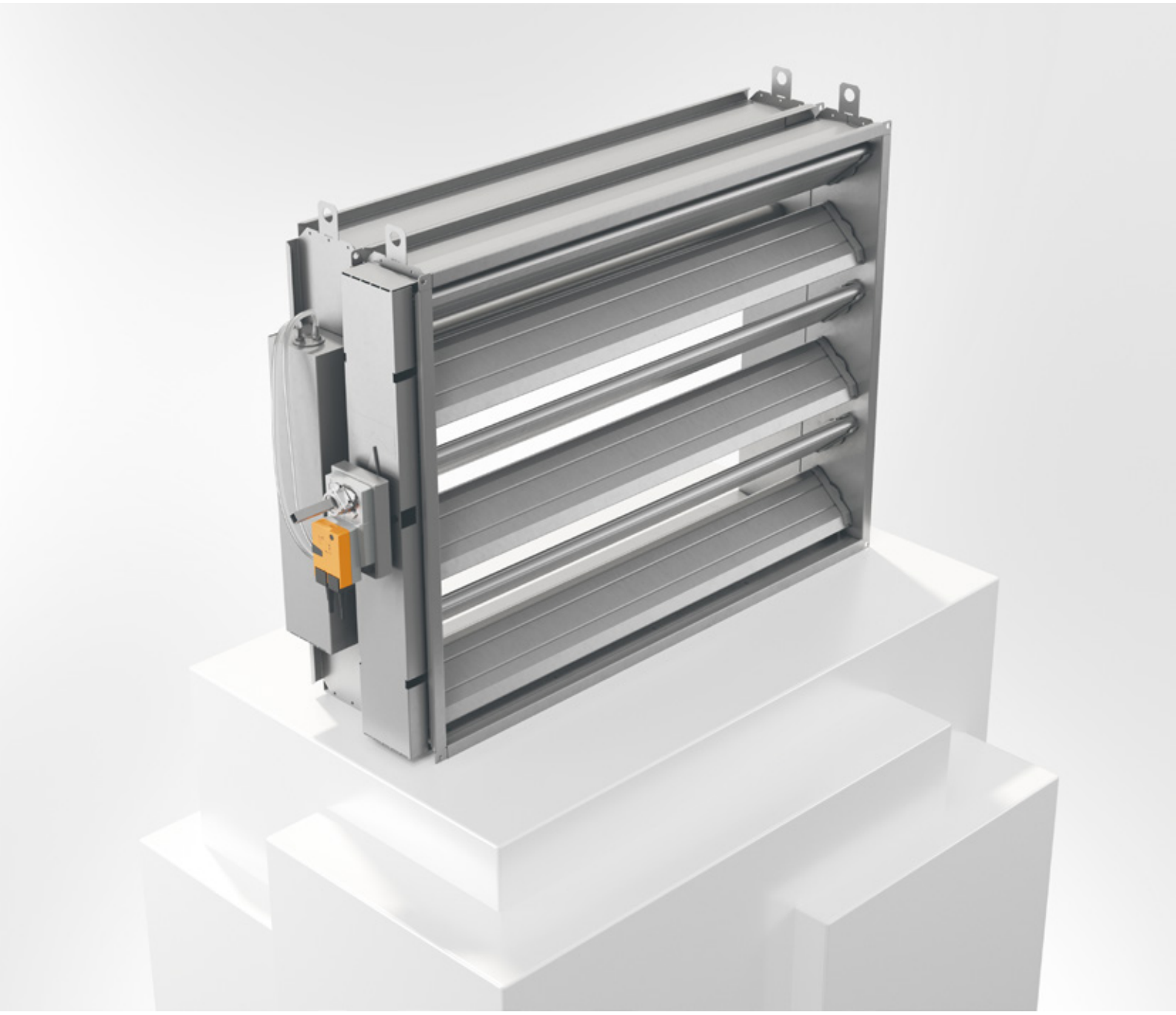
BVAV-3

Rectangular variable/constant flow device

VAV, CAV & FLOW
MEASURING DAMPERS



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Variable/constant flow device BVAV-3

