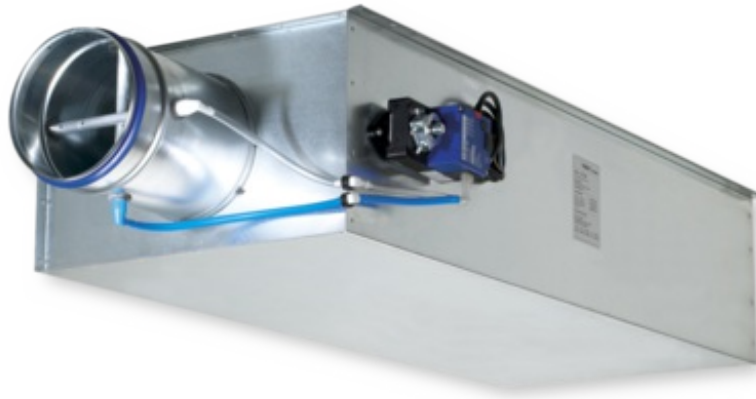


Type TVZ



FOR SUPPLY AIR SYSTEMS WITH DEMANDING ACOUSTIC REQUIREMENTS

VAV terminal units for the supply air control in buildings with variable air volume systems and demanding acoustic requirements

- Highly effective integral attenuator
- Box style construction for the reduction of the airflow velocity
- Electronic control components for different applications (Easy, Compact, Universal, and LABCONTROL)
- Suitable for airflow velocities up to 13 m/s
- Closed blade air leakage to EN 1751, up to class 4
- Casing air leakage to EN 1751, class A

Optional equipment and accessories

- Acoustic cladding for the reduction of case-radiated noise
- Secondary silencer Type TS for the reduction of air-regenerated noise
- Hot water heat exchanger of Type WT for reheating the airflow



APPLICATION

Application

- VARYCONTROL VAV terminal units of Type TVZ for the supply air control in variable air volume systems
- Closed-loop volume flow control using an external power supply
- Integral attenuator for demanding acoustic requirements
- Shut-off by means of switching (equipment supplied by others)

Special characteristics

- Integral attenuator with at least 26 dB insertion loss at 250 Hz
- Hygiene tested and certified
- 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
- Inspection access for cleaning to VDI 6022

Nominal sizes

- 125, 160, 200, 250, 315, 400

DESCRIPTION

Variants

- TVZ: Supply air unit
- TVZ-D: Supply air unit with acoustic cladding
- Units with acoustic cladding and/or secondary silencer Type TS for very demanding acoustic requirements
- Acoustic cladding cannot be retrofitted

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

- Inspection access
- Factory assembled control components complete with wiring and tubing
- Aerodynamic functional testing on a special test rig prior to shipping of each unit
- Set-up data is given on a label or volume flow rate scale affixed to the unit
- High control accuracy (even with upstream bend $R = 1D$)

Attachments

- Easy controller: Compact unit consisting of controller with potentiometers, differential pressure transducer and actuator
- Compact controller: Compact unit consisting of controller, differential pressure transducer and actuator
- Universal controller: Controller, differential pressure transducer and actuators for special applications
- LABCONTROL: Control components for air management systems

Accessories

- Lip seal (factory fitted)

Useful additions

- Secondary silencer Type TS
- Heat exchanger Type WT

Construction features

- Rectangular casing
- Spigot on the fan end suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for lip seal
- Connection on the room end suitable for air duct profiles
- Baffle plate is fitted after the damper blade for optimum aerodynamic performance
- Position of the damper blade indicated externally at shaft extension
- Thermal and acoustic insulation (lining)

Materials and surfaces

- Casing and damper blade made of galvanised sheet steel
- Damper blade seal made of TPE plastic

- Lining is mineral wool
- Differential pressure sensor made of aluminium
- Plastic bearings

Variant with acoustic cladding (-D)

- Acoustic cladding made of galvanised sheet steel
- Lining is mineral wool
- Rubber elements for the insulation of structure-borne noise

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

- Hygiene conforms to VDI 6022
- VDI 2083, air cleanliness class 3, and US standard 209E, class 100
- Closed blade air leakage to EN 1751, class 4 (nominal sizes 125 and 160, class 3).
- Nominal sizes 125 and 160 meet the general requirements, nominal sizes 200 – 400 meet the increased requirements of DIN 1946, part 4, with regard to the acceptable closed blade air leakage
- Casing air leakage to EN 1751, class A

Maintenance

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

TECHNICAL INFORMATION

FUNCTION

Functional description

The VAV terminal unit is fitted with a differential pressure sensor for measuring the volume flow rate.

