

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

- Communication via Modbus RTU (RS-485)
- Conversion of sensor signals
- Service socket for operating devices



LMV-D3-MOD  
NMV-D3-MOD

**Brief description**

<b>Application</b>	The digital VAV-Compact has PI control characteristics and is used for pressure-independent control of VAV units in the comfort zone.
<b>Pressure measurement</b>	The integrated D3 differential pressure sensor is also suitable for very small volumetric flows. The maintenance-free sensor technology enables versatile applications in the comfort zone: in residential construction, offices, hospitals, hotels, cruise ships, etc.
<b>Actuator</b>	2 different actuator variants (5 or 10 Nm) are available for different VAV unit structures.
<b>Control function</b>	Volumetric flow (VAV-CAV) or Open-Loop (for integration in an external VAV control loop).
<b>VAV – variable volumetric flow</b>	Demand-dependant setting of volumetric flows $\dot{V}_{\min} \dots \dot{V}_{\max}$ on a modulating reference variable via Modbus, e.g. room temperature / CO2 controller, DDC or Bus system, for energy-saving air conditioning in individual rooms or zones.
<b>DCV – Demand Controlled Ventilation</b>	In higher-level Modbus system, for example with integrated optimiser function.
<b>Type of action</b>	The actuator is fitted with an integrated interface for Modbus RTU, it receives the digital positioning signal from the Modbus-Master and returns the current status.
<b>Converter for sensors</b>	Connection option for a sensor (active sensor or switching contact). In this way, the analogue sensor signal can be easily digitised and passed along to Modbus.
<b>Parameterisation</b>	The factory settings cover the most common applications. As desired, individual parameters can be adapted for specific systems or servicing with a service tool (e.g. ZTH EU).
<b>Modbus communication parameters</b>	The Modbus communication parameters (address, baud rate, ...) are set with the ZTH EU. Pressing push-button 3 while connecting the supply voltage resets the communication parameters to the factory setting. Rapid addressing: As an alternative, the Modbus address can be set with the keys on the actuator in the range of 1 to 16. The selected value is added to the "Base address" parameter and yields the effective Modbus address. With a basic address of 140, for example, the parameters for Modbus addresses between 141 and 156 can be set using fast addressing.
<b>Operating and service devices</b>	Service tool ZTH, PC-Tool service socket: locally pluggable or via PP connection.
<b>Electrical connection</b>	The connection is made with the integrated connection cable .
<b>Sales, mounting and setting</b>	VAV-Compact will be mounted by the VAV unit manufacturer (OEM), the application will be set and calibrated accordingly. The VAV-Compact is sold exclusively via the OEM channel for this reason.

Type overview MOD versions	Type	Torque	Power consumption	Rating	Weight
	LMV-D3-MOD	5 Nm	2 W	4 VA (max. 8 A @ 5 ms)	Approx. 500 g
	NMV-D3-MOD	10 Nm	3 W	5 VA (max. 8 A @ 5 ms)	Approx. 700 g

**Other versions** The VAV-Compact is also available with a built-in interface for direct integration in MP-Bus systems, KNX and LONWORKS®.  
See [www.belimo.eu](http://www.belimo.eu) for more information and documentation.

Safety notes

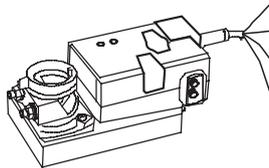


- The device must not be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.
- Outdoor applications: possible only in the absence of direct effects on the actuator from (sea)water, snow, ice, sunlight and aggressive gases and when it is guaranteed that the ambient conditions do not deviate at any time from the limit values specified in the datasheet.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied with during installation.
- 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.
- Cables must not be removed from the device.
- When calculating the torque required, the specifications supplied by the damper manufacturers (cross-section, construction, place of installation), and the ventilation 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.

Electrical installation

Notes

- Supply via safety isolating transformer!
- Modbus signal assignment:  
C<sub>1</sub> = D- = A  
C<sub>2</sub> = D+ = B
- Supply and communication are not galvanically isolated.
- Connect earth signal for devices with one another.



