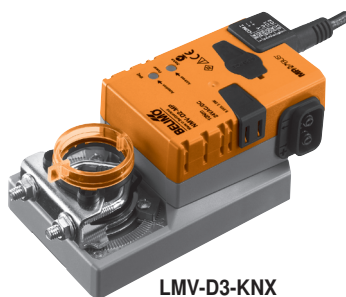


A pressure sensor, digital VAV controller and damper actuator all in one, providing a compact solution with a communications capability for pressure-independent VAV and CAV systems in the comfort zone

- Communication via KNX (S mode)
- Conversion of sensor signals
- Service socket for operating devices



LMV-D3-KNX
NMV-D3-KNX


Brief description

Application	The VAV-Compact has PI control characteristics and is used for pressure-independent control of VAV units in the comfort zone.
Volume flow measurement	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.
Actuator	2 different actuator variants (5 or 10 Nm) are available for different VAV unit structures.
Control function	Volumetric flow (VAV-CAV) or Position control (Open-Loop) for integration in an external VAV control loop.
VAV – variable volumetric flow	Demand-dependant setting of volumetric flows $\dot{V}_{min..max}$ on a modulating reference variable via KNX, e.g. room temperature / CO2 controller, DDC or Bus system, for energy-saving air conditioning in individual rooms or zones.
DCV – Demand Controlled Ventilation	In higher-level KNX system, for example with integrated optimiser function.
Type of action	The actuator is fitted with an integrated interface for KNX (S mode), it receives the digital positioning signal from the KNX system and returns the current status.
Converter for sensors	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 KNX.
Parameterisation	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).
Communication parameters	The VAV Compact is equipped with an integrated interface for KNX (S MODE). The VAV controller can be connected with all KNX devices that have corresponding data points available.
Operating and service devices	Service tool ZTH, PC-Tool service socket: locally pluggable or via PP connection.
Electrical connection	The connection is made with the integrated connection cable.
Sales, mounting and setting	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 KNX versions	Type	Torque	Power consumption	Rating	Weight
	LMV-D3-KNX	5 Nm	2 W	4 VA (max. 8 A @ 5 ms)	Approx. 500 g
	NMV-D3-KNX	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, Modbus and BACnet.
See www.belimo.com for more information and documentation.

Safety notes

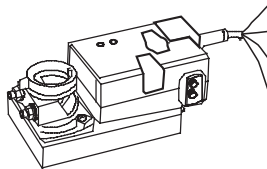


- The device must not be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.
- Outdoor applications: possible only in the absence of direct effects on the actuator from (sea)water, snow, ice, no sunlight and aggressive gases and when 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, installation situation), 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!
- Signal assignment KNX:
D+ = KNX+ (pink > red)
D- = KNX- (grey > black)
- The connection to the KNX line should take place via WAGO connection terminals 222/221.



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

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...28.8 V / DC 21.6...28.8 V	
	Performance data	See Overview of types (page 1)	
	Connecting	Cable, 6 x 0.75 mm ² , preassembled	
Volumetric flow controller	Control function	VAV/CAV and Position control (Open-Loop)	
	\dot{V}_{nom} ¹⁾	OEM specific nominal volumetric flow setting, suitable for VAV unit	
	$\Delta p @ \dot{V}_{nom}$ ¹⁾	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 Ω	
	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 KNX	Medium	KNX TP	
	Number of nodes	Max. 64 per line segment, reduce number of nodes with connection cable with short lines	
	Operating mode	S mode	
	Voltage consumption of KNX-Bus	Max. 5 mA	
	Planning and commissioning tool	ETS4 or higher	
	Parameterisation	with service tool ZTH EU	
	Sensor integration	Active sensor (0...10 V) Switching contact (0 / 1) (switching capacity 16 mA @ 24 V)	
	Operation and servicing	Service tool ZTH, PC-Tool	Local plug / Remote via PP connection
		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 ¹⁾	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	
	cMeasurement 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	
	Measuring air conditions	Comfort zone 0...50°C / 5...95% RH, non-condensing	
	Safety	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% RH, 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.		

