

Actuators for shut-off dampers

Type Open/Close actuators



For the opening and closing of shut-off dampers in air conditioning systems

Actuators for Type AK or AKK shut-off dampers

- Change of the damper blade position for two different operating situations
- Supply voltage 24 V AC/DC or 230 V AC or operating pressure 1 bar
- Control input signal: 1-wire control or 2-wire control (3-point)
- Mechanical stops
- Retrofit possible

Type		Page
Open/Close actuators	General information	3.3 – 2
	Special information – B3*	3.3 – 4
	Special information – B4*	3.3 – 5
	Special information – B*2	3.3 – 6
	Special information – BP0	3.3 – 7
	Special information – BP2	3.3 – 8
	Special information – BR0	3.3 – 9
	Special information – BR2	3.3 – 10
	Special information – TN0	3.3 – 11
	Basic information and nomenclature	3.4 – 1

Description

Application

- Actuators for opening and closing
- Opening and closing of Type AK or AKK shut-off dampers

Parts and characteristics

- Mechanical stops for setting the damper blade positions
- Electric or pneumatic operation
- Overload protection
- Control input signal: 1-wire control, 2-wire control (3-point) or pneumatic control
- Optional spring return actuator for damper blade safety function
- Optional auxiliary switch for capturing the end positions

Any attachments must be defined with the order code of the shut-off damper.

Actuators for Type AK or AKK shut-off dampers

Order code detail	Actuator			Auxiliary switch	
	Part number	Type	Supply voltage	Part number	Type
B30	M466DU5	LM24A	24 V	–	–
B32	M466DU5	LM24A	24 V	M536AI3	S2A
B40	M466DU4	LM230A	230 V	–	–
B42	M466DU4	LM230A	230 V	M536AI3	S2A
BP0	M466ET0	NF24A spring return actuator	24 V	–	–
BP2	M466ET2	NF24A-S2 spring return actuator	24 V	–	integrated
BR0	M466ET1	NFA spring return actuator	24 – 240 V AC 24 – 125 V DC	–	–
BR2	M466ET3	NFA-S2 spring return actuator	24 – 240 V AC 24 – 125 V DC	–	integrated
TN0	B555DC2	Pneumatic control	0.2 – 1 bar	–	–

Function

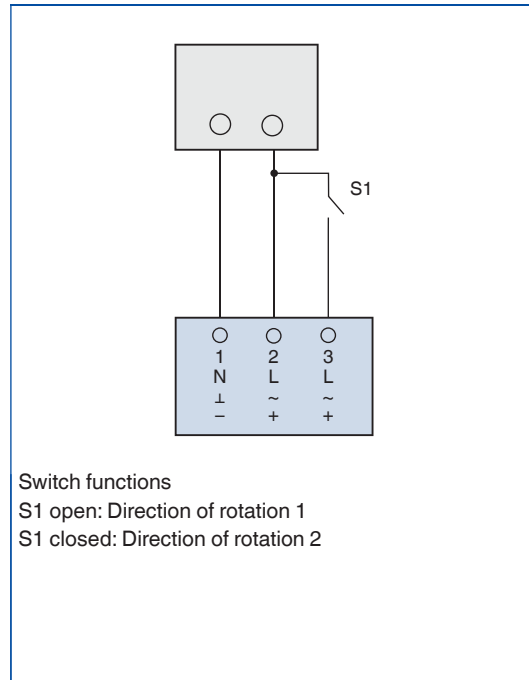
Functional description

The actuator opens or closes the damper blade. Minimum and maximum positions can be set using mechanical stops. 1-wire control or 2-wire control (3-point) can be used. 1-wire control is actually an open/close control. A spring return actuator moves the damper blade to the safe position in case of a power failure.

