

Adjustment devices for VAV terminal units

Type: Adjustment devices



For service and commissioning

Adjustment devices for the service and commissioning of VAV terminal units. For the display of actual values and parameters, and for functional tests.

- Display of actual and setpoint values
- Display and changing of parameters and operating modes
- Easy plug connection to the controller or terminal connection to the switch cabinet
- Easy operation
- Portable devices for use on site

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Description

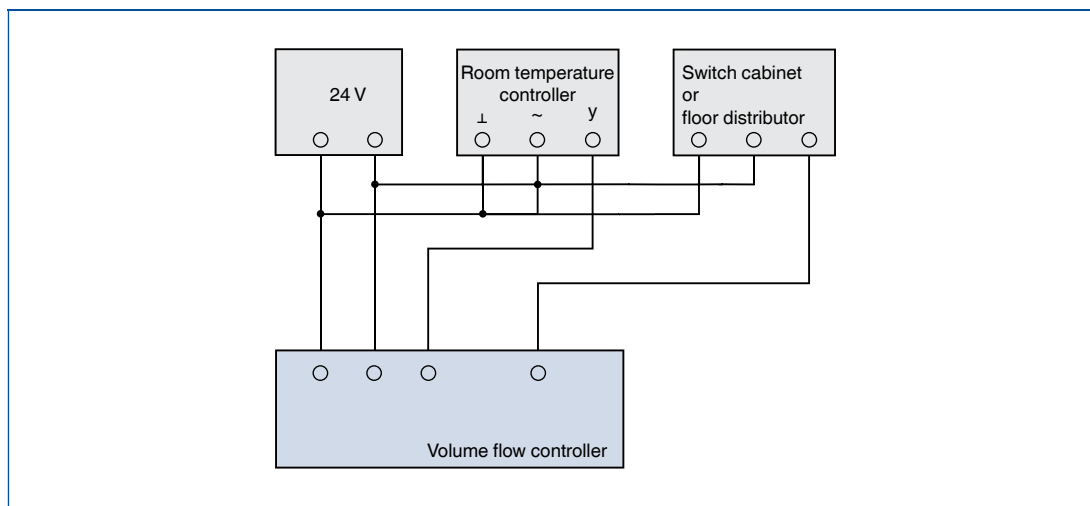
Application

- Adjustment devices for VAV terminal units, used to facilitate service and commissioning
- Read current actual values and setpoint values
- Read and change parameters
- Read and set operating modes
- Functional test

Installation and commissioning

- Recommendation: The signal line for the individual adjustment devices should be connected in an easily accessible place; this avoids having to open any false ceilings for inspection or service at a later stage.
- Easily accessible places include: switch cabinet, floor distribution box, or an unused terminal on the room temperature controller
- Important: The ground (and perhaps 24 V) must also be available.

Wire connection to an additional service terminal in the switch cabinet



Function

Functional description

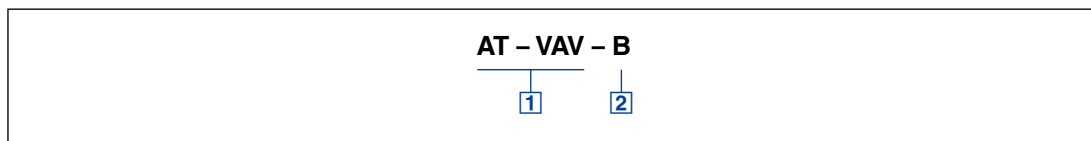
The adjustment device communicates with the controller using the voltage signal line for the actual value or setpoint value.

The adjustment device recognises the controller type and allows access to the available operating values and parameters.

The values are displayed. Operation is with push buttons.

Order code

AT



1 Type

AT-VAV Adjustment devices for VAV terminal units

2 Variants

- B** ZTH-GEN for TROX/Belimo volume flow controllers
- G** GUIV-A for TROX/Gruner volume flow controllers
- S** AST10 for Siemens volume flow controllers

Order example

AT-VAV - S

Adjusting device for Siemens volume flow controllers

Description

1

Application

- Adjustment device ZTH-GEN for VAV terminal units with TROX/Belimo volume flow controllers, used to facilitate service and commissioning
- Read current actual values and setpoint values
- Read and change \dot{V}_{min} and \dot{V}_{max}
- Read and change signal voltage ranges
- Read and change the operating mode
- Reset parameters to the factory settings
- MP bus test
- Measure and display the supply voltage