¹⁾ Setting by VAV manufacturer (OEM)

KNX Group Objects

Name	Type	Flags					Data point type			Unit	Values range
		C	R	W	T	U	ID	DPT_Name	Format		
Setpoint	I	C	-	W	-	-	5.001	_percentage	1 Byte	%	[0...100] Resolution 0.4%
Override control	I	C	-	W	-	-	20.*	_enum	1 Byte	-	0 = no override 1 = Open 2 = Closed 3 = Min 4 = Mid 5 = Max
Reset	I	C	-	W	-	-	1.015	_reset	1 Bit	-	0 = no action 1 = reset
Adaptation	I	C	-	W	-	-	1.001	_switch	1 Bit	-	0 = no action 1 = adapt
Testrun	I	C	-	W	-	-	1.001	_switch	1 Bit	-	0 = no action 1 = Testrun
Min	I/O	C	R	W	-	-	5.001	_percentage	1 Byte	%	[0...100] Resolution 0.4%
Max	I/O	C	R	W	-	-	5.001	_percentage	1 Byte	%	[0...100] Resolution 0.4%
Relative position	O	C	R	-	T	-	5.001	_percentage	1 Byte	%	[0...100] Resolution 0.4%
Absolute position	O	C	R	-	T	-	8.011 7.011	_rotation_angle _length	2 Byte	° mm	[-32'768...32'768] [0...65'535]
Relative volumetric flow	O	C	R	-	T	-	5.001	_percentage	1 Byte	%	[0...100] Resolution 0.4%
Absolute volumetric flow	O	C	R	-	T	-	14.077 9.009	_volume_flux _air_flow	4 Byte 2 Byte	m ³ /s m ³ /h	1.0 x 10 ⁻¹⁰ m ³ /s 1.0 x m ³ /h
Nominal volumetric flow	O	C	R	-	T	-	14.077 9.009	_volume_flux _air_flow	4 Byte 2 Byte	m ³ /s m ³ /h	1.0 x 10 ⁻¹⁰ m ³ /s 1.0 x m ³ /h
Fault state	O	C	R	-	T	-	1.002	_boolean	1 Bit	-	0 = no error 1 = error
Overriden	O	C	R	-	T	-	1.002	_boolean	1 Bit	-	0 = not active 1 = active
Gear disengagement active	O	C	R	-	T	-	1.002	_boolean	1 Bit	-	0 = engaged 1 = disengaged
Service information	O	C	R	-	T	-	22.*	_bitset16	2 Byte	-	Bit 0 (1) Utilisation too high Bit 1 (2) Actuation path increased Bit 2 (4) Mechanical overload Bit 3 (8) - (Not used) Bit 4 (16) - (Not used) Bit 5 (32) - (Not used) Bit 6 (64) - (Not used) Bit 7 (128) - (Not used) Bit 8 (256) Internal activity Bit 9 (512) Bus monitoring triggered
Sensor value - Relative Humidity - Air Quality - Voltage mV - Value voltage scaled - Voltage scaled % - switch	O	C	R	-	T	-	9.007 9.008 9.020 7.* 5.001 1.001	_humidity _parts/million _voltage _pulses_length _percentage _switch	2 Byte 2 Byte 2 Byte 2 Byte 1 Byte -	% RH ppm mV mm % -	[0...670'760] [0...670'760] [-670'760...670'760] [0...65'535] [0...100] 0/1

KNX Group Objects (Continued)