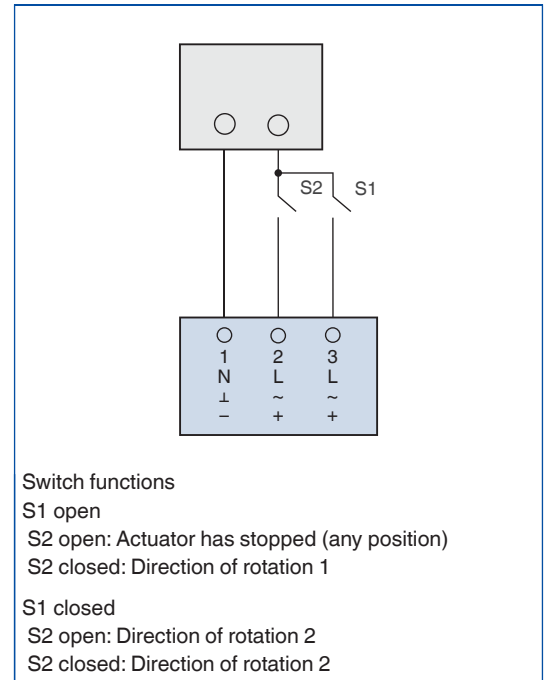
Define the safe position with the order code: NC (normally closed) or NO (normally open). The spring return actuator is factory set according to the safe position. The normal position of the damper blade is only achieved with 1-wire control (control voltage).

Applies to attachments with order codes B3*, B4*

1-wire control



2-wire control (3-point)

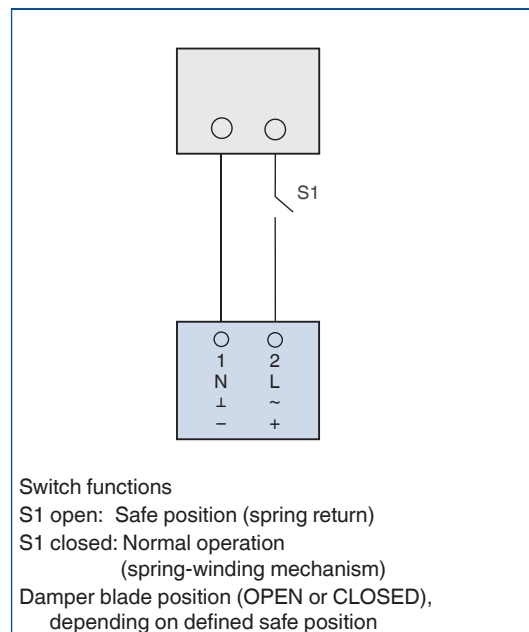


Effect of actuator action in case of factory setting

Order code detail	Direction of rotation	
	1	2
B30, B32	CLOSED	OPEN
B40, B42	CLOSED	OPEN

Applies to attachments with order codes BP* and BR*

1-wire control (control input signal for spring return actuator)



Description

/ B30
/ B32

Order code detail

Application

- Actuator LM24A
- Opening and closing of Type AK or AKK shut-off dampers

Variants

- B32: with auxiliary switch for capturing the end positions

Parts and characteristics

- Supply voltage 24 V AC/DC
- 1-wire control or 2-wire control (3-point)
- Mechanical stops for setting the volume flow rate setpoints
- Switch for setting the direction of rotation
- Release button to allow for manual operation

Installation and commissioning

- Change the direction of rotation if necessary, using the switch

Technical data



Actuator LM24A

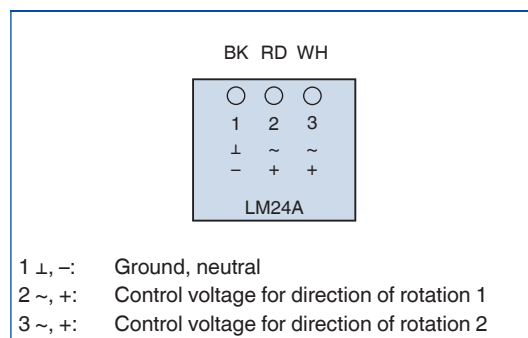
Actuators LM24A and LM24A-F

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	2 VA max.
Power rating (DC)	1 W max.
Torque	5 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (3-point)
Connecting cable	3 × 0.75 mm ² , 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EC
Operating temperature	–30 to 50 °C
Weight	0.5 kg

Wiring

For control options see General information – function

Connecting cable core identification



LM24A and LM24A-F

Description

/ B40
/ B42

Order code detail

Application

- Actuator LM230A
- Opening and closing of Type AK or AKK shut-off dampers

Variants

- B42: with auxiliary switch for capturing the end positions

Parts and characteristics

- Supply voltage 100 – 240 V AC
- 1-wire control or 2-wire control (3-point)
- Mechanical stops for setting the volume flow rate setpoints
- Switch for setting the direction of rotation
- Release button to allow for manual operation