Compatible volume flow controllers

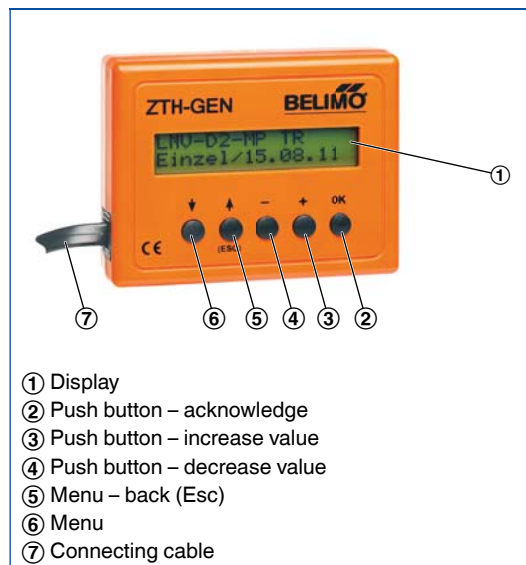
The volume flow controllers are attachments for VAV terminal units.

- BC0; BF0: LMV-D*-MP, NMV-D*-MP
- BL0: LMVD3-LON
- BP1, BP3, BPB, BPG; BR1, BR3, BRB, BRG;
- BS1, BS3, BSB, BSG: VRP-M
- B11, B13, B1B; B27: VRD3

Parts and characteristics

- Adjustment tool
- Cable with plug

AT-VAV-B



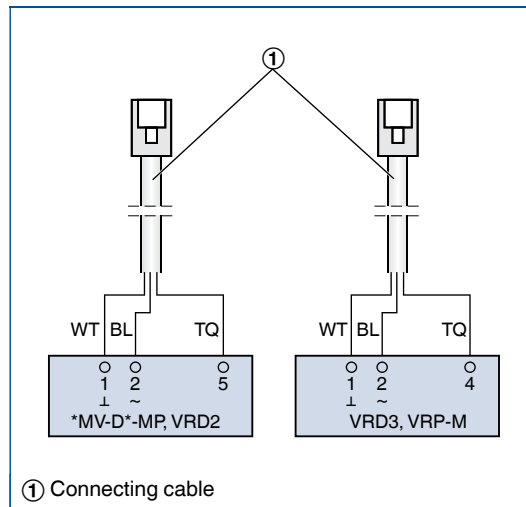
- ① Display
- ② Push button – acknowledge
- ③ Push button – increase value
- ④ Push button – decrease value
- ⑤ Menu – back (Esc)
- ⑥ Menu
- ⑦ Connecting cable

Electrical connection

Plug connection to the controller



Terminal connection to the controller or switch cabinet



- ① Connecting cable

Description

Application

- Adjustment device GUIV-A for VAV terminal units with TROX/Gruner volume flow controllers, used to facilitate service and commissioning
- Read current actual values and setpoint values
- Read and change \dot{V}_{min} and \dot{V}_{max}
- Read and change signal voltage ranges
- Read and change the operating mode
- Reset parameters to the factory settings

Compatible volume flow controllers

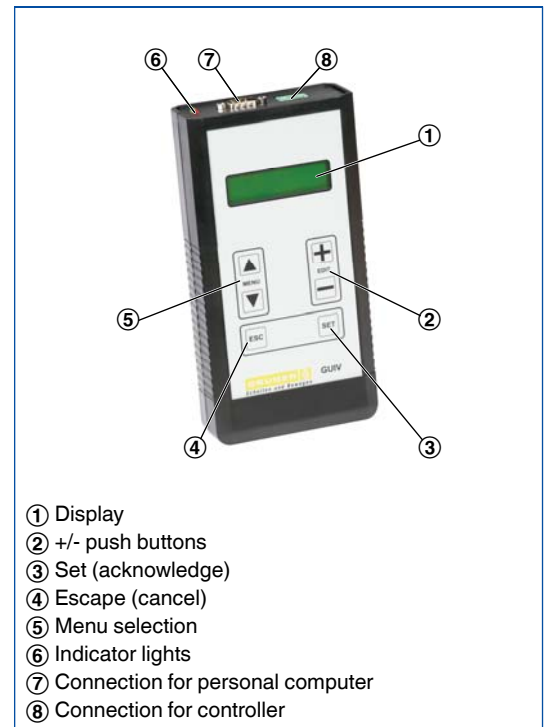
The volume flow controllers are attachments for VAV terminal units.