No.	Designation	Wire colour	Function
1	⊥ -	black	} AC/DC 24 V supply
2	~ +	red	
3			
5	▶ MFT	orange	PP connection
6	D-	pink	} Modbus (RS485)
7	D+	grey	

See separate documentation for description of functions and applications

Technical Data		
Electrical data	Nominal voltage	AC/DC 24 V, 50/60 Hz
	Operating range	AC 19.2 ... 28.8V / DC 21.6 ... 28.8V
	Performance data	See Overview of types (page 1)
	Connection	Cable, 6 x 0.75 mm <sup>2</sup> , preassembled
Volumetric flow controllers	Control function	VAV/CAV and Open-Loop
	$\dot{V}_{nom}$ <sup>1)</sup>	OEM specific nominal volumetric flow setting, suitable for VAV unit
	$\Delta p @ \dot{V}_{nom}$ <sup>1)</sup>	38 ... 500 Pa
	$\dot{V}_{max}$	20 ... 100 % of $\dot{V}_{nom}$ , adjustable
	$\dot{V}_{mid}$	> $\dot{V}_{min}$ ... < $\dot{V}_{max}$ , adjustable
	$\dot{V}_{min}$	0 ... 100 % of $\dot{V}_{nom}$ , adjustable (< $\dot{V}_{max}$ )
Sensor integration	input	0 ... 32 V, input impedance 100 k $\Omega$
	Sensor	Active Sensor (0 ... 10 V) Switching contact (0 / 1) switching capacity 16 mA @ 24 V
Local override control	Override	CLOSED / $\dot{V}_{max}$ / OPEN, AC 24 V supply required
Data for Modbus	Protocol	Modbus RTU (RS-485), not galvanically isolated
	Number of nodes	Max. 32 (without repeater)
	Transmission formats	1-8-N-2, 1-8-N-1, 1-8-E-1, 1-8-O-1 Default: 1-8-N-2 (Start bits, Data bits, Parity, Stop bits)
	Baud rates	9600, 19,200, 38,400, 76,800, 115,200 Bd Default: 38,400 Bd
	Scheduling	120 $\Omega$ , can be switched
	Parameterisation	with service tool ZTH EU, push-button-operated fast addressing 1 ... 16 possible
	Operation and service	Service tool ZTH, PC-Tool
LED		Supply, status and communication display
Push-button		Addressing, angle of rotation adaptation and test function
Actuator	Rotary/linear version	Brushless, non-blocking actuator with power-save mode
	Direction of rotation <sup>1)</sup>	ccw / cw
	Angle of rotation	95°, adjustable mechanical or electronic limiting
	Gear disengagement	Push-button self-resetting without functional impairment
	Position indication	Mechanical or accessible (Tool, Bus-Master)
	Spindle holder	Spindle clamp for round and square shafts
Volumetric flow measurement	Differential pressure sensor	Belimo D3 sensor, dynamic measurement principle
	Measurement range, operating range	-20 ... 500 Pa, 0 ... 500 Pa
	Overload capability	$\pm 3000$ Pa
	Altitude compensation	Adaptation to system altitude (adjustable between 0 ... 3000 m above sea level)
	Installation position	Any, no reset necessary
	Materials in contact with medium	Glass, epoxy resin, PA, TPE
Safety	Measuring air conditions	Comfort zone 0 ... 50°C / 5 ... 95% rH, non-condensing
	Protection class IEC/EN	III Safety extra-low voltage
	Degree of protection IEC / EN	IP54
	EMC	CE according to 2014/30/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Rated current voltage	0.8 kV
	Supply / control	
	Control pollution degree	3
	Ambient temperature	-30...50°C
	Non-operating temperature	-40...80°C
	Ambient humidity range	95% r.h., non-condensing
	Maintenance	Maintenance-free. Depending on the application, the differential pressure sensor (measuring cross, disc, ...) of the VAV unit is checked occasionally and cleaned if required.

<sup>1)</sup> Setting by VAV manufacturer (OEM)

## Modbus overview

## Register

	No.	Adr	Register
Operation	1	0	<b>Setpoint [%]</b>
	2	1	<b>Override control</b>
	3	2	<b>Command</b>
	4	3	Actuator type
	5	4	Relative position [%]
	6	5	Absolute position [°] [mm]
	7	6	Relative volumetric flow [%] (only for VAV/EPIV)
	8	7	Absolute volumetric flow (pressure) [m <sup>3</sup> /h] [l/min] [Pa] (only for VAV/EPIV)
	9	8	Sensor value [mv] [-]
Service	101	100	Series number 1st part
	102	101	Series number 2nd part
	103	102	Series number 4th part
	104	103	Firmware version (Modbus module)
	105	104	Malfunction and service information
	106	105	<b>Min [%]</b>
	107	106	<b>Max [%]</b>
	108	107	<b>Sensor type</b>
	109	108	<b>Bus fail position</b>
	110	109	-
	111	110	Nominal volumetric flow (pressure) [m <sup>3</sup> /h] [l/min] [Pa] (only for VAV/EPIV)

- Registers in Bold can be written
- Registers <100 (In operation) which can be written are non-permanent and should therefore be updated periodically
- Registers >100 which can be written are not non-permanent

## Commands

All data is arranged in a table and addressed by 1..n (register) or 0..n-1 (address). No distinction is made between data types (Discrete Inputs, Coils, Input Registers, Holding Registers). As a consequence, all data can be accessed with the two commands for Holding Register. The commands for Discrete Inputs and Input Registers can be used as an alternative.

