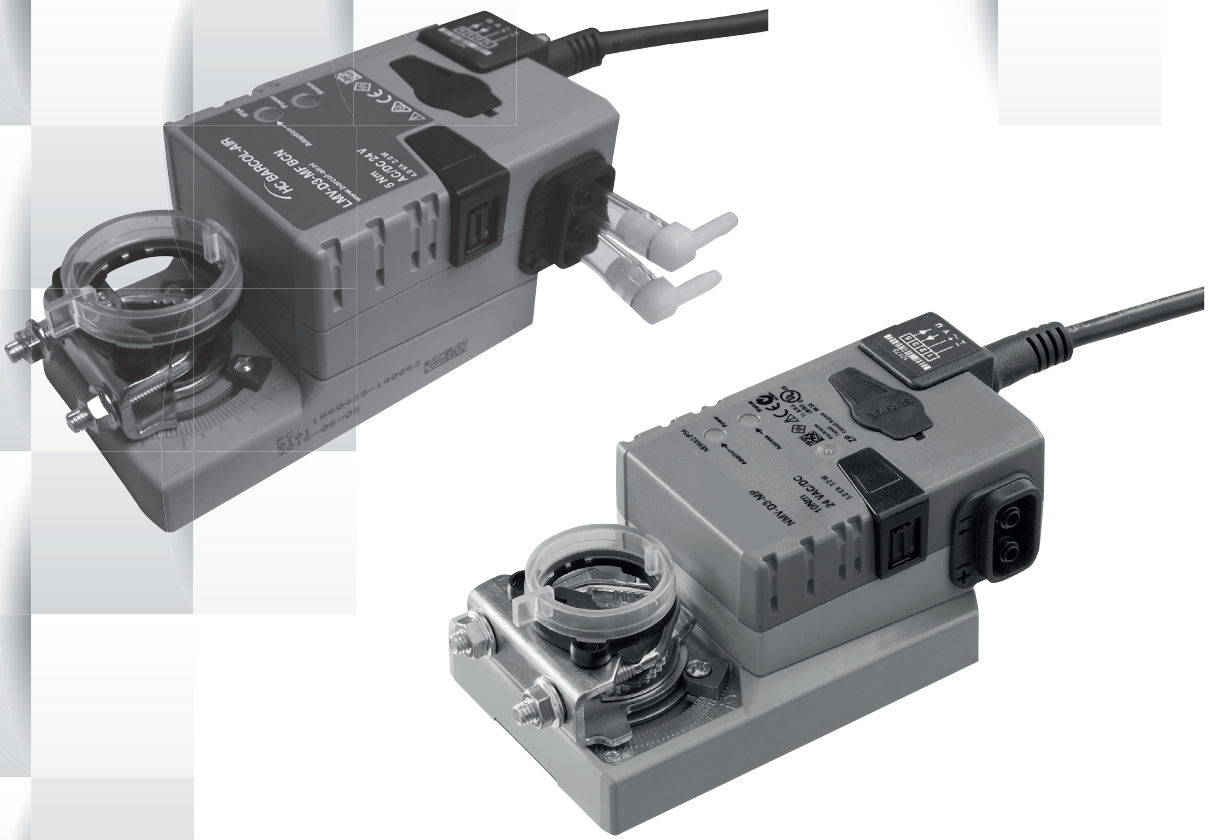
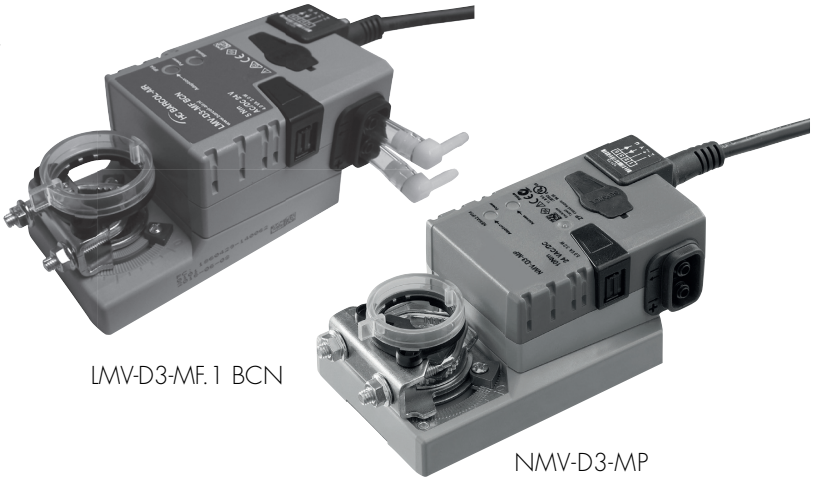