Installation and commissioning

- Change the direction of rotation if necessary, using the switch

3

Technical data



Actuator LM230A

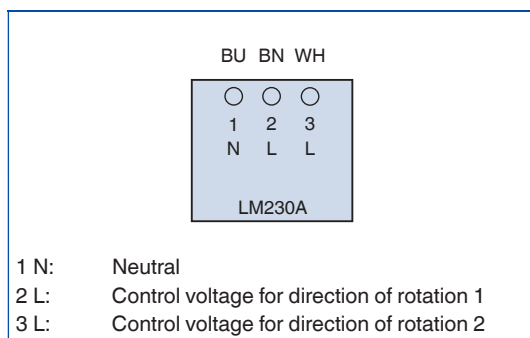
Actuator LM230A

Supply voltage	85 – 265 V AC, 50/60 Hz
Power rating	4 VA max.
Torque	5 Nm
Running time for 90°	150 s
Control input signal	1-wire control or 2-wire control (3-point)
Connecting cable	3 × 0.75 mm ² , 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EU, low voltage to 2006/95/EU
Operating temperature	–30 to 50 °C
Weight	0.5 kg

Wiring

For control options see General information – function

Connecting cable core identification



Description

/ B52
/ B62

Order code detail

Application

- Auxiliary switch S2A for capturing damper blade end positions (end positions reached through actuator operation)
- Volt-free contacts for signalling or activating switch functions
- Two integral switches, e.g. for damper blade OPEN and damper blade CLOSED
- Potentiometer for setting any switch point



Auxiliary switch S2A

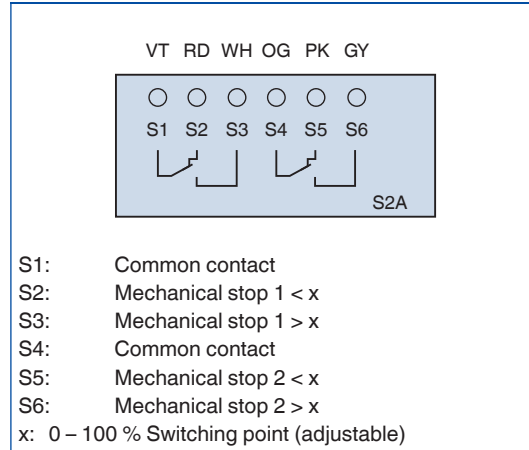
Auxiliary switch S2A

Type of contact	2 changeover contacts ¹⁾
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable	6 × 0.75 mm ² , 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EU, low voltage to 2006/95/EU
Operating temperature	-30 to 50 °C
Weight	0.250 kg

¹⁾ If both auxiliary switches are used the switching voltages must be the same

Wiring

Connecting cable core identification



Description

/ BP0 / NO

Order code detail

Application

- Pneumatic actuator NF24A for the opening and closing of Type AK or AKK shut-off dampers
- Opening and closing with safety function
- The safety function of the shut-off damper is defined with the order code

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Supply voltage on/off
- Mechanical stops for setting the volume flow rate setpoints
- Manual operation using crank handle and position lock

Technical data



Spring return actuator
NF24A

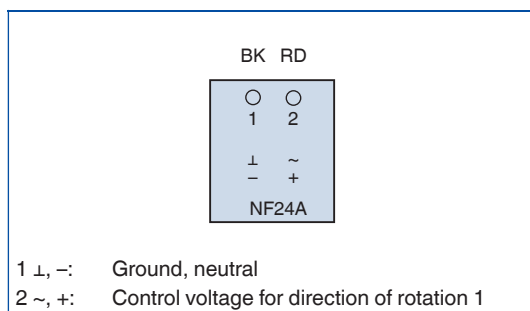
Spring return actuator NF24A

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC –10 %, +20 %
Power rating (AC)	8.5 VA max.
Power rating (DC)	6 W max.
Torque	10 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < –20 °C up to 60 s)
Control input signal	Supply voltage on/off
Connecting cable	2 × 0.75 mm ² , 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EC
Operating temperature	–30 to 50 °C
Weight	1.8 kg

Wiring

For control options
see General information –
function

Connecting cable core identification



Description

/ BP2 / NO

Order code detail

Application

- Spring return actuator NF24A-S2 with integral auxiliary switches for the opening and closing of Type AK or AKK shut-off dampers
- Opening and closing of shut-off dampers with safety function
- The safety function of the shut-off damper is defined with the order code