Standard commands:

Read Holding Registers [3]

Write Single Register [6]

Optional commands:

Read Discrete Inputs [2]

Read Input Registers [4]

Write Multiple Registers [16]

**Note regarding Read Discrete Inputs**

The command reads one or more bits and can alternatively be used for register 105 (Malfunction and service information). The start address to be used is 1664.

## Modbus register description

**Register 1: Setpoint** Setpoint for actuator setting or volumetric flow in hundredths of one percent, i.e. 0 ... 10 000 correspond to 0 ... 100%

**Register 2: Override control** Overriding the setpoint with defined compulsions

Override control	
0	None
1	Open
2	Close
3	Min
5	Max

**Register 3: Command** Initiation of actuator functions for service and test; the register is reset automatically.

Command	
0	None
1	Adaptation
2	Test run
3	Synchronisation
4	Reset actuator malfunctions

**Register 4: Actuator type** Actuator type; the allocation may deviate from the basic category with some actuators.

Actuator type	
0	Actuator not connected / not known
1	Air/water actuators with/without safety function
2	Volumetric flow controller VAV / EPIV
3	Fire protection actuator

**Register 5: Relative position** Relative position in hundredths of one percent, i.e. 0 ... 10 000 correspond to 0 ... 100%

**Register 6: Absolute position** Absolute position  
0 ... 10 000 (65535 if not supported by the actuator)  
The unit depends on the device:  
[°] for actuators with rotary movement  
[mm] for actuators with linear movement

**Register 7: Relative volumetric flow** Relative volumetric flow in hundredths of one percent of  $V_{nom}$ , i.e. 0 ... 10 000 correspond to 0 ... 100%.  
This value is available only for VAV controllers and EPIV devices (actuator type: 2).  
For all other types, 65535 will be entered.

**Register 8: Absolute volumetric flow** Absolute volumetric flow  
This value is available only for VAV controllers and EPIV devices (actuator type: 2).  
For all other types, 65535 will be entered.  
The unit depends on the device:  
[m<sup>3</sup>/h] for VAV controllers (or [Pa] for pressure applications)  
[l/min] for EPIV devices

**Register 9: Sensor value** Current sensor value; dependent on the setting in Register 108  
The unit depends on the sensor type: [mv] [-]

**Register 101 to 103: Series number** Each device has an unambiguous series number which is either impressed on or glued to the housing. The series number consists of 4 segments, although only parts 1, 2 and 4 are displayed on Modbus.  
Example: 00839-31324-064-008

Register 101	Register 102	Register 103
1st part	2nd part	4th part
00839	31234	008

**Register 104: Firmware Version** Firmware version of Modbus module (VX.XX)  
e.g. 101 V1.01

## Modbus register description

**Register 105:**  
Malfunction and service information

The status information is split into messages about the actuator (malfunctions) and other service information.

	bit	Description
Malfunctions (low byte)	0	Utilisation too high
	1	Actuation path increased
	2	Mechanical overload
	3	–
	4	Safety-relevant malfunction (fire protection only)
	5	Damper mobility fault (fire protection only)
	6	Channel temperature too high (fire protection only)
	7	Smoke detector tripped (fire protection only)
Service (high byte)	8	Internal activity (test run, adaptation, ...)
	9	Gear disengagement active
	10	Bus monitoring triggered
	11	–
	12	–
	13	–
	14	–
	15	–

The malfunction bits can be reset with Register 3 (command 4) or with the Belimo PC-Tool. Malfunctions 0 and 4 cannot be reset.

**Register 106: Min / Vmin setting**

Minimum limit (position or volumetric flow) in hundredths of one percent, i.e. 0 ... 10 000 correspond to 0 ... 100%  
Caution: Changing the setting may result in malfunctions.

**Register 107: Max / Vmax setting**

Minimum limit (position or volumetric flow) in hundredths of one percent, i.e. 2000 ... 10 000 correspond to 20 ... 100%  
Caution: Changing the setting may result in malfunctions.