The control components (attachments) include a differential pressure transducer that transforms the differential pressure (effective pressure) into an electric signal, a controller, and an actuator; the control functions can be achieved with an Easy controller, with a Compact controller, or with individual components (Universal or LABCONTROL).

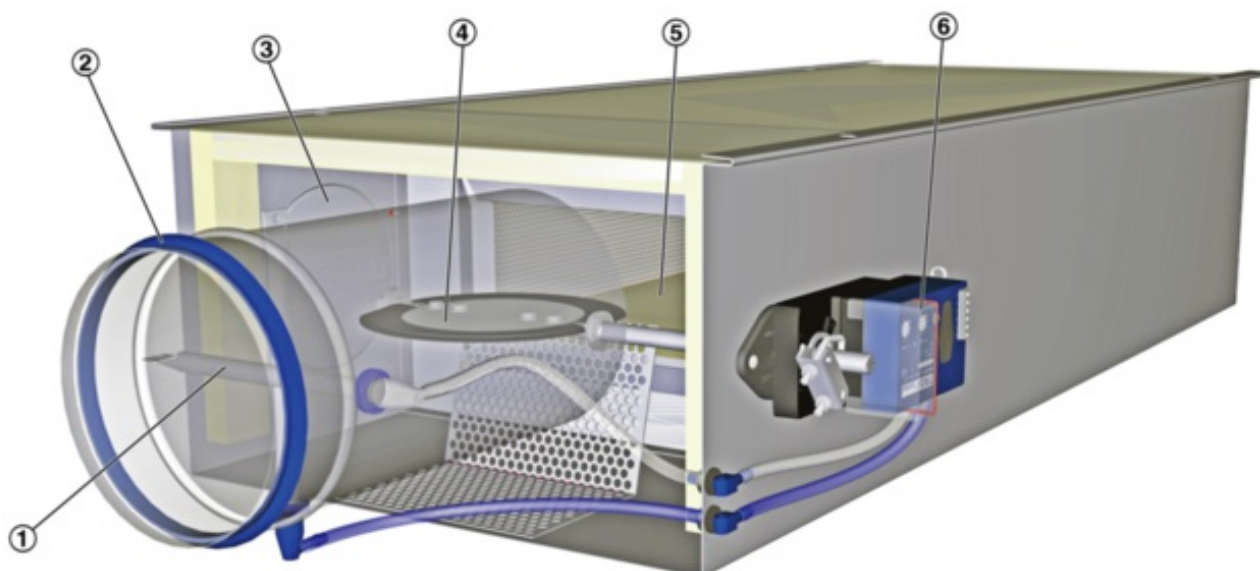
For most applications, the setpoint value comes from a room temperature controller.

The controller compares the actual value with the setpoint value and alters the control signal of the actuator if there is a difference between the two values.

An integral attenuator reduces the noise that is created by the restriction of the airflow.

The airflow velocity at the room end is, due to the larger rectangular cross section, about half the velocity in the circular duct.

Schematic illustration of the TVZ



- ① Differential pressure sensor
- ② Lip seal
- ③ Inspection access
- ④ Damper blade
- ⑤ Integral attenuator
- ⑥ Control components, e.g. an Easy controller

TECHNICAL DATA

Volumenstrombereiche

Die Mindestdruckdifferenz der VVS-Regelgeräte ist eine wichtige Größe zur Planung des Kanalnetzes und zur Dimensionierung des Ventilators einschließlich der Drehzahlsteuerung.

Es muss sichergestellt sein, dass unter allen Betriebsbedingungen an allen Regelgeräten ein ausreichender Kanaldruck ansteht. Der Messpunkt oder die Messpunkte für die Drehzahlsteuerung des Ventilators sind dementsprechend auszuwählen.