Parts and characteristics

- Supply voltage 24 V AC/DC
- Control input signal: Supply voltage on/off
- Mechanical stops for setting the volume flow rate setpoints
- Manual operation using crank handle and position lock
- One fixed and one adjustable auxiliary switch for signalling rotation angles of 10 % and 10 – 90 %.
- Fixed auxiliary switch, switching point 10 %
- Adjustable auxiliary switch, switching point 10 – 90 %

Technical data



Spring return actuator
NF24A-S2

Spring return actuator NF24A-S2

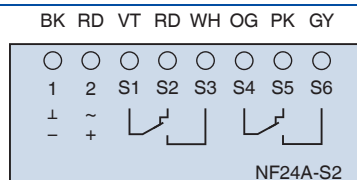
Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC –10 %, +20 %
Power rating (AC)	8.5 VA max.
Power rating (DC)	6 W max.
Torque	10 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < –20 °C up to 60 s)
Control input signal	Supply voltage on/off
Auxiliary switch: type of contact	2 changeover contacts ¹⁾
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable – actuator	2 × 0.75 mm ² , 1 m long
Connecting cable – auxiliary switch	6 × 0.75 mm ² , 1 m long
IEC protection class	III (protective extra-low voltage)
Protection level	IP 54
EC conformity	EMC according to 2004/108/EC
Operating temperature	–30 to 50 °C
Weight	2.0 kg

¹⁾ If both auxiliary switches are used the switching voltages must be the same

Wiring

For control options
see General information –
function

Connecting cable core identification



- 1 ⊥, -: Ground, neutral
- 2 ~, +: Control voltage for direction of rotation 1
- S1: Common contact
- S2: Mechanical stop 1 < x
- S3: Mechanical stop 1 > x
- S4: Common contact
- S5: Mechanical stop 2 < y
- S6: Mechanical stop 2 > y
- x: 10 % Switching point 1
- y: 10 ... 90 % Switching point 2 (adjustable)

Description

/ BR0 / NO

Order code detail

Application

- Pneumatic actuator NFA for the opening and closing of Type AK or AKK shut-off dampers
- Opening and closing with safety function
- The safety function of the shut-off damper is defined with the order code

Parts and characteristics

- Supply voltage 24 – 240 V AC/24 – 125 V DC
- Control input signal: Supply voltage on/off
- Mechanical stops for setting the volume flow rate setpoints
- Manual operation using crank handle and position lock

Technical data



Spring return actuator
NFA

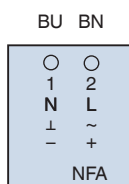
Spring return actuator NFA

Supply voltage (AC)	19.2 – 264 V AC, 50/60 Hz
Supply voltage (DC)	21.6 – 137 V DC
Power rating (AC)	9.5 VA max.
Power rating (DC)	6 W max.
Torque	10 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < -20 °C up to 60 s)
Control input signal	Supply voltage on/off
Connecting cable	2 × 0.75 mm ² , 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EU, low voltage to 2006/95/EU
Operating temperature	-30 to 50 °C
Weight	2.0 kg

Wiring

For control options
see General information –
function

Connecting cable core identification



- 1 N ⊥, -: Ground, neutral
2 L ~, +: Control voltage for direction of rotation 1

Description

/ BR2 / NO

Order code detail

Application

- Spring return actuator NFA-S2 with integral auxiliary switches for the opening and closing of Type AK or AKK shut-off dampers
- Opening and closing with safety function
- The safety function of the shut-off damper is defined with the order code

Parts and characteristics

- Supply voltage 24 – 240 V AC or 24 – 125 V DC
- Control input signal: Supply voltage on/off
- Mechanical stops for setting the volume flow rates
- Manual operation using crank handle and position lock
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Fixed auxiliary switch, switching point 10 %
- Adjustable auxiliary switch, switching point 10 – 90 %