Quick facts

- Sizes from 200–200 mm.
  Max. width 1600 mm, max. height 1300 mm.
- Dynamic pressure sensor.
- Factory-set max and min flows
- Calibrated before delivery
- Possibility of adjusting flows on site using a mobile phone (NFC) or with the ZTH handheld device
- Available in MagiCAD

Use

BVAV-3 is a variable/constant air flow damper with a Belimo compact actuator that features an integrated measurement unit and regulator. The dampers are supplied calibrated from the factory where selected max. and min. flows are programmed. The air flows can be changed manually on site with the ZTH handheld device or with a mobile phone (NFC).
BVAV-3 can be ordered with several different communication options such as Modbus RTU, BACnet MS/TP and KNX.

Special

Actuators with spring return or measurement units with static pressure sensor can be ordered as a special option and are then equipped with Belimo's VRU regulator. If any other make of actuator is required, special solutions can be supplied, e.g. Siemens, Schischek and others.

Specification

Example: **Variable/Constant flow device**
BVAV - 3 - 400 - 200 - 1 - 200/100

Size,
W x H, see Dimensions

Actuators, communication:
Standard, MP-bus = 1
ModBus RTU, BACnet MS/TP = 2
KNX = 3

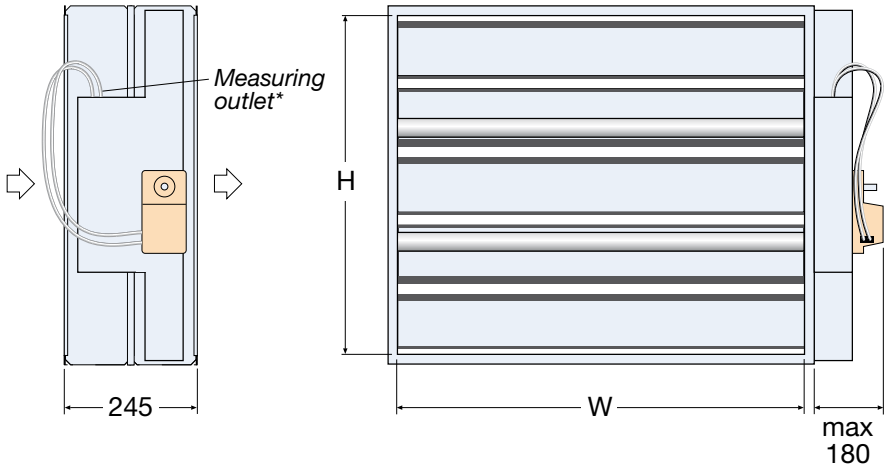
Set airflow, max/min. air flow, l/s
NB: If the devices are to be used as master/slave, this must be specified.

Accessories
Room regulator T-SENSE VAV
Time switch TEL-2
Silencer
Temperature regulator TR24-M

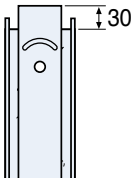
Material, surface treatment

Casing and components of hot-dip galvanized sheet steel, plastic bearings and seals of EPDM rubber. Corrosion protection class C3. The measurement tube is made of extruded aluminium. The damper is supplied as standard in pressure class A and leakage class 1. Alternative casing and component materials available on request for higher pressures and environmental requirements.

Dimensions



** Number of measuring tubes varies depending on the size of the damper.*



Dampers with height 150 or 250 have a build height 30 mm above and below the H dimension.