VAV CONTROLLERS LMV-D3-MF.1 BCN / NMV-D3-MP

BARCOL-AIR
AIR DISTRIBUTION

VAV controllers LMV-D3-MF.1 BCN / NMV-D3-MP

VAV-Compact controller with integrated pressure sensor, VAV controller and damper actuator for pressure-independent VAV and CAV applications in the comfort zone
- Control: DC 0/2 … 10 V
- Diagnostic socket for Service and PC-Tool



LMV-D3-MF.1 BCN

NMV-D3-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	The integrated maintenance-free D3 differential pressure sensor is also suitable for very small volumetric flows. It is for this reason that it covers versatile applications in the comfort zone, e.g. in residential construction, offices, hospitals, hotels, cruise ships, etc.
Actuator	Two versions available, depending on the size of the VAV unit: 5 / 10 Nm. – Rotary actuator, depending on the size
Control function	VAV-CAV or Open-Loop operation for integration in an external VAV control loop.
Feedback	Current volumetric flow, damper position or differential pressure value.
VAV – variable volumetric flow	For variable volumetric flow applications with a modulating reference variable, e.g. room temperature controller or direct digital control, it enables demand-related, energy-saving ventilation of individual rooms or zones. The operating range $\dot{V}_{min}$ … $\dot{V}_{max}$ can be connected via selectable mode. The following are available: DC 2 … 10 V / 0 … 10 V / adjustable range.
CAV – constant volumetric flow	For constant volumetric flow applications, e.g. in step mode, controlled by means of a switch. The following operating modes can be selected from: CLOSED / $\dot{V}_{min}$ / ($\dot{V}_{mid}$) / $\dot{V}_{max}$ / OPEN
Operating and service devices	PC-Tool or service tool ZTH-EU, can be plugged into the VAV-Compact (PP connection) or connection U5.
Assembly and connection	The VAV-Compact, which is assembled on the unit by the Barcol-Air, is connected using the prefabricated connecting cable.
Test function / test display	The VAV-Compact features two LEDs with a functional readiness display for commissioning and functional checking. Extended information with ZTH-EU.
Factory settings	The VAV-Compact is mounted on the VAV unit by Barcol-Air, who will adjust and test it according to the application.

Type overview:

Type	Torque	Power consumption	Dimensioning	Weight
LMV-D3-MF.1 BCN	5 Nm	2 W	4 VA (max. 8 A @ 5 ms)	Approx. 500 g
NMV-D3-MP	10 Nm	3 W	5 VA (max. 8 A @ 5 ms)	Approx. 700 g

VAV controllers LMV-D3-MF.1 BCN / NMV-D3-MP

Technical data:

Supply	
Nominal voltage	AC 24 V, 50/60 Hz DC 24 V
Operating range	AC 19.2 … 28.8 V DC 21.6 … 28.8 V
Differential pressure sensor	
Type, principle of operation	D3 sensor, dynamic response
Operating range	0 … 600 Pa
Overload capability	±3000 Pa
Installation position	Any, no reset necessary
Materials in contact with medium	Glass, epoxy resin, PA, TPE
Control function	– VAV-CAV – Open-loop operation
Adjustment values	
$\dot{V}_{nom}$	Nominal volumetric flow setting, suitable for the Barcol-Air VAV unit
$\triangle p$ @ $\dot{V}_{nom}$	38 ... 450 Pa
$\dot{V}_{max}$	20 … 100% of $\dot{V}_{nom}$
$\dot{V}_{min}$	0 … 100% of $\dot{V}_{nom}$
$\dot{V}_{mid}$	50% of $\dot{V}_{min}$ to $\dot{V}_{max}$
Classic Control	
VAV mode for reference value input Y (Connection 3)	– DC 2 … 10 V / (4 … 20 mA with 500 Ω resistance) – DC 0 … 10 V / (0 … 20 mA with 500 Ω resistance) – Adjustable DC 0 … 10 V } Input impedance min. 100 kOhm
Mode for actual value signal U5 (Connection 5)	– DC 2 … 10 V – DC 0 … 10 V – Adjustable: volumetric flow, damper position or differential pressure } max. 0.5 mA
CAV operating modes (constant volumetric flow)	CLOSED / $\dot{V}_{min}$ / ($\dot{V}_{mid}$ *) / $\dot{V}_{MAX}$ / OPEN * (* only with AC 24 V supply)
Operating and service	Pluggable / PC-Tool (V3.6 or higher) / service tool ZTH-EU
Push-button	Adaption
LED display	– 24 V supply – Status
Actuator	Brushless, non-blocking actuator with power-save mode
Direction of rotation	ccw / cw
Adaption	Capture of setting range and resolution to control range
Gear disengagement	Push-button self-resetting without functional impairment
Sound power level	Max. 35 dB (A)
Angle of rotation	95° ⊲, adjustable mechanical or electronic limiting
Spindle driver	– Clamp, spindle round 10 ... 20 mm / spindle square 8 ... 16 mm – Form fit in various versions, e.g. 8 x 8 mm
Connection	Cable, 4 x 0.75 mm²

VAV controllers LMV-D3-MF.1 BCN / NMV-D3-MP

Safety	
Protection class	III Safety extra-low voltage
Degree of protection	IP54
Electromagnetic compatibility	CE according to 89/336/EEC
Mode of operation	Type 1 (in accordance with EN 60730-1)
Rated impulse voltage	0.5 kV (in accordance with EN 60730-1)
Control pollution degree	2 (in accordance with EN 60730-1)
Ambient temperature	0 … +50°C
Non-operating temperature	–20 … +80°C
Ambient humidity	5 ... 95% r.h., non-condensing (in accordance with EN 60730-1)
Maintenance	Maintenance-free

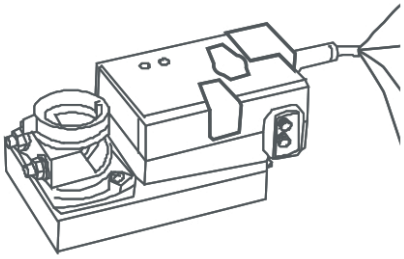
Restrictions:

Bus function MP	no MP Bus communication possible
Fan Optimiser (Fan control)	no communication to Fan Optimiser COU24-A-MP
Sensor integration	no Sensor integration possible

VAV controllers LMV-D3-MF.1 BCN / NMV-D3-MP

Connection:

The connection is made using the connecting cable mounted to the VAV-Compact device.