Die Volumenstrombereiche von VVS-Regelgeräten sind von der Nenngröße und von der verwendeten Regelkomponente (Anbauteil) abhängig. Die dargestellten Tabellenwerte sind die Minimal- und Maximalwerte des VVS-Regelgerätes. Für bestimmte Regelkomponenten gelten eingeschränkte Bereiche. Dies gilt insbesondere für Regelkomponenten mit statischem Differenzdrucktransmitter. Volumenstrombereiche für alle Regelkomponenten enthält das Auslegungsprogramm Easy Product Finder.

Nominal sizes	125 – 400 mm
Volume flow rate range	15 – 1680 l/s or 54 – 6048 m ³ /h
Volume flow rate control range (unit with dynamic differential pressure measurement)	Approx. 10 – 100 % of the nominal volume flow rate
Minimum differential pressure	5 – 80 Pa
Maximum differential pressure	1000 Pa
Operating temperature	10 – 50 °C

QUICK SIZING

Die Schnellauslegung gibt einen guten Überblick über die zu erwartenden Schalldruckpegel im Raum. Ungefähre Zwischenwerte können interpoliert werden. Zu exakten Zwischenwerten und Spektraldaten führt die Auslegung mit unserem Auslegungsprogramm Easy Product Finder.

Die Auswahl der Nenngröße erfolgt zunächst nach den gegebenen Volumenströmen V_{\min} und V_{\max} . In der Schnellauslegung sind praxiserrechte Dämpfungswerte berücksichtigt. Liegt der Schalldruckpegel über dem zulässigen Wert, sind ein größeres

Volumenstrom-Regelgerät und/oder ein Schalldämpfer erforderlich.

Auslegungsbeispiel

Gegeben

$V_{\max} = 280 \text{ l/s}$ (1010 m³/h)

$\Delta p_{\text{st}} = 150 \text{ Pa}$

Zulässiger Schalldruckpegel im Raum 30 dB(A)

Schnellauslegung

TVZ-D/200

Strömungsgeräusch $L_{\text{PA}} = 23 \text{ dB(A)}$

Abstrahlgeräusch $L_{\text{PA3}} = 24 \text{ dB(A)}$

Schalldruckpegel im Raum = 27 dB(A)

(nach logarithmischer Addition, da Gerät in der Zwischendecke des betrachteten Raumes)

TVZ, Sound pressure level at differential pressure 150 Pa

Nominal size	V		Air-regenerated noise		Case-radiated noise	
			①	②	①	③
Nominal size	V		L _{PA}	L _{PA1}	L _{PA2}	L _{PA3}
	l/s	m ³ /h	dB(A)			
125	15	54	17	16	21	<15
	60	216	24	20	24	16
125	105	378	29	24	27	19
	150	540	34	29	32	23
160	25	90	18	16	20	<15
	100	360	28	24	25	18
	175	630	35	29	29	21

160	250	900	36	30	35	27
200	40	144	16	<15	22	15
	160	576	21	17	27	20
200	280	1008	23	17	31	23
	405	1458	31	24	39	31
250	60	216	16	15	22	16
	250	900	17	<15	26	19
250	430	1548	22	15	29	22
	615	2214	31	21	37	28
315	105	378	18	15	21	15
	410	1476	21	16	27	19
315	720	2592	24	18	33	24
	1030	3708	29	22	38	29
400	170	612	17	<15	25	17
	670	2412	19	15	29	20
400	1175	4230	26	20	33	25
	1680	6048	32	27	43	35

① TVZ

② TVZ with secondary silencer TS

③ TVZ-D

SPECIFICATION TEXT

Rectangular VAV terminal units for variable and constant air volume systems, suitable for supply air, available in 6 nominal sizes.

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

Ready-to-commission unit which consists of the mechanical parts and the electronic control components. Each unit contains an averaging differential pressure sensor for volume flow rate measurement, a damper blade, and an integral attenuator. Factory-assembled control components complete with wiring and tubing.

Differential pressure sensor with 3 mm measuring holes (resistant to dust and pollution)

On the fan end, spigot with groove for lip seal, suitable for connecting ducts according to EN 1506 or EN 13180.

Room end suitable for the connection of air duct profiles.

Baffle plate is fitted after the damper blade for optimum acoustic and aerodynamic performance.

Casing with acoustic and thermal insulation.

Position of the damper blade indicated externally at shaft extension.

Closed blade air leakage to EN 1751, class 4 (nominal sizes 125 and 160, class 3).

Casing air leakage to EN 1751, class B.