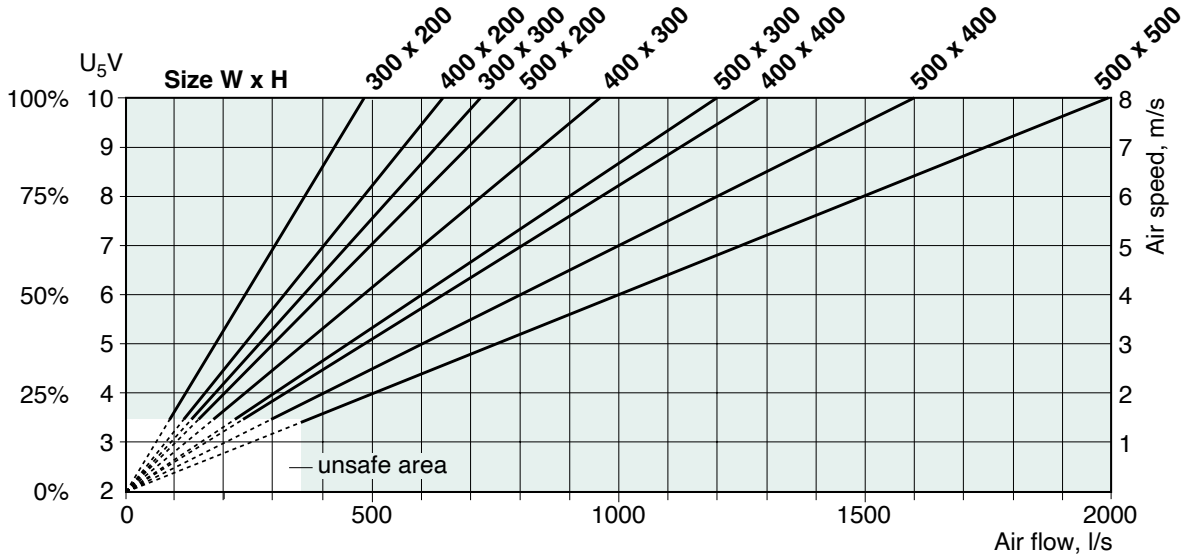
H \ W	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
200	●	●	●	●	●										
300	●	●	●	●	●	●	●	●							
400		●	●	●	●	●	●	●	●	●	●				
500		●	●	●	●	●	●	●	●	●	●	●	●	●	
600			●	●	●	●	●	●	●	●	●	●	●	●	●
700			●	●	●	●	●	●	●	●	●	●	●	●	●
800				●	●	●	●	●	●	●	●	●	●		
900				●	●	●	●	●	●	●	●				
1000					●	●	●	●	●	●					
1100						●	●	●	●						
1200						●	●	●							
1300							●								

NB: The measuring outlet is placed on the H-side

Air flow ranges

In general, the nominal flow rate is equivalent to 8 m/s in the duct. Max. adjustable air flow is between 30-100% of nom. air flow. Min. air flow can be set between 0-100% of max. ari flow. Measurement uncertainty increases at air speeds below 1.5 m/s.

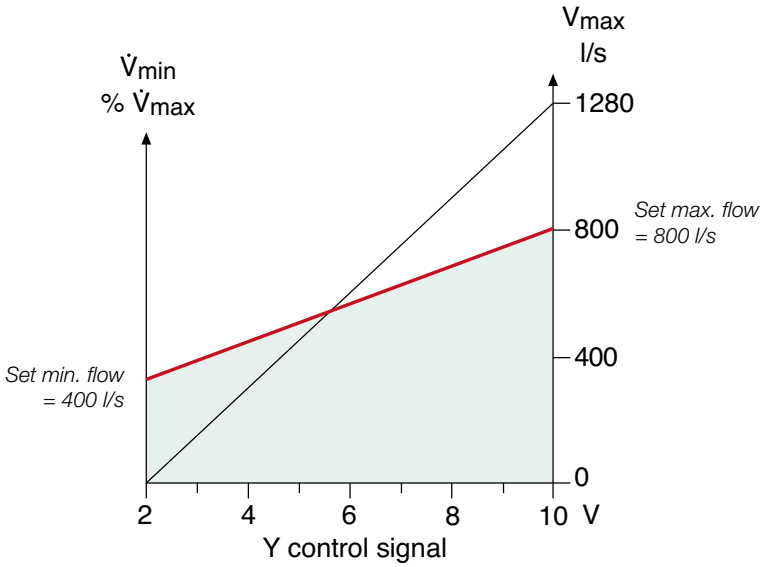
The following chart encompasses only a selection of sizes. The chart shows the ratio between nominal flow and actual value signal (U_5) for each size.



Example:

Conditions:
– Flow, max. 800 l/s, min. 400 l/s

Choose size 400x400.
Nom. flow = 1280 l/s
Max. flow = 800 l/s
Min. flow = 400 l/s
(all of the above flows are set from factory)
The actual value output U is not affected by the Vmax and Vmin setting.



