

PRODUCT MANUAL

# Variable Air Volume Dampers

RVP-P

Airflow regulation

Version 1.0.5  
Date: 01.10.2021



## RVP-P

RVP-P ensures volume flow control regulation by a given set-point. Set-point can be given as air volume flow or overpressure/underpressure. Parametrization is carried out in the factory in accordance with clients request. Advantages of variable air volume dampers are high regulation precision and no maintenance required.



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### DESCRIPTION

VAV dampers are used to control a variable or constant airflow volume in duct ventilation systems. All VAV dampers are equipped with compact VAV actuator, which has in-built pressure differential sensor and PID logic control. Actuator sensor is connected with rubber hoses to the measuring cross which is used for measuring the duct airflow. By having a real time information about the volume airflow in the duct, VAV's can dynamically respond to the changes in the setpoint (temperature, CO2 or humidity) and ensure optimized ventilation with lowest possible energy consumption.

### MATERIALS

Casing and damper blade of the VAV damper are produced out of galvanized steel sheet. Sealing gaskets are produced out of EPDM rubber, and measuring cross is made out of aluminium tubes. On special demand, VAV casing can be produced out of stainless steel sheet EN 1.4301/EN 1.4491/EN 1.4404 (AISI 304/316/316L), and can also be powdercoated to any standard RAL chart colour.

### DIMENSIONS

B [mm]	H [mm]	Aef [mm <sup>2</sup> ]	Vmin [m <sup>3</sup> /h]	Vmax [m <sup>3</sup> /h]
200	100	0,0170	130	720
300		0,0255	190	1080
400		0,0340	255	1440
200	200	0,0340	255	1440
300		0,0510	380	2160
400		0,0680	505	2880
500	300	0,0850	630	3600
600		0,1020	755	4320
300		0,0765	570	3240
400	400	0,1020	755	4320
500		0,1275	940	5400
600		0,1530	1130	6480
700	500	0,1785	1320	7560
800		0,2040	1505	8640
900		0,2295	1695	9720
1000	600	0,2550	1880	10800
400		0,1360	1005	5760
500		0,1700	1255	7200
600	700	0,2040	1505	8640
700		0,2380	1755	10080
800		0,2720	2005	11520
900	800	0,3060	2260	12960
400		0,1360	1005	5760
500		0,1700	1255	7200
600	900	0,2040	1505	8640
700		0,2380	1755	10080
800		0,2720	2005	11520
900	1000	0,3060	2260	12960

B [mm]	H [mm]	Aef [mm <sup>2</sup> ]	Vmin [m <sup>3</sup> /h]	Vmax [m <sup>3</sup> /h]
1000	400	0,3401	2510	14400
500		0,2125	1570	9000
600		0,2550	1880	10800
700	500	0,2975	2195	12600
800		0,3400	2510	14400
900		0,3825	2820	16200
1000	600	0,4250	3135	18000
600		0,3060	2260	12960
700		0,3570	2635	15120
800	700	0,4080	3010	17280
900		0,4590	3385	19440
1000		0,5100	3760	21600
700	800	0,4165	3070	17640
800		0,4760	3510	20160
900		0,5355	3950	22680
1000	900	0,5950	4385	25200
800		0,5440	4010	23040
900		0,6120	4515	25920
1000	1000	0,6800	5015	28800
900		0,6885	5075	29160
1000		0,7650	5640	32400
1000	1000	0,8500	6265	36000



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## PRODUCT OVERVIEW

## TESTS AND CERTIFICATES

All our dampers are submitted to a number of tests by official test institutes. Reports of these tests form the basis for the approvals of our dampers. Klimaoprema VAV dampers are also suitable for installation in buildings with high hygienic demands such as hospitals, clinics and pharmaceutical areas.

To confirm this, our products are tested by an independent Institute of Hygiene, based in Gelsenkirchen, Ruhr, and comply with directives and guidelines in VDI 6022.



1 [Empty box]

2 SERIAL NUMBER: 200385900200001      3 PRODUCTION DATE: 12.07.2021

4 TYPE: RVP-C-125-MP      5 WORKSHEET: 2003859

6 CUSTOMER:      ALT. TYPE:

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7 FACILITY:

8 POSITION:

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8 SETTINGS:      Vmin = 26      m3/h      Vmin = 9.81%

                 Vmax = 265      m3/h      Vmax = 100.00%

                 Vnom = 265      m3/h

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9 DRIVE: Motor LMV-D3-MP      13 USER MANUAL

10 CONTROL SIGNAL: 2-10 VDC

11 REGULATION TYPE Constant

12 AIR FLOW DIRECTION

14 200385900200001

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**PRODUCT OVERVIEW**

## TECHNICAL DATA

VAV damper casing is manufactured from galvanized steel sheet, but on demand can be produced out of:

- Galvanized steel and powder coated
- Stainless steel EN 1.4301/EN 1.4404 (AISI 304/316L)
- Stainless steel EN 1.4301/EN 1.4404 (AISI 304/316L) and powder coated

VAV damper for areas with potentially explosive atmospheres are also available!

### Product label

- 1 - Company info
- 2 - Serial number
- 3 - Production date
- 4 - Type
- 5 - Worksheet
- 6 - Customer
- 7 - Installation location
- 8 - Parametrization
- 9 - Actuator
- 10 - Control signal
- 11 - Regulation type
- 12 - Air flow direction
- 13 - User manual link
- 14 - Barcode

### Product specifications

Nominal sizes RVP-P	200 x 100 - 1000 x 1000 [mm]
Casing length	350 mm
Temperature range	0 °C ... 50 °C
Volume flow rate range	up to 36000 m³/h
Differential pressure range	up to 1000 Pa
Casing air leakage	Class C, EN 1751
Closed blade air leakage	Class 3, EN 1751
Upstream velocity	< 12 m/s
EC conformity	EN ISO 12100:2010
Declaration of incorporation	Doi 429/2020_03_EN



# MODELS

## VAV dampers with compact controllers

These regulators are equipped with compact VAV controllers which include actuator, controller and dynamic pressure sensor in the same device. VAV units are called pressure independent when the air flow rate passing through it is maintained constant regardless of variations in the system supply pressure. This level of control is possible with the addition of airflow sensor (measuring cross) and variable air controller that maintains the airflow according to required set-point. The controller is measuring the air flow through the device and modulates the damper blade angle in response to system disturbances. The preset volume can be varied between calibrated airflow limits ( $V_{min}$ ,  $V_{max}$ ) via input control signal (analog, communication protocol) provided by room thermostat or HVAC BMS system.

Pressure independent regulation ensures economical dis-



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## PRODUCT OVERVIEW

tribution of air volume to the ventilated spaces according to the individual space requirements. A wide range of actuators are available with VAV dampers (Belimo, Gruner and Siemens), and a wide range of communication protocols are supported by them (MPBus, KNX, ModBus, Bacnet).

Dynamic pressure sensors have operating range 0..600Pa, with  $\pm 1$ Pa resolution. Maximum operating duct pressure is 1000Pa. Casing can also be additionally insulated with 50mm of mineral wool and double skin galvanized sheet casing for reduction of the casing radiated noise. The damper blade and the connection sleeves are equipped with rubber gaskets.

ATEX rated version is available and equipped with EX rated Schischek actuators and controllers.

### Controllers

#### Analogue communication

Compact VAV controllers controlled via 0(2)..10V analogue signal. All actuators are equipped with feedback signal for common functions like actual flow, pressure drop or damper blade angle.

#### MP-Bus communication

MP-Bus is a simple sensor/actuator bus, which is used for certain sub-systems of building automation systems. MP-Bus uses a master/slave bus technology where defined number of slave units can be connected to an MP-Master unit.

#### Communication protocols

Compact controllers are also available with support for most common communication protocols: ModBus, Bacnet and KNX. Communication protocols enable connection of much larger number of units to a common communication network. Network is controlled by a building management system (BMS) controller.

#### Schischek EX

ATEX rated VAV dampers are equipped with Schischek ExMax actuators and ExReg volumetric/pressure controllers. Optionally, casing can be produced in EN 1.4301/EN 1.4491/EN 1.4404 (AISI 304/316/316L) stainless steel.

### ORDERING KEY RVP-P

(1) Model	(2) Dimensions	(3) Communication type	(4) Insulation
RVP-P	BxH	Z	MP
(1) RVP-P - VAV damper	(2) BxH	(3) Communication type: MP - Belimo MP MF - Belimo analogue (0..10V) SGB - Siemens analogue (0..10V) MOD-S - Siemens Modbus MOD-BAC - Belimo Modbus / Bacnet MOD-G -Gruner Modbus	(4) Z - 50mm mineral wool insulation KNX-S - Siemens KNX KNX-B - Belimo KNX BAC - Siemens Bacnet PP - Gruner analogue (0..10V)



## RVP-P with Belimo controller

Volume flow control regulation by a given set-point. Factory parametrization in accordance with clients request.

- High regulation precision.
- No maintenance required.
- Airtightness classes according to EN 1751, C 3
- Hygiene certificate according to VDI 6022.



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### PRODUCT OVERVIEW

#### OPTIONS

- Constant, variable, 3-stage control
- Single, master-slave and parallel modes of operation
- Insulated casing (50mm)

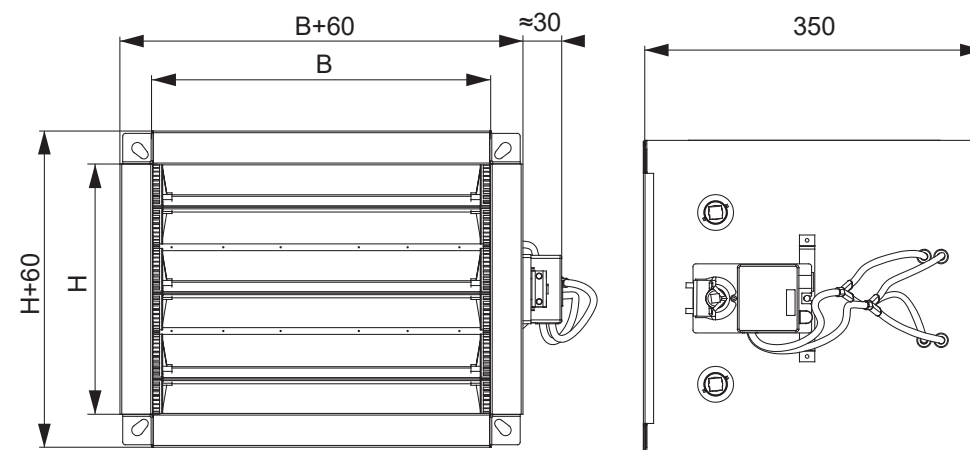
**MP** - Belimo MP

**MF** - Belimo analogue (0..10V)

**MOD-BAC** - Belimo Modbus / Bacnet

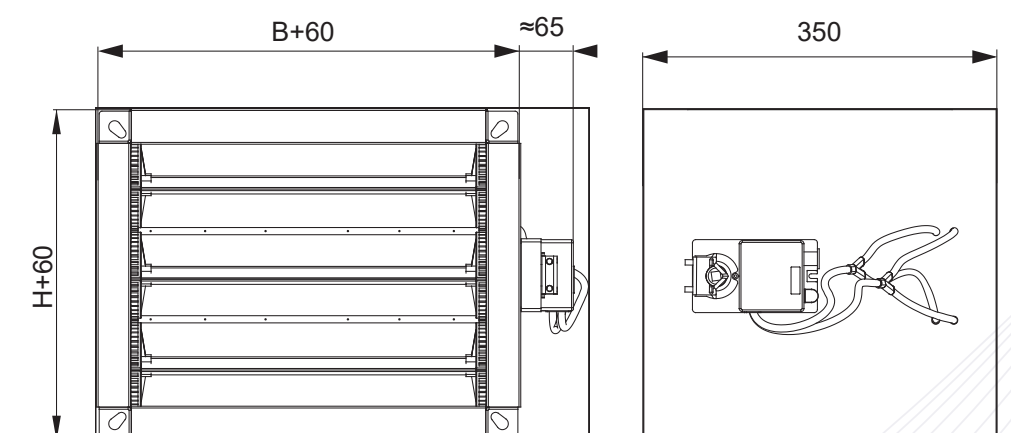
**KNX-B** - Belimo KNX

RVP-P



RVP-P-Z

(Insulated casing)





## RVP-P with Gruner controller

Volume flow control regulation by a given set-point. Factory parametrization in accordance with clients request.

- High regulation precision.
- No maintainance required.
- Airtightness classes according to EN 1751, C 3
- Hygiene certificate according to VDI 6022.