**Register 108: Sensor type**

Sensor type connected to the actuator; in the absence of sensor specification, the switching at the Y input will have the effect of a local compulsion.

**Note**

- After changing the sensor type, the actuator must always be restarted in order for correct sensor values to be read out.
- Sensor values are not available for actuator versions with RJ12 connection socket (J6) since no sensor connection is possible.

Sensor type	
0	None
1	Active sensor (mV)
2	–
3	–
4	Switching contact (0 / 1)

**Register 109: Bus fail position**

Modbus communication is not monitored as standard. In the event of a breakdown in communication, the actuator retains the current setpoint. The bus monitoring controls the Modbus communication. If neither the setpoint (Register 1) nor the override control (Register 2) is renewed within 120 seconds, the actuator controls to the bus fail position. Triggered bus monitoring is indicated in Register 105.

Bus fail position	
0	Last setpoint (no bus monitoring)
1	Rapid close if time is exceeded
2	Rapid open if time is exceeded
3	Intermediate position Mid is parameterised for time delay

**Register 110: (Reserved)**

Not used in this device

**Register 111: Nominal volumetric flow**

This value is available only for VAV controllers and EPIV devices (actuator type: 2). The nominal volumetric flow is determined by the manufacturer of the volume flow box. For all other types, 65535 will be entered. The unit depends on the device:  
[m<sup>3</sup>/h] for VAV controllers (or [Pa] for pressure applications)  
[l/min] for EPIV devices

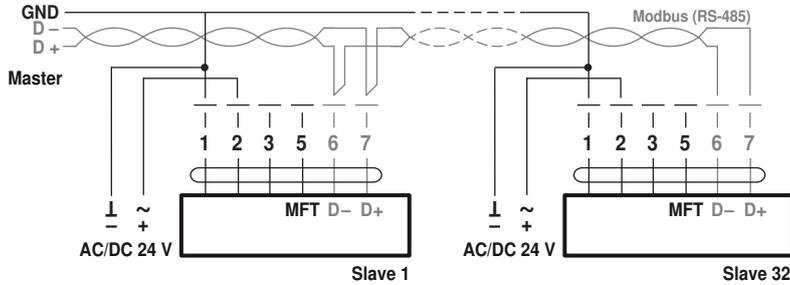
Electrical installation



Notes

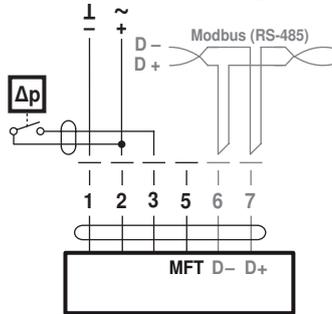
- Connection via safety isolating transformer.
- The wiring of Modbus RTU (RS485) is to be carried out in accordance with applicable regulations (www.modbus.org). The device has connectible resistances for the bus connection,
- Modbus-GND: Supply and communication are not galvanically isolated. Connect earth signal for devices with one another.

Modbus Wiring



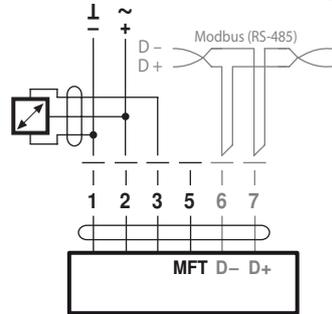
Modbus signal assignment:  
 C<sub>1</sub> = D- = A  
 C<sub>2</sub> = D+ = B

Connection with switching contact, e.g. Δp-monitor



Switching contact requirements:  
 The switching contact must be able to switch a current of 16 mA at 24V accurately.

Connection of active sensors, e.g. 0...10 V @ 0...50°C



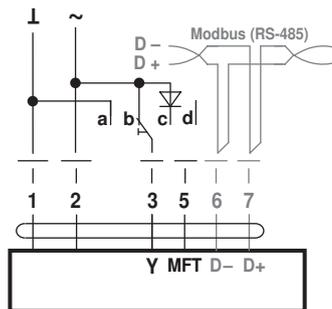
Possible voltage range:  
 0 ... 32 V (resolution 30 mV)

Local override control

If no sensor is integrated, then connection 3 (Y) is available for the protective circuit of a local override control.