Complies with VDI 2083, clean room class 3, and US standard 209E, class 100. Hygiene complies with VDI 6022, DIN 1946, part 4, as well as EN 13779 and VDI 3803.

Special characteristics

- Integral attenuator with at least 26 dB insertion loss at 250 Hz
- Hygiene tested and certified
- 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
- Inspection access for cleaning to VDI 6022

Materials and surfaces

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

Variant with acoustic cladding (-D)

- Acoustic cladding made of galvanised sheet steel
- Lining is mineral wool
- Rubber elements for the insulation of structure-borne noise

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

Technical data

- Nominal sizes: 125 to 400 mm
- Volume flow rate range: 15 to 1680 l/s or 54 to 6048 m³/h
- Volume flow rate control range (unit with dynamic differential pressure measurement): approx. 10 to 100 % of the nominal volume flow rate
- Minimum differential pressure: 5 – 80 Pa
- Maximum differential pressure: 1000 Pa

Attachments

Variable volume flow control with electronic Easy 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}
- Potentiometers with percentage scales to set the 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 control range: approx. 10 – 100 % of the nominal volume flow rate
- Clearly visible external indicator light for signalling the functions: Set, not set, and power failure

Electrical connections with screw terminals. Double terminals for looping the supply voltage, i.e. for the simple connection of

voltage transmission to the next controller.

Sizing data

- V _____ [m³/h]
- Δp_{st} _____ [Pa]

Air-regenerated noise

- L_{PA} _____ [dB(A)]

Case-radiated noise

- L_{PA} _____ [dB(A)]

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

ORDER CODE

TVZ – D / 160 / D1 / B1B / E 0 / 200 – 900 / NO

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

1 2 3 4 5 6 7 8 9

TVZ – D / 160 / D1 / Easy

↓ ↓ ↓ ↓ ↓

1 2 3 4 5

1 Type

TVZ VAV terminal unit, supply air

2 Acoustic cladding

No entry: none

D With acoustic cladding

3 Nominal size [mm]

125

160

200

250

315

400

4 Accessories

No entry: none

D1 Lip seal

5 Attachments (control component)

Example

Easy Easy controller

BC0 Compact controller

B13 Universal controller

6 Operating mode

E Single

M Master

S Slave

F Constant value

Z Differential pressure control – supply air

7 Signal voltage range

For the actual and setpoint value signals

0 0 – 10 V DC

2 2 – 10 V DC

8 Volume flow rates [m³/h or l/s], differential pressure [Pa]

V_{\min} – V_{\max} for factory setting

Δp_{\min} for factory setting (operating mode A)

9 Damper blade position

Only with spring return actuators

NO Power off to OPEN

NC Power off to CLOSE

VARIANTS

TVZ

- VAV terminal unit for the control of variable supply air volume flows

TVZ-D

- VAV terminal unit with acoustic cladding for the control of variable supply air volume flows
- For rooms where the case-radiated noise of the unit is not sufficiently reduced by a false ceiling
- The circular ducts for the room under consideration must have adequate acoustic insulation (provided by others) on the fan end
- Acoustic cladding cannot be retrofitted

ATTACHMENTS

TVZ, Regelkomponenten VARYCONTROL

Bestellschlüsseldetail	Regelgröße	Regler	Differenzdrucktransmitter	Stellantrieb
Easyregler				
Easy	Volumenstrom	Easyregler Fabrikat TROX	Dynamisch, integriert	Integriert
Compactregler, dynamisch				
BC0	Volumenstrom	Compactregler mit MP-Bus-Schnittstelle Fabrikat TROX/Belimo	Dynamisch, integriert	Integriert
BL0	Volumenstrom	Compactregler mit LonWorks-Schnittstelle Fabrikat TROX/Belimo	Dynamisch, integriert	Integriert
BM0	Volumenstrom	Compactregler mit Schnittstelle Modbus RTU (mit Anschlussleitung) Fabrikat TROX/Belimo	Dynamisch, integriert	Integriert
BM0-J6	Volumenstrom	Compactregler mit Schnittstelle Modbus RTU (mit Anschlussbuchse) Fabrikat TROX/Belimo	Dynamisch, integriert	Integriert

