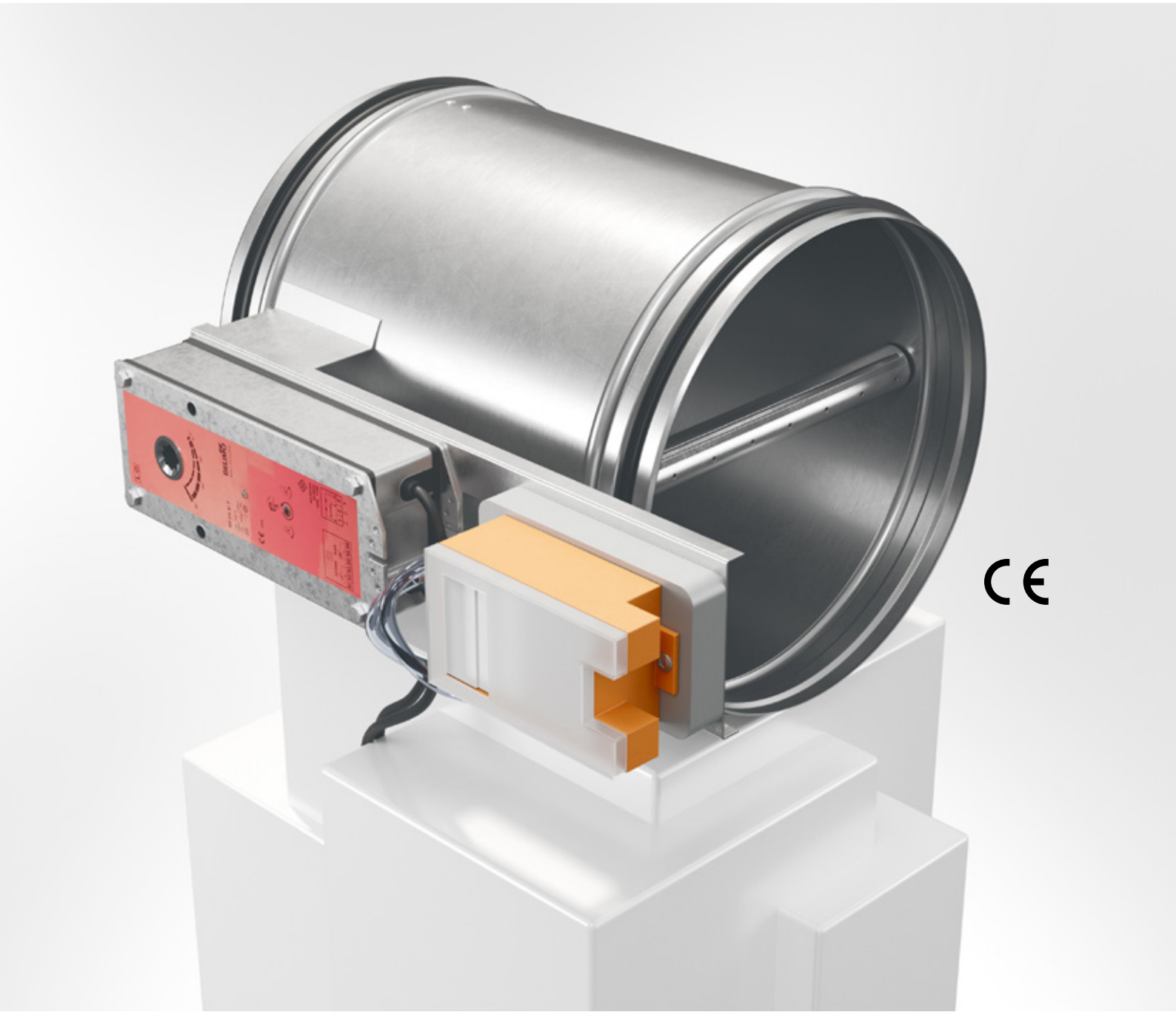
RABC-VAV

Fire damper and VAV-damper combined

FIRE SAFETY

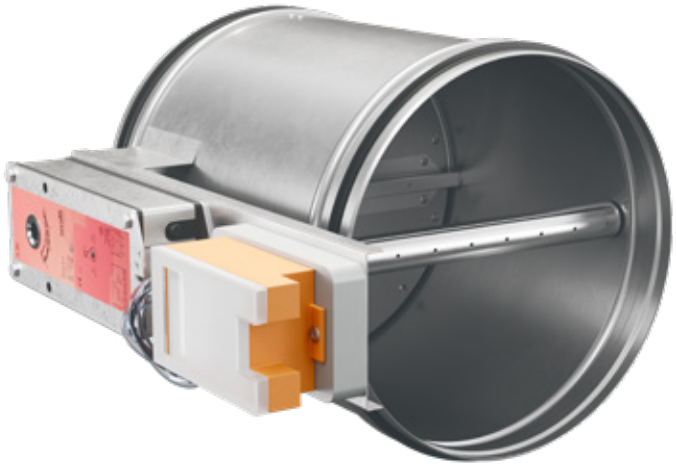


CE

20/12/2023

www.bevent-rasch.com

BEVENT RASCH



Quick facts

- Fire resistance class E60
- Sizes from 100 mm to 630 mm
- Prefitted safety actuator 24V
- Installation in ducts
- Available in MagiCAD
- CE-marked building product according to 15650:2010

CE-certified fire damper and VAV-damper combined

RABC-VAV is both a CE-certified fire damper E60 and a variabel-/constant flow damper. This combination of two functions solves both fire separation and VAV-flow control in the same damper. This saves both time, space and money when installed in for example hotels, office- and retail complexes, where both functions is needed. RABC-VAV consists of a damper unit, measuring unit, regulator and actuator.

