技术参数表 LMV-D3-KNX

紧凑型VAV机组 – 带VAV控制器, 动态压差传感器和风阀执行器

- **应用领域: VAV装置适用于舒适性空间**
- **应用: VAV/CAV, 位置控制**
- **Belimo D3, 动态流量传感器**
- **功能性压差范围 0...500 Pa**
- **控制方式 交互通信式**
- **通过 KNX® 通信（S-模式）**
- **传感器信号转换**
- **用于操作设备的服务插口**

图片可能与实际产品不同

技术参数

电气参数	额定电压	AC/DC 24 V
	额定电压频率	50/60 Hz
	额定电压范围	AC 19.2...28.8 V / DC 21.6...28.8 V
	运行功耗	2 W
	保持功耗	1 W
	变压器容量	4 VA
	浪涌电流 (Imax)	8.0 A @ 5 ms
	连接方式	电缆 1 m, 6x 0.75 mm^2
数据 总线通信	通信控制	KNX (S 模式)
	节点数量	每个线段最多64个，用短线连接电缆减少节点数
	通信媒体	KNX TP
	配置模式	S-模式
	KNX-Bus 的电流消耗	最大5 mA
功能参数	运行扭矩	5 Nm
	V'max可调节	20...100%的V'nom
	V'mid可调节	>V'min...<V'max
	V'min可调节	0...100%的V'nom (<V'max)
	手动操作	按下手动操作钮，执行器齿轮机构解锁
	旋转角度	95°
	旋转角度说明	可调的机械或电气限制
	机械接口	通用轴夹持器 6...20 mm
	位置指示	机械式
测量参数	测量原理	Belimo D3, 动态流量传感器
	安装方向	不受位置限制，无需调零
	功能性压差范围	0...500 Pa
	最大系统压力	1500 Pa
	过载压力	±5 kPa
	高度上的补偿	调整系统所在位置的高度（海拔0 ... 3000m范围）
	空气测量条件	0...50°C / 5...95% 相对湿度，无结露
	压力套管连接	螺纹接头直径5.3mm
安全参数	防触电保护等级IEC/EN	III，保护特低电压 (PELV)
	电气防护等级IEC/EN	IP54
	NEMA/UL 防护等级	NEMA 2
	外壳	UL Enclosure Type 2
	EMC	CE 遵循 2014/30/EU

技术参数

安全参数	IEC/EN认证	IEC/EN 60730-1 和 IEC/EN 60730-2-14
	运行方式	类型 1
	额定冲击电压 — 供电/控制	0.8 kV
	污染等级	3
	环境湿度	最大 95% 相对湿度，无结露
	环境温度	0...50°C [32...122°F]
	存储温度	-20...80°C [-4...176°F]
	维护	免维护
重量	重量	0.55 kg

安全注意事项

- 该设备不得用于指定范围以外的应用，特别是在飞机及其他同类的航空运输设备应用。
- 户外应用：只能在没有 (海) 水、雪、冰、阳光或腐蚀性气体直接干扰执行器的情况下，并且确保环境条件在任何时候都保持在数据表规定的阈值内。
- 只有经授权的专业人员才能进行安装。并需在安装过程中遵循所有适用的法律或主管机构的安装规定。
- 本设备只得在制造商工厂被打开。本设备不包含任何用户可以自行更换或维修的部件。
- 不得将电缆从设备上移除。
- 此设备含有电子元件，不得作为普通家庭垃圾处理，必须按照所在地的相关法令法规处理。

产品特点

应用

通用型VAV用于VAV设备机组压力独立控制的舒适应用。参见技术手册-适用于风量应用的紧凑型VAV产品系列。

压力测量

集成的压差传感器也适用于非常小的风量。免维护的传感器技术可以广泛地应用于舒适区的暖通空调(HVAC)，诸如住宅建筑，办公室，酒店等。

执行器

对于不同的应用和风阀设计，为生产VAV设备机组的厂家提供了各种型号的执行器，扭矩为5，10或20Nm。

控制功能

风量 (VAV/CAV)或位置控制 (开环式回路)