Technical data



Spring return actuator NFA-S2

Spring return actuator NFA-S2

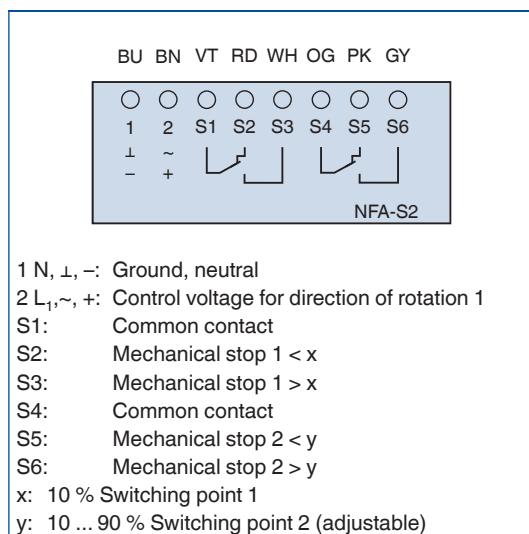
Supply voltage (AC)	19.2 – 264 V AC, 50/60 Hz
Supply voltage (DC)	21.6 – 137 V DC
Power rating (AC)	9.5 VA max.
Power rating (DC)	6 W max.
Torque	10 Nm
Motor running time for 90°	< 75 s
Spring return time	20 s (for < -20 °C up to 60 s)
Control input signal	Supply voltage on/off
Auxiliary switch: type of contact	2 changeover contacts ¹⁾
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	110 V DC
Max. switching current (DC)	0.5 A (resistive load); 0.2 A (inductive load)
Connecting cable – actuator	2 × 0.75 mm ² , 1 m long
Connecting cable – auxiliary switch	6 × 0.75 mm ² , 1 m long
IEC protection class	II (protective insulation)
Protection level	IP 54
EC conformity	EMC to 2004/108/EU, low voltage to 2006/95/EU
Operating temperature	-30 to 50 °C
Weight	2.2 kg

¹⁾ If both auxiliary switches are used the switching voltages must be the same

Wiring

For control options see
General information –
function

Connecting cable core identification



Description

/ TN0 / NO

Order code detail

Application

- Pneumatic actuator B555DC2 for the opening and closing of Type AK or AKK shut-off dampers
- Opening and closing with safety function
- The safety function of the shut-off damper is defined with the order code

Parts and characteristics

- Control pressure 0.2 – 1 bar
- Control input signal: pneumatic, control pressure on/off
- Piston rod with 85 mm stroke
- When the control pressure increases, the piston rod extends; it retracts by means of the spring force

3

Technical data

Pneumatic actuator B555DC2

Control pressure	0.2 – 1.0 bar
Maximum pressure	2.0 bar
Compressed air	Compressed air for instruments, free of oil, water and dust
Weight	0.840 kg



Pneumatic actuator B555DC2

Shut-off and restriction

Basic information and nomenclature



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

Shut-off and restriction

Basic information and nomenclature

Product selection

	Type			
	AK	AK-Ex	AKK	VFR
Type of system				
Supply air	●	●	●	●
Extract air	●	●	●	●
Duct connection				
Circular	●	●	●	●
Rectangular				
Volume flow rate range				
Up to [m ³ /h]	5435	5435	5435	1745
Up to [l/s]	1510	1510	1510	485
Air quality				
Filtered	●	●	●	●
Office extract air	●	●	●	●
Polluted	○	○	●	
Contaminated	○	○	●	
Shut-off				
Manually	●		●	
Electric/pneumatic actuator	○	●	○	
Safe position	○	○	○	
Restriction				
Manually				●
Electric actuator				○
Special areas				
Areas with explosive atmospheres		●		
●	Possible			
○	Possible under certain conditions: Robust unit variant and/or specific actuator			
	Not possible			

3

Shut-off and restriction

Basic information and nomenclature

Principal dimensions

$\varnothing D$ [mm]

Shut-off and flow adjustment dampers made of stainless steel: Outside diameter of the connecting spigot

Shut-off dampers made of plastic:
Inside diameter of the connecting spigot

$\varnothing D_1$ [mm]

Pitch circle diameter of flanges

$\varnothing D_2$ [mm]

Outside diameter of flanges

$\varnothing D_4$ [mm]

Inside diameter of the screw holes of flanges

L [mm]

Length of unit including connecting spigot

L_1 [mm]

Length of casing or acoustic cladding

n []

Number of flange screw holes

T [mm]

Flange thickness

m [kg]

Unit weight including the minimum required attachments

Nomenclature

L_{PA} [dB(A)]

A-weighted sound pressure level of air-regenerated noise of the shut-off or flow adjustment damper, system attenuation taken into account

\dot{V} [m³/h] and [l/s]