Use – Combustion gas function

CE-certified fire damper preventing combustion gases from spreading where ventilation ducts pass through fire cell separating building elements or for placement after air handling units, serving more than one fire cell.

Performance

EC certificate according
to EN 15650:2010
0402-CPD-SC0058-13

Classification of fire resistance
according to EN 13501-3
E60 (ve ho i <–> o)

VAV function

Variable air volume reduces energy consumption for fans, heating, cooling and reduces filter costs. The dampers are controlled by 2-10V/0-10V signal from for example temperature or CO2 sensors. Max and min air flows or constant air flow is calibrated and verified before delivery. The controll gives an output signal of 2-10V/0-10V depending on air flow. 2-10V is a default setting. To controll the damper by 0-10V, this needs to be stated when ordering.

Size

Ø100 – 630 mm.

Design

RABC-VAV is supplied complete with factory mounted, maintenance-free, 24V electric safety actuator with thermal sensor featuring built-in signal contacts to indicate the damper position.
RABC-VAV is prepared to be over insulated 50 mm. Controll signal from regulator giving 2-10V/0-10V DC output. At power failure (fire), the damper closes using the actuator spring return.

Material and surface treatment

Casing and components of aluzink AZ185 according to environmental class C4 in sizes 100 mm-315 mm. Casing and components of galvanized steel sheet according to environmental class C3 in sizes 400 mm-630 mm.
Fabric seals. EPDM spiral duct connections.
For higher demands on environmental class, the damper can be manufactured in stainless AISI 316L – EN 1.4404.

Activation
Smoke detectors are verified according to SS-EN 54-7 to activate dampers. The mandatory thermal sensor closes the damper at 72°C according to ISO 10294-4.

Control and monitoring
When the damper is used to prevent the spread of fire and combustion gases it must be closed via impulses from the smoke detector. This must be fitted in the ventilation duct in the proximity of the damper or in another suitable location. Smoke detectors are monitored by means of Bevent Rasch's MRB system or the like. The MRB monitoring system also performs automatic operating checks on the damper every 48 hours and is designed so that faults are indicated immediately and the damper closes.
See www.bevent-rasch.com for further details.

The following monitoring units from Bevent Rasch can be used:
- MRB3 with RCTC/RCTU

PLEASE NOTICE: RCTU unit must be factory fitted.

Installation
RABC-VAV is installed in horizontal or vertical ducts that pass through fire cell separating building elements, according to the adjoining installation instructions.
When installed as the termination device, the damper must be fitted with protective grilles.

Actuator
In accordance to the certification, RABC-VAV is always supplied with an electric safety actuator 24V with spring return, closed when power off. The actuator has micro switches for closed and open positions.

Miscellaneous
All data refers to dampers in normal design.

Specification
Example:

Fire damper **RABC-VAV - 250 - 1 - 1**

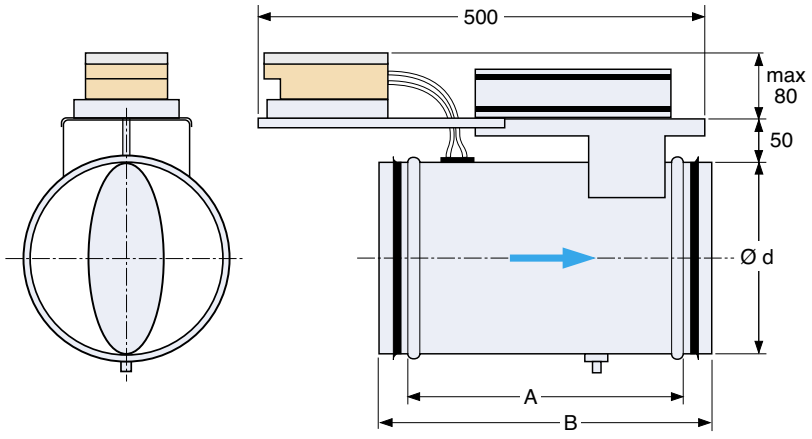
Size
Nom. diameter Ød, mm

Connection
Spiro = 1

Material
Galvanized sheet steel = 1
Stainless AISI 316L – EN 1.4404 = 3

Note. Factory fitted actuator always included.