- XB0, XG0: 227V-024
- XC3: GUAC-D3
- XD1, XD3: GUAC-S3
- XE1, XE3: GUAC-P1
- XF1, XF3: GUAC-P6

Parts and characteristics

- Adjustment tool
- Cable 1 with plug for the controller
- Connecting cable 2 with two bare wire ends that can be connected to terminals

AT-VAV-G

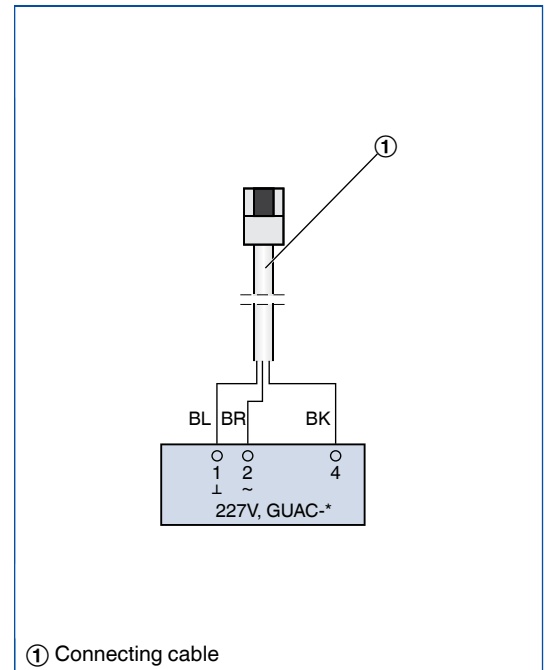


Electrical connection

Plug connection to the controller



Terminal connection to the controller or switch cabinet



Description

Application

- Adjustment device Type AST10 for VAV terminal units with Siemens volume flow controllers, used to facilitate service and commissioning
- Read current actual values and setpoint values
- Read and change \dot{V}_{min} and \dot{V}_{max}
- Read and change the operating mode
- Reset parameters to the factory settings

Compatible volume flow controllers

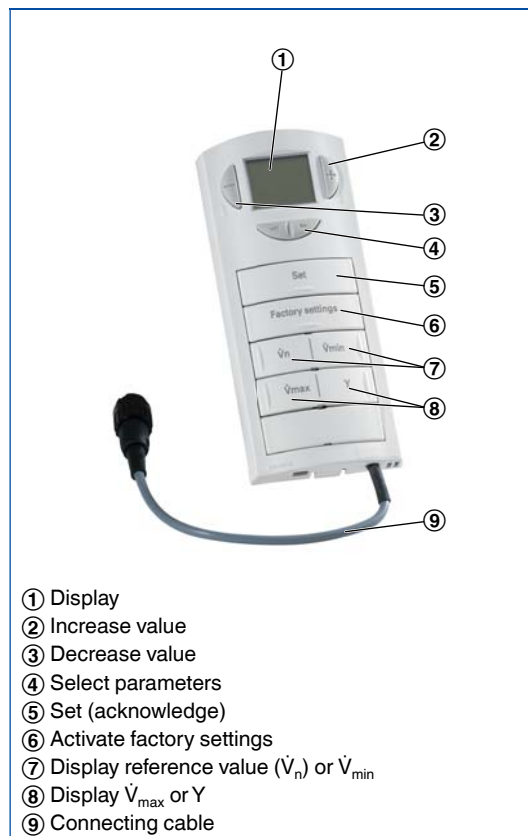
The volume flow controllers are attachments for VAV terminal units.

- LNO, LYO: GLB181/1E

Parts and characteristics

- Adjustment tool
- Cable 1 with plug for the controller
- Connecting cable 2 with two bare wire ends that can be connected to terminals

AT-VAV-S

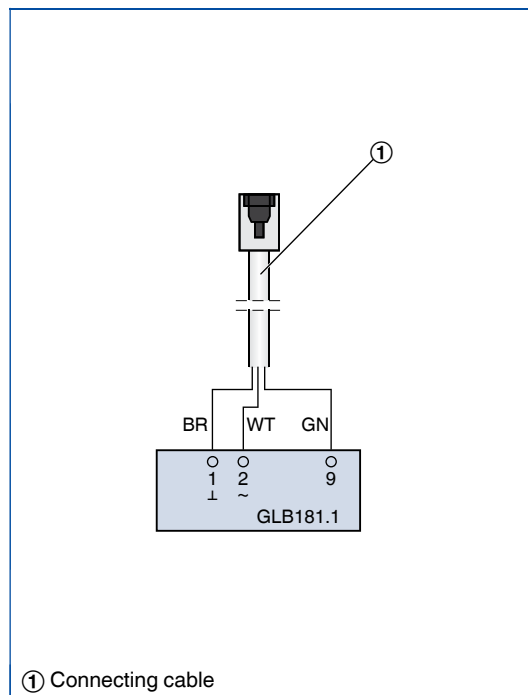


Electrical connection

Plug connection to the controller



Terminal connection to the controller or switch cabinet



Basic information and nomenclature



Variable volume flow control – VARYCONTROL

- Product selection
- Principal dimensions
- Nomenclature
- Correction values for system attenuation
- Measurements
- Sizing and sizing example
- Function
- Operating modes