Connecting cable

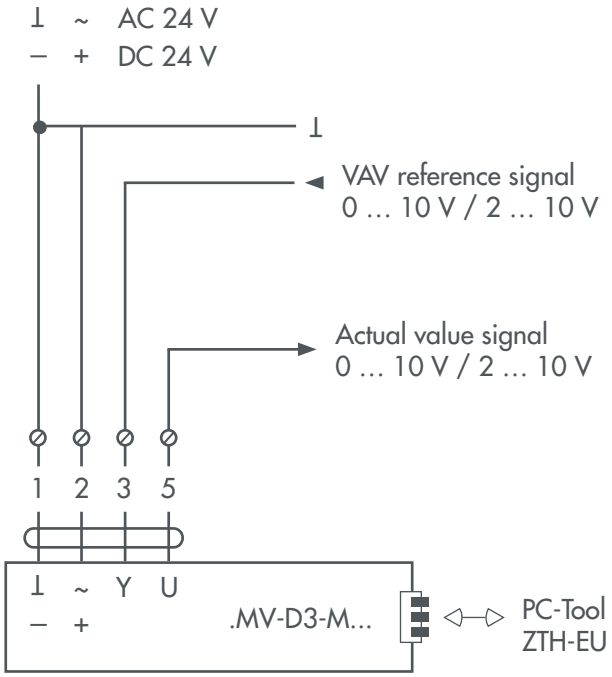
No.	Designation	Wire colour	Function	
1	⊥ –	black	⊥ –	} AC/DC 24 V supply
2	~ +	red	~ +	
3	Y	white	Reference signal VAV/CAV	
5	U	orange	– Actual value signal – Tool communication	

Instructions
– Supply via safety isolatingtransformer!
– Connections 1 and 2 (AC/DC 24 V) and 5 must be routed to accessible terminals (room temperature controller, floor distributor, control cabinet, etc.) in order to enable access with the tool for diagnostic and service work.

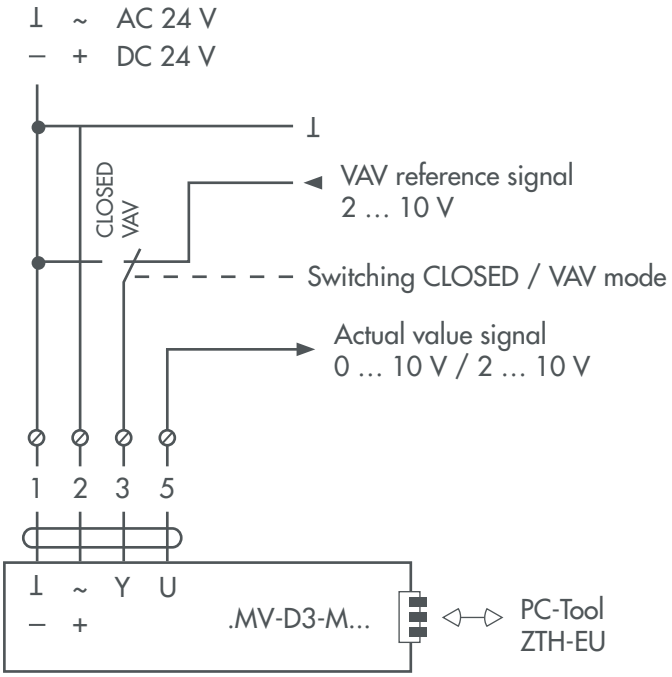
VAV - Variable operation $\dot{V}_{min}$ ... $\dot{V}_{max}$

Wiring diagrams

Example 1:
VAV with analogue reference signal



Example 2:
VAV with shut-off (CLOSED), 2 ... 10 V mode



VAV controllers LMV-D3-MF.1 BCN / NMV-D3-MP

CAV – Step mode CLOSED / $\dot{V}_{min}$ / $\dot{V}_{mid}$ / $\dot{V}_{max}$ / OPEN