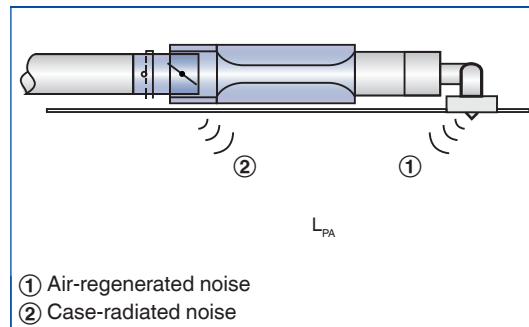
Volume flow rate

Δp_{st} [%]

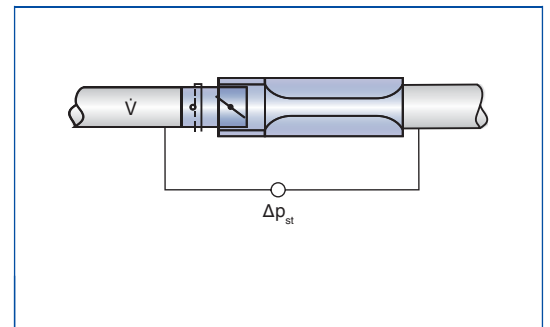
Static differential pressure

All sound pressure levels are based on 20 μ Pa.

Definition of noise



Static differential pressure



Constructions

Galvanised sheet steel

- Casing made of galvanised sheet steel
- Parts in contact with the airflow as described for the product type
- External parts, e.g. mounting brackets or covers, are usually made of galvanised sheet steel

Powder-coated surface (P1)

- Casing made of galvanised sheet steel, powder-coated RAL 7001, silver grey
- Parts in contact with the airflow are powder-coated or made of plastic
- Due to production, some parts that come into contact with the airflow may be stainless steel or aluminium, powder-coated
- External parts, e.g. mounting brackets or covers, are usually made of galvanised sheet steel

Stainless steel (A2)

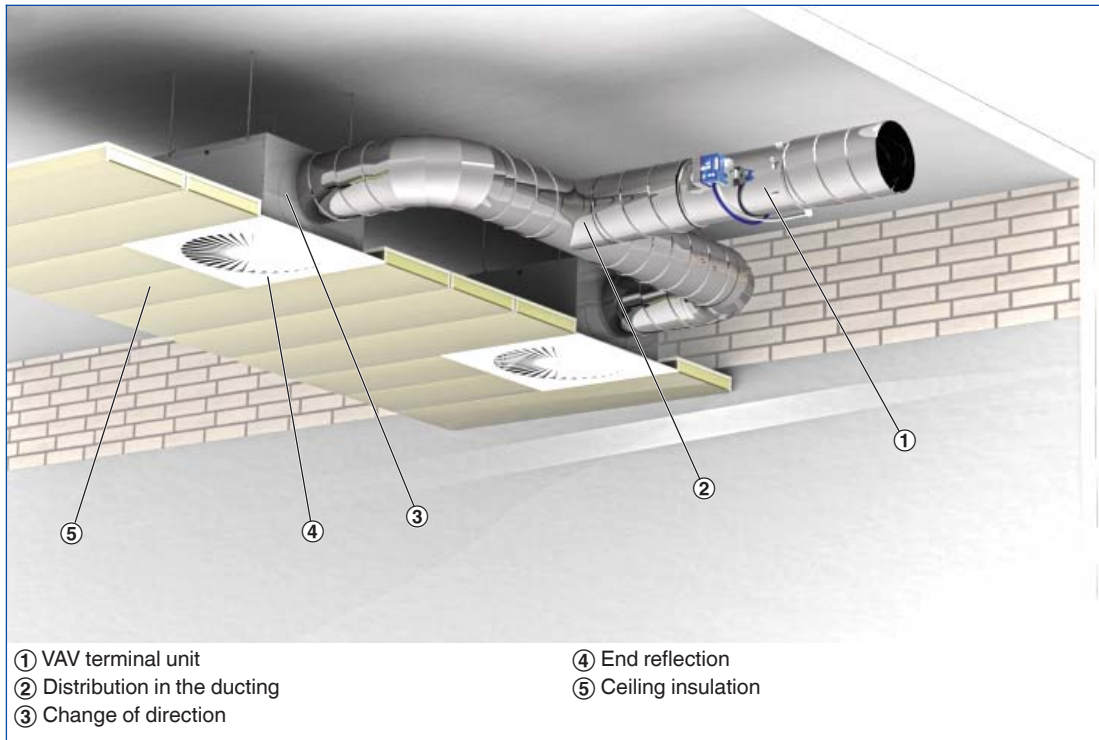
- Casing made of stainless steel 1.4201
- Parts in contact with the airflow are powder-coated or made of stainless steel
- External parts, e.g. mounting brackets or covers, are usually made of galvanised sheet steel