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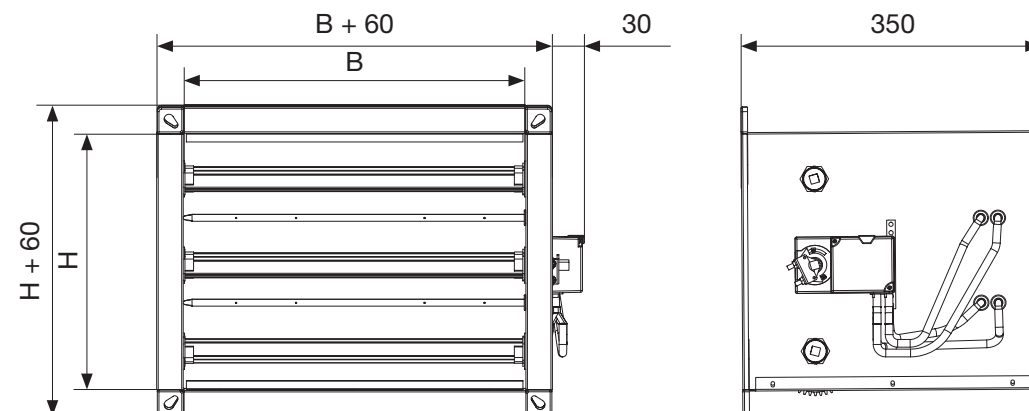
## PRODUCT OVERVIEW

### OPTIONS

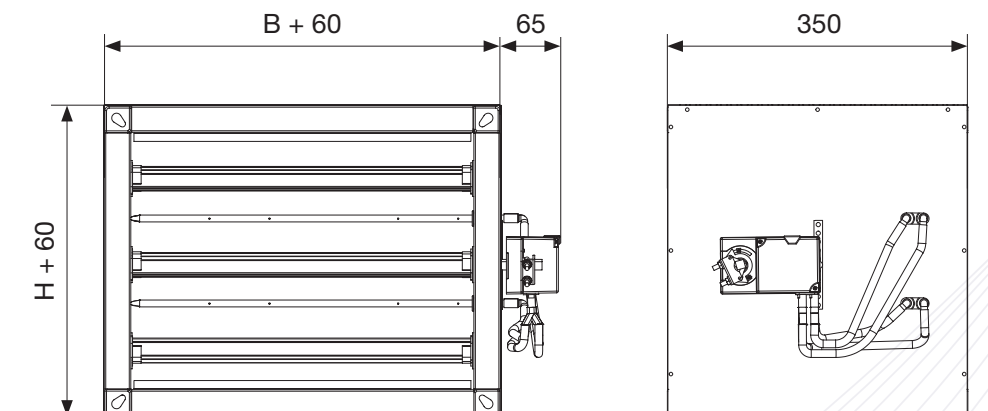
- Constant, variable, 3-stage control
- Single, master-slave and parallel modes of operation
- Insulated casing (50mm)

PP - Gruner analogue (0..10V)  
MOD-G -Gruner Modbus

RVP-P



RVP-P-Z  
(Insulated casing)





## RVP-P with Siemens controller

Volume flow control regulation by a given set-point. Factory parametrization in accordance with clients request.

- High regulation precision.
- No maintenance required.
- Airtightness classes according to EN 1751, C 3
- Hygiene certificate according to VDI 6022.



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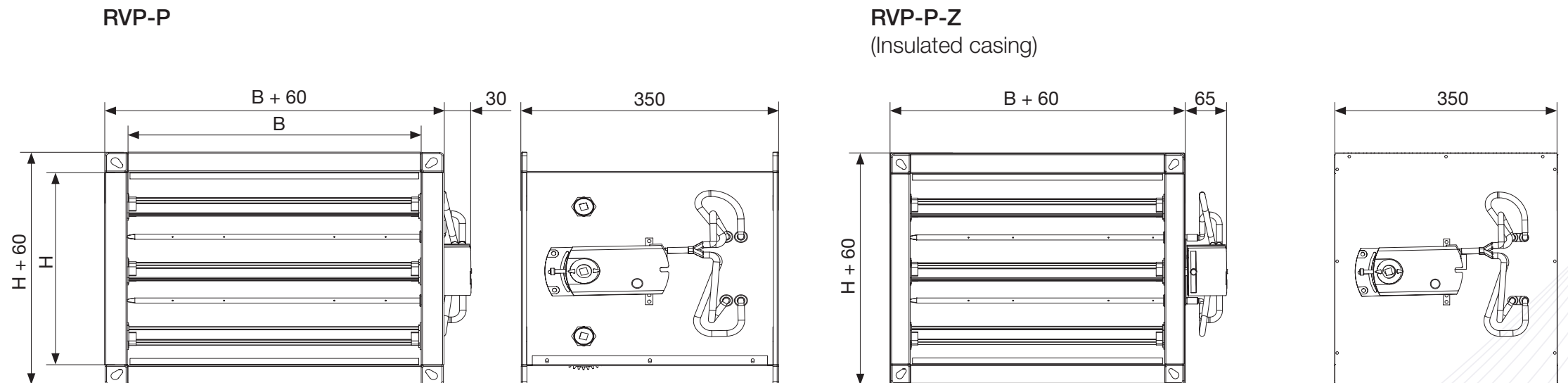


## PRODUCT OVERVIEW

### OPTIONS

- Constant, variable, 3-stage control
- Single, master-slave and parallel modes of operation
- Insulated casing (50mm)

**KNX-S** - Siemens KNX  
**BAC** - Siemens Bacnet  
**SGB** - Siemens analogue (0..10V)  
**MOD-S** - Siemens Modbus





# RVP-P-EX

Volume flow control regulation by a given set-point. Factory parametrization in accordance with clients request.

- High regulation precision
- No maintainance required
- Designed for all gases, mists and vapours in zones 1 and 2, with electronic control additionally for dusts in zones 21 and 22
- Closed blade air leakage to EN 1751, up to class 4
- Casing air leakage to EN 1751, class C

For more details:

- (1) [Schischek ExMax spring return actuators](#)
- (2) [ExReg-V VAV controllers](#)



1

Schischek ExMax spring return actuator



2

ExReg-V VAV controller



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## PRODUCT OVERVIEW

### DESCRIPTION

VAV units for potentially explosive atmospheres are equipped with Schischek ExMax spring return actuators (1) and ExReg-V VAV controllers (2). ExReg-V controllers can be parametered on-site using menu navigation, without any electronic aids. The internal PID control structure is easy to use and can be configured fully automatically for standard applications. The display indicated the current status for actual value, setpoint value and control variable during operation.

Type Examination Certificate Number: FIDI 21 ATEX D060. Equipment complies with the essential health and safety requirements relating to the design and construction of equipment intended to use in potentially explosive atmospheres given in annex VIII of the directive ATEX 2014/34/EU.

### MATERIALS

Casing and damper blade of the VAV damper are produced out of galvanized steel sheet. Sealing gaskets are produced out of EPDM rubber, and measuring cross is made out of aluminium tubes. On special demand, VAV casing can be produced out of stainless steel sheet EN 1.4301/EN 1.4491/EN 1.4404 (AISI 304/316/316L), and can also be powdercoated to any standard RAL chart colour.

### ORDERING KEY RVP-P-EX

(1) Model	(2) Actuator/ controller	(3) Dimensions	(4) Insulation
RVP-P	EX	BxH	Z

- (1) RVP-P - VAV damper
- (2) EX - Schischek ExMax + ExReg-V  
EX-F - Schischek ExMax with spring return + ExReg-V
- (3) BxH - Dimensions
- (4) Z - 50 mm mineral wool insulation

### CLASSIFICATION ATEX RATED VAV ACTUATORS

**Ex II 2G Ex h IIC T6 Gb**

**Ex II 2D Ex h IIIC T80°C Db**

For more information about Ex classification, visit website: [ATEX classification](#)

Compact VAV solutions									
	Belimo L(N)MV-D3-MF	Belimo L(N)MV-D3-MP	Belimo L(N)MV-D3-MOD	Belimo L(N)MV-D3-KNX	Siemens GL(D)B181.1E/3	Siemens GL(D)B181.1E/MO	Siemens GL(D)B181.1E/KN	Siemens GL(D)B181.1E/BA	Gruner 227VM-024-05(10)
<b>Applications</b>									
VAV/CAV control	•	•	•	•	•	•	•	•	•
<b>Actuators</b>									
Torque	5(10) Nm	5(10) Nm	5(10) Nm	5(10) Nm	5(10) Nm	5(10) Nm	5(10) Nm	5(10) Nm	5(10) Nm
Running time	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable
<b>Control</b>									
0/2..10V	•	•			•				•
Via contacts (CAV)	•	•							•
MP-Bus		•							
Modbus RTU			•			•			
LonWorks									
KNX				•			•		
Bacnet			•					•	
PP Bus									•
<b>Pressure sensor</b>									
	0..450Pa	0..450Pa	0..450Pa	0..450Pa	0..300Pa	0..300Pa	0..300Pa	0..300Pa	0..250Pa
<b>Accessories</b>									
KOER Codis E35-VAV	•	•			•			•	•
Room temperature controller / CR24..	•	•							
Fan optimiser / COU24-A-MP	•	•							
MP gateways / UK24xxx	•	•							
PC Tool / MFT-P	•	•	•	•					
Service tool / ZTH-GEN	•	•	•	•					
Siemens software ASC941					•	•	•	•	
AST20					•	•	•	•	
<b>Supply / Inputs</b>									
AC/DC 24V	•	•	•	•	•	•	•	•	•
Feedback signal	Airflow / Damper position / Δp	Airflow / Damper position / Δp	Modbus Bacnet / Not relevant	KNX /Not relevant	Airflow	Modbus / Not relevant	KNX /Not relevant	Bacnet / Not relevant	Airflow

\* if not otherwise specified, regulator is set to standard factory values  $V_{max}$  and  $V_{min}$ .

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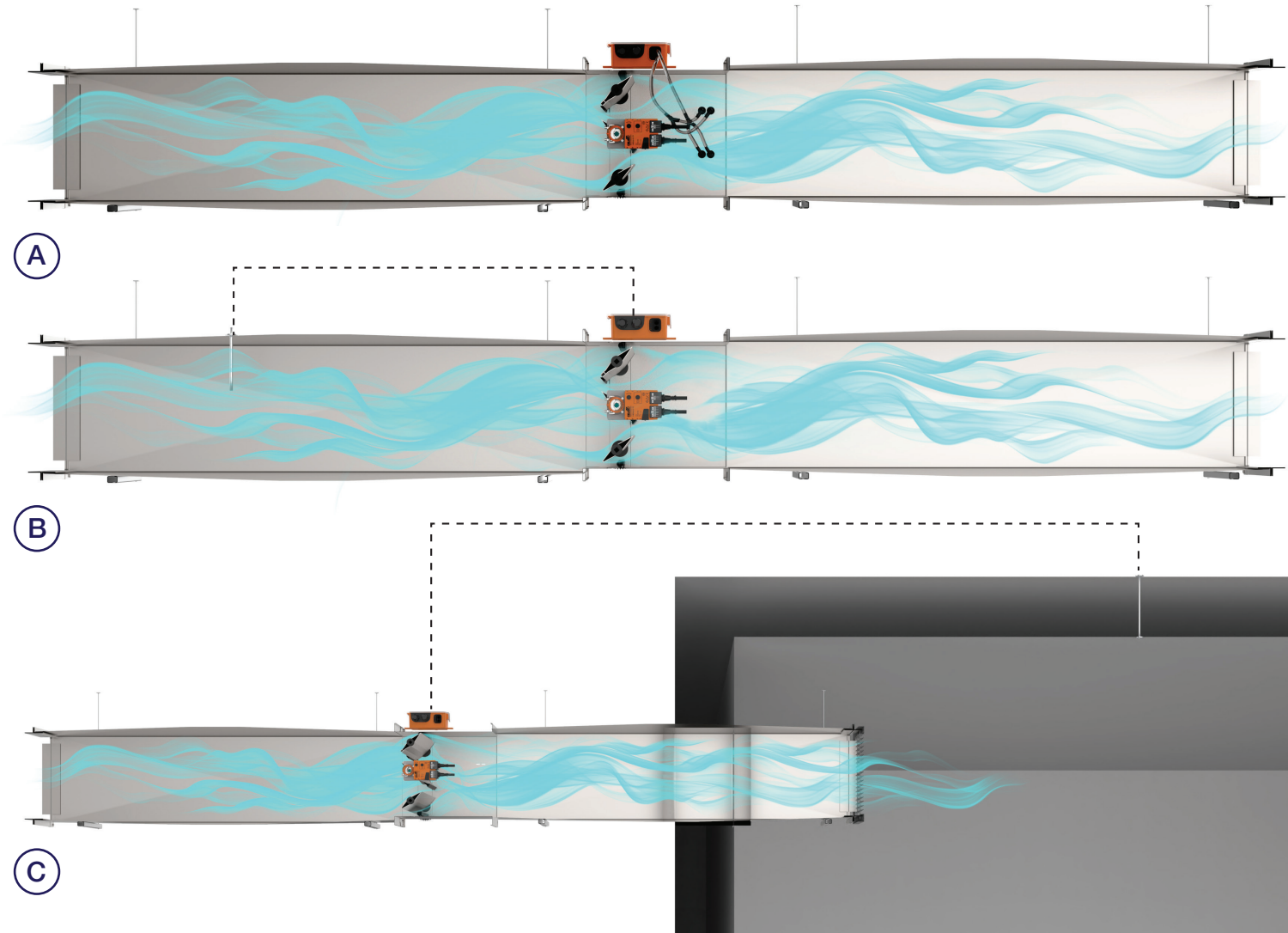