Accessories
MRB3 with RCTC/RCTU	Monitoring & function testing of system with up to 236 dampers.
RCKD/RCRD	Smoke detectors
T-Sense	Air quality sensor

Dimensions and weight


Size Ø d	A	B	Weight *) kg
100	316	396	6,2
125	316	396	6,4
160	316	396	6,6
200	316	396	7,6
250	316	396	7,8
315	316	396	9,2
400	435	515	11,2
500	435	515	13
630	500	580	15,6

**) Excl. controller and actuator*
d = Swedish Standard SS 2609 (spiral connection)

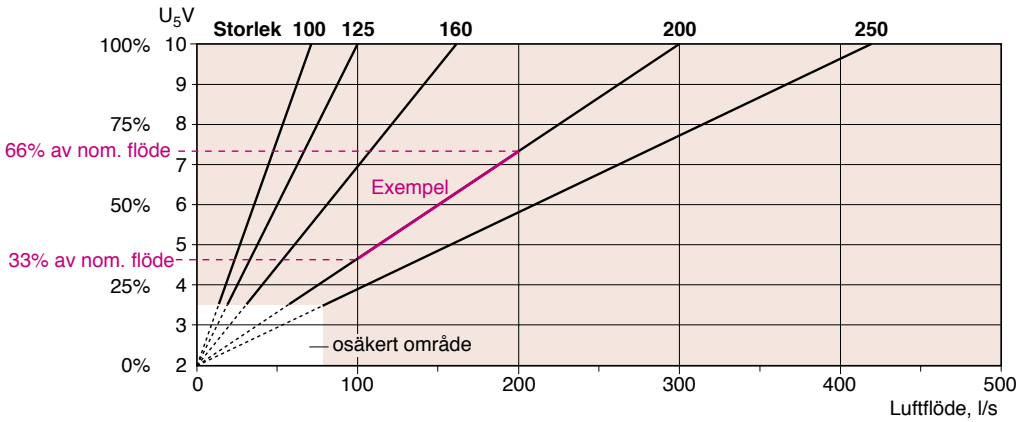
Air flow areas

The diagrams show the relationship between nominal flow and the output signal (U_5) for each size.

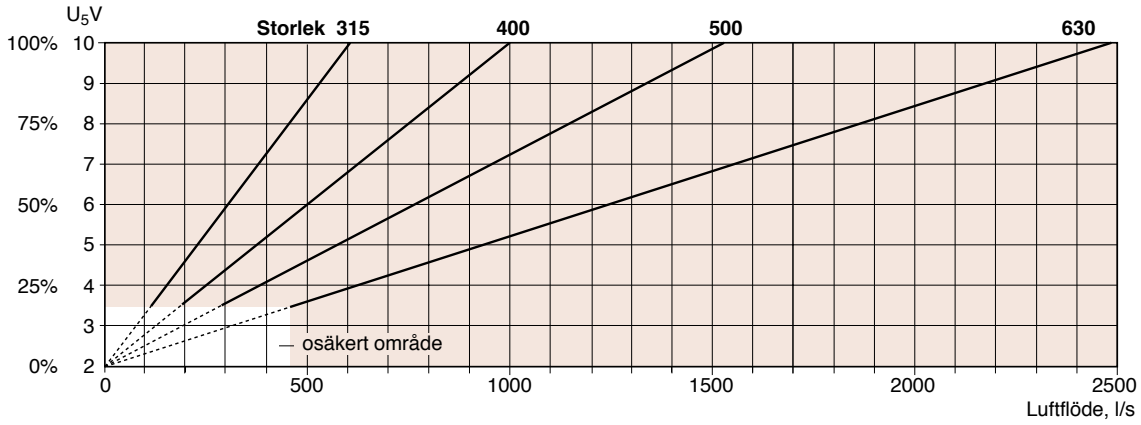
Installation

See installation examples.

RABC-VAV, size 100-250



RABC-VAV, size 315-500



Operation range

Size	Nom. flow l/s	Max. flow l/s	Min. flow l/s
100	70	21-70	12-70
125	100	30-100	20-100
160	160	50-160	35-160
200	300	90-300	50-300
250	420	130-420	90-420
315	600	180-600	120-600
400	1000	300-1000	200-1000
500	1530	460-1530	300-1530
630	2490	750-2490	470-2490

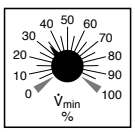
Max. adjustable air flow is 30-100% of nom. air flow.
With min. air flow below the recommended min. air flow, the measuring uncertainty increases.

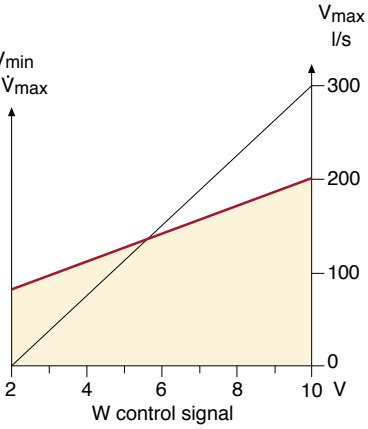
Example:

Prerequisites:
– Air flow, max. 200 l/s, min. 100 l/s

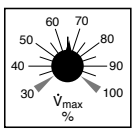
Select size 200.
Nom. air flow = 300 l/s
Max. air flow (66% of nom. air flow) = 200 l/s
Min. air flow (33% of nom. air flow) = 100 l/s
(all the above air flows are set at the factory)
The min. and max. air flow is always set as a % of nom. air flow.
The output signal U_5 is not affected by the V_{max} and V_{min} settings.

Set min. air flow 33% of nom. air flow = 100 l/s





Set max. air flow 66% of nom. air flow = 200 l/s

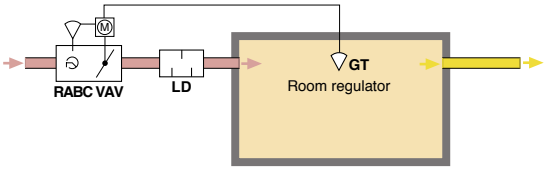


The max. air flow can be regulated between 100-30 % of the nom.air flow.