Shut-off and restriction

Basic information and nomenclature

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. Generally accepted attenuation and insulation values have been taken into account. 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



- ① VAV terminal unit
- ② Distribution in the ducting
- ③ Change of direction
- ④ End reflection
- ⑤ Ceiling insulation

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 shut-off damper or flow adjustment damper. 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} in [m ³ /h]	500	1000	1500	2000	2500	3000	4000	5000
[l/s]	140	280	420	550	700	840	1100	1400
[dB]	0	3	5	6	7	8	9	10

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 bends 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								
Change of direction	0	0	1	2	3	3	3	3
Mündungsreflexion	10	5	2	0	0	0	0	0
Room attenuation	5	5	5	5	5	5	5	5

The calculation is based on the end reflection for nominal size 250

Octave correction for the calculation of case-radiated noise

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

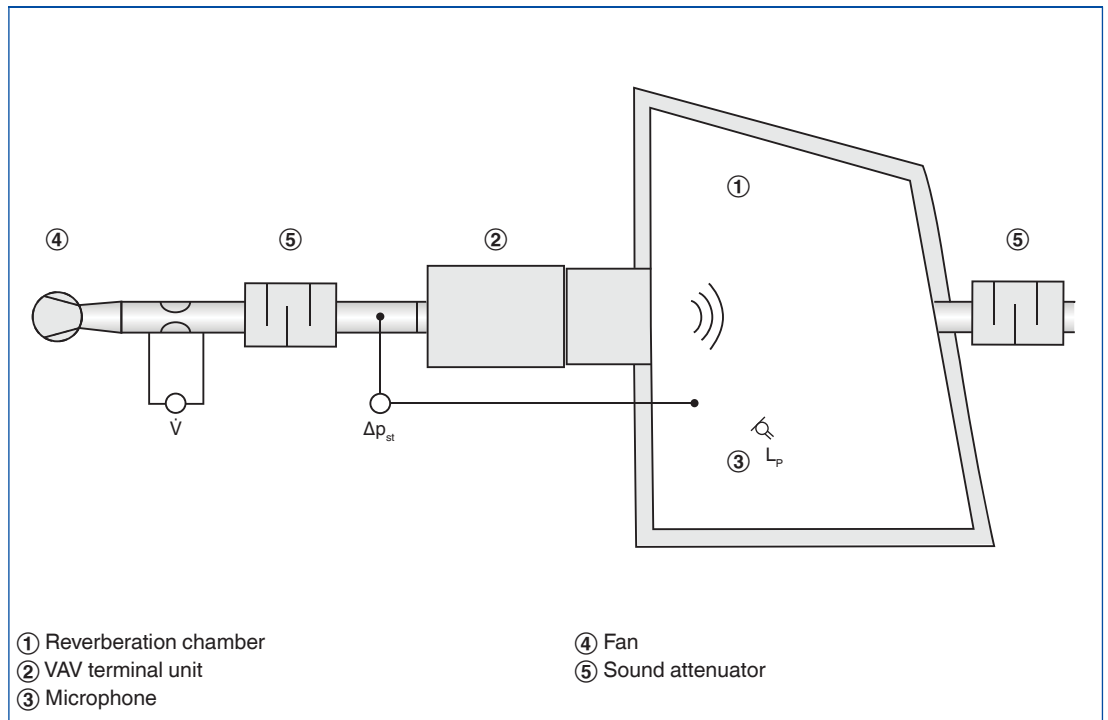
Shut-off and restriction

Basic information and nomenclature

Measurements

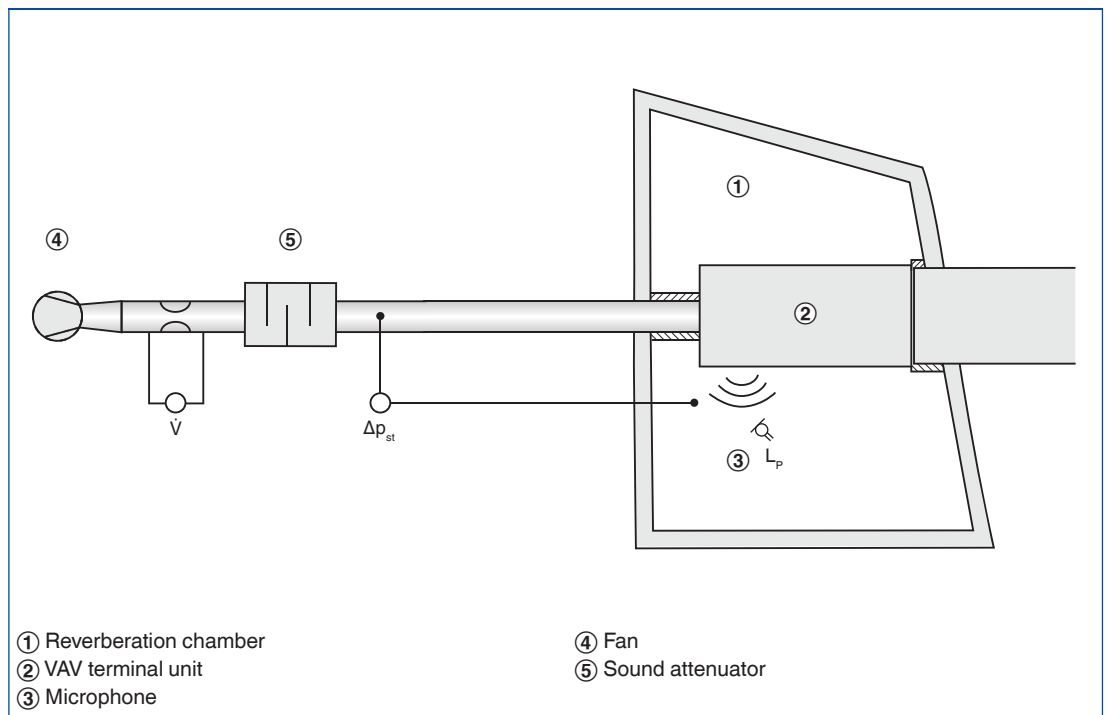
The acoustic data for the air-regenerated noise and case-radiated noise are determined according to EN ISO 5135. All measurements are carried out in a reverberation chamber to EN ISO 3741.

Measuring the air-regenerated noise



The sound pressure levels for air-regenerated noise L_{PA} given by us result from measurements in a reverberation chamber. The sound pressure L_p is measured for the entire frequency range. The evaluation of the measurements, including system attenuation and A-weighting, results in the sound pressure level L_{PA} .