## PRODUCT OVERVIEW



## VAV universal components

- (A) VOLUMETRIC FLOW CONTROL**  
Standard VAV casing equipped with VRU-D3-BAC controller/pressure sensor and standard modulating, fast-acting or spring return actuator. Casing is equipped with measuring cross for airflow measurement and control in the duct.
- (B) DUCT PRESSURE CONTROL**  
Damper casing without measuring cross, equipped with duct pressure controller and static sensor VRU-M1-BAC. Static pressure probe is installed on the duct, and static pressure is maintained inside the duct.
- (C) ROOM PRESSURE CONTROL**  
Damper casing without measuring cross, equipped with duct pressure controller and static sensor VRU-M1R-BAC. Static pressure probe is installed in the room and in the reference area. Static overpressure or underpressure is maintained in the room.



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## PRODUCT OVERVIEW

### VARIANTS

#### VAV universal components

VAV components offer modular product range capable of volumetric or pressure control in duct or rooms.

Two types of sensors are available, D3 dynamic sensor and M1 diaphragm static pressure sensor. D3 sensor is used in relatively clean ventilation systems whereas diaphragm sensor is used for polluted air systems.

Multiple casing options are therefore available to provide a basis for components and actuators.

There are three types of casings that can be ordered:

- WA - RVP casing with measuring cross and damper blade without actuator
- WMC - RVP casing without measuring cross and actuator but with damper blade
- MC - measuring cross only

Three different sensor and controller types are available:

- VRU-D3-BAC - duct pressure/volume controller with dynamic D3 pressure sensor
- VRU-M1-BAC - duct pressure/volume controller with M1 static pressure sensor for duct pressure control
- VRU-M1R-BAC - pressure controller with M1 static pressure sensor for room pressure control

There types of actuators are available:

- Standard modulating actuator
- Fast acting modulating actuator
- Spring return modulating actuator

Integrated NFC interface for simple commissioning and configuration with a smartphone using the Belimo Assistant App

### ORDERING KEY RVP-P


(1) Variable air volume damper	(2) Casing type	(3) Dimensions	(4) Actuator type	(5) Controller type	(6) Insulation
<b>RVP-P</b>	<b>WA</b>	<b>BxH</b>	<b>M</b>	<b>D3</b>	<b>Z</b>
(1) <b>RVP-P</b>	(2) <b>WA</b> - standard VAV casing <b>WMC</b> - casing without measuring cross <b>MC</b> - only measuring cross	(3) <b>BxH</b>	(4) <b>M</b> - standard VAV actuator <b>MQ</b> - fast acting VAV actuator <b>F</b> - spring return VAV actuator	(5) <b>D3</b> - dynamic pressure controller <b>M1</b> - static duct pressure controller <b>M1R</b> - static room pressure controller	(6) <b>Z</b> - 50 mm mineral wool casing insulation

## Pressure VAV system components

Component	Description	Documentation
VRU-D3-BAC	Modbus RTU, Bacnet MS/TP, MP-Bus, dynamic pressure sensor 0...500Pa Volume flow applications	<a href="#">Technical sheet</a>
VRU-M1-BAC	Modbus RTU, Bacnet MS/TP, MP-BUS, static sensor 0...600Pa Duct pressure applications	<a href="#">Technical sheet</a>
VRU-M1R-BAC	Modbus RTU, Bacnet MS/TP, MP-BUS, static sensor -75...+75Pa Room pressure applications	<a href="#">Technical sheet</a>
LM24A-VST	VAV-Universal, ready-to-connect damper actuator for VAV and CAV units in technical building installations • Torque motor 5 Nm • Nominal voltage AC/DC 24 V • Control communicative PP	<a href="#">Technical sheet</a>
NM24A-VST	VAV-Universal, ready-to-connect damper actuator for VAV and CAV units in technical building installations • Torque motor 10 Nm • Nominal voltage AC/DC 24 V • Control communicative PP	<a href="#">Technical sheet</a>
SM24A-VST	VAV-Universal, ready-to-connect damper actuator for VAV and CAV units in technical building installations • Torque motor 20 Nm • Nominal voltage AC/DC 24 V • Control communicative PP	<a href="#">Technical sheet</a>
LMQ24A-VST	VAV-Universal, ready-to-connect damper actuator for VAV and CAV units in technical building installations • Torque motor 4 Nm • Nominal voltage AC/DC 24 V • Control communicative PP • Running time motor 2.5 s	<a href="#">Technical sheet</a>
NMQ24A-VST	VAV-Universal, ready-to-connect damper actuator for VAV and CAV units in technical building installations • Torque motor 8 Nm • Nominal voltage AC/DC 24 V • Control communicative PP • Running time motor 4 s	<a href="#">Technical sheet</a>
NF24A-VST	Ready-to-connect rotary actuator fail-safe for VAV and CAV units in technical building installations • Torque motor 10 Nm • Nominal voltage AC/DC 24 V • Control communicative PP • Spring return	<a href="#">Technical sheet</a>
SF24A-VST	Ready-to-connect rotary actuator fail-safe for VAV and CAV units in technical building installations • Torque motor 20 Nm • Nominal voltage AC/DC 24 V • Control communicative PP • Spring return	<a href="#">Technical sheet</a>
NKQ24A-VST	Ready-to-connect actuator with fail-safe for VAV and CAV units in technical building installations • Torque motor 6 Nm • Nominal voltage AC/DC 24 V • Control communicative PP • Running time motor 4 s	<a href="#">Technical sheet</a>

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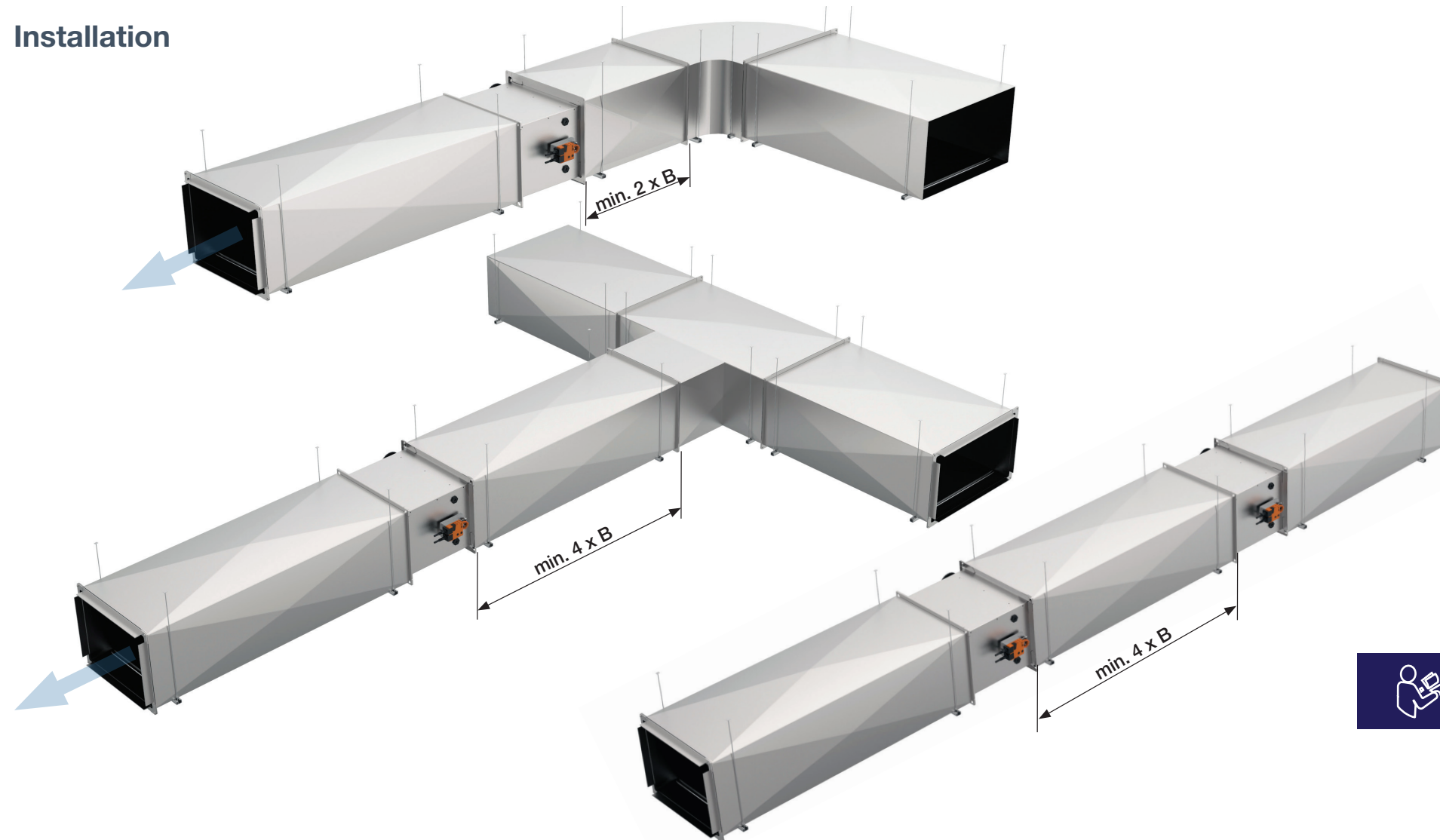
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	Application					Sensor type	Control				Tool	
	VAV/CAV	Air duct pressure	Room pressure	Comfort zone	Polluted air		0...10 / 2...10 V	MP-Bus®	Modbus RTU	BACnet MS/TP	Belimo App	Belimo PC-Tool
VRU-D3-BAC	•	•	-	•	-	D3, dynamic 0...500 Pa	•	•	•	•	•	•
VRU-M1-BAC	•	•	-	•	•	M1, diaphragm 0...600 Pa	•	•	•	•	•	•
VRU-M1R-BAC	-	-	•	•	•	M1R, diaphragm -75...75 Pa	•	•	•	•	•	•



## Installation



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## INSTALLATION

All installation orientations are permitted (except the units with the pressure control components). The volume control accuracy depends on flow conditions before measuring cross. Bends, junctions and narrowings or widenings of the duct cause turbulence and may affect the measurement. For that reason, when installing damper after a bend or a T-section, it is necessary to ensure long enough straight section of the duct. Recommendations for the length of the straight section of the duct:

- Bend - 2 x B
- T-section - 4 x B
- Damper - 4 x B

Note: All duct fittings (eg. connections, branches etc) should comply with EN 1505.

Installation space is required and should be reserved for installation and maintenance of the VAV dampers. It is necessary to provide access to the inspection openings. Standard RVP-C units come pre-calibrated from

the factory. Standard calibration implies  $V_{nom}$  values that are equivalent to air duct velocity of 12 m/s.  $V_{max}$  and  $V_{min}$  values can be found in the table on [page 2](#).

$V_{min}$  value can be calibrated in a range from 10% of  $V_{nom}$ .  $V_{max}$  can be calibrated in the range between  $V_{min}$  and  $V_{nom}$ . Input signal regulates the volume flow between  $V_{min}$  and  $V_{max}$  linearly. Below  $V_{min}$ , the volume flow cannot be regulated.

If the dampers are installed according to the recommendations, airflow control accuracy depends on the airflow velocity in the duct.