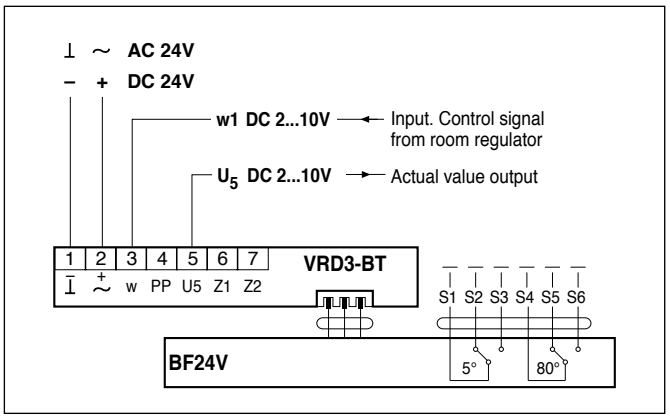
Installation examples

Alt. 1. Installation of separate VAV devices

The control signal from the room regulator or DUC controls the VAV-device. The actual value signal can be forwarded for external monitoring of the actual flow.

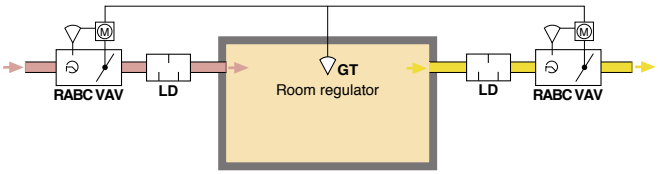


Wiring diagram

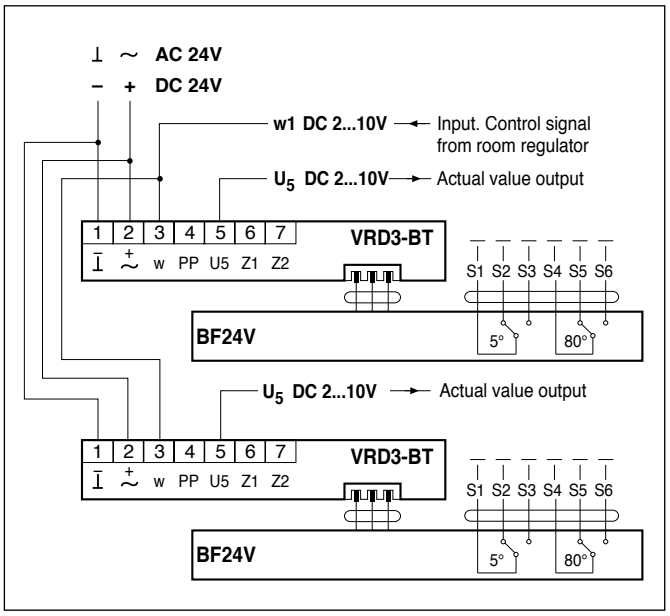


Alt. 2. Supply and exhaust air are controlled in parallel

The control signal from the room regulator or DUC, controls the supply air and exhaust air devices in parallel. The air flow for the devices can be set individually. The actual value signal from each device can be forwarded for external monitoring of the actual flow.



Wiring diagram

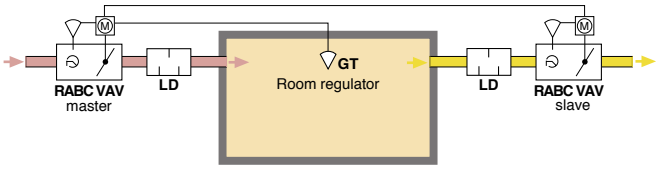


Caution!
When connecting several VAV-devices to the same transformer, it is important that all system phases are connected to (~) and all system neutrals are connected to (⊥.

In case of alarm and function tests, the 24V supply must be disconnected!

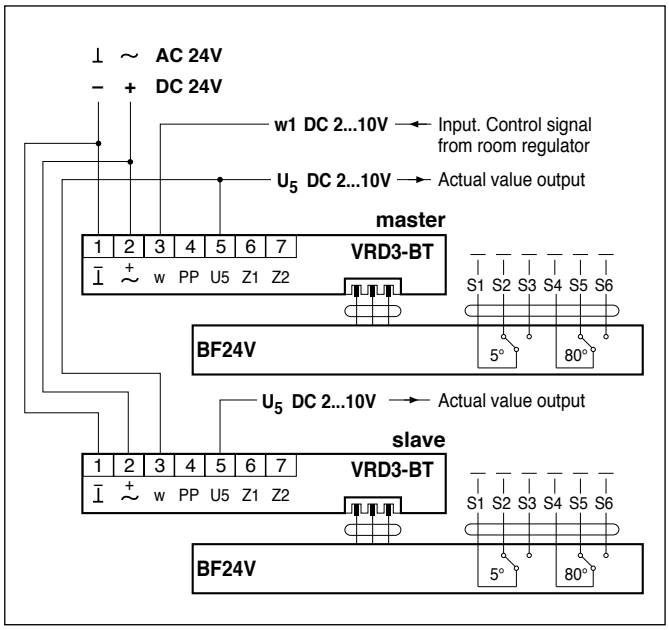
Alt. 3. The exhaust air is slave controlled by the supply air

The control signal from the room regulator or DUC, controls the master device (RABC-VAV master). The slave device (RABC-VAV slave) is controlled by the master device's control signal (U_5 output signal). The slave follows the master. The flow relationship between slave and master is dependent on the set maximum flow of the slave (normally 100%). The actual value signal from each device can be forwarded for external monitoring of the actual flow.