XB0	Volumenstrom	Compactregler Fabrikat TROX/Gruner	Dynamisch, integriert	Integriert
LN0	Volumenstrom	Compactregler Fabrikat Siemens	Dynamisch, integriert	Integriert
LK0	Volumenstrom	Compactregler mit KNX-Schnittstelle Fabrikat Siemens	Dynamisch, integriert	Integriert
Compactregler, statisch				
SA0	Volumenstrom	Compactregler mit SLC-Schnittstelle Fabrikat Sauter	Statisch, integriert	Integriert
SC0	Volumenstrom	Compactregler mit SLC-Schnittstelle Fabrikat Sauter	Statisch, integriert	Schnelllaufender Stellantrieb, integriert
Universalregler, dynamisch				
B13	Volumenstrom	Universalregler Fabrikat TROX/Belimo	Dynamisch, integriert	Stellantrieb
B1B	Volumenstrom	Universalregler Fabrikat TROX/Belimo	Dynamisch, integriert	Federrücklaufantrieb
XC3	Volumenstrom	Universalregler Fabrikat TROX/Gruner	Dynamisch, integriert	Federrücklaufantrieb
Universalregler, statisch				
BP3	Volumenstrom	Universalregler mit MP-Bus-Schnittstelle Fabrikat TROX/Belimo	Statisch	Stellantrieb
BPB	Volumenstrom	Universalregler mit MP-Bus-Schnittstelle Fabrikat TROX/Belimo	Statisch	Federrücklaufantrieb
BPG	Volumenstrom	Universalregler mit MP-Bus-Schnittstelle Fabrikat TROX/Belimo	Statisch	Schnelllaufender Stellantrieb
BB3	Volumenstrom	Universalregler Fabrikat TROX/Belimo	Statisch	Stellantrieb
BBB	Volumenstrom	Universalregler Fabrikat TROX/Belimo	Statisch	Federrücklaufantrieb

	Easyregler		Dynamisch												
Easy	V			Integriert	Integriert	①	●	●	●	●	●	●	●	●	●
		Compactregler		Dynamisch											
BC0	V	MP-Bus		Integriert	Integriert	②	●	●	●	●	●	●	●	●	●
BF0	V	MP-Bus		Integriert	Integriert	②									
BL0	V	LonWorks		Integriert	Integriert	②		●	●	●	●	●	●	●	●
BM0	V	Modbus		Integriert	Integriert	②									
BM0-J6	V	Modbus und steckerfertiger Anschlussleitung		Integriert	Integriert	②									
XG0	V			Integriert	Integriert	③									
XB0	V			Integriert	Integriert	③		●	●	●	●	●	●	●	●
LN0	V			Integriert	Integriert	⑤		●	●	●	●	●	●	●	●
LK0	V	KNX				⑤									
LY0	V			Integriert	Integriert	⑤									
		Compactregler		Statisch											
SA0	V			Integriert	Integriert	④									
SC0	Δp			Integriert	Schnelllaufender Stellantrieb integriert	④									
		Universalregler		Dynamisch											
B11	V			Integriert	Stellantrieb, Drehmoment für TVT	②					●				
B13	V			Integriert	Stellantrieb	②		●	●		●	●	●	●	●

BRG	Δp	MP-Bus		100 Pa	Schnelllaufender Stellantrieb	②		●			●	●	●	●
BS1	Δp	MP-Bus		600 Pa	Stellantrieb, Drehmoment für TVT	②					●			
BS3	Δp	MP-Bus		600 Pa	Stellantrieb	②		●	●					●
BSB	Δp	MP-Bus		600 Pa	Federrücklaufantrieb	②		●	●	●				
BSG	Δp	MP-Bus		600 Pa	Schnelllaufender Stellantrieb	②		●	●	●				
BG1	Δp			100 Pa	Stellantrieb, Drehmoment für TVT	②					●			
BG3	Δp			100 Pa	Stellantrieb	②		●	●		●	●	●	●
BGB	Δp			100 Pa	Federrücklaufantrieb	②		●	●	●	●	●	●	●
BH1	Δp			600 Pa	Stellantrieb, Drehmoment für TVT	②					●			
BH3	Δp			600 Pa	Stellantrieb	②		●	●					
BHB	Δp			600 Pa	Federrücklaufantrieb	②		●	●	●				
XE1	Δp			Integriert, 100 Pa	Stellantrieb	③		●	●	●	●	●	●	●
XE3	Δp			Integriert, 100 Pa	Federrücklaufantrieb	③		●	●	●	●	●	●	●
XF1	Δp			Integriert, 600 Pa	Stellantrieb	③		●	●	●				
XF3	Δp			Integriert, 600 Pa	Federrücklaufantrieb	③		●	●	●				