- for velocities > 3 m/s accuracy is declared to  $\pm 5\%$
- for velocities between 1,2 m/s and 3 m/s accuracy is declared to  $\pm 10\%$
- for velocities < 1,2 m/s accuracy is declared to  $\pm 20\%$

Compact VAV actuators with integrated dynamic pressure sensors are intended for use in ventilation systems with relatively clean air. That means that the ventilation systems should not contain abrasive, chemical or adhesive particles. Temperature

range in the place of installation is permitted to 0 °C to 50 °C. For regulation in areas with contaminated media, units with static pressure sensors are used (VRU-M1-BAC and VRU-M1R-BAC). These controllers can be calibrated to regulate airflow or pressure in the duct or room.

### Control

Pressure independent VAV's have the following control parameters:  $V_{min}$  (minimum airflow),  $V_{max}$  (maximum airflow) and  $V_{nom}$  (nominal airflow). These parameters are defining the volume airflow range in which the VAV is operating. Nominal airflow range depends on the size of the damper, and is equal to the corresponding duct air velocity of 12 m/s.

$V_{min}$  can be set to any volume airflow between 10% $V_{nom}$  and 100% $V_{nom}$ , and  $V_{max}$  can be set to any volume airflow between  $V_{min}$  and  $V_{nom}$ . The control of the dampers is done via analog signal (0(2)-10V) or some of the supported communication protocols. Most commonly a BMS system is controlling the ventilation system (including the VAV's), but it is possible for the VAV's to work independently with a simple room controller providing it with the needed setpoint.

Except stand-alone operation, VAV's can work in parallel operation and master/slave operation. In parallel operation control signals are always the same, and control parameters  $V_{min}/V_{max}$  can be set independently. In master/slave operation the actual signal from the master unit is controlling the reference air volume in the slave unit. Actuators are overload proof. Compact, standard and high speed actuators will remain at their last position in the event of power shutdown. Spring return actuators will completely close or open the damper, depending on their installation orientation.

Parametrization is made in the factory according to the customer demands or default settings. Subsequently changes to the parametrization can be made on site with ZTH tool or Belimo assistant app.

### Belimo motor drive



- motor drives : Belimo (MP, ModBus/Bacnet, MF, KNX)
- power supply - AC 24V, 50/60 Hz  
- DC 24V
- diagnostic socket for service and PC-Tool software

Type	Torque	Energy consumption	Dimensioning	Weight
LMV-D3-MP	5Nm	2W	4VA (max- 8A @ 5ms)	≈ 500g
NMV-D3-MP	10Nm	3W	5VA (max- 8A @ 5ms)	≈ 700g
LMV-D3-MOD/BAC	5Nm	2W	4VA (max- 8A @ 5ms)	≈ 500g
NMV-D3-MOD/BAC	10Nm	3W	5VA (max- 8A @ 5ms)	≈ 700g
LMV-D3-MF	5Nm	2W	4VA (max- 8A @ 5ms)	≈ 500g
LMV-D3-KNX	5Nm	2W	4VA (max- 8A @ 5ms)	≈ 500g
NMV-D3-KNX	10Nm	3W	5VA (max- 8A @ 5ms)	≈ 700g

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#### Control variables

Vnom	specific nominal volume flow, suitable for VAV units
Δp @ Vnom	50...450 Pa
Vmax	20...100%
Vmin	0...100%
Vmid	50% od Vmin do Vmax

#### Classic control

VAV mod for referent variables Y (connection 3)	- DC 2...10V / (4...20mA with 500Ω impedance) - DC 0...10V / (0...20mA with 500Ω impedance) }input impedance min. 100 kOhm - Adjustable DC 0...10V
Actual signal value mod U5 (connection 5)	- DC 2...10V - DC 0...10V } max. 0.5 mA - Adjustable : volume flow, damper position or differential pressure
CAV mode (constant volume flow)	CLOSED / Vmin / Vmid / Vmax / OPEN* (*only with AC 24V supply)

#### Actuator

Connection	Cable, 4 x 0,75 mm <sup>2</sup>
Protection	
Safety class	III Safety extra - low voltage
Level of protection	IP54
Electromagnetic compliance	CE according to 89/336/EEC
Mode	Type 1 (according to EN 60730-1)
Rated power	0,5kV (according to EN 60730-1)
Operating temperature	0...+50 °C
Non operating temperature	-20...+80 °C
Relative humidity	5...95% r.h., no condensation (according to EN 60730-1)
Maintainance	Not required



## ACTUATORS



**Operation specification:**

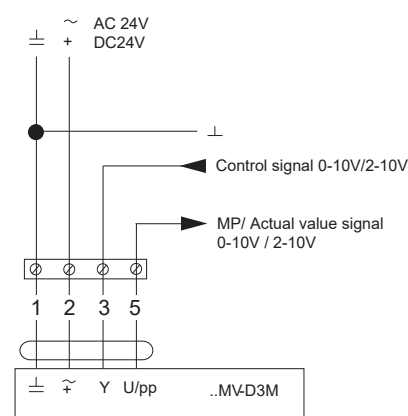
Rated voltage	DC 15 V (from regulator VRP...)		
Voltage range	DC 13,5...16,5 V		
Mesuring range	0...100 Pa 0...300 Pa 0...600 Pa		
Mesuring principle	Inductive membrane differential pressure measurement		
Output signal	DC 0...10 V (proportional pressure for VRP..)		
Linearity	±1% from extreme value (FS)		
Hysteresis	0,1% typ.		
<b>Temperature influence</b>			
zero position	±0,1% / K	±0,05% / K	±0,05% / K
Mesuring range	±0,1% / K t = +10...+40°C (referent temperature to = 5 °C)		
Installation position	Vertical		
Position dependance	Max. ±4,5 Pa za 90° rotation from horizontal		
Electric connection	Cable 1 m , with 4 pole connector		
Protection class	III (safety extra-low voltage) IP4		
Operating temperature	0...+50 °C		
Storage temperature	0...+80 °C		
Humidity test	to EN 60335-1		

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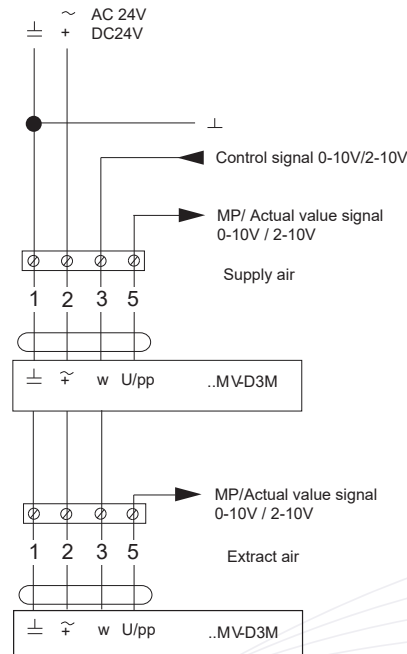
**ACTUATORS**

**Wiring diagram**

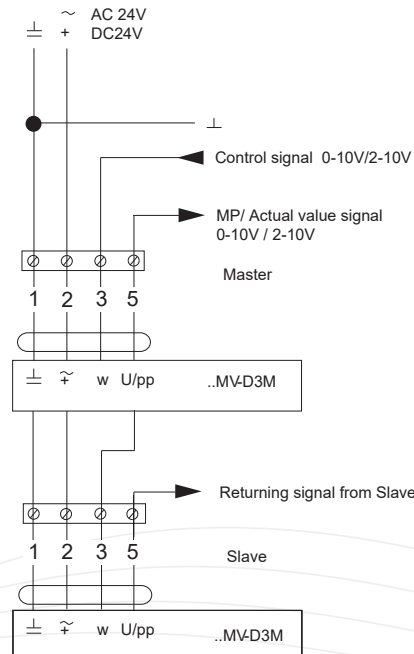
Analogue control signal



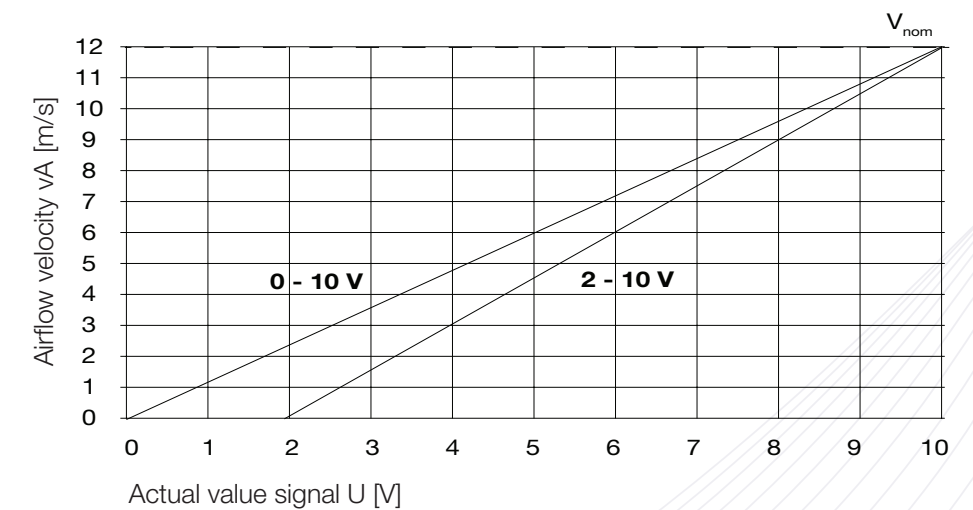
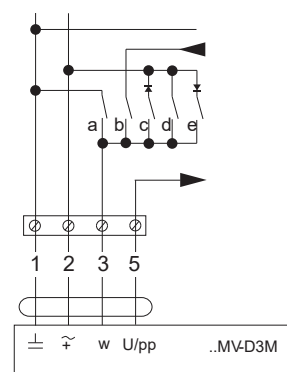
Analogue control signal supply/extract in paralel mode



Analogue control signal master / slave mode



Constant mode: - Standard 0,1V closing



$$0 - 10 \text{ V } V_{act} = \frac{U_{act} - V_{nom}}{10}$$

$$2 - 10 \text{ V } V_{act} = \frac{U_{act} - 2}{8} V_{nom}$$

### Siemens motor drive



- motor drives : Siemens (KNX, ModBus, Bacnet, Analogue)
- power supply: AC 24 V ±20% 50/60 Hz

Type	Torque	Energy consumption	Dimensioning	Weight
GDB181.1E/3	5Nm	2W	4VA (max- 8A @ 5ms)	≈ 500g
GLB181.1E/3	10Nm	3W	5VA (max- 8A @ 5ms)	≈ 700g
GDB181.1E/MO	5Nm	2W	4VA (max- 8A @ 5ms)	≈ 500g
GLB181.1E/MO	10Nm	3W	5VA (max- 8A @ 5ms)	≈ 700g
GDB181.1E/BA	5Nm	2W	4VA (max- 8A @ 5ms)	≈ 500g
GLB181.1E/BA	10Nm	3W	5VA (max- 8A @ 5ms)	≈ 700g
GDB181.1E/KN	5Nm	2W	4VA (max- 8A @ 5ms)	≈ 500g
GLB181.1E/KN	10Nm	3W	5VA (max- 8A @ 5ms)	≈ 700g

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#### Damper actuator

Normal torque	5 Nm (GDB) / 10 Nm (GLB)
Maximum torque	<7 Nm (GDB) / <14 Nm (GLB)
Normal rotation angle / maximum rotation angle	90° / 95° ±2°
Running time for normal rotation angle 90°	150 s (50Hz) / 125 s (60Hz)
Direction of rotation (Adjustable with e.g. ACS941)	Clockwise / Counterclockwise
<b>Signal inputs</b>	
Input voltage	DC 0/2 ... 10 V
Max. perm input volume	DC 35 V
Contact Sensing	
Contact open	DC 30 V contact voltage
Contact closed	DC 0 V, 8 mA contact current
<b>Signal outputs</b>	
Output voltage	DC 0/2 ... 10 V limited to DC 12 V
Max. output current	DC ±1 mA
Time constant (actual value U)	0,05...5 s
Resolution 0.01 S / factory settin 1 s	
<b>Degree of protection and safety class</b>	
Degree of protection acc. to EN 60529 (cf. mounting instructions)	IP54
Safety class acc. to EN 60730	6 x 0.75 mm <sup>2</sup>
<b>Enviromental conditions</b>	
Operation / transport	IEC 721-3-3 / IEC 721-3-2
Temperature	0 ... 50 °C / -25...70 °C
Humidity (non-condensing)	<95% r.h. / <95% r.h.



