

A pressure sensor, digital VAV controller and damper actuator all in one, providing a VAV-Compact solution with a communications capability for pressure-independent VAV and CAV systems in the comfort zone

Control function: VAV-CAV / Open-Loop

Control:

DC 2...10 V / 0...10 V / MP-bus

Integration into

- DDC controller with MP interface
- LONWORKS® systems
- EIB-Konnex systems
- Fan optimiser systems

With additional connection facility for sensors or switches

Service button and LEDs for servicing and commissioning

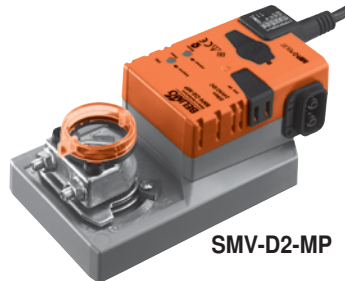
Diagnostic socket for operating devices



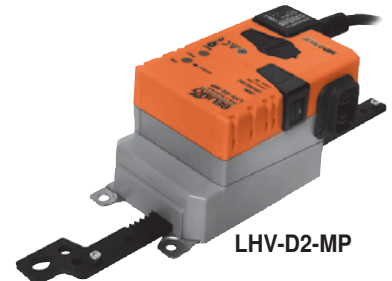
LMV-D2-MP



NMV-D2-MP



SMV-D2-MP



LHV-D2-MP

Brief description

Application	The digital VAV-Compact has PI control characteristics and is used for pressure-independent control of VAV units in the comfort zone.
Pressure measurement	Maintenance-free, dynamic, differential pressure sensor technology, proven in a wide range of applications, suitable for use in offices, hospital wards, alpine hotels or cruise liners.
Actuator	Three versions available, depending on the size of the VAV unit: 5 / 10 / 20 Nm. – Rotary actuator, depending on size – Linear actuator 150 N with 100, 200 or 300 mm linear motions
Control function	VAV-CAV or open-loop operation (actuator/ volumetric flow sensor) for integration in an external VAV control circuit. Feedback of damper position for fan optimisation
VAV – variable air volume	For variable air volume applications based on a modulating reference variable, e.g. supplied by a room temperature controller or a DDC or bus system. It facilitates demand-related, power-saving ventilation in individual rooms or in zones of air conditioning systems. The $\dot{V}_{min} \dots \dot{V}_{max}$ working range can be subdivided by selecting a mode. The following operating modes are available: DC 2...10 V / 0...10 V / adjustable / bus.
CAV – constant air volume	For constant air volume applications, e.g. in step mode, controlled by means of a switch. The following operating modes are available: CLOSE / \dot{V}_{min} / \dot{V}_{mid} / \dot{V}_{max} / OPEN
Bus function	Up to eight Belimo MP devices (VAV / damper actuator / valve) can be connected together over the MP-Bus and integrated into the following systems: – LONWORKS® applications with Belimo UK24LON interface – EIB Konnex applications with Belimo UK24EIB interface – DDC controller with integrated MP-Bus protocol – Fan optimiser applications with optimisation COU24-A-MP A sensor (0...10 V or passive, e.g. a temperature sensor) or a switch can optionally be integrated into the higher-level DDC or bus system via the MP-Bus.
Test function / test display	The VAV-Compact features an LED with a ready display for commissioning and functional checking as well as a service mode with air shortage, excess air and setpoint = actual value display with LEDs.
Operating and service devices	Belimo PC-Tool, remote control or ZEV, plugged into the VAV-Compact oder via MP-Bus
Assembly and connection	The VAV-Compact, which is assembled on the unit by the OEM, is connected using the prefabricated connecting cable.
OEM factory settings	The VAV-Compact is mounted on the VAV unit by the unit manufacturer, who adjusts and tests it according to the application. The VAV-Compact is sold exclusively via the OEM channel for this reason.