Setpoint	Specification of set volume or actuator position in % between the parameterised Min and Max limits. The operating mode is set by the manufacturer of the volumetric flow unit.
Override control	Overriding the setpoint with defined compulsions. As data point type, 1 Byte (without algebraic sign) is recommended (DPT 20.*)
Reset	Resetting the saved service messages (see KNX group object <i>Service information</i>).
Adaptation	Perform the adaptation. The first-time adaptation is performed by the manufacturer of the volumetric flow unit. An active adaptation is signaled in Bit 8 of <i>Service information</i> .
Testrun	Performance of a testrun that checks the entire operating range. An active testrun is signalled in Bit 8 of <i>Service information</i> . After completion, detected faults (mechanical overload, actuation path exceeded) are signalled in <i>Service information</i> .
Min	Minimum Limit (volumetric flow or position) in % of the nominal volumetric flow V_{nom} Caution: Changing the setting may result in malfunctions.
Max	Maximum Limit (volumetric flow or position) in % of the nominal volumetric flow V_{nom} Caution: Changing the setting may result in malfunctions.
Relative position	Current actuator position in %
Absolute position	Absolute position/stroke The data point type is to be selected depending on the type of movement: [°] DPT 8.011 [mm] DPT 7.011
Relative volumetric flow	Relative volumetric flow in % of the nominal volumetric flow V_{nom}
Absolute volumetric flow	Absolute volumetric flow in m^3/s and m^3/h
Nominal volumetric flow	Nominal volumetric flow in m^3/s and m^3/h The nominal volumetric flow is determined by the manufacturer of the volumetric flow unit.
Fault state	Collective fault based on Bit 0...Bit 7 of <i>Service information</i> .
Overridden	Signalling of an active override control (OPEN/CLOSED) The device can be commanded via the KNX group object <i>Override control</i> or via the forced switching at the input Y/3. Only the override controls OPEN and CLOSED are signalled.
Gear disengagement active	Signalling an active gear disengagement
Service information	Detailed information regarding instrument status As data point type, Bitset 16-Bit is recommended (DPT 22.*) Status information: Bit 0: Motor operation in relation to operating period too high Bit 1: Actuation path increased, e.g. defined end position exceeded Bit 2: Mechanical overload, i.e. defined end position not reached Bit 3...7: not used with this instrument type Bit 8: Internal activity (Synchronisation, Adaptation, Testrun, ...) Bit 9: Bus monitoring triggered Bit 0: Bit 7 are stored by the device and can be reset with the KNX group object <i>Reset</i> . As an alternative, they can be read as total fault status.
Sensor value	The representation of the sensor value is dependent on the parameterization. See section „KNX parameters – Sensor“

KNX parameters

Common

System altitude [m] The specification of the system altitude increases the precision of the volumetric flow control.

Values range: 0...3'000 m
Factory setting: 500 m

Setpoint with bus fail A setpoint can be defined for cases of communication interruption.

Values range: None (last setpoint)
Open
Closed
Mid

Factory setting: None (last setpoint)

The monitoring of the communication takes place for the KNX group objects *Setpoint* and *Override control*. If none of the objects is written within the parameterised monitoring time, the bus fail position is set and signalled in the *Service information* (Bit 9).

Bus monitoring time [min] Monitoring time for the detection of a communication interruption.

Values range: 1...120 min
Factory setting: -

Difference value for sending the actual values [%] Actual values (position, volumetric flow) are transferred at the time of a value change insofar as these change by the parameterised difference value. If the relative value changes by the difference value, not only the relative actual value but also the absolute actual value are transferred.

Values range: 0...100%
Factory setting: 5%

The transfer is deactivated with 0% in the event of a value change.

Repetition time [s] Repetition time for all position and sensor actual values. Status objects are not transferred except with a change.

Values range: 0...3'600 s
Factory setting: 0 = no periodic transmission

Sensor

Sensor type The input Y/3 can be used to connect a sensor. The sensor value is digitised and made available as KNX communication object.

Values range: No sensor
Active sensor (0...32 V)
Switching contact (0 / 1)
Humidity sensor (0...10 V corresponds 0...100%)
Air quality sensor CO₂ (0...10 V corresponds 0...2'000 ppm)
No sensor

Factory setting: No sensor

A switching to Y/3 is treated as local override switching in the absence of sensor parameterization.

Difference value for sending the sensor value The sensor value is transferred at the time of a value change insofar as this changes by the parameterised difference value.