## ACTUATORS



<b>Air volume controller</b>	
3-position controller with hysteresis	
V <sub>max</sub>	20 ... 100%
V <sub>min</sub>	-20 ... 100%
V <sub>mid</sub>	0 ... 100%
V <sub>n</sub>	1...3.16
<b>Differential pressure sensor</b>	
Connection tubes (inerior diameter)	3 ... 8 mm
Measuring range	0 ... 500 Pa
Operation range	0 ... 300 Pa
Precision at 23°C, 966 mbar and optional mounting position	
Zero point	± 0.2 Pa
Amplitude	± 4.5 of the measured value
Drift	± 0.1 Pa / Year
Max. permissible operation pressure	3000 Pa
Max. permissible overload on one side	3000 Pa
<b>Connection cable</b>	
Cable length	0.9 m
Number of cores and cross-sectional area	6 x 0.75 mm <sup>2</sup>

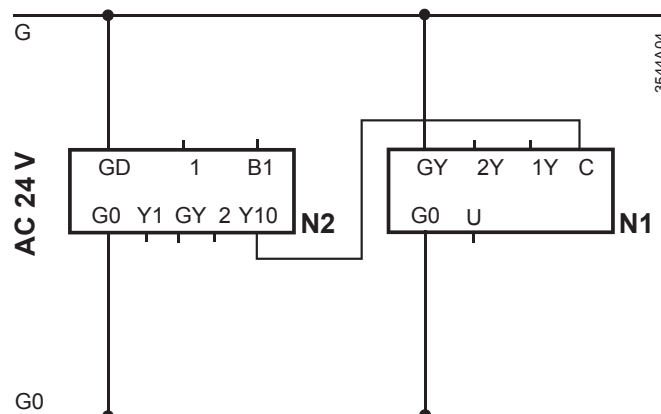
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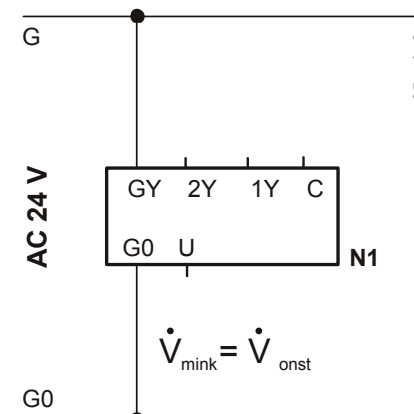
## ACTUATORS

### Wiring diagram

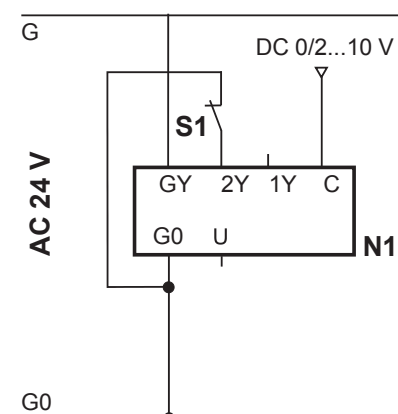
Supply / extract air control in operating mode "con"  
 N1 GDB181.1E/3 or GLB181.1E/3  
 N2 Supervisory controller, e.g. RCU5.. or RCU6.



Supply / extract air control in operating mode "con"



Complete shutoff in operating mode "con"  
 N1 GDB181.1E/3 or GLB181.1E/3  
 S1 Window switch (Window closed – switch open)





### Gruner motor drive

- motor drives : Gruner (327V)
- Running time 100 s / 90°, 150 s / 90°
- Torque 5 -10 - 15 Nm
- Nominal voltage 24 VAC/DC
- Control 3 (EN 60730-1)
- Sensor 250 Pa (dynamic)
- Communication Modbus RTU

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<b>Damper actuator</b>	
Nominal voltage	24 VAC/DC, 50/60 Hz
Nominal voltage range	19...29 VAC/DC
Power consumption motor (motion)	3 W
Power consumption standby (end position)	2 W
Wire sizing	5,5 VA
Control	Modbus RTU / analog (0)2...10 VDC / Ri > (100 kΩ) 50 kΩ (0)4...20 mA / Rext. = 500 Ω
Feedback signal	Modbus RTU / analog (0)2...10 VDC, max. 0,5 mA
Priority control	close / min / btw / max / open / stop
Connection motor	cable 1000 mm, 4 x 0,75 mm <sup>2</sup> (halogen free)
<b>Sensor</b>	
Measuring range - dynamic version	500-1500 Pa
Measuring range - static version	400-600-1000 Pa
Burst pressure	1 bar
Nominal value damper manufacturer specific value	damper manufacturer specific value Vmin / Vbtw / Vmax based on Vnom
Media	air -40°C...85°C / 5...95% r.H., non condensing
Mounting position	independent of position
Connection	tube clip Ø 4-6 mm
<b>Functional data</b>	
Torque	5 -10 - 15 Nm
Synchronised speed	±5%
Direction of rotation	adjustable

## ⏏ ACTUATORS



Manual override	gear de-clutch with pushbutton, lockable
Angle of rotation	0°...max. 95° can be limited with adjustable mechanical end stops
Running time	5 Nm: 100 s / 90° (adjustable 20...120 s / 90°) 10 & 15 Nm: 150 s / 90° (adjustable 70...420 s / 90°)
Sound power level	< 35 dB(A) @ standard running time
Shaft coupling	universal clamp (Ø 20 mm) or form fit □ 8/10/12 mm
Position indication	mechanical with pointer
Service life	> 100 000 cycles (0°...95°...0°) > 1 500 000 partial cycles (max. ±5°)

<b>Safety</b>	
Protection class	III (safety extra-low voltage)
Degree of protection	IP 42 (cable downwards, tube clip connected) IP 20 (with screw terminals)
EMC	CE (2014/30/EU)
LVD	CE (2014/35/EU)
RoHS	CE (2011/65/EU - 2015/863/EU - 2017/2102/EU)
Mode of operation	Typ 1 (EN 60730-1)
Rated impulse voltage	0,5 kV (EN 60730-1)
Control pollution degree	3 (EN 60730-1)
Ambient temperature normal operation	0°C...+50°C
Storage temperature	-20°C...+80°C
Ambient humidity	5...95% r.H., non condensing (EN 60730-1)
Maintenance	maintenance free

<b>Dimensions</b>	
Dimensions	155 x 67 x 66 mm
Weight	5 Nm: 450 g 10/15 Nm: 550 g

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## ACTUATORS

### Wiring diagram

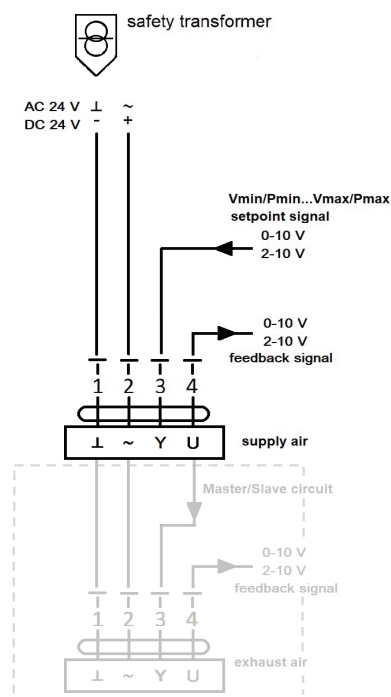
#### VAV

- variable operation min ... max

-Mode 2-10V:

Damper closed < 0,8 V (adjustable via WIN-VAV2 0,2 V ... 1,8 V)

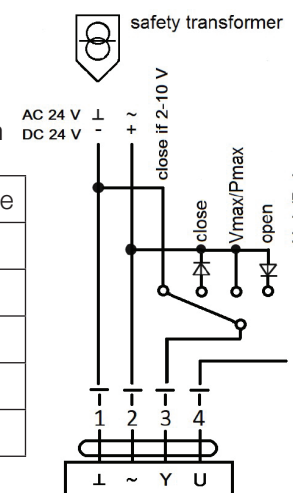
-Master/Slave circuit possible



#### CAV

- step operation close / min / btw / max / open

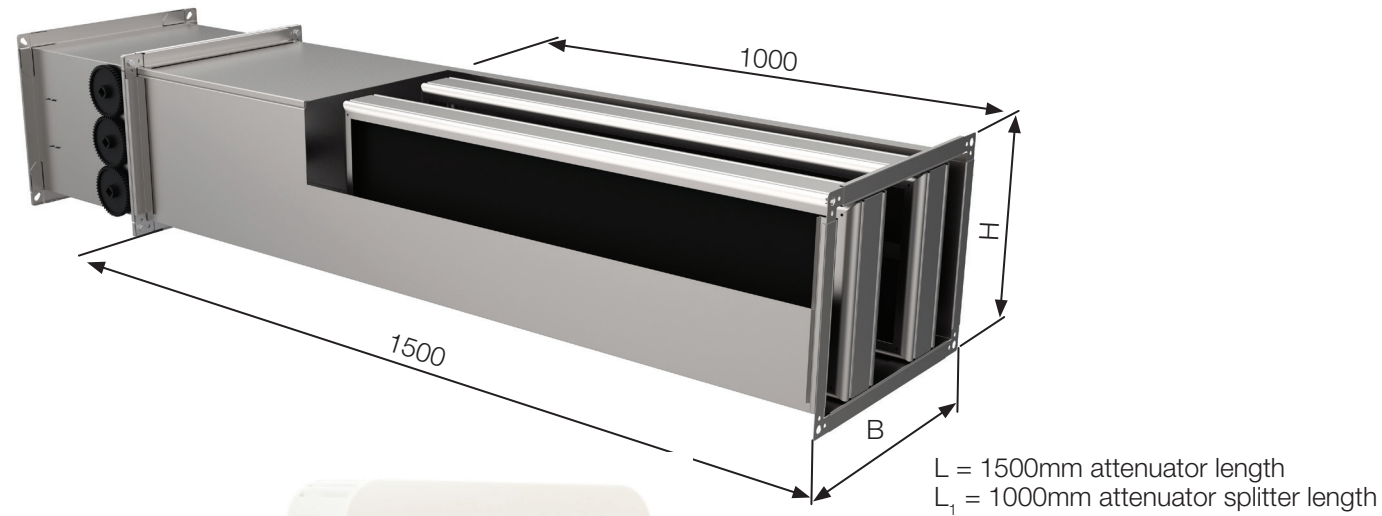
Signal/ Function	Min	Max	Btw	Open	Close
Open line	X				
GND (2.10 V)					X
Full wave		X		X	
Pos. Hal-wave				X	
Neg. Hal-wave					X



## Accessories

### PZX

PZX unit is an additional silencer for reduction of the air regenerated sound power levels. It is specifically designed for use with RVP-P variable air volume dampers, with 500mm of free space for unaffected operation of RVP-P. Absorption material is non combustable mineral wool. Mineral wool is covered with glass fibre voal to prevent erosion of the particles inside the duct.



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### CODIS E35-VAV

Codis 35 helps control ventilation more efficiently by demanding just the right amount of fresh air needed for optimal indoor conditions. Device can be used for temperature, air quality and humidity control.



### BELIMO Parametrization

Adjustment device ZTH-EU and NFC for VAV terminal units with Belimo volume flow controllers, used to facilitate service and commissioning.  
**ORDERING KEY: RVPA-ZTH-EU**



### Gruner GUIV3-M

Adjustment device GUIV3-M for VAV terminal units with Gruner volume flow controllers, used to facilitate service and commissioning.  
**ORDERING KEY: RVPA-GUIV3-M**



### Siemens AST20

Adjustment device Type AST20 for VAV terminal units with Siemens volume flow controllers, used to facilitate service and commissioning.  
**ORDERING KEY: RVPA-AST20**



## ACCESSORIES

### ORDERING KEY ACCESSORIES CODIS E35

(1) Type                      (2) Built in sensor                      (3) Protocol

**E35 - VAV - H - B**

- (1) **E35 - VAV**
- (2) **C** - CO2 sensor  
**H** - Humidity sensor  
**CH** - CO2 and humidity sensor
- (3) **B/RS** - BACNet

### ORDERING KEY PZX

(1) Damper attenuator                      (2) Dimensions

**PZX - BxH**

- (1) **PZX**
- (2) **BxH**



# CODIS E35

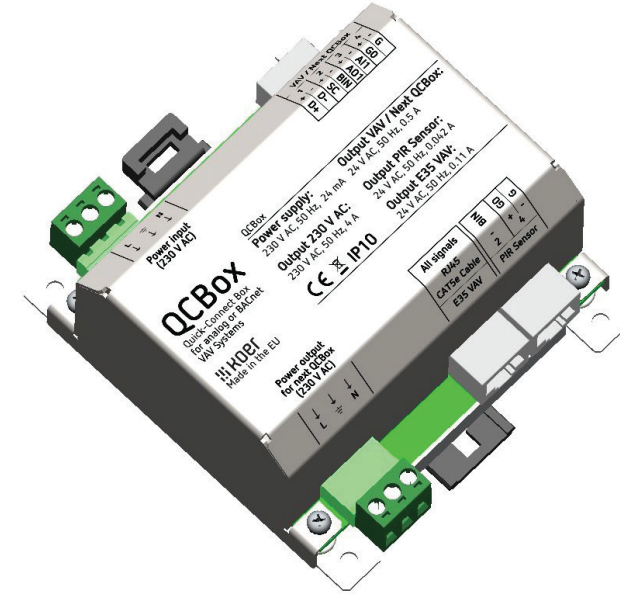
Device can be used for temperature, air quality and humidity control of individual zones as part of a Demand Controlled Ventilation system, HVAC system or as a standalone controller.