Overview of types

Type	Torque	Power consumption	For wire sizing	Weight
LMV-D2-MP	5 Nm	3 W	5 VA (max. 5 A @ 5 ms)	approx. 500 g
NMV-D2-MP	10 Nm	3.5 W	5.5 VA (max. 5 A @ 5 ms)	approx. 700 g
SMV-D2-MP	20 Nm	4 W	6 VA (max. 5 A @ 5 ms)	approx. 830 g
LHV-D2-MP	150 N	3.5 W	5.5 VA (max. 5 A @ 5 ms)	approx. 550 g

Technical data

Supply	
Nominal voltage	AC 24 V, 50/60 Hz DC 24 V
Power supply range	AC 19.2 ... 28.8 V DC 21.6 ... 28.8 V
Differential pressure sensor	
	2 ... ~300 Pa (OEM-specific)
Operating pressure	max. 1000 Pa
Characterising	OEM-specific differential pressure sensor, linearisation
Installation position	Any, no reset necessary
Operating medium (see «Materials»)	Supply and exhaust air in the comfort zone and in applications with sensor-compatible media
Materials	PC + ABS to UL94-V0; stainless steel, DIN 1.4301 X10CrNiS1810; PP Santoprene
Measuring air conditions	0 ... +50°C / 5 ... 95% r.h., non-condensing
Control function	
	– VAV-CAV – Open-loop operation
VAV and CAV applications	
	– Supply/exhaust air units in stand-alone operation / master-slave / parallel connection for rooms with positive/negative pressure or neutral air pressure – Mixing units
Operating volumetric flow	
\dot{V}_{nom}	OEM-specific nominal volumetric flow setting, matches VAV box
\dot{V}_{max}	30 ... 100% of \dot{V}_{nom}
\dot{V}_{min}	0 ... 100% of \dot{V}_{nom} (see VAV-Compact documentation, page 17 «Minimum setting limit»)
\dot{V}_{mid}	0 ... 100% of (\dot{V}_{min} ... \dot{V}_{max})
Classic control	
Mode for reference value input w (connection 3)	– DC 2 ... 10 V / (4 ... 20 mA with 500 resistance) – DC 0 ... 10 V / (0 ... 20 mA with 500 resistance) – Adjustable DC 0 ... 10
Mode for actual value signal U5 (connection 5).	– DC 2 ... 10 V – DC 0 ... 10 V – Adjustable: Air volume or damper position
Operating modes for constant air volume	CLOSE / \dot{V}_{min} / \dot{V}_{mid} * / \dot{V}_{max} / OPEN * (* only with AC 24 V supply)
MP-Bus function	
Address in bus operation	MP 1 ... 8 (classic control: PP)
LONWORKS® / EIB-Konnex	With BELIMO UK24LON / UK24EIB interface, 1 ... 8 BELIMO MP devices (VAV / damper actuator / valve)
DDC controller	DDC controller / PLC, from various manufacturers, with integrated MP interface
Fan optimiser	With BELIMO optimiser COU24-A-MP
Sensor integration	Passive (Pt1000, Ni1000 etc.) and active sensors (0...10 V) e.g. temperature, humidity 2-point signal (switching capacity 16 mA @ 24 V), e.g. switches, occupancy switches
Operation and servicing	
Communication	PP/MP-Bus, max. DC 15 V, 1200 baud
Button	Adaptation / addressing / service function
LED indicator	– 24 V feed – Status / service / bus function
Actuator	
	Brushless, non-blocking actuator with current reduction
Direction of rotation	ccw / cw or ↑ / ↓
Adaptation	Setting range recording and resolution to control range
Manual disengagement	Pushbutton, self-resetting without affecting functions
Sound power level	max. 35 dB (A), SMV-D2-MP max. 45 dB (A)
Actuator – full-rotation	
Angle of rotation	95° <math>\overleftarrow{\<math>
Position indication	Mechanical with pointer
Spindle driver	– Clamp, for round spindles 10 ... 20 mm / square spindles 8 ... 16 mm – Positive fit, wide range of versions, e.g. 8 x 8 mm
Actuator – linear	
Stroke	100, 200 or 300 mm, with adjustable mechanical or electronic limiting
Connection	
	Cable, 4 x 0.75 mm ² , terminals
Safety	
Protection class	III Safety extra-low voltage
Degree of protection	IP54
EMC	CE according to 89/336/EEC