Options: CLOSED –  $\dot{V}_{max}$  – OPEN

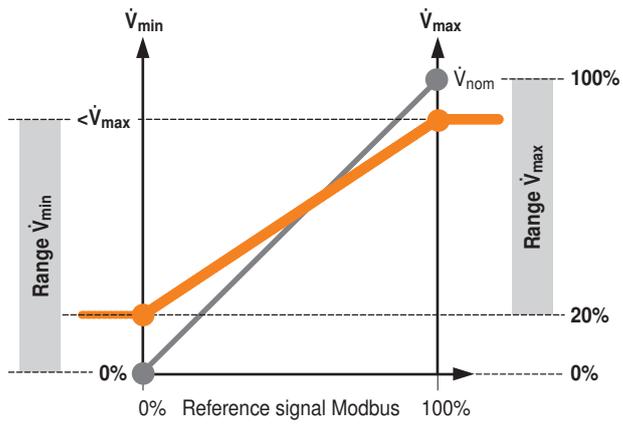
**Note:** Functions only with AC 24V supply!



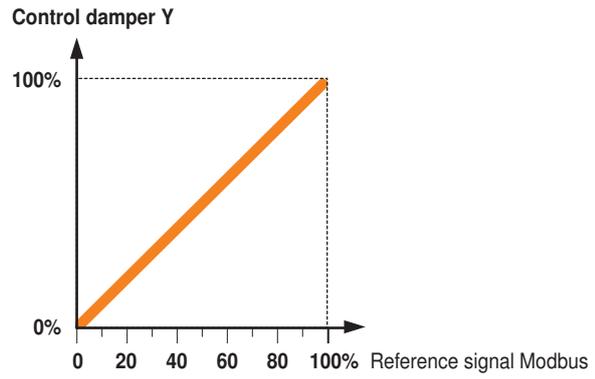
- a Damper CLOSED
- b  $\dot{V}_{Max}$
- c Damper OPEN
- d Bus mode

Control functions - VAV / CAV

VAV-operating volumetric flow – Setting and control



Open-Loop (separate external VAV-Control)