Values range: 0...65'535
Factory setting: 1

The transfer is deactivated with 0 in the event of a value change. Without value change, the sensor value is sent because of the repetition time.

Output
(for sensor type „Active sensor“)

Values range: Sensor value mV (DPT 9.020)
Sensor value scaled (DPT 7.xxx)
Sensor value scaled % (DPT 5.001)

Factory setting: -

For „Sensor value mV“, the measured voltage is made available without processing. In the case of the scaled sensor values, a linear transformation can be defined with two points.

Polarity
(for sensor type «Switching contact»)

Values range: Normal
Inverted

Factory setting: -

Work procedures

Product database The product database for the import in ETS4 or higher is available at the Belimo website www.belimo.com (Download Centre)

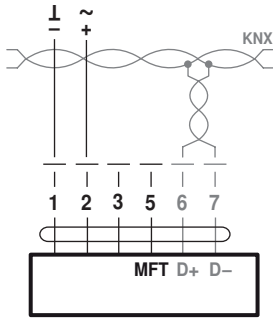
Setting physical address The programming of the physical address takes place by ETS and the programming button on the device.
 If the programming button is not accessible or accessible only with difficulty, then the address can be set using a point-to-point connection:
 „Overwrite physical address: 15.15.255“
 As a third possibility, the physical address can be programmed on the basis of the KNX series number (e.g. with Move'n'Group). The KNX series number is placed on the device in two versions. One sticker can be removed for adhesion on the commissioning journal, for example.

Firmware upgrade The KNX firmware of the device is updated automatically with the programming of the application program insofar as the product database has a more recent version. The first programming procedure takes somewhat longer in such cases (>1 min).

Resetting to KNX factory settings If necessary, the device can be reset manually to the KNX factory settings (physical address, group address, KNX parameters).
 For the reset, the programming button on the device must be pressed down for at least 5 s during start-up.

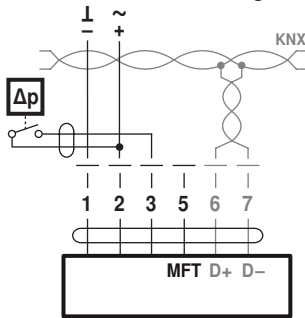
Electrical installation

Connection without sensor



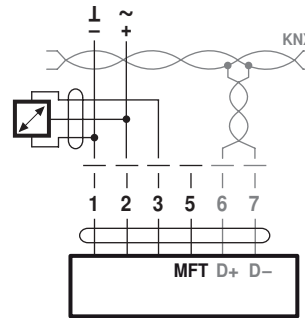
KNX signal assignment:
 D+ = KNX+ (pink > red)
 D- = KNX- (grey > black)
 The connection to the KNX line should take place via WAGO connection terminals 222/221.

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 24 V accurately.

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

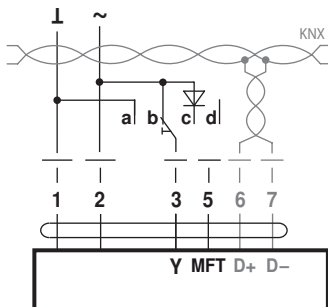


Possible voltage range:
 0...32 V (resolution 30 mV)

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

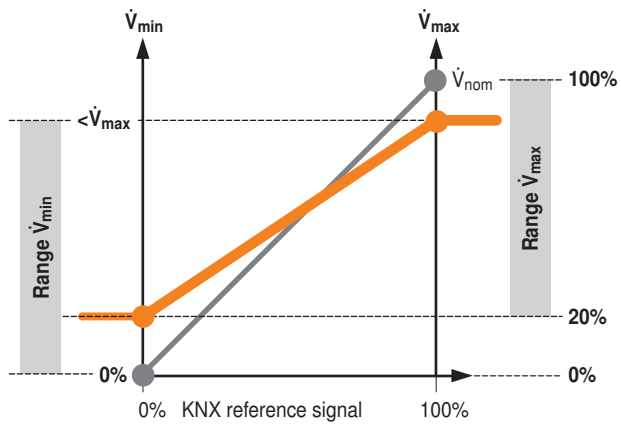
Note: Functions only with AC 24 V supply!