Technical data

(continued)

Safety

Mode of operation	Type 1 (to EN 60730-1)
Rated impulse voltage	0.5 kV (to EN 60730-1)
Control pollution degree	2 (to EN 60730-1)
Ambient conditions	0 ... +50°C
Non-operating temperature	-20 ... +80°C
Ambient humidity range	5 ... 95% rH, non-condensating (to EN 60730-1)
Maintenance	Maintenance-free

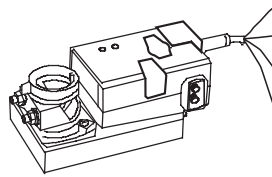
Connection

Connecting cable

The connection is established via the connection cable installed on the VAV-Compact device.

Note

- Supply via safety isolation transformer!
- Connections 1, 2 (AC/DC 24 V) and 5 (MP signal) must be routed to accessible terminals (room temperature controller, floor distributor, control cabinet, etc.), in order to simplify access with the PC-Tool for diagnostic and service work.



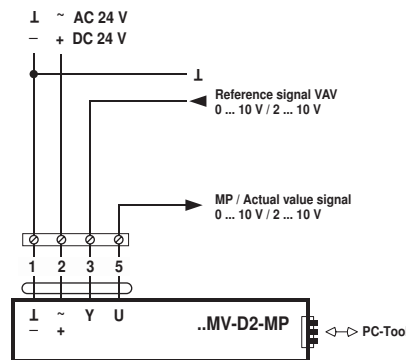
No	Designation	Wire colour	Function
1	BK COM	black	Supply AC/DC 24 V
2	RD + ~	red	
3	WH Y	white	Reference signal VAV / CAV
5	OG U	orange	– Actual value signal – MP-Bus connection

VAV – Variable operation $\dot{V}_{min} \dots \dot{V}_{max}$

Wiring diagrams

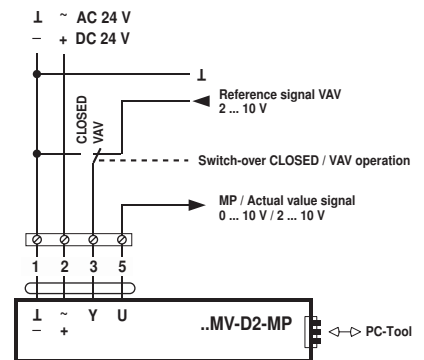
Example 1:

VAV with analogue reference signal



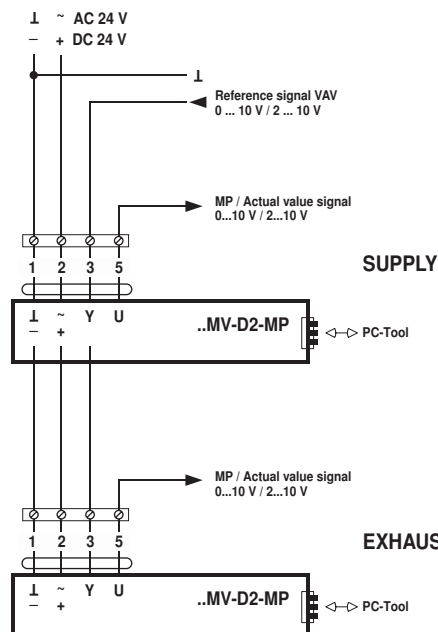
Example 2:

VAV with shut-off (CLOSE), 2...10 V mode



Example 3:

VAV parallel operation with analogue reference signal Supply/exhaust air



Example 4:

VAV master-slave operation with analogue reference signal