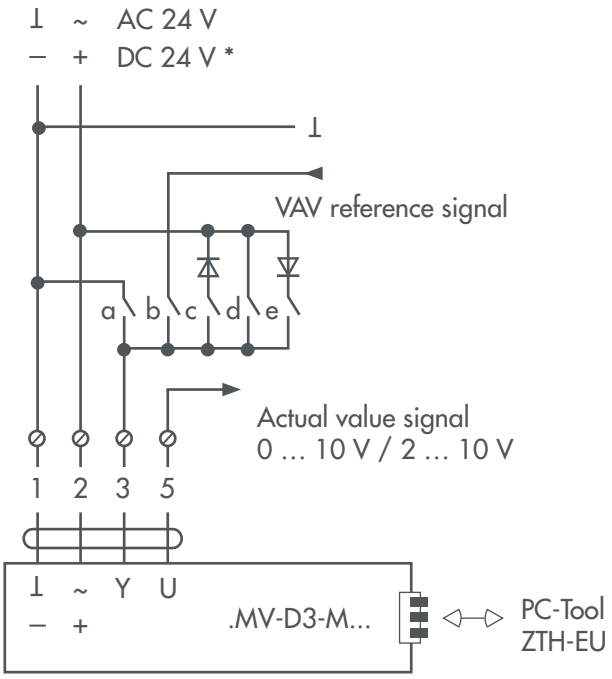
CAV control

Note
«Standard 0.5 V shut-off» not use at:
– Mode 2 ... 10 V and MP bus operation
– Mode 2 ... 10 V and CAV control

Wiring diagrams

Note
The contacts are mutually interlocking!

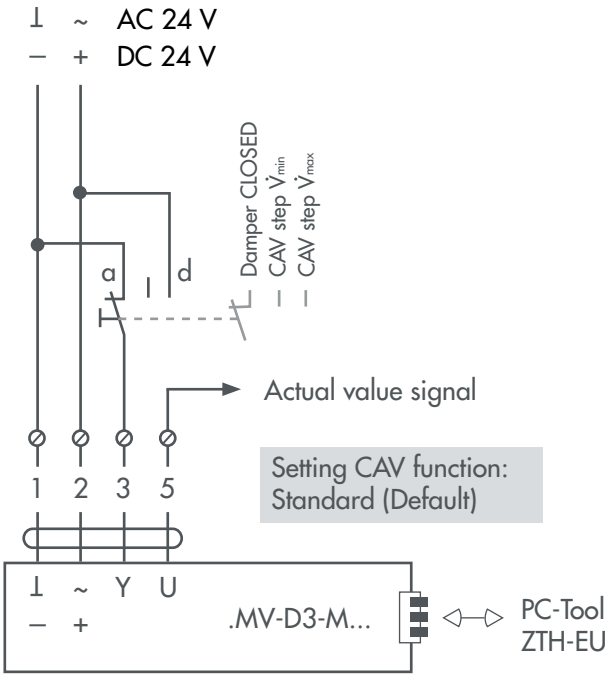
Three options are available for the CAV control:
– Standard 0.1 V shut-off: CLOSED – $\dot{V}_{min}$ – $\dot{V}_{max}$ – OPEN (default setting)
– Standard 0.5 V shut-off: CLOSED – $\dot{V}_{min}$ – $\dot{V}_{max}$ – OPEN
– Old Generation (NMV-D2M): CLOSED – $\dot{V}_{min}$ – $\dot{V}_{mid}$ – $\dot{V}_{max}$ – OPEN



CAV function: Standard

Mode setting	–	0...10 V	0...10 V	0...10 V	0...10 V
	2...10 V	2...10 V	2...10 V	2...10 V	2...10 V
Signal	⊥ –	0...10 V 2...10 V	~	~ +	~
Function	3	3	3	3	3
Damper CLOSED	a) CLOSED		c) CLOSED *		
$\dot{V}_{min}$ ... $\dot{V}_{max}$		b) VAV			
CAV – $\dot{V}_{min}$	All open – $\dot{V}_{min}$ active **				
Damper OPEN					e) OPEN *
CAV – $\dot{V}_{max}$				d) $\dot{V}_{max}$	

Example:
CAV application CLOSED – $\dot{V}_{min}$ – $\dot{V}_{max}$
(mode 2 ... 10 V)



Legend

Contact closed, function active

Contact closed, function active, only in 2 ...10 V mode

Contact open

* Not available with DC 24 V supply
** the damper is closed when the 0.5 V shut-off level is used

Dimensioning of supply and connecting cable

General

In addition to the actual wire sizing, attention must also be paid to the surrounding area and the cable routing. Signal cables must not be laid in the vicinity of load cables, objects liable to cause EMC interference etc. if possible. Paired or layer stranded cables improve immunity to interference.