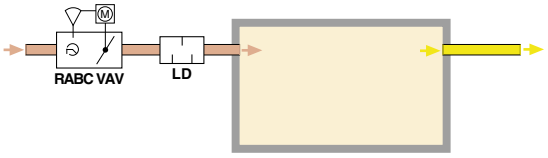
This option must be made known before delivery of the VAV devices.

Wiring diagram

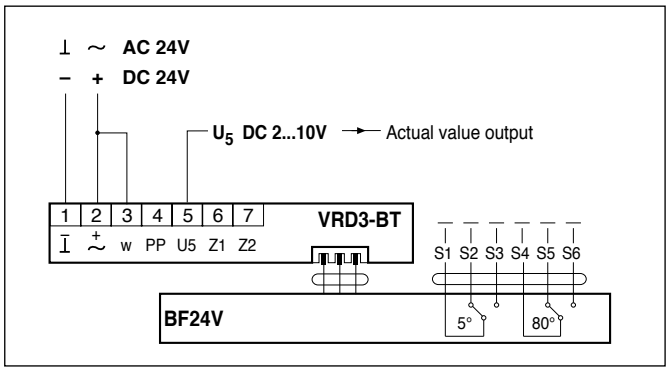


Alt. 4. Constant supply air flow

RABC-VAV maintains a constant flow that is preset at the factory, which is why the damper is not normally controlled by any external control signal. The output signal can be forwarded for external monitoring of the actual flow. RABC-VAV can be mechanically operated for a range of operational alternatives.



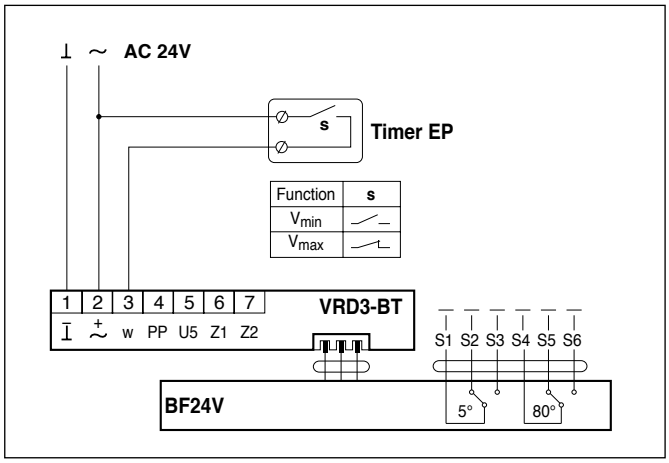
Wiring diagram



Constant supply air flow, basic or forced flow

A timer or monitor controls the supply air device (RABC-VAV) to force the supply air to a constant set max. flow when the room is used. When the room is not in use RABC-VAV works with the basic flow.

Wiring diagram



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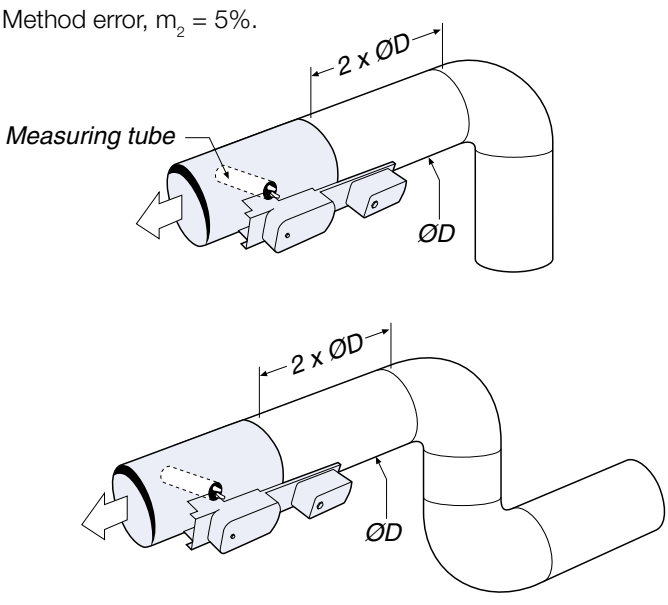
Electrical data	RABC-VAV	VRD3
Sizing, max	10 VA - BF24-V	3,5 VA
Running time;		
– motor opening	120-300 s	
– spring return, max	approx. 20 s	
Protection class	IP 54	
Power supply	24V~ ±20%, 6V ±1V (from VRD3), 50/60 Hz	
- Control signal Y		DC 2-10 V DC 0-10 V (option)
- Output signal U		DC 2-10 V DC 0-10 V (option) 0-100% U nom.
Ambient temperature		0° till +50°C
End position contacts:		
- load ≤ 300 mW	min 1 mA/5V=, max 100 mA/250V~	
After exceeding the above values it applies:		
- load > 300 mW	min 100 mA, max 3 A/250~	
Sound level		
- when regulating	approx. 45 dB(A)	
- with spring return	approx. 62 dB(A)	