变风量应用（VAV）

V'min.....V'max范围内的可变风量控制，通过调节参考变量（模拟或总线）根据需求进行控制，例如室内温度，CO_2控制器用于单个房间或区域的节能空调。

V'nom, Δp @ V'nom

适用于VAV设备机组的OEM特定校准参数

可调范围 Δp @ V'nom: 38...450 Pa

V'max (Max)

最大的运行风量，在20...100% V'nom范围内可调

V'min (Min)

最小的运行风流量，在0...100% V'nom范围内可调

恒定风量应用 (CAV)

定风量控制。如有需要，可将步进开关（开关触点）用于定风量应用。

步骤: CLOSE (全关) / 最小 / 最大 / OPEN (全开)

位置控制应用 (开路)

紧凑型VAV集成到外部VAV控制回路的位置控制。变送器和执行器组件。

最大范围: 20...100 %的旋转范围

最小范围: 0...100 %的旋转范围

按需控制通风 (DCV)

向更高级别的自动化系统输出需求信号（风阀位置）-DCV功能。

产品特点

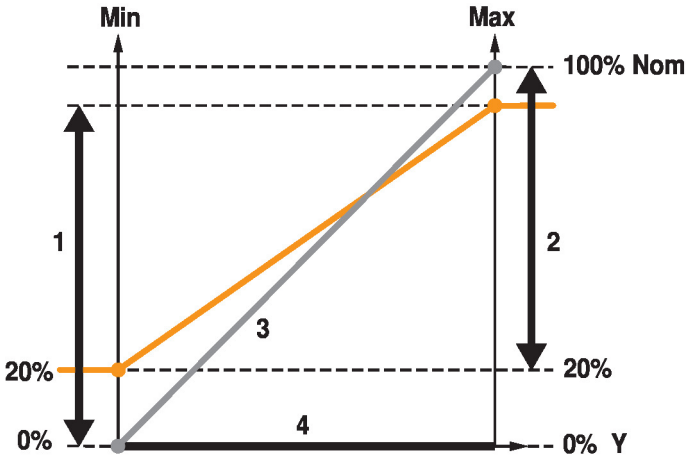
总线运行 执行器配备有 KNX(S-模式)的集成接口，可与具有相应可用数据点的所有 KNX 设备连接。

在总线模式下，可选接一个传感器(0...10 V)，如：温度传感器或开关触点，用于集成到更高级别的总线系统中。

运行设置 控制功能

风量 (VAV/CAV)或位置控制 (开环式回路)

运行设置 Min/Max/Nom



额定值 (OEM 设置) Nom
调节范围 Min 1
调节范围 Max 2
反馈信号 U 0...100% Nom 3
控制信号 Y Min...Max 4

运行和维护工具 搏力谋小助手2 ZTH EU/AP – 可以本地插入服务接口或通过MP连接远程插入。

ETS (配置软件，用于 KNX)

配件

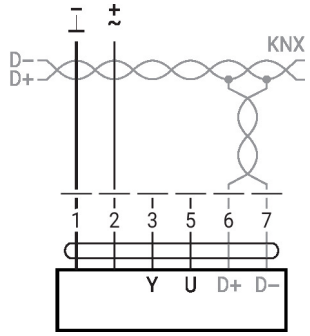
工具	描述	型号
	用于有线及无线设置、现场操作与故障排查的服务工具。	Belimo Assistant 2
	Belimo Assistant Link 支持蓝牙转NFC或USB转MP-Bus的转换器用于可参数化设置和可通信型设备	LINK.10
	连接电缆 5 m, A: RJ11 6/4 LINK.10, B: 用于带6针插座的搏力谋设备	ZK1-GEN
	连接电缆 5 m, A: RJ11 6/4 LINK.10, B: 连接到MP/PP端子	ZK2-GEN