E35-VAV... can be used in HVAC systems for:

- Heating
- Cooling
- Ventilation
- Dehumidification



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MODEL	E35-VAV	E35-VAV-B/RS	E35-VAV-C	E35-VAV-C-B/RS	E35-VAV-H	E35-VAV-H-B/RS	E35-VAV-H-C	E35-VAV-H-C/RS	QCB	QCAdapter
Description	Temperature	Temperature BACNet / RS485	Temperature CO2	Temperature CO2 BACNet / RS485	Temperature Humidity	Temperature Humidity BACNet / RS485	Temperature Humidity CO2	Temperature Humidity CO2 BACNet / RS485	Quick connect box with power supply	Quick-Connect Adapter

E35-VAV... can control of the following operational elements:

- Damper actuators
- Heat exchange actuators
- Radiator/Floor heating actuator
- Modulating electric heaters
- EC motor fanT

E35-VAV hardware features:

- Resistive Color TFT touchscreen display
- Built-in sensors:
  - Temperature
  - CO2 (optional)
  - Relative Humidity (optional)
- Three analog 0...10 V DC outputs
- One analog 0...10 V DC input
- One analog resistive input
- One binary input
- RS-485 transceiver (optional)
- Galvanic isolated RS-485 transceiver (optional)
- Real Time Clock
- Easy wall mounting
- Power supply 24 V AC/DC

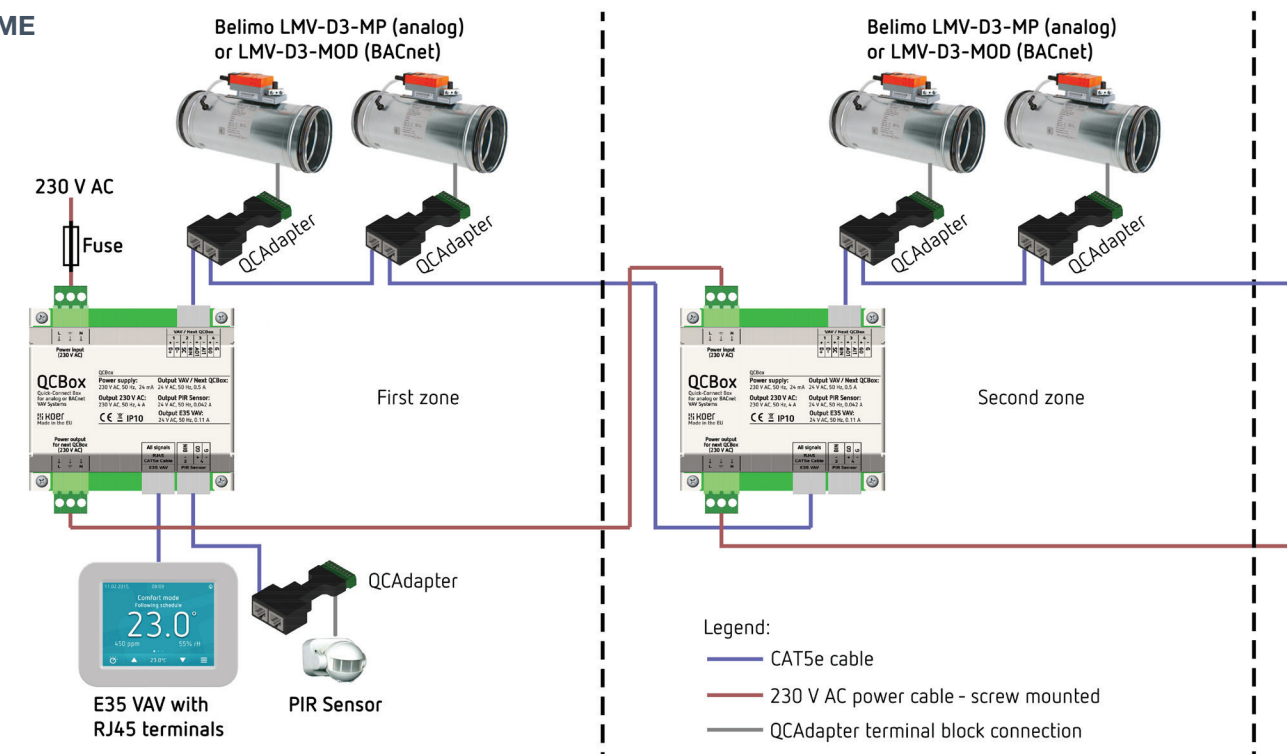
E35-VAV software features:

- PID control based on temperature, air quality and \* humidity parameters
- Weekly scheduler, four preset modes, up to eight scheduler timers per day
- Occupied mode function
- Three operating modes: Comfort, Economy, Standby
- Protection functionality in Standby mode
- Password protected menu and advanced menu
- Window contact or presence sensor input
- Automatic or manual changeover
- Standby, Dim and Night Mode display brightness
- Easily configurable commissioning and working parameters
- Setpoint limitations for users
- BACnet MS/TP communication protocol (optional)
- Internal Temperature Compensation Algorithm

For more details:

- (1) [CODIS E35 VAV](#)
- (2) [QCB Quick-Connect Box](#)

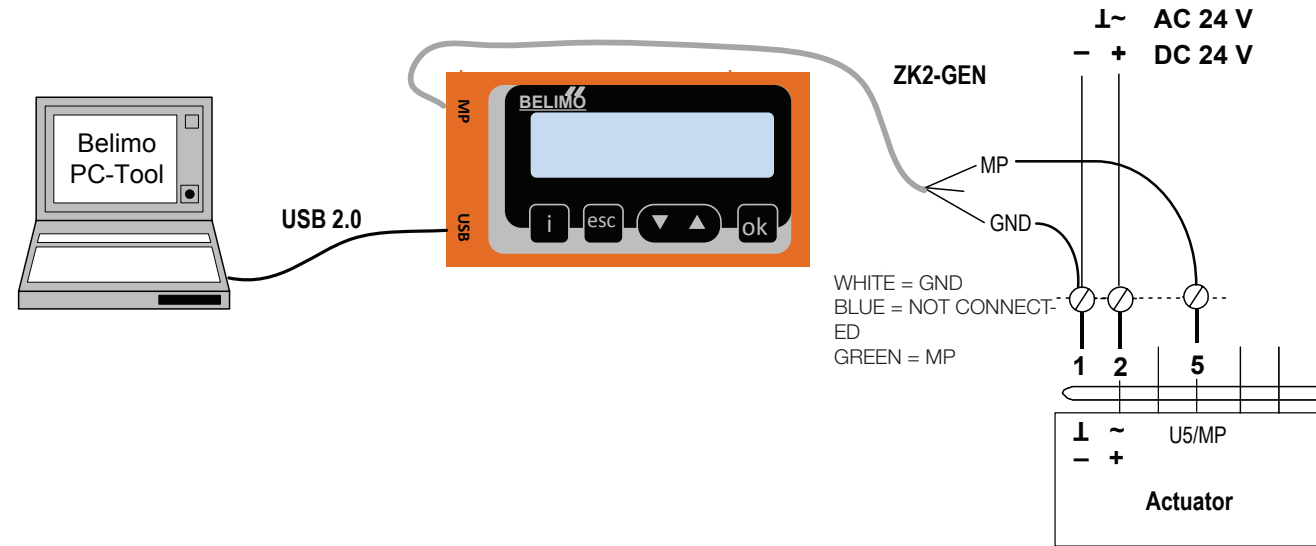
## WIRING SCHEME



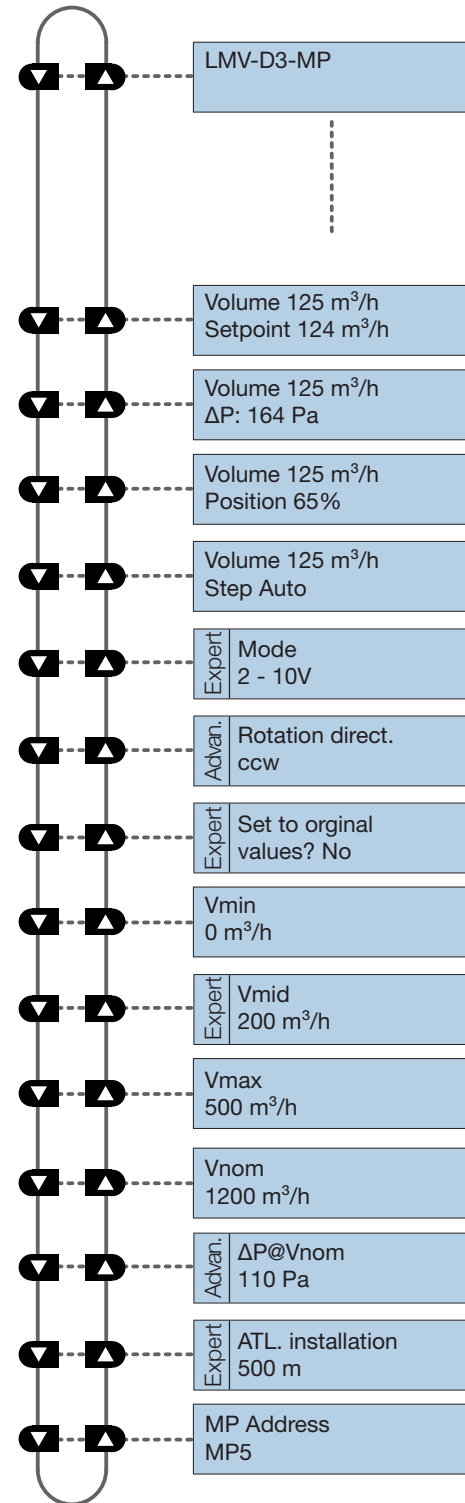
## PARAMETRIZATION

### ZTH


Adjustment device ZTH-EU for VAV terminal units with Belimo volume flow controllers, used to facilitate service and commissioning. Service tool for parameterisable and communicative actuators / VAV controllers and HVAC performance devices from Belimo. Connection via service socket on the device or MP/PP connection ZIP USB function.



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### Instructions

Pressing the buttons , you scroll through the main menu. In order to prepare the selected values (parameters), it is necessary to follow the steps in the picture.

AUTO / OPEN / CLOSE / Min / Mid / Max / Stop

2 - 10V / 0 - 10V (only with MF/MP types)

ccw / cw

No / Yes

0...Vmax

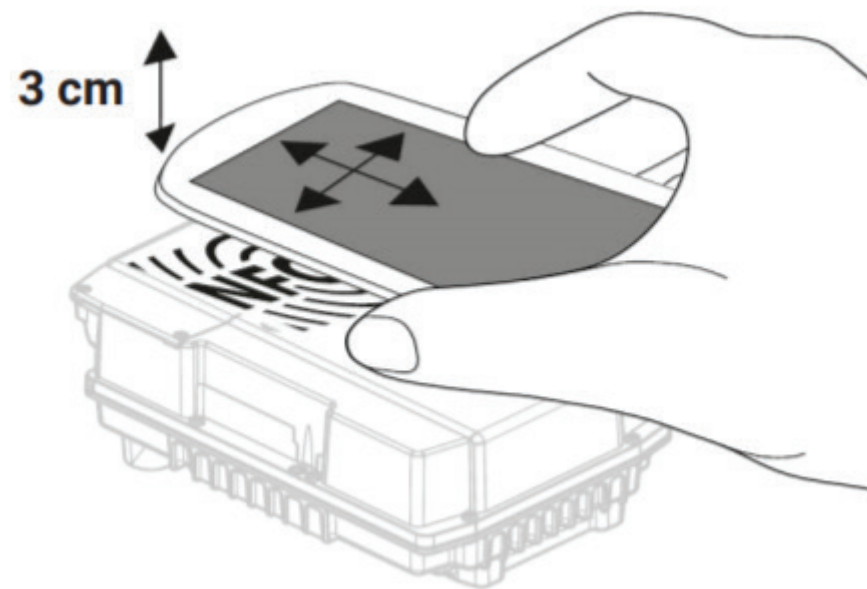
Vmin...Vmax

Vmin...Vnom, minimum 20% of Vnom

0...3000 m

PP, MP1...MP8  
(on MF types only PP)

## PARAMETRIZATION



### BELIMO NFC

The integrated NFC interface (Near Field Communication) of the VAV-Compact and VAV-Universal controllers allows you to use the system with your own smartphone – for simple and efficient commissioning and configuration – wirelessly with the Belimo Assistant App.