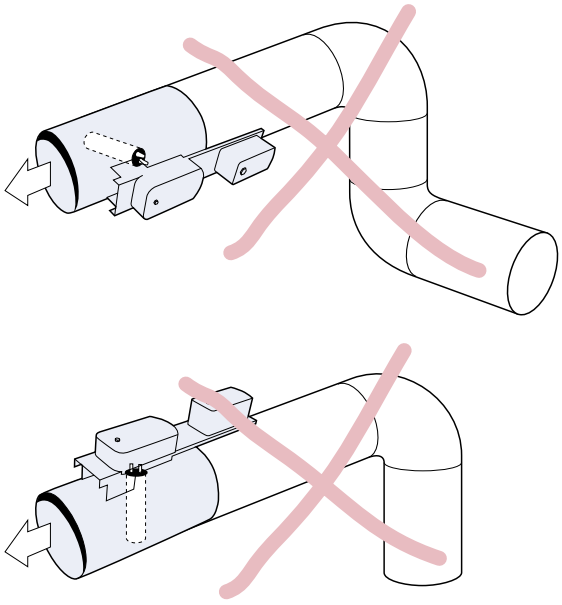
Installation

An adequately sized straight duct and correct installation are essential for low measuring uncertainty when measuring the flow in a duct. The required straight duct following a bend is shown in the figures below.
For other sources of interference such as union pieces, a straight duct of at least 5 x ØD is necessary before the device.

NOTE!
- *The measuring tube shall be fitted at 90° to the plane of the bends.*
- *Measuring tubes shall not be placed after two 90° bends in prependicular alignment.*

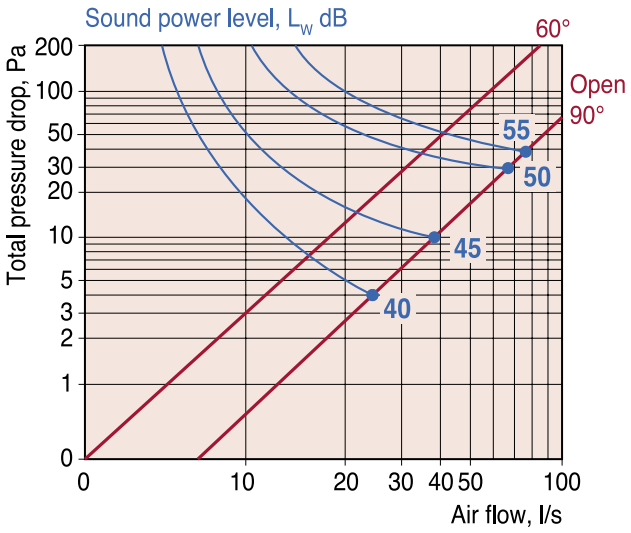
The duct's nom. diameter = ØD
Method error, m_2 = 5%.