电气安装

电缆颜色:
1 = 黑色
2 = 红色
3 = 白色
5 = 橙色
6 = 粉色
7 = 灰色

功能:
D+ = KNX+ (粉色 > 红色)
D- = KNX- (灰色 > 黑色)

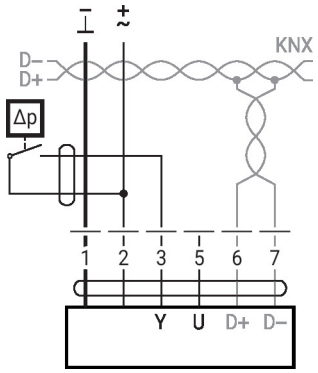
无传感器连接



电气安装

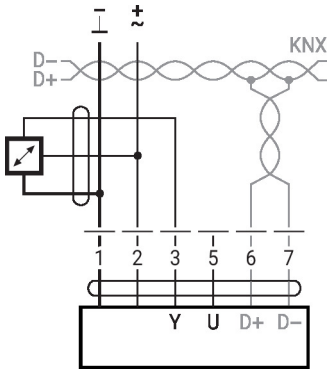
外接传感器端子

带开关触点的连接，例如压差开关



切换触点要求：切换触点必须能够准确地在24 V时切换16 mA的电流。

连接有源传感器，如 0...10 V @ 0...50°C

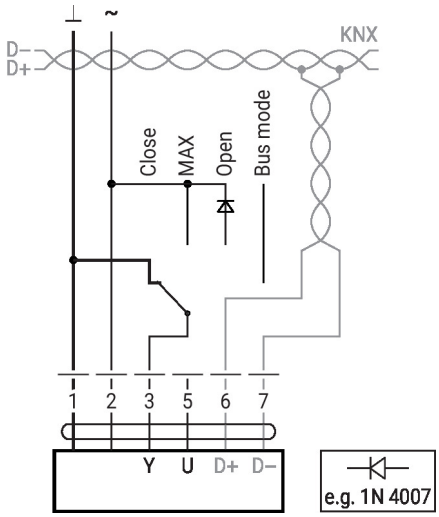


可能的电压范围: 0...32 V
分辨率 30 mV
• 切换电流 16 mA @ 24 V
• 运行范围的起点必须在KNX执行器上配置为 ≥0.5 V

其他电气安装

具有特定参数的功能(需要参数设置)

本地超驰控制



如果没有集成传感器，则连接3(Y)可用于本地超驰控制。
注意: 仅在 AC 24 V 电压下工作!

参数与工具概述

Settings and tool function

Designation	Setting values, limits, explanations	Units	Tool		Remarks
			ZTH EU	PC-Tool	
System-specific data					
Position	16 characters, e.g. Office 4 6th OG ZL	String	r	r/w	
Designation	16 characters: Unit designation, etc.	String	r	r/w	
Address (MP)	PP		r/w	r/w	For KNX applications: PP
V'_{max}	20...100% [V'_{nom}]	m³/h / l/s / cfm	r/w	r/w	>/= V'_{min}
V'_{mid}	V'_{min}...V'_{max}	m³/h / l/s / cfm	r/w	r/w	
V'_{min}	0...100% [V'_{nom}]	m³/h / l/s / cfm	r/w	r/w	</= V'_{max}
Altitude of installation	0...3000	m	r/w	r/w	Adaptation of Δp sensor to altitude (meters above sea level)
Controller Settings					
Control function	Volumetric flow / Position control (Open Loop)		–	r/w	
Mode	0...10 / 2...10	V	r/w[2]	r/w	For KNX applications: 2...10
CAV function[2]	CLOSE/V'_{min}/V'_{max}; Shut-off level CLOSE 0.1 V CLOSE/V'_{min}/V'_{max}; Shut-off level CLOSE 0.5 V V'min/V'_{mid}/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	V	r	r/w	Not relevant for KNX applications
Feedback U	Volume / Damper position / Δp		–	r/w	Definition of feedback signal
Feedback U	Start value: 0...8; Stop value: 2...10	V	–	r/w	
Behaviour when switched on (Power-on)	No action / Adaptation / Synchronisation		–	r/w	
Synchronisation behaviour	Y=0% Y=100%		–	r/w	Synchronisation at damper position 0 or 100%
Bus fail position	Last setpoint / Damper CLOSE V'_{min} / V'_{max} / Damper OPEN		–	r/w	
Unit-specific settings					
V'_{nom}	0...60´000 m³/h	m³/h / l/s / cfm	r	r/(w)[1]	Unit-specific setting value
Δp@V'_{nom}	38...450	Pa	r	r/(w)[1]	Unit-specific setting value
Print function label			–	w	
Other settings					
Direction of rotation (for Y=100%)	cw/ccw		r/w[2]	r/w	Unit-specific setting value
Range of rotation	Adapted [4] / programmed 30...95	°	–	r/w	
Torque	100 / 75 / 50 / 25	%		r/w	% of nominal torque