The ZIP-BT-NFC is available for connection via Bluetooth. For configuration at the VAV unit manufacturer (OEM) or during commissioning for bus addressing, both also in a de-energised state. Simple operational check thanks to the graphical trend analysis.



### GUIV3-M

GUIV will start via on/off switch. If GUIV is connected to an actuator, the data will be read out and shown in the display. The control panel is used to set various operating modes, override controls and parameter settings. The GUIV features a micro USB. This allows to use the GUIV as an interface converter between WINVAV2 software and actuator or for loading a battery pack.

#### Instructions

To perform parameterization, it is necessary to connect the drive with the adjustment device GUIV3-M.

The adjustment device contains a circular button and a confirmation button. With circular button you scroll through the main menu and you can change the values (parameters).

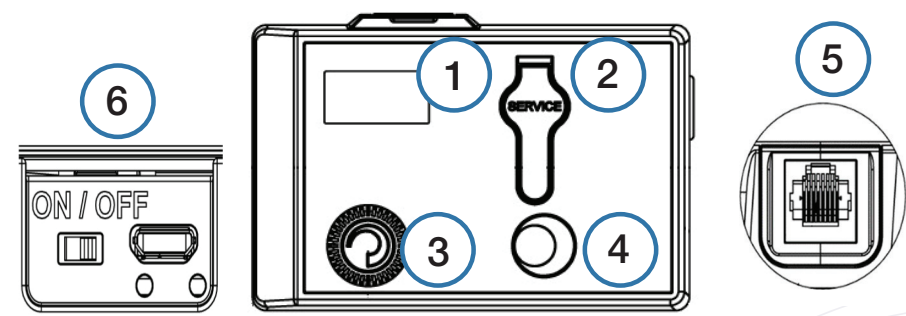
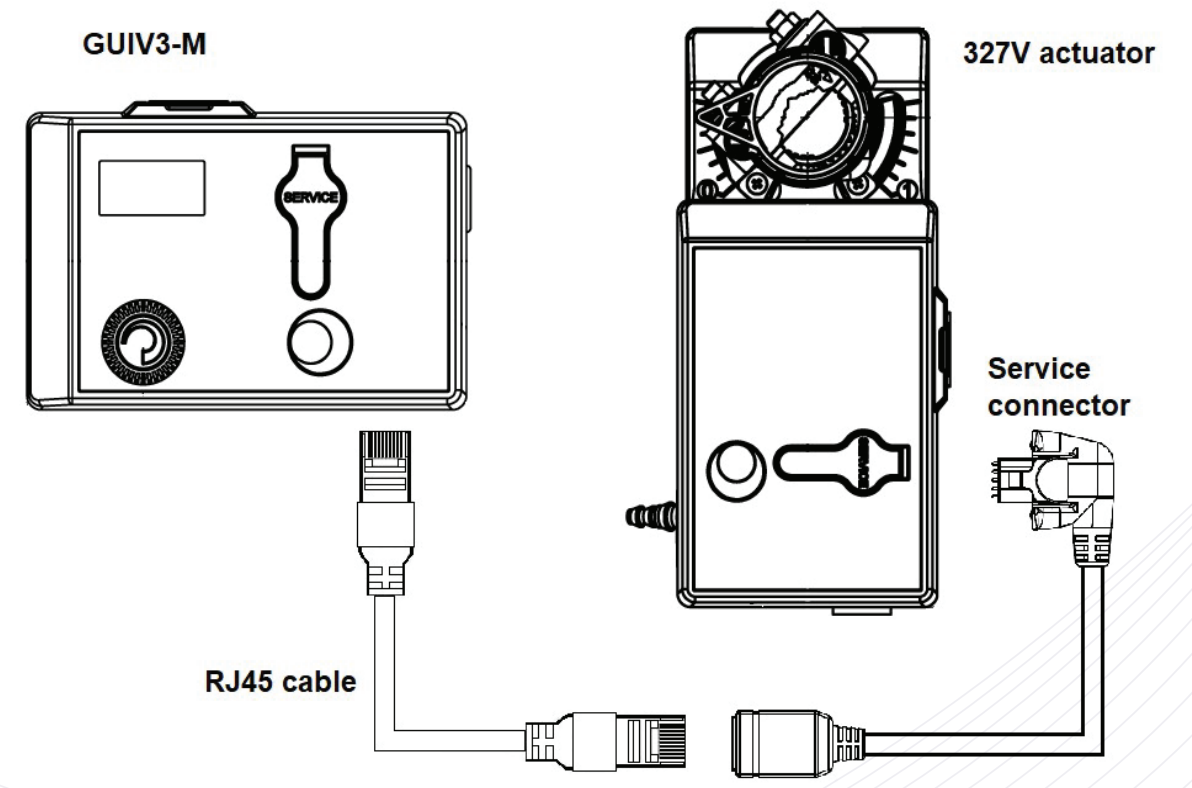
#### Menu points GUIV3-M

- 1.Act / Set  
Shows actual value / setpoint (override function).
- 2.Min  
Adjust the desired min value (setpoint Y = 0 / 2 V DC).
- 3.Max  
Adjust the desired max value (setpoint Y = 10 V DC).
- 4.Diag  
Diagnostic menu:  
y/u – shows setpoint / feedback signal  
off – return to first level  
oP – opens the damper  
cL – closes the damper  
Hi – activates max. value  
Lo – activates min. value  
bE – activates between value  
St – diagnostic mode on, motor off  
Adp – adaption drive (only 15 Nm or Modbus version)
- 123 – software version
- 5.Mode  
0An (0-10 VDC | normal direction of rotation) 2An (2-10 VDC |normal direction of rotation)

- 2Ai (0-10 VDC | inverse direction of rotation) 2Ai (2-10 VDC | inverse direction of rotation)
- 6.Com  
Setting the Modbus address (1...247) and communication parameters (if Modbus version).
- 7.Nom  
Volumetric air flow: Shows & setting the nominal value depending on the VAV-Box  
Pressure: Setting the correction factor
- Settings  
327 VAV actuators can be set directly on the display. All 327 VAV actuators can communicate via service connector with setting tool GUIV3-M or with setting software WIN-VAV2. GUIV3-S is used as an interface for setting software WIN-VAV2.
- Accessories  
GUIV3-M – service connector + handheld tool GUIV3-M  
WINVAV2-Bundle – service connector + PC interface GUIV3-S + setting software WIN-VAV2.

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## ↻ PARAMETRIZATION



- 1. Display
- 2. Port for service-plug
- 3. Rotary selector switch
- 4. LED push button
- 5. RJ45 socket
- 6. On/off Switch and Micro-USB Interface

### AST20

#### Instructions

Pressing the UP/DOWN buttons, you scroll through the main menu. Button ENTER opens submenu or allows changing the selected value using UP/DOWN button. The pictures show the way of changing the values (parameters).

AST20 <> VAV Modbus	1/1 SVC
Online view	▶
Field device configuration	▶
Bus configuration	▶
Diagnostics and maintenance	▶
AST20 settings	▶
Mass configuration	▶

Field device configuration	1/2 SVC
Operating mode	VAV mode
Opening dir	CW
Adaptive pos	On
Vn value	2.04
Vmin	10%
Vmax	90%
Vnom	450 m3/h

Field device configuration	1/2 SVC
Operating mode	VAV mode
Opening dir	CW
Adaptive pos	On
Vn value	2.04
Vmin	10%
Vmax	90%
Vnom	450 m3/h

Field device configuration	1/2 SVC
Operating mode	VAV mode
Opening dir	CW
Adaptive pos	On
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Vmin	10%
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Vnom	450 m3/h

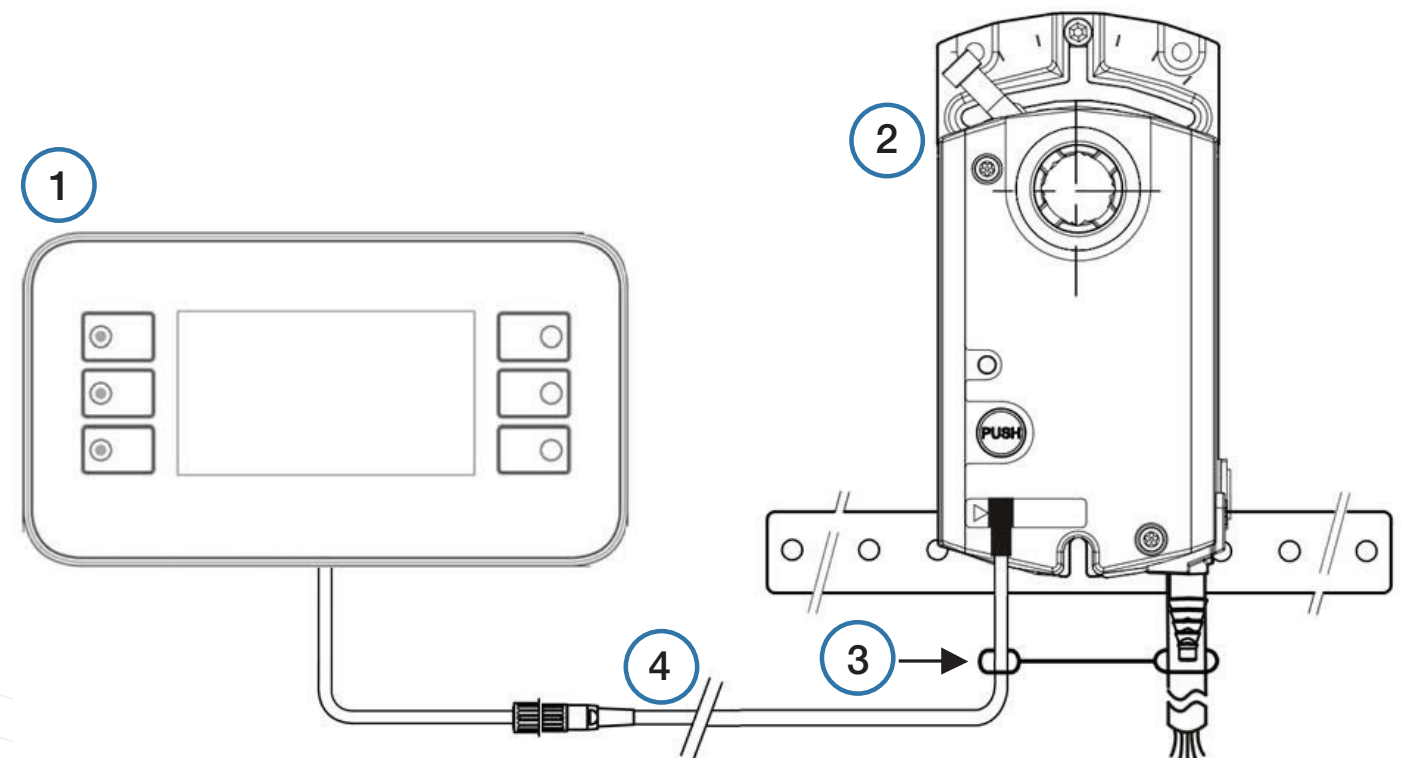
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## ↻ PARAMETRIZATION

### AST20

1. AST20
2. G..B181.1E/.. , ASV181.1E/3, or G..B111../MO
3. Strain release strip
4. Connection cable (7-pin or 6-pin)

Handheld Tool for VAV Compact Controllers and Communicative Actuators. For configuration and maintenance of OpenAir VAV compact and modular controllers and actuators with Modbus RTU communication