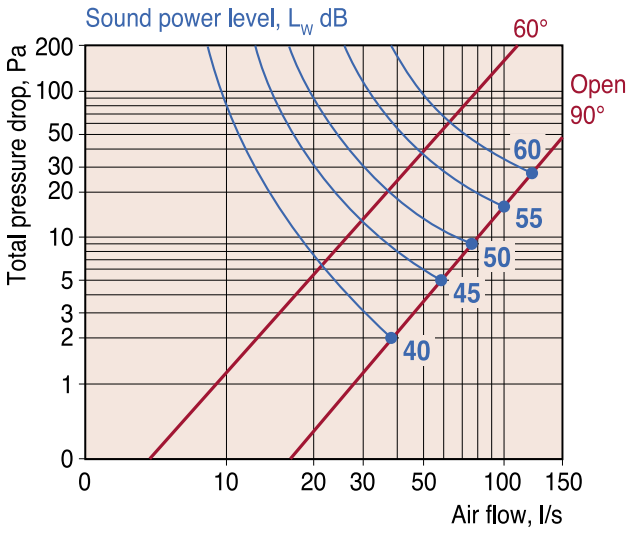


Size chart

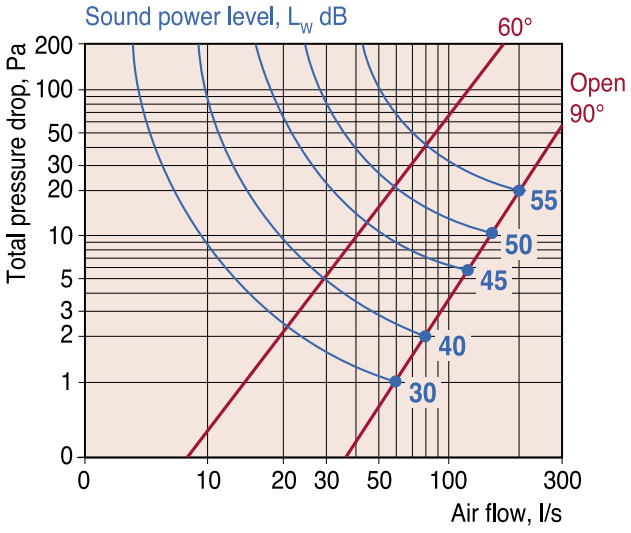
Size - 100



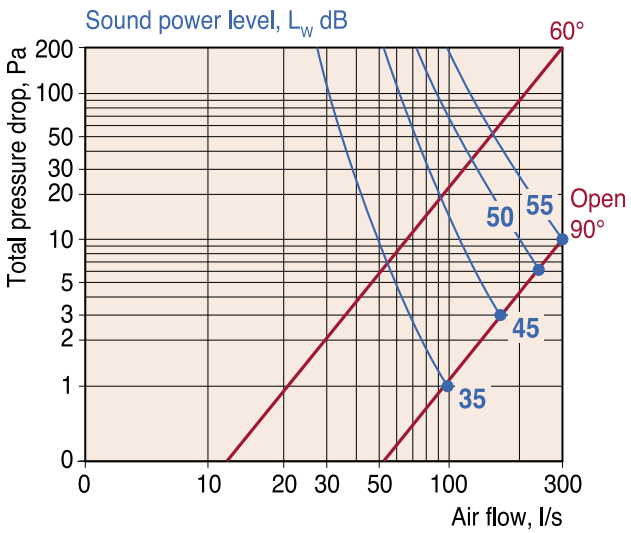
Size - 125



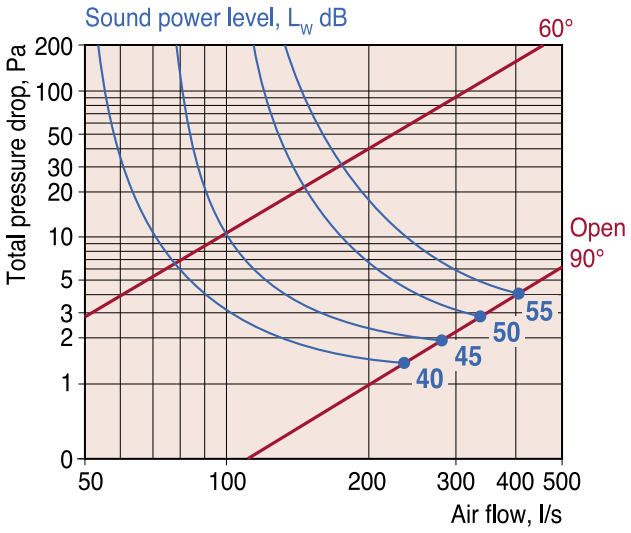
Size - 160



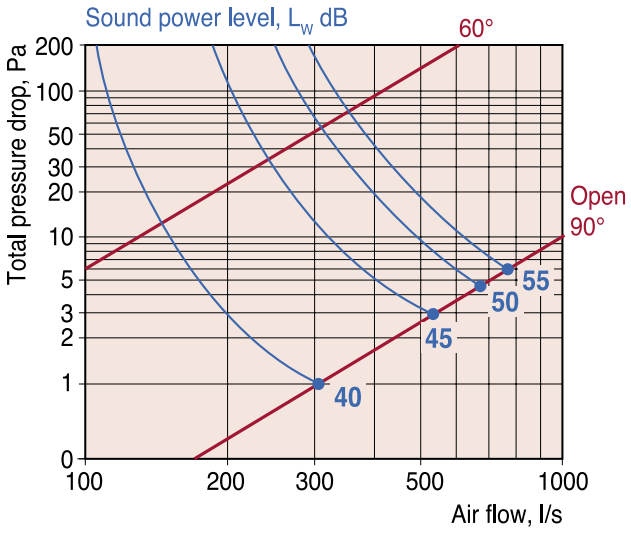
Size - 200



Size - 250



Size - 315



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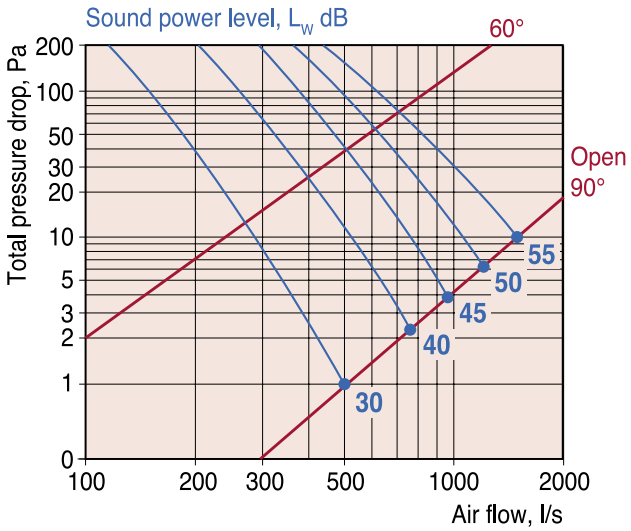
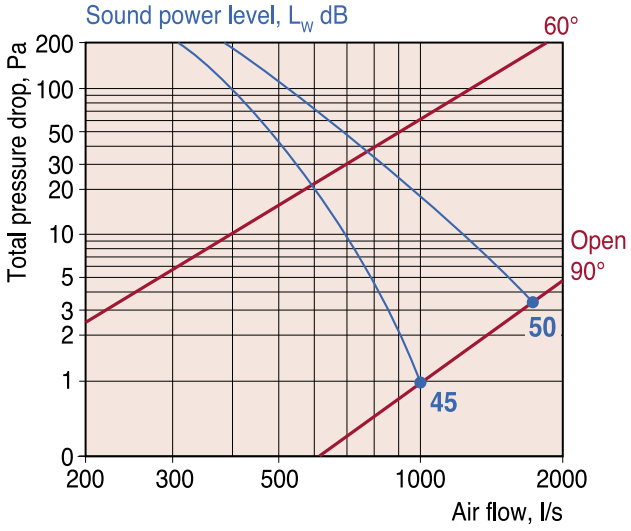
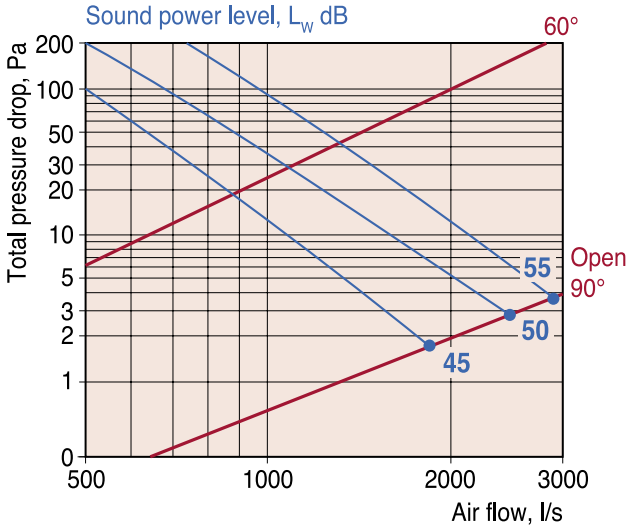