Variable volume flow control – VARYCONTROL

Basic information and nomenclature

1 Product selection

	Type											
	LVC	TVR	TVJ	TVT	TZ-Silenzio	TA-Silenzio	TVZ	TVA	TVM	TVRK	TVLK	TVR-Ex
Type of system												
Supply air	●	●	●	●	●		●			●		●
Extract air	●	●	●	●		●		●		●	●	●
Dual duct (supply air)									●			
Duct connection, fan end												
Circular	●	●					●	●	●	●	●	●
Rectangular			●	●	●	●						
Volume flow rate range												
Up to [m³/h]	1080	6050	36360	36360	3025	3025	6050	6050	6050	6050	1295	6050
Up to [l/s]	300	1680	10100	10100	840	840	1680	1680	1680	1680	360	1680
Air quality												
Filtered	●	●	●	●	●	●	●		●	●	●	●
Office extract air	●	●	●	●		●		●		●	●	●
Polluted		○	○	○		○		○		●	●	○
Contaminated										●	●	
Control function												
Variable	●	●	●	●	●	●	●	●	●	●	●	●
Constant	●	●	●	●	●	●	●	●	●	●	●	●
Min/Max	●	●	●	●	●	●	●	●	●	●	●	●
Differential pressure control		○	○	○	○	○	○	○		○		○
Master/Slave	●	●	●	●	●	●	●	●	Master	●	●	●
Shut-off												
Leakage			●									
Low leakage	●	●		●	●	●	●	●	●	●	●	●
Acoustic requirements												
High < 40 dB (A)			○	○	●	●	●	●	○			
Low < 50 dB (A)	●	●	●	●	●	●	●	●	●	●	●	●
Other functions												
Volume flow rate measurement	●	●	●	●	●	●	●	●	●	●	●	●
Special areas												
Potentially explosive atmospheres												●
Laboratories, clean rooms, operation theatres (EASYPAC, TCU-LON II)		●	●	●			●	●		●	●	

● Possible

○ Possible under certain conditions: Robust unit variant and/or specific control component or useful additional product

□ Not possible

Variable volume flow control – VARYCONTROL

Basic information and nomenclature

Principal dimensions

ØD [mm]

VAV terminal units made of stainless steel:
Outside diameter of the connecting 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 flange screw holes

L [mm]

Length of unit including spigot

L₁ [mm]

Length of casing or acoustic cladding

W [mm]

Width of the duct

B₁ [mm]

Screw hole pitch of air duct profile (horizontal)

B₂ [mm]

Outside dimension of air duct profile (width)

B₃ [mm]

Unit width

H [mm]

Duct height

H₁ [mm]

Screw hole pitch of air duct profile (vertical)

H₂ [mm]

Outside dimension of air duct profile (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)

Nomenclature

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

\dot{V}_{nom} [m³/h] and [l/s]

Nominal volume flow rate (100 %)

\dot{V} [m³/h] and [l/s]

Volume flow rate

$\Delta\dot{V}$ [± %]

Volume flow rate accuracy

$\Delta\dot{V}_{warm}$ [± %]

Volume flow rate accuracy for the warm air volume flow of VAV dual duct terminal units

Δp_{st} [Pa]

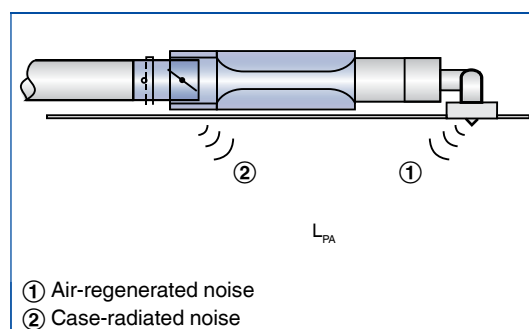
Static differential pressure

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

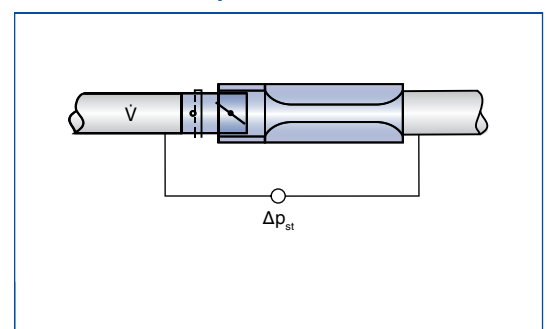
Minimum static differential pressure

All sound pressure levels are based on 20 µPa.