[1] Write function accessible only for VAV manufacturers
[1] Access only via Servicing level 2
[2] CAV setting for MP operation
[3] Within the mechanical limitation
[4] The first time the supply voltage is switched on, i.e. at the time of initial 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 control signal.

参数与工具概述

Settings and tool function

Designation	Setting values, limits, explanations	Units	Tool		Remarks
			ZTH EU	PC-Tool	
Operating data					
Actual value / Setpoint Damper position		m^3/h / l/s / cfm Pa / %	r T	r	T (Trend) display with print function and data saving to HD
Simulation	Damper OPEN/CLOSE V'_{min} / V'_{mid} / V'_{max} / Motor Stop		w	w	
Running times	Operating time, running time Ratio (relation)		–	r	
Alarm messages	Setting range enlarged, Mech. overload, Stop&Go ratio too high		–	r/w	
Serial number	Device ID		r	r	Incl. production date
Type	Type designation		r	r	
Version display	Firmware, Config. table ID		r	r	
Configuration data					
Print, send			–	yes	
Backup in file			–	yes	
Log data / Logbook	Activities log		–	yes	

KNX 组对象

Name	Type	Flags					Data point type				Values range
		C	R	W	T	U	ID	DPT_Name	Format	Unit	
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	_volume_flux	4 Byte	m^3/s	1.0 x 10^{-10} m^3/s
Absolute volumetric flow	O	C	R	–	T	–	9.009	_air_flow	2 Byte	m^3/h	1.0 x m^3/h
Nominal volumetric flow	O	C	R	–	T	–	14.077	_volume_flux	4 Byte	m^3/s	1.0 x 10^{-10} m^3/s
Nominal volumetric flow	O	C	R	–	T	–	9.009	_air_flow	2 Byte	m^3/h	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组对象(续)

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.*).
The override control is not stored persistentely and is reset after restarting the device.

Reset
Resetting the saved service messages
(see KNX group object *Service information*).

Adaptation
Perform the adaption. The first-time adaption is performed by the manufacturer of the volumetric flow unit.
An active adaptation is signaled in Bit 8 of *Service information.*

Testrun
Performance of a testrun that checks the entire operating range.
An active testrun is signalled in Bit 8 of *Service information.* After completion, detected faults (mechanical overload, actuation path exceeded) are signalled in *Service information.*

Min
Minimum Limit (volumetric flow or position) in %
Position control: Limit in % of adapted working range
Volumetric flow control: Limit in % of nominal volumetric flow V'nom
⚠ This value is stored persistently on the device and must not be written to regularly. Regular writing to the object can lead to malfunctions.

Max
Maximum Limit (volumetric flow or position) in %
Position control: Limit in % of adapted working range
Volumetric flow control: Limit in % of nominal volumetric flow V'nom
⚠ This value is stored persistently on the device and must not be written to regularly. Regular writing to the object can lead to malfunctions.

