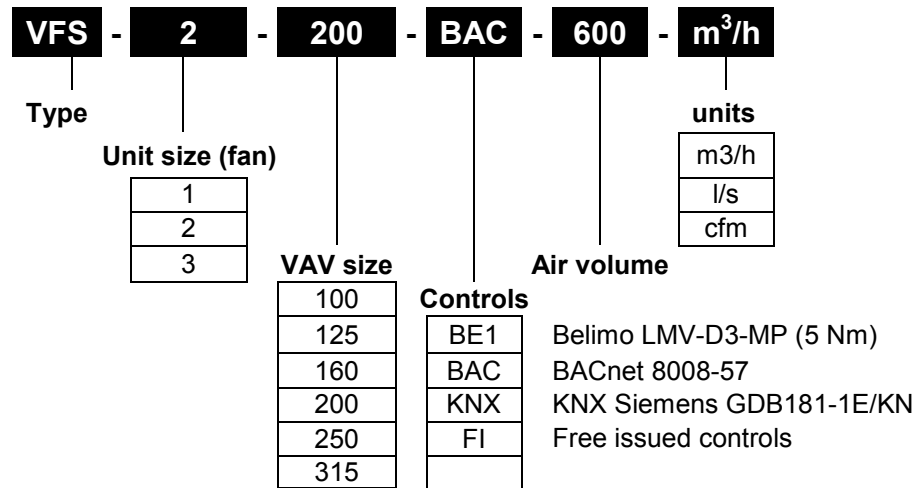
Evaluation conditions UL 94-HB: The specimen is mounted horizontally and gets flamed with a flame (h = 20mm) for 30 sec. The measurement starts when the flame has reached the mark (25mm). The test is passed, when:

- sample thickness < 3mm: burning rate < 75mm/min;
- sample thickness 3 - 13mm < 40mm/min
- stop burning before reaching the 100mm mark

Fan motor details (EC type)

Unit size	n ⁻¹ (max)	W (max)	Kg
1	2510	170	1,9
2	1910	168	2,7
3	2700	500	4,3

- **Technical features:**
 - Control input 0-10 VDC / PWM
 - Output 10 VDC max. 1,1 mA
 - Tach output
 - Motor current limitation
 - Soft start
- **Motor protection:** TOP wired internally
- **EMC:**
 - Ⓐ Interference emission acc. to EN 61000-6-3
 - Ⓐ Ⓑ Interference immunity acc. to EN 61000-6-2
 - Ⓐ Harmonics acc. to EN 61000-3-2
- **Leakage current:** <= 3,5 mA acc. to EN 60335-1
- **Connection leads:** Via plug
- **Protection class:** I
- **Product conforming to standards:** EN 60335-1



Specify as:

Example:

Supply and install, Fan powered VAV terminal, from galvanized sheet steel, duct sleeve connection suitable for DIN 24 145 or DIN 24 146. Casing leakage rate to class II, VDI 3803/ DIN 24 194. The primary air inlet VAV should have a low leakage, sandwich construction damper blade with SBR gasket and an aluminium damper shaft with self lubricating Nylon bearings and averaging airflow sensor type FloXact®.

For:

Air volume	....	m ³ /h
Primary inlet	....	mm
Max. pressure loss	....	Pa
Max. discharge SPL	....	NR
Max. radiated SPL	....	NR
Controller	BACnet type 8008-57 (factory programmed, fitted and calibrated)	
Manufacturer	Barcol-Air (UK) Ltd	
Type	VFS-xxx-BAC-xxx-	

Delivery / Controls

- All controls fitted are pressure independent and factory calibrated.
- The unit can be supplied with analogue, DDC or pneumatic controls
- When units are ordered with controls "free-issued" by 3rd party, wiring diagrams, calibration instructions, calibration tools and mounting instructions must be provided free of charge.
- All controls will be mounted, as standard, on the right hand side of the unit when looking in the direction of airflow, unless otherwise requested.

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