Definition of noise



Static differential pressure



Variable volume flow control – VARYCONTROL

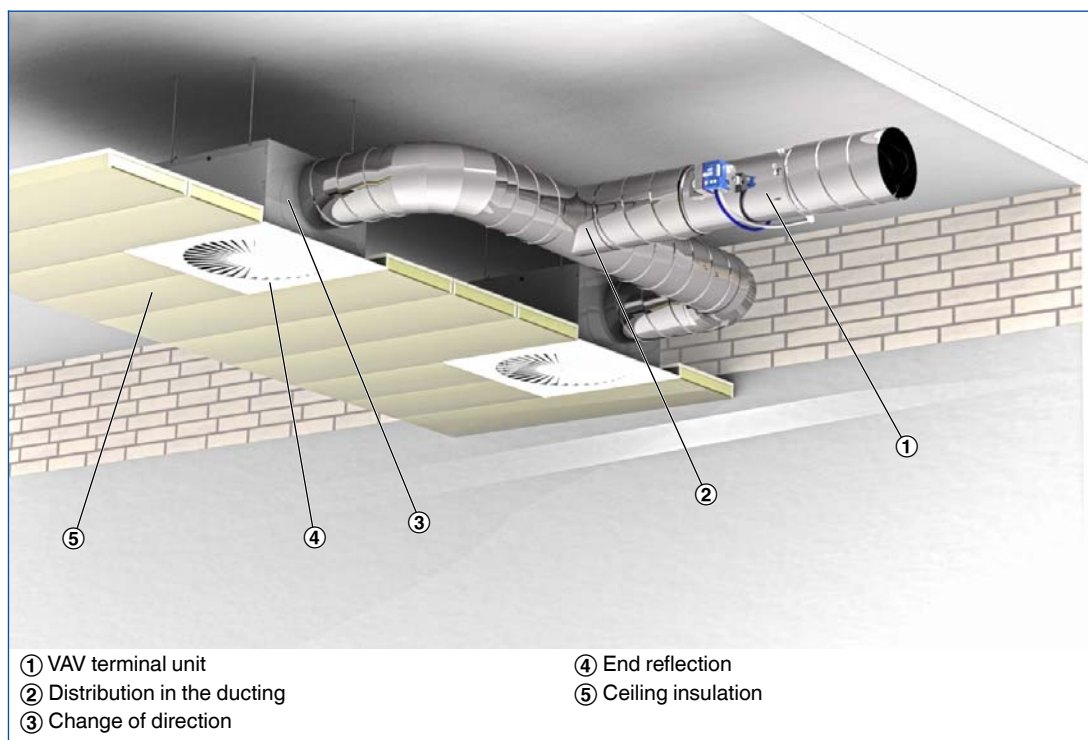
Basic information and nomenclature

1

The quick sizing tables show the sound pressure levels that can be expected in a room both for the air-regenerated noise and for the case-radiated noise. The sound pressure level in a room results from the sound power level of the products – for a given volume flow rate and differential pressure – and the attenuation and insulation on site. This is why generally accepted attenuation and insulation values have been taken into account for the tables.

The distribution of air across the ductwork, changes of direction, end reflection, and room attenuation all affect the sound pressure level of the air-regenerated noise. Ceiling insulation and room attenuation influence the sound pressure level of the case-radiated noise.

Reducing the sound pressure level of the air-regenerated noise



Correction values for acoustic quick sizing

The correction values for the distribution in the ducting are based on the number of diffusers assigned to any one air terminal unit. If there is just one diffuser (assumption: 140 l/s or 500 m³/h), no correction is necessary.

Octave correction for the distribution in the ducting, used to calculate the air-regenerated noise

\dot{V} [m ³ /h]	500	1000	1500	2000	2500	3000	4000	5000	6000
[l/s]	140	280	420	550	700	840	1100	1400	1700
[dB]	0	3	5	6	7	8	9	10	11

One change of direction, e.g. at the horizontal connection of the diffuser plenum box, has been taken into consideration for the system attenuation values. Vertical connection of the plenum box does not result in a system attenuation. Additional changes of direction result in lower sound pressure levels.