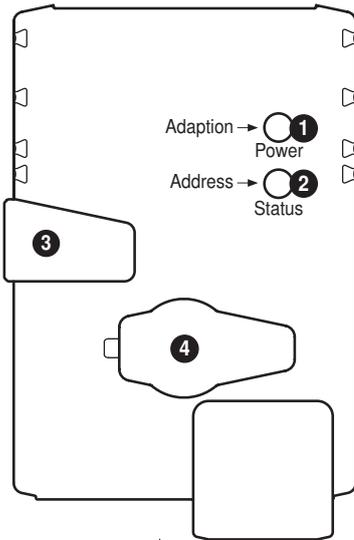
Setting and Tool function

Designation	Adjustment values, limits, explanations	Units	Tools <sup>5)</sup>		Remarks
			ZTH EU	PC-Tool	
<b>System specific data</b>					
Position	16 characters e.g.: Office 4 6.OG ZL	Text	r	r/w	
Designation	16 Characters: Unit designation, etc.	Text	r	r/w	
Modbus address	1...247 Baud rate and etc.		r/w	-	Modbus addressing
Address (MP)	PP		r/w	r/w	for Modbus applications: PP
$\dot{V}_{max}$	20...100 % [ $\dot{V}_{nom}$ ]	m <sup>3</sup> /h / l/s / cfm	r/w	r/w	$\geq \dot{V}_{min}$
$\dot{V}_{mid}$	$\dot{V}_{min}$ ... $\dot{V}_{max}$	m <sup>3</sup> /h / l/s / cfm	r/w	r/w	
$\dot{V}_{min}$	0...100 % [ $\dot{V}_{nom}$ ]	m <sup>3</sup> /h / l/s / cfm	r/w	r/w	$\leq \dot{V}_{max}$
System altitude	0...3000	Meter	r/w	r/w	Adaptation of $\Delta p$ -Sensor to system altitude (above sea level)
<b>Controller settings</b>					
Controller function	Volumetric flow / open loop		-	r/w	
Mode	0...10 / 2...10	Volt	r/w <sup>1)</sup>	r/w	for Modbus applications: 2...10
CAV function <sup>2)</sup>	CLOSED/ $\dot{V}_{min}$ / $\dot{V}_{max}$ ; Shut-off level CLOSED 0.1 V CLOSED/ $\dot{V}_{min}$ / $\dot{V}_{max}$ ; Shut-off level CLOSED 0.5 V $\dot{V}_{min}$ / $\dot{V}_{mid}$ / $\dot{V}_{max}$ ; (NMV-D2M comp.)		-	r/w	not relevant for Modbus applications
Positioning signal Y	Start value: 0.6 ... 30; Stop value: 2.6 ... 32	Volt	r	r/w	not relevant for Modbus applications
Feedback U	Volume / damper position / $\Delta p$		-	r/w	not relevant for Modbus applications
Feedback U	Start value: 0.0 ... 8.0; Stop value: 2.0 ... 10	Volt	-	r/w	not relevant for Modbus applications
Response when switched on (Power-On) <sup>4)</sup>	No action / Adaption / Synchronisation		-	r/w	
Synchronisation behaviour	Y=0 % Y=100 %		-	r/w	Synchronisation to damper position 0 or 100 %
Bus fail position	Last set point / Damper CLOSED $\dot{V}_{min}$ / $\dot{V}_{max}$ / Damper OPEN		-	r/w	
<b>Unit specific settings <sup>*)</sup> Write function only available for VAV manufacturer</b>					
$\dot{V}_{nom}$	0 ... 60'000 m <sup>3</sup> /h	m <sup>3</sup> /h / l/s / cfm	r	r/(w*)	Unit specific adjustment value
$\Delta p@ \dot{V}_{nom}$	38 ... 450 Pa	Pa	r	r/(w*)	Unit specific adjustment value
Label print function			-	w	Incl. customer logo
<b>Other settings</b>					
Direction of rotation (for Y = 100%)	cw/ccw		r/w <sup>1)</sup>	r/w	
Range of rotation	Adapted <sup>3)</sup> / programmed 30...95	°	-	r/w	
Torque	100 / 75 / 50 / 25	%		r/w	% of nominal torque
<b>Operating data</b>					
Setpoint / actual value Damper position		m <sup>3</sup> /h / l/s / cfm Pa / %	r	r	Trend display with print function and data storage on HD
Simulation	Damper CLOSED / OPEN $\dot{V}_{min}$ / $\dot{V}_{mid}$ / $\dot{V}_{max}$ / motor stop		w	w	
Running times	Operating time, running time Ratio	h %	-	r	
Alarm messages	Setting range enlarged, mech. overload, Stop&Go ratio too high		-	r/w	
Series number	Device ID.		r	r	incl. date of manufacture
Type	Type designation		r	r	
Version display	Firmware, Config table ID		r	r	
<b>Configuration data</b>					
Print, create PDF			-	Yes	
Save to file			-	Yes	
<b>Log data / book</b>	Activity log		-	Yes	incl. complete setting data

Explanations

- 1) Access only on operating level 2
- 2) CAV setting for MP/MF type
- 3) within the mechanical limit.
- 4) The first time the supply voltage is switched on, i.e. at the time of commissioning, the actuator carries out an adaption, which is when the operating range and position feedback adjust themselves to the mechanical setting range. The actuator then moves into the required position in order to ensure the volumetric flow defined by the positioning signal.
- 5) See [www.belimo.eu](http://www.belimo.eu) for function and version history.

Display and operation



- 1 Push-button and LED display green**  
 Off: No power supply or malfunction  
 On: In operation  
 Flashing: In address mode: Pulses according to set address (1 ... 16)  
 When starting: Reset to factory setting (Communication)  
 Press button: In standard mode: Triggers angle of rotation adaptation  
 In address mode: Confirmation of set address (1 ... 16)
- 2 Push-button and LED display yellow**  
 Off: Standard mode  
 On: Adaption or synchronising process active  
 or actuator in address mode (LED display green flashing)  
 Flickering: Modbus communication active  
 Press button: In operation (>3 s): Switch address mode on and off  
 In address mode: Address setting by pressing several times  
 When starting (>5 s): Reset to factory setting (Communication)
- 3 Gear disengagement button**  
 Press button: Gear disengaged, motor stops, manual override possible  
 Release button: Gear engaged, synchronisation starts, followed by standard mode
- 4 Service plug**  
 For connecting parameterisation and service tools

Check power supply connection

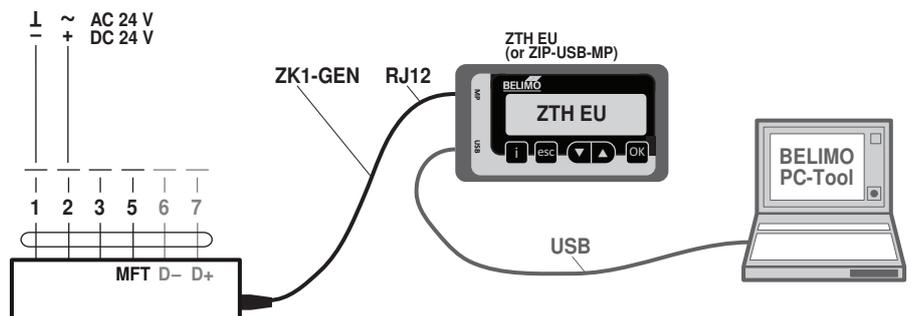
- 1** Off and **2** On Possible wiring error in power supply