① TROX, ② TROX/Belimo, ③ TROX/Gruner, ④ Sauter, ⑤ Siemens

☒ Bestellschlüsseldetail, V Volumenstrom, Δp Differenzdruck

Anbauteile: LABCONTROL Regelkomponenten

☒	Regel- größe	Schnittstelle	V _{min} -/ V _{max} - Verstellung	Differenzdruck- transmitter	Stellantrieb	TVR	TVJ	TVT	TZ- S	TA- S	TVZ	TVA	TVRK	T
	Easylabregler		Statisch											
Elab	Raumzuluft Raumabluft Raumdruck Einzelregler	TCU3		Integriert	Schnelllaufender Stellantrieb	●	●	●						
	Raumzuluft Raumdruck Einzelregler	TCU3		Integriert	Schnelllaufender Stellantrieb				●		●			
Elab	Raumabluft Raumdruck Einzelregler	TCU3		Integriert	Schnelllaufender Stellantrieb					●		●		
	Raumzuluft Raumabluft Raumdruck Laborabzug Einzelregler	TCU3		Integriert	Schnelllaufender Stellantrieb								●	
		Elektronischer Regler		Statisch										

TMB	Schnelllaufender Stellantrieb (bürstenloser Motor)												●	●
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DIMENSIONS AND WEIGHT

Installation details, Basic information and nomenclature

INSTALLATION DETAILS

Installation and commissioning

- Any installation orientation (except units with static differential pressure transducer)
- Return edges of the casing with drilled holes suitable for M10 threaded rods
- TVZ-D: For constructions with acoustic cladding, ducts on the room side should have cladding up to the acoustic cladding of the controller

Anströmbedingungen

Die Volumenstromgenauigkeit ΔV gilt für gerade Anströmung. Formstücke wie Bögen, Abzweige oder Querschnittsveränderungen verursachen Turbulenzen, die die Messung beeinflussen können. Bei Ausführung von Luftleitungsanschlüssen, wie z. B. dem Abzweig von einer Hauptleitung, ist die EN 1505 zu beachten. Für manche Einbausituationen sind gerade Anströmlängen erforderlich.

Platzbedarf für Inbetriebnahme und Instandhaltung

Um die Arbeiten zur Inbetriebnahme und Instandhaltung zu ermöglichen, ausreichenden Bauraum im Bereich der Anbauteile freihalten. Gegebenenfalls sind Revisionsöffnungen in ausreichender Größe erforderlich, sodass die Anbauteile leicht zugänglich sind.

Platzbedarf

Anbauteile	①	②	③
	mm		
VARYCONTROL			
Easyregler	400	300	300
Compactregler	400	300	300
Universalregler	700	300	300
LABCONTROL			
EASYPAB	900	350	400

Platzbedarf für die Revisionsöffnung

Bauteil	①	②	③
	mm		
Revisionsöffnung	400	300	300

BASIC INFORMATION AND NOMENCLATURE

Principal dimensions

ØD [mm]

VAV terminal units made of stainless steel: Outside diameter of the spigot

VAV terminal units made of plastic: Inside diameter of the connecting spigot

ØD₁ [mm]

Pitch circle diameter of flanges

ØD₂ [mm]

Outside diameter of flanges

ØD₄ [mm]

Inside diameter of the screw holes of flanges

L [mm]

Length of unit including connecting spigot

L₁ [mm]

Length of casing or acoustic cladding

B [mm]

Duct width

B₁ [mm]

Screw hole pitch of flange (horizontal)

B₂ [mm]

Outside dimension of flange (width)

B₃ [mm]

Width of device

H [mm]

Duct height

H₁ [mm]

Screw hole pitch of flange (vertical)

H₂ [mm]

Outside dimension of flange (height)

H₃ [mm]

Unit height

n []

Number of flange screw holes

T [mm]

Flange thickness

m [kg]

Unit weight including the minimum required attachments (e.g. Compact controller)

Acoustic data **f_m [Hz]**

Octave band centre frequency

 L_{PA} [dB(A)]

A-weighted sound pressure level of air-regenerated noise of the VAV terminal unit, system attenuation taken into account

 L_{PA1} [dB(A)]

A-weighted sound pressure level of air-regenerated noise of the VAV terminal unit with secondary silencer, system attenuation taken into account

 L_{PA2} [dB(A)]

A-weighted sound pressure level of case-regenerated noise of the VAV terminal unit, system attenuation taken into account

 L_{PA3} [dB(A)]

A-weighted sound pressure level of case-regenerated noise of the VAV terminal unit with acoustic cladding, system attenuation taken into account

All sound pressure levels are based on 20 μ Pa.