System attenuation per octave to VDI 2081 for the calculation of the air-regenerated noise

Centre frequency [Hz]	63	125	250	500	1000	2000	4000	8000
	ΔL							
	dB	dB	dB	dB	dB	dB	dB	dB
Change of direction	0	0	1	2	3	3	3	3
End reflection	10	5	2	0	0	0	0	0
Room attenuation	5	5	5	5	5	5	5	5

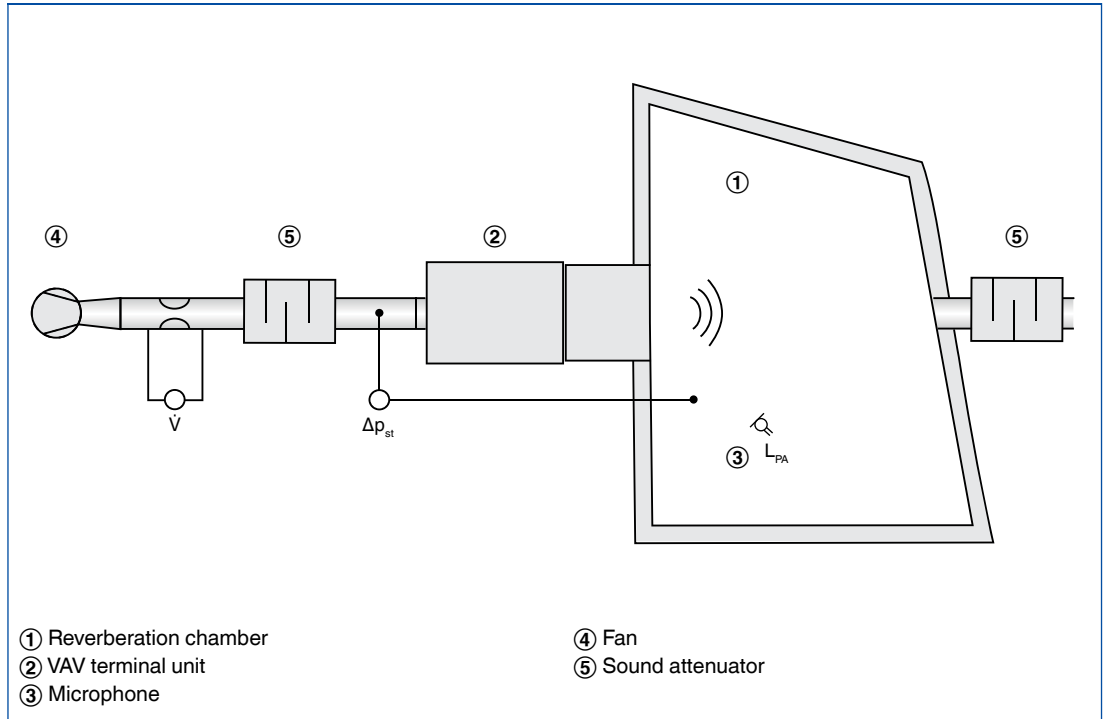
Octave correction for the calculation of case-radiated noise

Centre frequency [Hz]	63	125	250	500	1000	2000	4000	8000
	ΔL							
	dB	dB	dB	dB	dB	dB	dB	dB
Ceiling insulation	4	4	4	4	4	4	4	4
Room attenuation	5	5	5	5	5	5	5	5