Fast addressing Modbus

1. Hold the "Service" button pressed down until the green "Power" LED display is no longer illuminated. The green "Adaption" LED display flashes in accordance with the previously set address.
  2. Set the address by pressing the "Service" button the corresponding number of times (1-16).
  3. The green LED display flashes in accordance with address that has been entered (1-16). If the address is not correct, then this can be reset in accordance with Step 2.
  4. Confirm the address setting by pressing the green "Adaption" button.
- If no confirmation occurs for 60 seconds, then the address procedure is ended.  
 Any address change that has already been started will be discarded.  
 The resulting Modbus address is made up of the set basic address plus the short address (e.g. 140+7=147).

ZTH / PC-Tool - local service connection

The settings and diagnostics of the VAV-Compact can be performed easily and rapidly with the Belimo PC-Tool or with the ZTH-EU service tool. When using the PC-Tool, the ZTH EU serves as an interface converter.

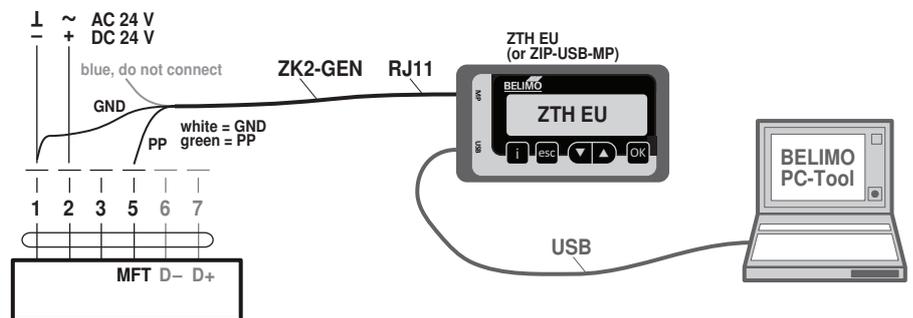


Download PC-Tool (MFT-P) from [www.belimo.eu](http://www.belimo.eu)

Display and operation

ZTH / PC-Tool - remote connection

The VAV-Compact can communicate with the service tools via the PP connection (wire 5). The connection can be made in operating mode in the junction box or the control cabinet terminals. When using the PC-Tool, the ZTH EU serves as an interface converter.



Download PC-Tool (MFT-P) from [www.belimo.eu](http://www.belimo.eu)

Accessories

VAV-Compact / VAV-Universal

Description

VAV-Compact: version with integrated MP-Bus, LONWORKS® and KNX interface  
 VAV-Universal: VAV pressure controller,  $\Delta p$  sensors, actuator(spring-return, fast runner, etc.)  
 see [www.belimo.eu](http://www.belimo.eu) for more information and documentation

Electrical accessories

Description

Type

Connection cable 5 m, to ZTH / ZIP-USB-MP (RJ12) with service plug	ZK1-GEN
Connection cable 5 m, to ZTH / ZIP-USB-MP (RJ11) with free wire ends	ZK2-GEN