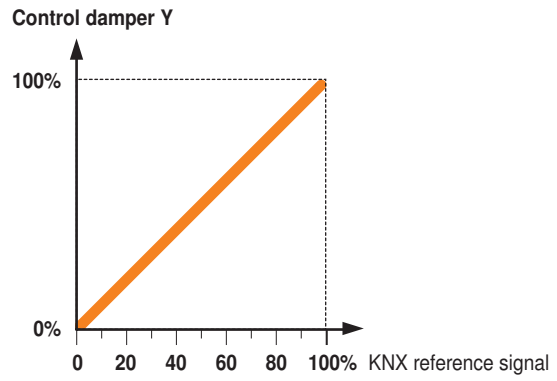
a Damper CLOSED
 b \dot{V}_{Max}
 c Damper OPEN
 d Bus mode

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 ⁵⁾		Remarks
			ZTH EU	PC-Tool	
System specific data					
Position	16 characters e.g.: Office 4 6. OG ZL	Text	r	r/w	
Designation	16 Characters: Unit designation, etc.	Text	r	r/w	
Address (MP)	PP		r/w	r/w	for KNX applications: PP
\dot{V}_{max}	20...100% [\dot{V}_{nom}]	m ³ /h / l/s / cfm	r/w	r/w	$\geq \dot{V}_{min}$
\dot{V}_{mid}	\dot{V}_{min} ... \dot{V}_{max}	m ³ /h / l/s / cfm	r/w	r/w	
\dot{V}_{min}	0...100% [\dot{V}_{nom}]	m ³ /h / l/s / cfm	r/w	r/w	$\leq \dot{V}_{max}$
System altitude	0...3000	Meter	r/w	r/w	Adaptation of Δp -Sensor to system altitude (above sea level)
Controller settings					
Controller function	Volumetric flow / Position control (Open loop)		-	r/w	
Mode	0...10 / 2...10	Volt	r/w ¹⁾	r/w	for KNX applications: 2...10
CAV function ²⁾	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 KNX applications
Positioning signal Y	Start value: 0.6...30; Stop value: 2.6...32	Volt	r	r/w	not relevant for KNX applications
Feedback U	Volume / damper position / Δp		-	r/w	Defining feedback signal
Feedback U	Start value: 0.0...8.0; Stop value: 2.0...10	Volt	-	r/w	
Response when switched on (Power-On) ⁴⁾	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	
Unit specific settings ^{*)} Write function only available for VAV manufacturer					
\dot{V}_{nom}	0...60'000 m ³ /h	m ³ /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
Other settings					
Direction of rotation (for Y = 100%)	cw/ccw		r/w ¹⁾	r/w	
Range of rotation	Adapted ³⁾ / programmed 30...95	°	-	r/w	
Torque	100 / 75 / 50 / 25	%		r/w	% of nominal torque
Operating data					
Setpoint / actual value		m ³ /h / l/s / cfm	r	r	Trend display with print function and data storage on HD
Damper position		Pa / %	Trend		
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	
Configuration data					
Print, Send			-	Yes	
Save to file			-	Yes	
Log data / book	Activity log		c-	Yes	incl. complete setting data

Explanations

1) Access only on operating level 2

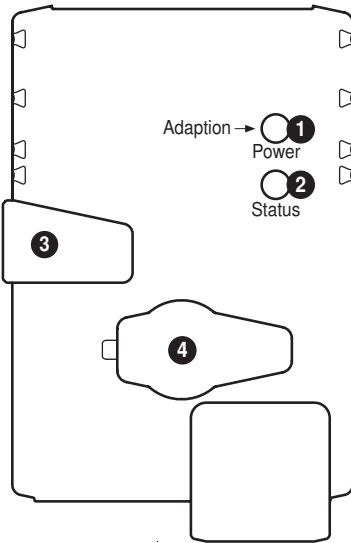
2) CAV setting for MP/MF type

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.com for function and version history.