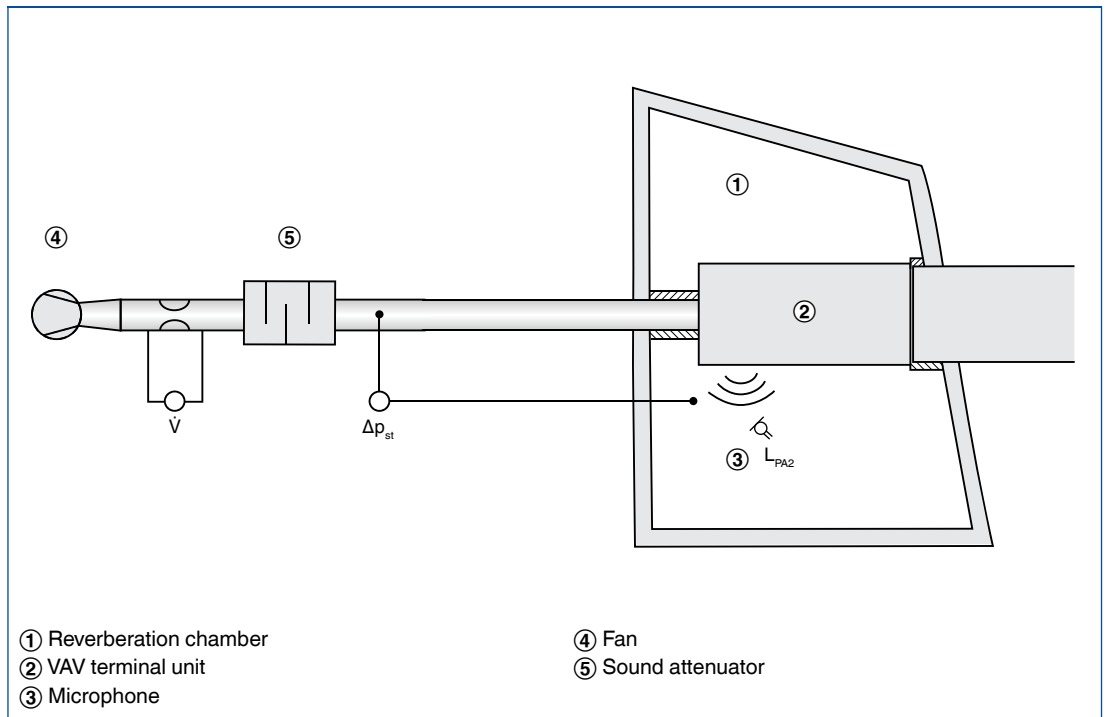
Measurements

The acoustic data for the air-regenerated noise and case-radiated noise are determined according to EN ISO 5135. All measurements are carried out in a reverberation chamber to EN ISO 3741.

Measuring the air-regenerated noise



Measuring the case-radiated noise



Variable volume flow control – VARYCONTROL

Basic information and nomenclature

1 Sizing with the help of this catalogue

This catalogue provides convenient quick sizing tables for VAV terminal units. The sound pressure levels for air-regenerated noise and for case-radiated noise are provided for all nominal sizes. In addition, generally accepted attenuation and insulation values have been taken into account. Sizing data for other volume flow rates and differential pressures can be determined quickly and precisely using the Easy Product Finder design programme.

Sizing example

Given data

$\dot{V}_{\max} = 280 \text{ l/s}$ (1010 m³/h)
 $\Delta p_{\text{st}} = 150 \text{ Pa}$
 Required sound pressure level in the room 30 dB(A)

Quick sizing

TVZ-D/200
 Air-regenerated noise $L_{\text{PA}} = 23 \text{ dB(A)}$
 Case-radiated noise $L_{\text{PA}} = 24 \text{ dB(A)}$

Sound pressure level in the room = 27 dB(A)
 (logarithmic addition since the terminal unit is installed in the suspended ceiling of the room)

Easy Product Finder



The Easy Product Finder allows you to size products using your specific data.

You will find the Easy Product Finder on our website.

Berechnung | Zeichnung | Bestelldetails

Bestellschlüssel (Anklicken zum Ändern)
 TVZ / 200 / BCO / E0 / 144-1010 m³/h

Regelkomponente
 Luftqualität: nicht belastet (verzinktes Stahlblech)
 Betriebsmedium: elektrisch
 Betriebsfunktion: stetig / analoge Ansteuerung VAV
 Ansteuerung: 0-10 VDC
 Schnelllaufend: ohne
 Sicherheitsfunktion: ohne

Regelung: BCO|VAV-Compact(0-10VDC)|LMV-D2MP

Volumenstrom
 variabel | konstant
 $V_{\min} <$ m³/h (54...6048)
 $V_{\max} <$ 1.010 m³/h (162...6048)

Volumenstrom-Regelgerät
 Filter
 Dämmschale: ohne Dämmschale
 Schalldämpfer: ohne und mit

Serie	Abmessung	V_{\min} [m ³ /h]		V_{\max} [m ³ /h]		L_p [dB(A)]	
		von	bis	von	bis	Strömungsgeräusch	Abstrahlergeräusch
▶ TVZ	200	144	1458	432	1458	23	31
TVZ+TS	200	144	1458	432	1458	18	31
TVZ	250	216	2214	666	2214	18	26
TVZ+TS	250	216	2214	666	2214	<15	26

Akustische Eingabedaten
 L_p Strömung < 23 dB(A)
 L_p Abstrahlung < 31 dB(A)
 Δp_{st} 150 Pa (100...1000)

Akustische Ergebnisse
 Daten | Lw Strö... | Lw Abst... | De

Variable volume flow control – VARYCONTROL

Basic information and nomenclature

Function

Volume flow control

The volume flow rate is controlled in a closed loop. The controller receives from the transducer the actual value that results from the effective pressure measurement. 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.