Measuring the case-radiated noise



The sound pressure levels for case-radiated noise L_{PA2} given by us result from measurements in a reverberation chamber. The sound pressure L_p is measured for the entire frequency range. The evaluation of the measurements, including system attenuation and A-weighting, results in the sound pressure level L_{PA2} .

Shut-off and restriction

Basic information and nomenclature

Sizing with the help of this catalogue

This catalogue provides convenient quick sizing tables for shut-off and flow adjustment dampers. The sound pressure levels for air-regenerated noise are provided for all nominal sizes. The quick sizing tables are based on normally accepted attenuation levels. 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

$$\dot{V}_{\max} = 280 \text{ l/s (1010 m}^3\text{/h)}$$

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

Required sound pressure level in the room 30 dB(A)

Quick sizing

AK/100/00H

Air-regenerated noise $L_{\text{PA}} = 23 \text{ dB(A)}$

Easy Product Finder



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

You will find the Easy Product Finder on our website.

Berechnung | Zeichnung | Bestelldetails |
Bestellschlüssel (Anklicken zum Ändern)
AK / 100 / / / 00H / /
Regelkomponente
Luftqualität nicht belastet (verzinktes Stahlblech)
Betriebsmedium manuell
Anwendung/Foto/Video
Regelung 00H[Mechanische Begrenzung]manuelle Regelung
Produktfoto
Volumenströmungsregelgerät

Stärke	Abmessung	Preis
AK 100		118,00
AK 125		119,00
AK 150		122,00
AK 200		126,00
AK 250		146,00
AK 315		162,00
AK 400		185,00