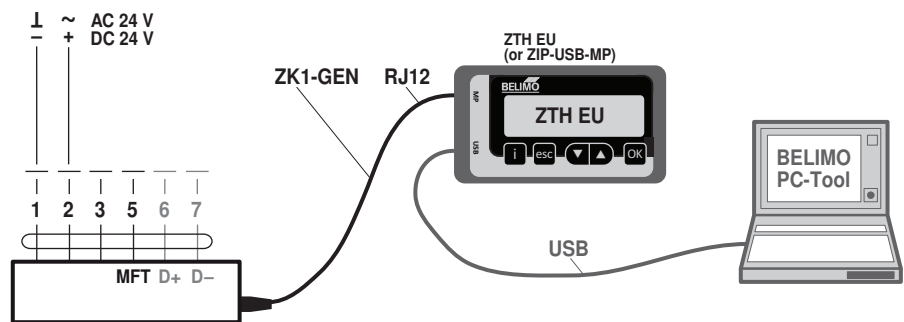
Display and operation



- 1 Push-button and LED display green**
 Off: No power supply or malfunction
 On: In operation
 Press button: Triggers angle of rotation adaptation
- 2 Push-button and LED display yellow**
 Off: The actuator is ready
 On: Adaption or synchronising process active or actuator in programming mode (KNX)
 Flashing: Connection test (KNX) active
 Press button: In operation (>1 s): Switch programming mode On and Off (KNX)
 When starting (>5 s): Reset to factory setting (KNX)
- 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

ZTH / PC-Tool – local service connection

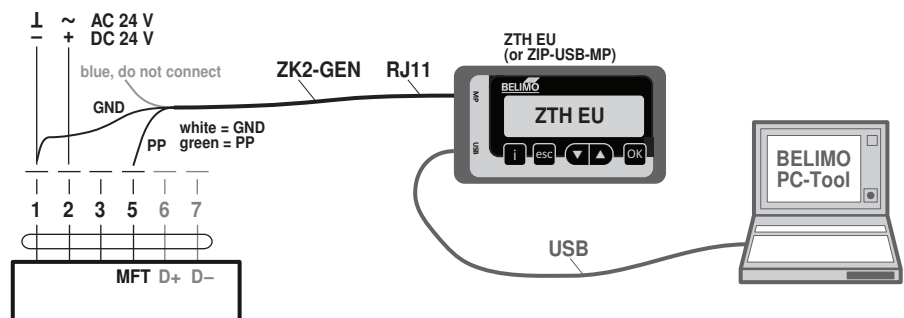
The settings and diagnostics of the VAV-Compact can be performed easily and rapidly with the Belimo PC-Tool or with the ZTH-EU service tool. When using the PC-Tool, the ZTH EU serves as an interface converter.



Download PC-Tool (MFT-P) from www.belimo.com

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.



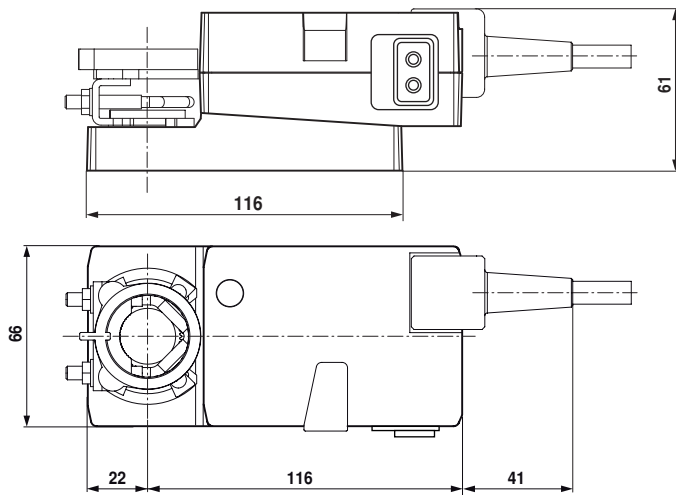
Download PC-Tool (MFT-P) from www.belimo.com