Tools

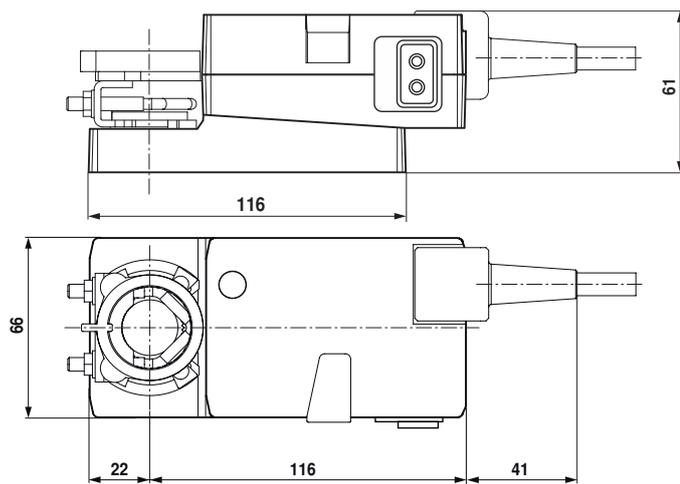
Description

Type

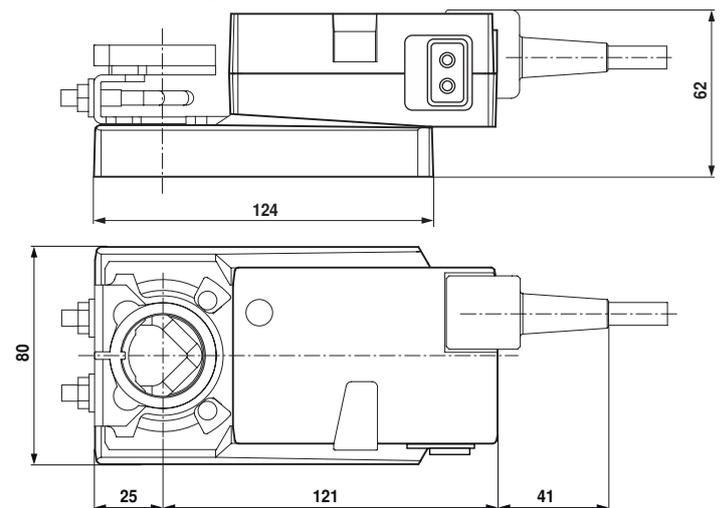
Service Tool, for MF/MP/Modbus/LONWORKS actuators and VAV controllers	ZTH EU
Belimo PC-Tool, software for adjustments and diagnostics	MFT-P

Dimensions [mm]

Dimensional drawings LMV-D3-MOD



Dimensional drawings NMV-D3-MOD



Further documentation

- Tool connections

	-MF	-MP	-KNX	LON	-MOD
					
Field of application: Supply and exhaust air in the comfort zone and sensor-compatible media	X	X	X	X	X
AC/DC 24 V supply	X	X	X	X	X
Integrated $\Delta p$ sensor, dynamic D3, measuring range:	-20 ... 500 Pa	-20 ... 500 Pa	-20 ... 500 Pa	-20 ... 500 Pa	-20 ... 500 Pa
Actuator variants:					
– Rotary actuator	5 / 10 Nm	5 / 10 / 20 Nm	5 / 10 / 20* Nm	5 / 10 / 20* Nm	5 / 10 / 20* Nm
– Linear actuator	–	150 / 200 / 300 mm	150* / 200* / 300* mm	150* / 200* / 300* mm	150* / 200* / 300* mm
VAV function $\dot{V}_{\min}$ ... $\dot{V}_{\max}$	X	X	X	X	X
CAV stages $\dot{V}_{\min}$ / $\dot{V}_{\text{mid}}$ / $\dot{V}_{\max}$	X	X	–	–	–
Open Loop (external V control)	X	X	X	X	X
DCV (Optimiser function)	–	DDC MP Partners Belimo fan optimiser	Yes, programmable	Yes, programmable	Yes, programmable
Analog control	0/2 ... 10 V	0/2 ... 10 V	–	–	–
With bus control	–	X	X	X	X
Bus specification	–	Belimo MP bus	KNX S mode	LONWORKS® FTT-10A	Modbus RTU RS485
Direct integration DDC MP Partners	–	X	–	–	–
Integration via Gateway	–		–	–	–
– BACnet		X			
– KNX		X			
– LONWORKS®		X			
– Modbus RTU		X			
Number of bus devices	–	8 per strand	64 per line segment	64 per bus segment	32 per strand
Sensor integration	–				
– passive (resistance)		X	–	–	–
– active (0...10 V)		X	X	X	X
– Switching contact		X	X	X	X
Optional control function	–	–	–	Temperature / CO <sub>2</sub>	–
Local forced (override)	–	CLOSED / $\dot{V}_{\max}$ / OPEN	CLOSED / $\dot{V}_{\max}$ / OPEN	CLOSED / $\dot{V}_{\max}$ / OPEN	CLOSED / $\dot{V}_{\max}$ / OPEN
Aids	–	MP-Bus Tester MP Monitor	ETS Product database	–	–
Integration tools	–	PC-Tool	ETS	LNS Tool + Plug-in	...
TypeList function (Retrofit, OEM)	–	X	(–)	(–)	(–)
Tool connection (U – PP/MP)	PP	PP/MP	PP	PP	PP
Service socket ZTH / PC-Tool	X	X	X	X	X
NFC interface	–	X	–	–	–
Assistant App	–	X	–	–	–
Service tool ZTH EU	X	X	X	X	X
PC-Tool	X	X	X	X	X
– Parameter					
– Save data					
– Trend, Logbook					
– Label Print					

\* on request