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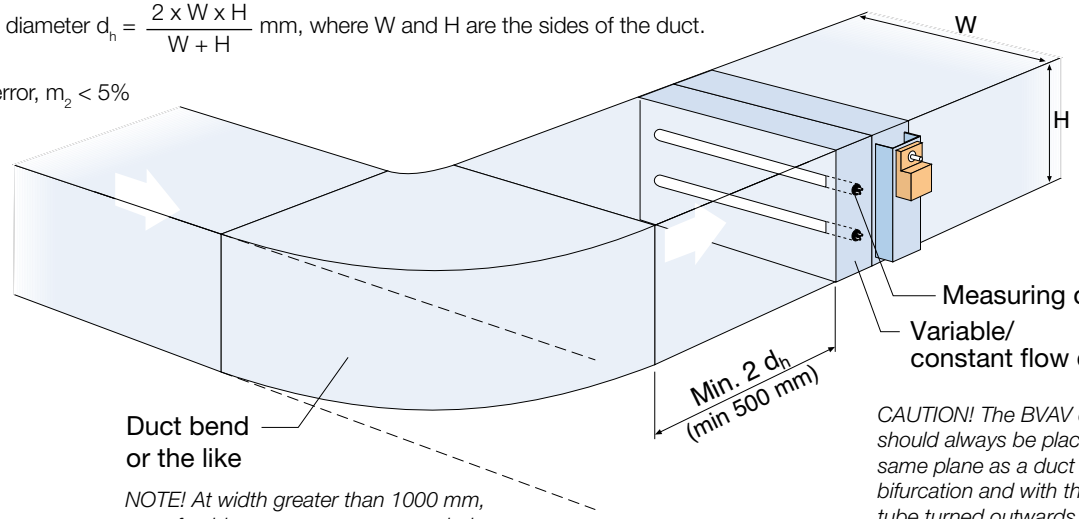
Installation

When installing the measuring unit a linear distance corresponding to minimum 2 hydralic diameters (dh), is required after a source of turbulence (min. 500 mm), see below. At other sources of turbulence, for example T-piece, minimum 5 x d_h is recommended.

Hydraulic diameter $d_h = \frac{2 \times W \times H}{W + H}$ mm, where W and H are the sides of the duct.

Method error, $m_2 < 5\%$



NOTE! At width greater than 1000 mm, use of guide vanes are recommended.

CAUTION! The BVAV device should always be placed in the same plane as a duct bend or bifurcation and with the measuring tube turned outwards.

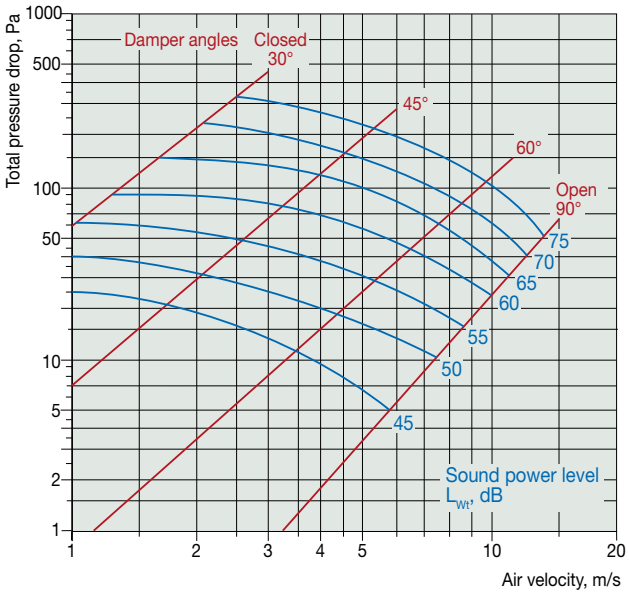
Electrical data

BVAV-3

AC 24V, 50/60Hz, DC 24V
AC 19,2...28,8V, DC 21,6...28,8V

Output:	3–3,5 W (5–5,5 VA)
Sound level:	35 dB(A)
Work range pressure sensor	2–300 Pa
Ambient temperature:	0°C - 50°C