Accessories

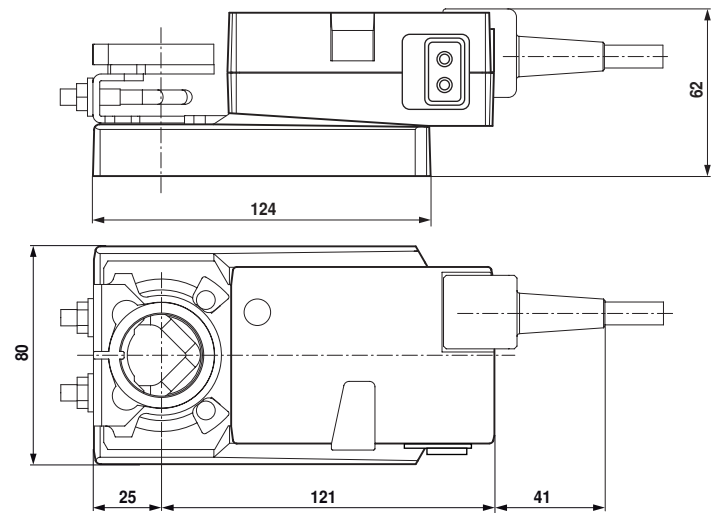
VAV-Compact / VAV-Universal	Description	
	VAV-Compact: version with integrated MP-Bus, LonWorks® and Modbus interface	
	VAV-Universal: VAV pressure controller, Δp sensors, actuator(spring-return, fast runner, etc.)	
	see www.belimo.com for more information and documentation	
Electrical accessories	Description	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
Service 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-KNX






Dimensional drawings NMV-D3-KNX



Further documentation

- Tool connections

	-MF	-MP	-KNX	-MOD
				
Field of application: Supply and exhaust air in the comfort zone and sensor-compatible media	X	X	X	X
AC/DC 24 V supply	X	X	X	X
Integrated Δp sensor, dynamic D3, measuring range:	-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
– Linear actuator	–	150 / 200 / 300 mm	150* / 200* / 300* mm	150* / 200* / 300* mm
VAV function Close, 2...10 V $\dot{V}_{min}... \dot{V}_{max}$	X	X	X	X
CAV stages $\dot{V}_{min} / \dot{V}_{mid} / \dot{V}_{max} / \text{Close}$	X	X	–	–
Position control (Open-Loop / external V-Control)	X	X	X	X
DCV (Optimiser function)	–	DDC MP Partners Belimo fan optimiser	Yes, programmable	Yes, programmable
Analog control	0/2...10 V	0/2...10 V	–	0/2...10 V
With bus control	–	X	X	X
Bus specification	–	Belimo MP bus	KNX S mode	Modbus RTU / BACnet MS/TP / RS485
Direct integration DDC MP Partners	–	X	–	–
Integration via Gateway	–		–	–
– BACnet		X		
– KNX		X		
– Modbus RTU		X		
Number of bus devices	–	8 per strand	64 per line segment	32 per strand
Sensor integration	–			
– passive (resistance)		X	–	–
– active (0...10 V)		X	X	X
– Switching contact		X	X	X
Optional control function	–	–	–	–
Local forced (override)	–	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	PC-Tool	ETS	...
TypeList function (Retrofit, OEM)	–	X	(–)	(–)
Tool connection (U – PP/MP)	PP	PP/MP	PP	PP
Service socket ZTH / PC-Tool	X	X	X	X
NFC interface	–	X	–	–
Assistant App	–	X	–	–
Service tool ZTH EU	X	X	X	X
PC-Tool	X	X	X	X
– Parameter				
– Save data				
– Trend, Logbook				
– Label Print				

* on request