Size - 500



Size - 630



Sound data

Correction of sound power level, L_{Wok}, in octave band

$L_{wok} = L_w + K_{ok}$

Correction, K_{ok}

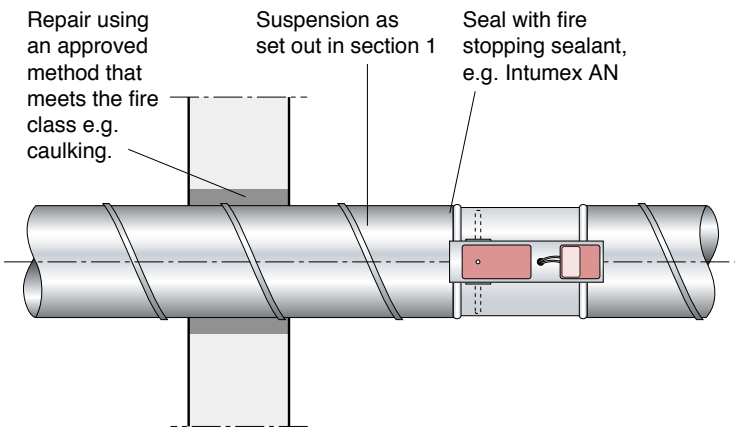
Size Ø mm	Centre frequency Hz							
	63	125	250	500	1000	2000	4000	8000
100	-5	-5	-8	-13	-21	-29	-35	-39
125	-6	-6	-7	-15	-19	-26	-36	-27
160	-5	-5	-8	-14	-17	-24	-32	-28
200	-5	-6	-8	-15	-21	-24	-26	-30
250	-4	-7	-9	-14	-20	-21	-23	-23
315	-4	-7	-11	-15	-20	-22	-25	-22
400	-5	-7	-11	-16	-20	-23	-23	-24
500	-3	-9	-14	-18	-19	-22	-29	-25
630	-3	-10	-16	-20	-21	-20	-20	-23
Tol. ± dB	2	2	2	2	2	2	2	2

Installation instruction

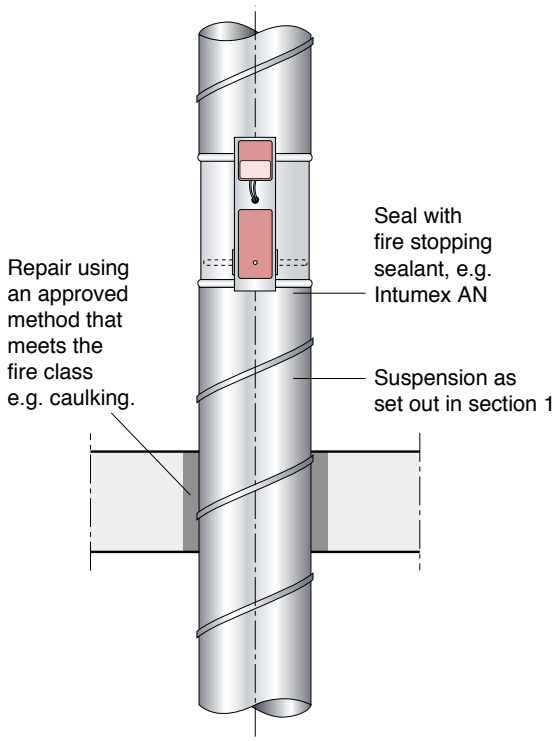
Damper's fire resistance class: E60 (ve ho i <–> o).
EC-certificate 0402-CPD-SC0058-13

CE

Option 1



Option 2



Options 1 and 2

1. Secure the damper in the duct and seal with fire stopping sealant, e.g. Intumex AN.
2. Install the duct system according to applicable requirements. Between the damper and the penetrated building element the maximum spacing between hangers is 1500 mm. Use M10 drop rods and cradles or equivalent.
3. Install the thermal sensor with the sensor body in the air stream without obstructing the movement of the damper blade.

- *Minimum distance between dampers must be 100 mm.*
- *Minimum distance to joist structure/wall must be 75 mm.*
- *No openings between dampers and fire separating building elements.*
- *Optional installation of the damper spindle.*
- *The damper can be installed in diagonal duct systems.*

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