Technical data



Correction of sound power level, L_W, for different sizes

$L_W = L_{Wt} + K_1$

Damper area, m²	0,04	0,2	0,36	0,64	1
K_1	-2	-1	0	2,5	5

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

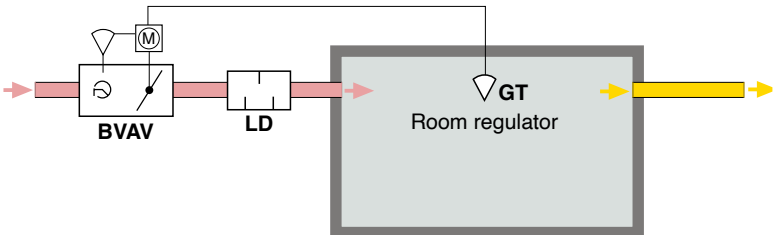
$L_{Wok} = L_W + K_{ok}$

Correction, K_{ok}

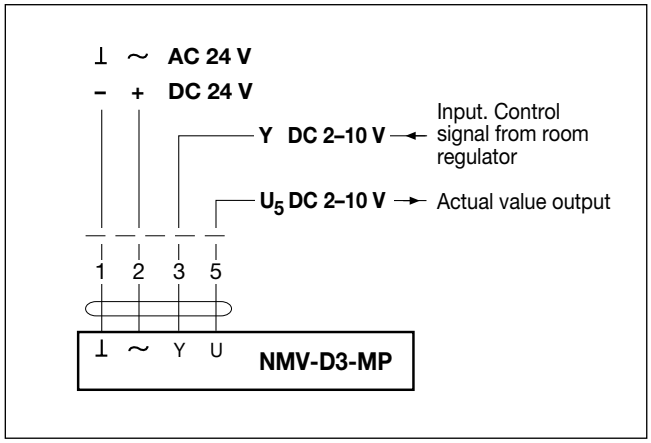
Opening angle	Centre frequency Hz							
	63	125	250	500	1000	2000	4000	8000
90°	-2	-7	-15	-18	-18	-23	-29	-33
60°	-2	-8	-14	-18	-19	-22	-28	-34
45°	-4	-8	-10	-13	-18	-22	-26	-32
30°	-5	-7	-9	-11	-14	-19	-22	-29
Tol. ± dB	3	2	3	4	5	5	6	4

Installation examples

Alt. 1. Installation of separate VAV devices
Control signal from e.g. the room regulator or DUC controls the VAV damper. The actual value signal can be forwarded for external monitoring of the current flow.