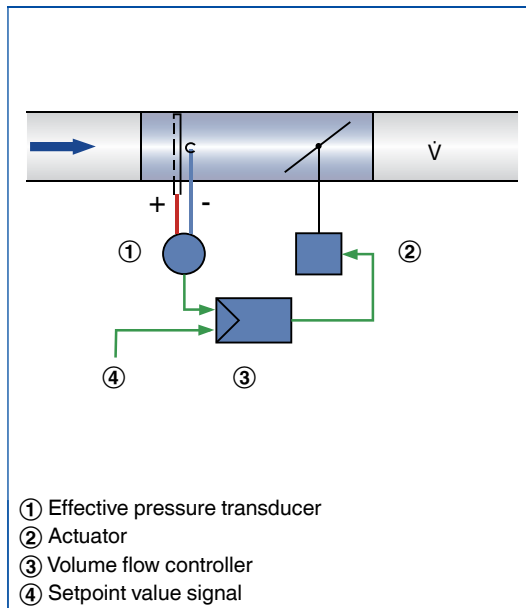
Correction of duct pressure changes

The controller detects and corrects changes of the duct pressure that may occur, for example, due to flow rate changes from other units. Pressure changes will therefore not affect the room temperature.

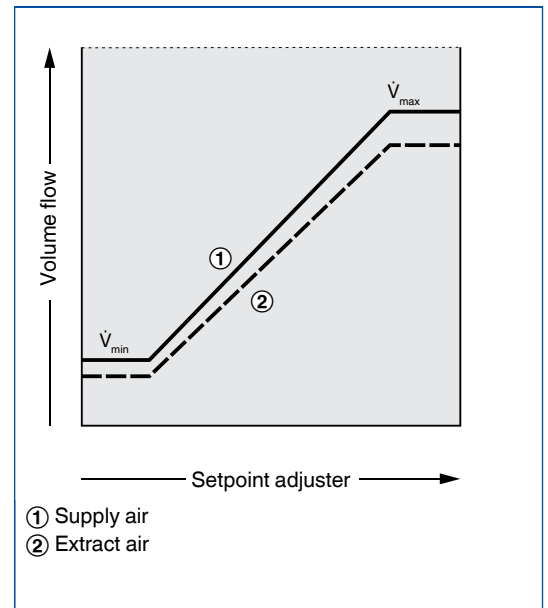
Variable volume flow

If the input signal is changed, the controller adjusts the volume flow rate to the new setpoint. The variable volume flow rate range is limited, i.e. there is a minimum value and a maximum value. This control strategy can be overridden, e.g. by shutting off the duct.

Control loop

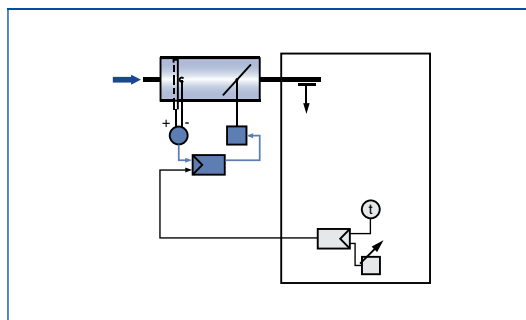


Control diagram

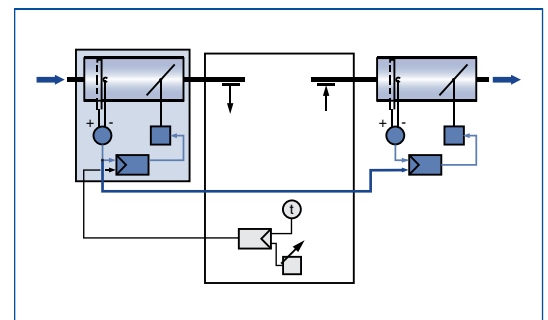


Operating modes

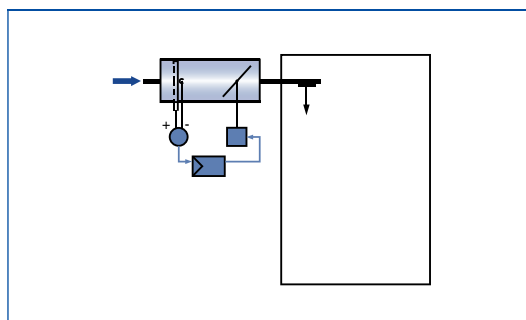
Single operation



Master slave operation (master)



Constant value



Master slave operation (slave)