Volume flow rates **V_{nom} [m³/h] and [l/s]**

Nominal volume flow rate (100 %)

- The value depends on product type and nominal size
- Values are published on the internet and in technical leaflets, and stored in the Easy Product Finder design software.
- Reference value for calculating percentages (e.g. V_{max})
- Upper limit of the setting range and maximum volume flow rate setpoint value for the VAV terminal unit

 $V_{min\ unit}$ [m³/h] and [l/s]

Technically possible minimum volume flow rate

- The value depends on product type, nominal size and control component (attachment)
- Values are stored in the Easy Product Finder design software
- Lower limit of the setting range and minimum volume flow rate setpoint value for the VAV terminal unit
- Depending on the controller, setpoint values below $V_{\min \text{ unit}}$ (if V_{\min} equals zero) may result in unstable control or shut-off

V_{\max} [m³/h] and [l/s]

Upper limit of the operating range for the VAV terminal unit that can be set by customers

- V_{\max} can only be smaller than or equal to V_{nom}
- In case of analog signalling to volume flow controllers (which are typically used), the set maximum value (V_{\max}) is allocated to the setpoint signal maximum (10 V) (see characteristic)

V_{\min} [m³/h] and [l/s]

Lower limit of the operating range for the VAV terminal unit that can be set by customers

- V_{\min} should be smaller than or equal to V_{\max}
- Do not set V_{\min} smaller than $V_{\min \text{ unit}}$, otherwise the control may become unstable or the damper blade may close
- V_{\min} may equal zero
- In case of analog signalling to volume flow controllers (which are typically used), the set minimum value (V_{\min}) is allocated to the setpoint signal minimum (0 or 2 V) (see characteristic)

V [m³/h] and [l/s]

Volume flow rate

ΔV [± %]

Volume flow rate tolerance from setpoint value

ΔV_{warm} [± %]

Volume flow rate tolerance for the warm air flow of dual duct terminal units

Differential pressure

Δp_{st} [Pa]

Static differential pressure

$\Delta p_{\text{st min}}$ [Pa]

Static differential pressure, minimum

- The static minimum differential pressure is equal to the pressure loss of the VAV terminal unit when the damper blade is open, caused by flow resistance (sensor tubes, damper mechanism)
- If the pressure on the VAV terminal unit is too low, the setpoint volume flow rate may not be achieved, not even when the damper blade is open
- Important factor in designing the ductwork and in rating the fan including speed control
- Sufficient duct pressure must be ensured for all operating conditions and for all terminal units, and the measurement point or points for speed control must have been selected accordingly to achieve this

Ausführungen

Verzinktes Stahlblech

- Luftführendes Gehäuse aus verzinktem Stahlblech
- Im Luftstrom befindliche Teile, wie bei der Serie beschrieben
- Außenliegende Bauteile, beispielsweise Konsolen und Deckel, in der Regel aus verzinktem Stahlblech

Pulverbeschichtete Oberfläche (P1)

- Luftführendes Gehäuse aus verzinktem Stahlblech, pulverbeschichtet RAL 7001, silbergrau
- Im Luftstrom befindliche Teile pulverbeschichtet oder Kunststoff
- Fertigungsbedingt eventuell einige im Luftstrom liegende Teile aus Edelstahl oder Aluminium pulverbeschichtet
- Außenliegende Bauteile, beispielsweise Konsolen und Deckel, in der Regel aus verzinktem Stahlblech

Edelstahl (A2)

- Luftführendes Gehäuse aus Edelstahl Typ 1.4201
- Im Luftstrom befindliche Teile pulverbeschichtet oder Edelstahl
- Außenliegende Bauteile, beispielsweise Konsolen und Deckel, in der Regel aus verzinktem Stahlblech

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