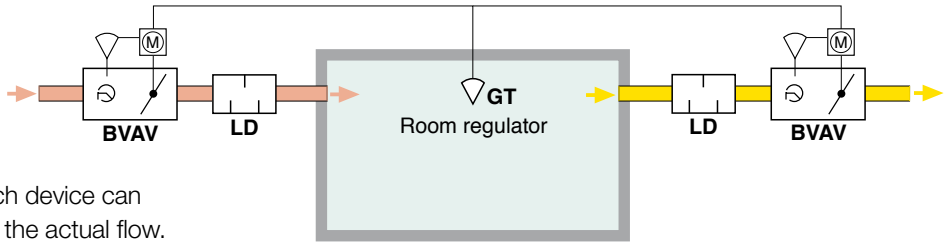


Wiring diagram
BVAV-Compact, NMV-D3-MP

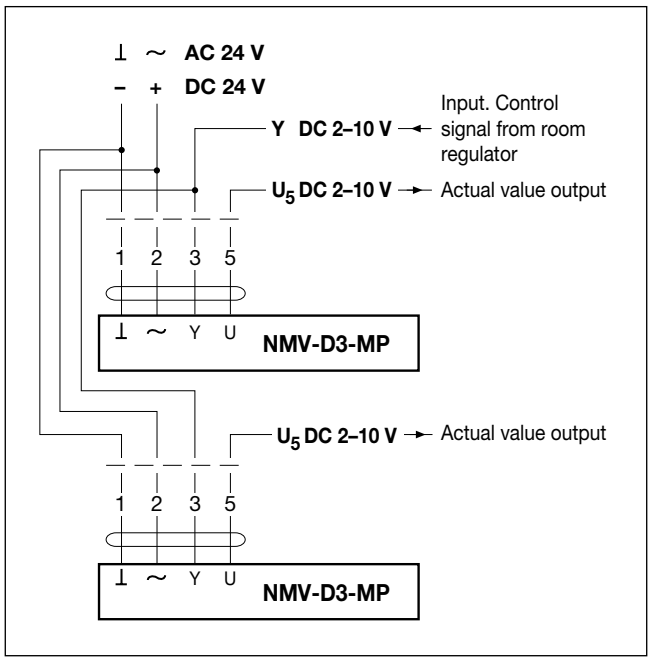


CAUTION! When connecting several VAV devices to the same transformer, it is important that all system phases are connected to (~) and all system neutrals are connected to (⊥).

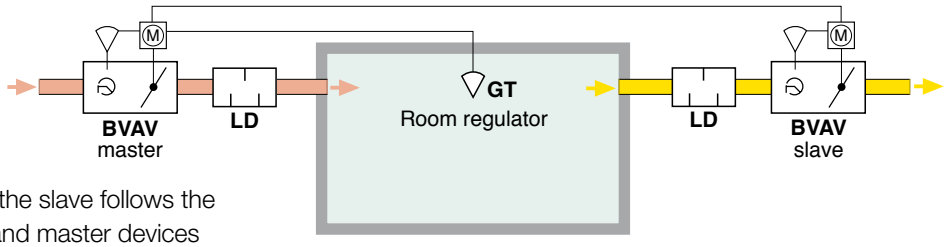
Alt. 2. Supply and exhaust air are controlled in parallel
The control signal from the room regulator or DUC, controls the supply air and exhaust air devices in parallel. The air flow for the devices can be set individually. The output signals from each device can be forwarded for external monitoring of the actual flow.



Wiring diagram
BVAV-Compact, NMV-D3-MP



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

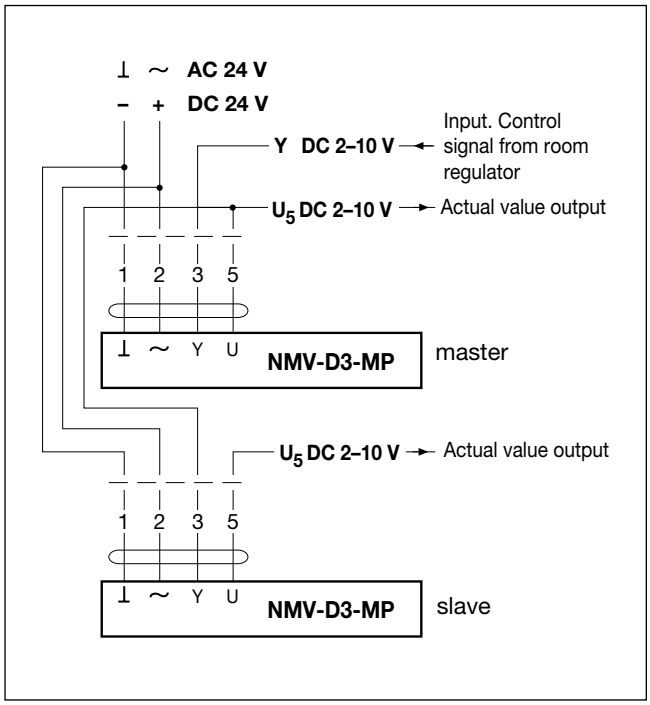


The control signal from the room regulator or DUC, controls the supply air device (BVAV master). The exhaust air device (BVAV slave) is controlled by the supply air device's control signal (U_5 output). Accordingly, the slave follows the master. The flow ratio between slave and master devices depends on the set max. flow of the slave device (normally 100%). The actual value signal from each damper can be forwarded for external monitoring of the current flow. If this connection option is used, the master and the slave need to be the same size.