24 V supply, dimensioning and cabling

The dimensioning and installation of the AC 24 V supply, the fuse protection and the cables are dependent on the total operated load and local regulations. Account must be taken of the following performance data, including the starting currents of the actuators:
– Dimensioning values VAV-Compact controller
– Other devices which are intended to be connected to the same 24 V supply
– Reserve capacity for subsequent expansion, if planned.

Tool connection

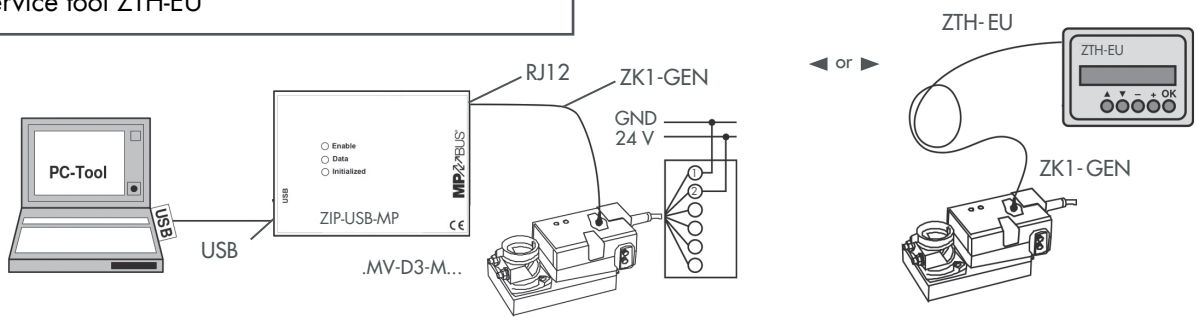
Settings and diagnostics

The settings and diagnostics of the connected VAV-Compact controller can be checked and adjusted easily and rapidly with the PC-Tool or with the ZTH-EU service tool.

On-board service connection

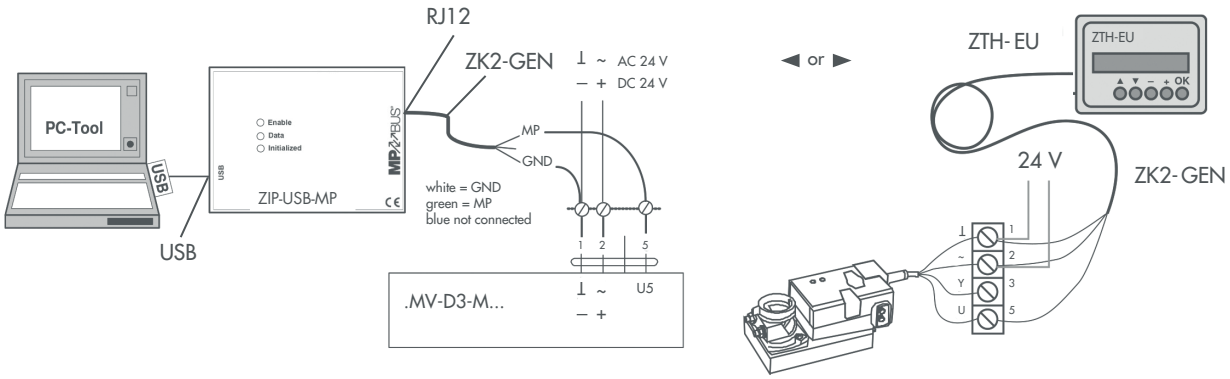
The service connection integrated in the VAV-Compact enables a rapid connection of the operating device used.