### Sound and pressure drop

		Correction values for other case widths																							
in relation to	B [mm]	$\Delta p_s = 125Pa$								$\Delta p_s = 250Pa$								$\Delta p_s = 500Pa$							
		63	125	250	500	1000	2000	4000	8000	63	125	250	500	1000	2000	4000	8000	63	125	250	500	1000	2000	4000	8000
B=600 [mm]	200	-8	-4	-6	-2	-2	-5	-4	-6	-5	-6	-3	-3	-4	-3	-4	-6	-5	-10	-5	-3	-4	-3	-3	
	300	-5	-3	-4	-1	-1	-3	-3	-4	-3	-4	-2	-2	-3	-2	-3	-4	-3	-6	-3	-2	-3	-2	-2	
	400	-3	-2	-2	-1	-1	-2	-2	-2	-2	-2	-1	-1	-2	-1	-1	-2	-2	-4	-2	-1	-2	-1	-1	
	500	-1	-1	-1	0	0	-1	-1	-1	-1	-1	0	0	-1	-1	-1	-1	-1	-2	-1	0	-1	0	-1	
	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	700	1	1	1	0	0	1	1	1	1	1	1	0	0	1	0	1	1	1	1	1	1	1	0	0
	800	2	1	2	0	1	1	1	2	1	1	2	1	1	1	1	2	1	3	1	1	1	1	1	
	900	3	2	2	1	1	2	2	2	2	2	1	1	2	1	1	2	2	4	2	1	2	1	1	
	1000	4	2	3	1	1	2	2	3	3	3	1	1	2	2	2	3	2	4	2	1	2	1	2	
	B=1000 [mm]	800	-2	-1	0	-1	-1	-1	-0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-1	-1	-1	
900		-1	-1	0	-1	0	0	-1	-1	-1	-1	0	0	0	0	0	-1	-1	0	-1	0	0	0		
1000		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

Size B x H [mm]	v [m/s]	600																			
		100				200				300				400				500			
		3	6	9	12	3	6	9	12	3	6	9	12	3	6	9	12	3	6	9	12
ps=125 Pa LW [dB/Okt]	63	45	55	63	68	51	60	68	73	53	63	71	76	56	65	73	78	59	68	76	81
	125	46	56	63	68	49	58	66	71	51	60	68	73	52	61	69	74	53	63	71	75
	250	42	49	54	57	46	53	58	61	48	55	60	63	50	56	62	64	52	59	64	67
	500	44	47	50	52	45	48	51	53	45	49	51	53	46	49	52	53	46	50	52	54
	1000	46	49	51	53	48	50	53	54	48	51	53	55	49	52	54	55	50	52	55	56
	2000	46	49	51	53	49	52	54	56	51	54	56	58	52	55	57	59	54	57	59	60
	4000	39	43	47	49	41	46	50	52	43	47	51	53	44	49	52	55	45	50	54	56
	8000	32	37	41	43	36	41	45	47	38	43	47	50	40	45	49	51	42	47	51	54
ps=250 Pa LW [dB/Okt]	63	52	61	68	72	56	64	71	75	58	66	73	77	59	68	75	79	61	70	77	81
	125	49	58	65	70	53	61	69	73	55	64	71	75	56	65	72	77	58	67	74	79
	250	46	53	58	62	49	56	62	66	51	58	64	68	53	60	66	69	55	62	68	72
	500	48	52	56	58	50	54	58	60	51	55	59	61	51	56	59	62	52	57	61	63
	1000	51	54	57	59	52	56	59	61	53	57	60	61	54	57	60	62	55	58	61	63
	2000	53	56	58	59	56	58	61	62	57	60	62	64	58	61	63	65	60	63	65	66
	4000	49	52	55	57	51	54	57	59	52	56	59	60	53	56	59	61	54	58	61	63
	8000	45	49	52	54	47	51	54	56	49	53	56	58	50	54	57	59	51	55	58	60
ps=500 Pa LW [dB/Okt]	63	57	65	72	76	60	69	76	80	63	71	78	82	64	73	80	84	67	75	82	86
	125	53	63	71	77	56	66	74	80	58	68	76	81	59	69	77	83	61	71	79	84
	250	49	58	66	70	55	64	72	76	59	68	75	80	61	70	78	82	54	64	71	76
	500	53	59	63	66	56	62	66	69	58	63	68	71	59	65	69	72	61	66	71	73
	1000	59	62	64	66	61	64	66	67	62	64	67	68	62	65	68	69	63	66	69	70
	2000	64	65	66	66	66	67	68	69	68	69	70	70	69	70	71	71	70	71	72	73
	4000	63	64	65	66	65	66	67	68	66	67	68	69	67	68	69	69	68	69	70	70
	8000	59	61	63	64	61	63	65	66	62	65	66	68	63	65	67	69	64	67	69	70



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### DIAGRAMS

#### Sound pressure level calculation

Given:  
 RVP-P-Z 500x300  
 $v = 6 \text{ m/s}$   
 $\Delta p_s = 500 \text{ Pa}$   
 Required sound pressure level in room is 42 dB(A)

fm [Hz]	63	125	250	500	1000	2000	4000	8000
Lw	71	68	68	63	64	69	67	65
Correction B=500	-1	-1	-2	-1	0	-1	0	-1
$\Delta Lw/\Delta Lw1$	7	7	14	21	25	28	28	25
Lw3	63	60	52	41	39	40	39	39
Ceiling reduction	4	4	4	4	4	4	4	4
Room attenuation	6	6	5	5	4	4	4	4
A-weighting	-26	-16	-9	-3	0	1	1	-1
Correction value	27	34	34	29	31	33	32	30

- $Lp_{A3} \approx 40 \text{ dB(A)}$ , requirement is met

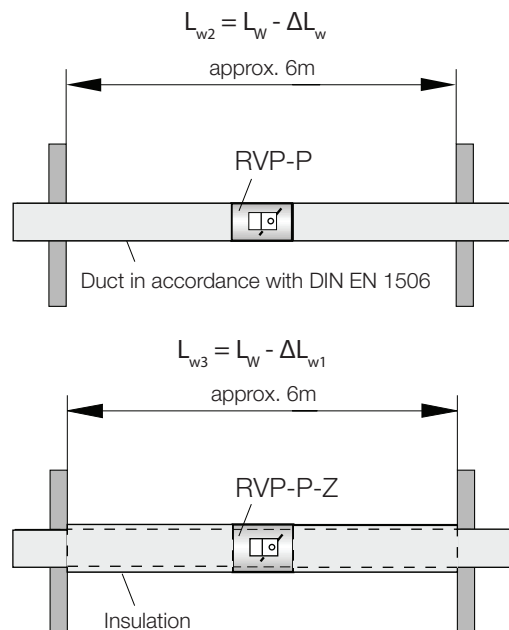
### Sound and pressure drop

Size B x H [mm]	600				700				800				1000								
	600	700	800	1000	600	700	800	1000	600	700	800	1000	600	700	800	1000					
v [m/s]	3	6	9	12	3	6	9	12	3	6	9	12	3	6	9	12					
ps=125 Pa LW [dB/Okt] fsr [Hz]	63	59	68	76	81	62	71	79	84	64	74	82	87	65	75	83	88	66	76	83	88
	125	53	63	71	75	55	65	73	77	57	66	74	79	57	67	75	80	57	67	75	80
	250	52	59	64	67	54	61	66	69	56	63	68	71	57	64	69	72	58	64	69	73
	500	46	50	52	54	47	51	53	55	47	51	53	55	48	51	54	55	48	51	54	55
	1000	50	52	55	56	51	53	56	57	51	54	56	57	51	54	56	58	51	54	56	58
	2000	54	57	59	60	56	59	61	62	57	60	62	64	58	61	63	65	58	61	63	65
	4000	45	50	54	56	47	52	56	58	49	53	57	59	49	54	58	60	49	54	58	60
	8000	42	47	51	54	45	50	54	56	47	52	56	58	48	53	57	59	48	53	57	59
ps=250 Pa LW [dB/Okt] fsr [Hz]	63	61	70	77	81	63	72	79	83	65	74	80	85	66	75	81	86	66	75	82	86
	125	58	67	74	79	60	69	77	81	62	71	79	83	63	72	80	84	64	72	80	84
	250	55	62	68	72	57	65	70	74	59	67	72	76	60	68	73	77	61	68	73	77
	500	52	57	61	63	54	58	62	64	55	59	63	65	55	60	63	66	55	60	63	66
	1000	55	58	61	63	56	59	62	64	57	60	63	65	57	61	64	65	57	61	64	65
	2000	60	63	65	66	62	65	67	68	63	66	68	69	64	67	69	70	64	67	69	70
	4000	54	58	61	63	56	59	62	64	57	60	63	65	57	61	64	66	57	61	64	66
	8000	51	55	58	60	53	57	60	62	54	58	61	63	55	59	62	64	55	59	62	64
ps=500 Pa LW [dB/Okt] fsr [Hz]	63	67	75	82	86	69	78	85	89	71	80	87	91	72	81	88	92	72	81	88	92
	125	61	71	79	84	63	73	81	86	64	74	83	88	65	75	84	89	65	75	84	89
	250	65	74	81	86	69	78	85	90	72	81	88	93	73	82	89	94	74	83	90	95
	500	61	66	71	73	63	68	73	75	64	70	74	77	65	71	75	78	65	71	75	78
	1000	63	66	69	70	64	67	70	71	65	68	70	72	66	69	71	72	66	69	71	72
	2000	70	71	72	73	72	73	74	75	73	75	75	76	74	75	76	77	74	75	76	77
	4000	68	69	70	70	69	70	71	72	70	71	72	73	70	72	73	73	70	72	73	73
	8000	64	67	69	70	66	68	70	71	67	69	71	72	68	70	72	73	68	70	72	73

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## DIAGRAMS



**ΔLw/ΔLw1 u dB, in relation to fm u Hz**

ΔLw/ΔLw1	63	125	250	500	1000	2000	4000	8000
ΔLw [dB(A)]	3	3	6	9	12	14	15	14

**ΔLw/ΔLw1 u dB, in relation to fm u Hz**

ΔLw/ΔLw1	63	125	250	500	1000	2000	4000	8000
ΔLw1 [dB(A)]	7	7	14	21	25	28	28	25

### Sound pressure level calculation

Given:  
 RVP-P-Z 500x300  
 v = 6 m/s  
 Δps = 500 Pa  
 Required sound pressure level in room is 42 dB(A)

fm [Hz]	63	125	250	500	1000	2000	4000	8000
Lw (pg. 25)	71	68	68	63	64	69	67	65
Correction B=500	-1	-1	-2	-1	0	-1	0	-1
ΔLw/ΔLw1	7	7	14	21	25	28	28	25
Lw3	63	60	52	41	39	40	39	39
Ceiling reduction	4	4	4	4	4	4	4	4
Room attenuation	6	6	5	5	4	4	4	4
A-weighting	-26	-16	-9	-3	0	1	1	-1
Correction value	27	34	34	29	31	33	32	30

• LpA3 ≈ 40 dB(A), requirement is met





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 **MAINTENANCE**

## TRANSPORT

After arrival, check the product for transport damage and shortcomings. In case of any damage or shortcomings, immediately contact your supplier.

## STORAGE

**If the damper is not installed immediately:**

- Remove any wrapping.
- Protect product from dust and contamination.
- Do not expose the product to the effects of weather - store fire damper in a dry place.
- Do not store the unit below -20 °C or above 50 °C.

**Please properly dispose of packaging material!**

## MAINTENANCE AND OPERATION

Activation mechanism should be inspected for proper operation on regular basis.

- Provide at least one annual check of the damper
- After each intervention, provide a systematic cleaning of dust
- Cleaning instruction: clean with a sponge, with water or a mild detergent
- Disinfection instruction: spray disinfectant (disinfectant may contain alcohol which is flammable, take precaution to avoid ignition)

It is not permitted to alter the dampers in any way nor perform any changes to their structure (except for the service procedures described in this manual) without the manufacturer's consent.

Provide at least one annual check of the damper.

The functional test must be carried out in compliance with the basic maintenance principles of the European norms EN 13306, EN 15423 and EN15650.

## COMMISSIONING

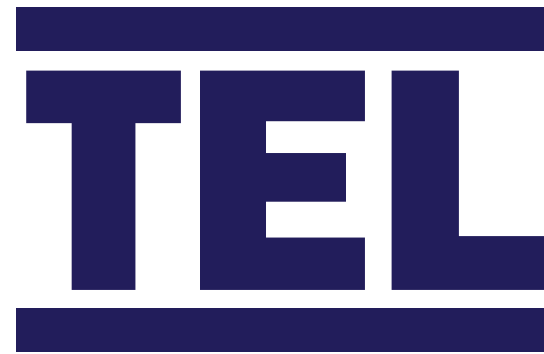
- Carefully unpack KVR - be careful of sharp edges and do not use excessive force for unpacking
- Inspect the product - check the volume flow damper for damage
- Before commissioning: check the product functions

## FUNCTIONS

**Release mechanism:**

- damper blade can be closed and opened manually





**AIRFLOW REGULATION**