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

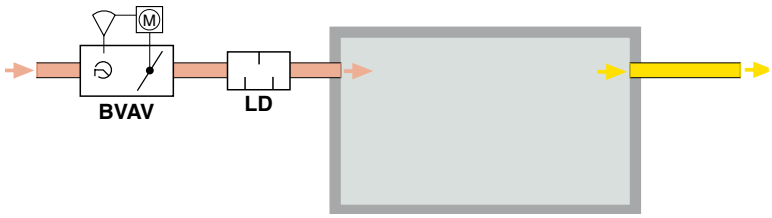
Wiring diagram

BVAV-Compact, NMV-D3-MP



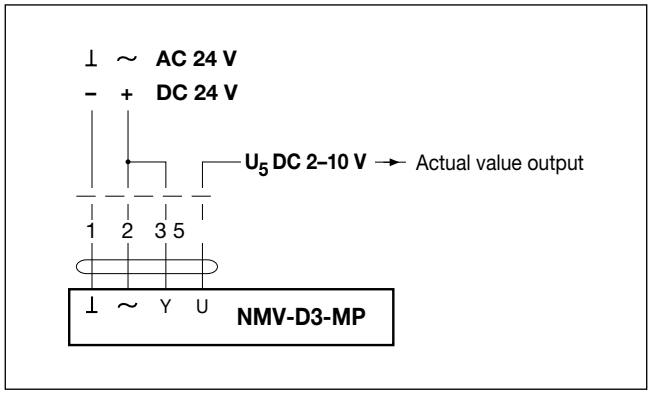
Alt. 4. Constant supply air flow

The VAV device maintains a constant flow preset at the factory. The device is therefore not normally controlled by an external control signal. The output signal can be forwarded for external monitoring of the actual flow. The VAV device can be force-controlled to different operational requirements.



Wiring diagram

BVAV-Compact, NMV-D3-MP

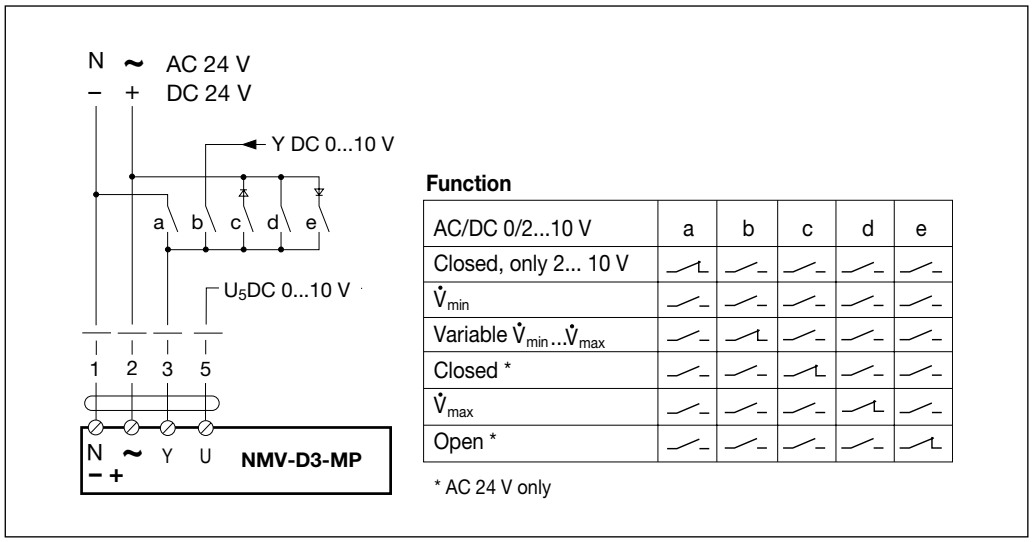


Control functions for BVAV-Compact

With the help of contact functions, the supply air damper (BVAV-Compact) can be regulated to closed, min. flow, variable flow and max. flow and completely open.

Wiring diagram

BVAV-compact, NMV-D3-MP



Function

AC/DC 0/2...10 V	a	b	c	d	e
Closed, only 2... 10 V	⌐_	_	_	_	_
$\dot{V}_{min}$	_	_	_	_	_
Variable $\dot{V}_{min}$...$\dot{V}_{max}$	_	⌐_	_	_	_
Closed *	_	_	⌐_	_	_
$\dot{V}_{max}$	_	_	_	⌐_	_
Open *	_	_	_	_	⌐_

* AC 24 V only

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