VAV operating and service devices
– PC-Tool with level converter ZIP-USB-MP
– Service tool ZTH-EU



Tool connection (5)

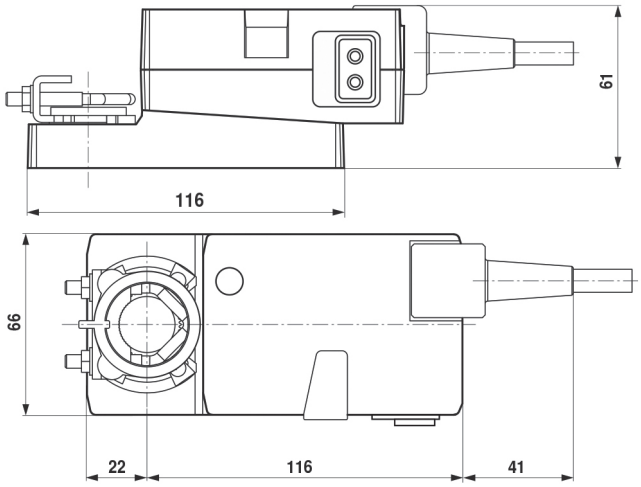
The VAV-Compacts can also communicate with the Service tools via the Tool connection (connection wire 5). The connection be set up during operations on-site, i.e. in the connection socket, on the tool socket of the room temperature controller CR24 or at the floor or control cabinet terminals.



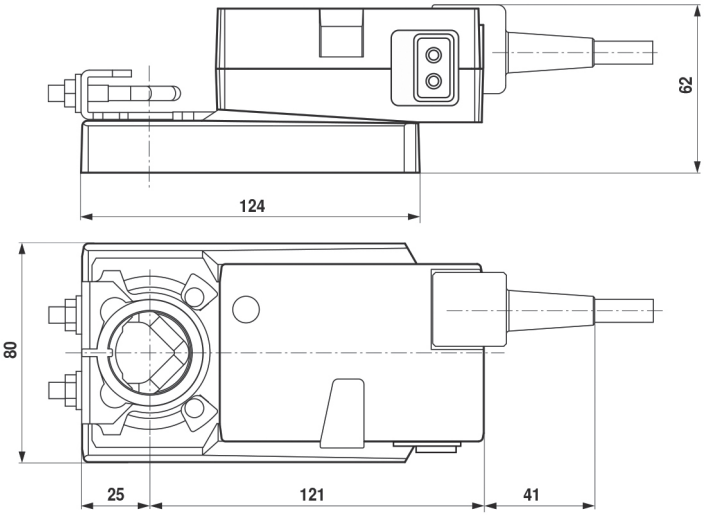
VAV controllers LMV-D3-MF.1 BCN / NMV-D3-MP

Dimensions [mm]

Dimensional drawings LMV-D3-MF.1 BCN



Dimensional drawings NMV-D3-MP



Safety notes

- The device is not allowed to be used outside the specified field of application, especially in air craft or in any other airborne means of transport.
- It may only be installed by suitably trained personnel. Any legal regulations or regulations issued by authorities must be observed during assembly.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- The cable must not be removed from the device.
- When calculating the required torque, the specifications supplied by the damper manufacturers (cross-section, design, installation site), and the air flow conditions must be observed.
- The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

BARCOL-AIR
AIR DISTRIBUTION

OUR TECHNOLOGY | YOUR WELLBEING

BARCOL-AIR | AIR DISTRIBUTION
Cantekoogweg 10-12 - 1442 LG Purmerend - the Netherlands
T +31 (0)299 689 300 | **E** export@barcol-air.nl

WWW.BARCOL-AIR.NL