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 *Service information.*

Overridden
Signalling of an active override control (OPEN/CLOSED)
The device can be commanded via the KNX group object *Override control* 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: Utilisation too high: Motor operation too high in relation to operating time
Bit 1: Actuation path increased: Defined end position exceeded
Bit 2: Mechanical overload: Defined end position not reached
Bit 3...7: Not used with this device type
Bit 8: Internal activity: Synchronisation, Adaption or test run active
Bit 9: Bus monitoring triggered
Bit 10...15: Not used with this device type
Bit 0..2: Are saved by the device and can be reset with the KNX group object Reset.
Alternatively, the individual bits can be read as the sum of the fault status.

Sensor value
The representation of the sensor value is dependent on the configuration.
See section „KNX parameters – Sensor"

KNX 参数

Common

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)
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")
Only for „Active sensor" sensor type

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»)
The polarity can be defined for the sensor type „Switching contact".

Values range: Normal
Inverted
Factory setting: –

KNX 工作流程

产品数据库 The product database for the import in ETS4 or higher is available at the Belimo website.

KNX 工作流程

设置物理地址

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 Individual 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 Moov'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.

硬件升级

The KNX firmware of the device is updated automatically with the programming of the application program if the product database has a more recent version.

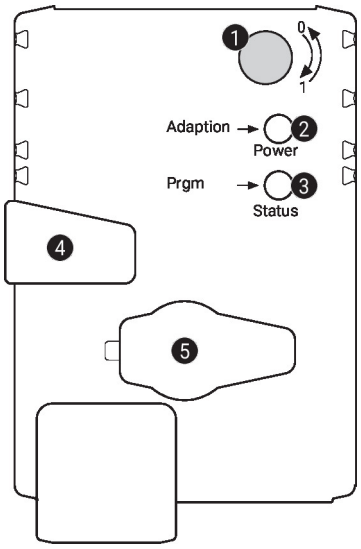
The first programming procedure takes somewhat longer in such cases (>1 min).

重置为KNX出厂设置

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.

操作控制及面板指示图



❶ 旋转方向开关

切换： 旋转方向改变

❷ 按钮和绿色 LED 灯显示

熄灭： 无电源或故障
亮： 运行中
按下按钮: 触发旋转角度自适应，随后进入标准模式

❸ 按钮和黄色 LED 灯显示

熄灭： 执行器已准备就绪
亮： 自适应或同步动作激活或执行器处于编程模式 (KNX)
闪烁: 连接测试 (KNX) 已启动
按下按钮： 运行中 (>3 s)：打开或关闭编程模式 (KNX)
启动时 (>5s): 恢复出厂设置 (KNX)

❹ 手动操作按钮

按下按钮: 齿轮传动装置解锁，电机停运，可进行手动操作
释放按钮: 齿轮传动装置啮合，同步开始，随后进入标准模式

❺ 维护插口

用于连接配置和维护工具

安装备注

安装情况

安装紧凑型VAV控制设备:

紧凑型VAV由VAV机组制造商在工厂中在VAV机组上组装、设置和校准。

VAV机组的安装:

VAV机组必须根据VAV装置制造商的规范进行安装。

Δp传感器安装规范:

没有限制，但必须避免任何冷凝物进入传感器并停留在那里。

控制设备的可及性:

必须始终保证控制设备的可接近性。

压力管连接:

压力管连接不得接触任何种类的液体或润滑剂，包括压力管内部或表面的任何残留物。

维护

安装、调试或维护期间的清洁工作

搏力谋VAV设备是免维护的。如有必要，我们建议干燥去除外壳外部的灰尘。

风管系统和VAV机组在法律或特定系统要求的清洁时间间隔内进行维护。请遵守以下几点。

风阀、压差拾取装置和压力管的清洁工作

清洁风管系统或VAV装置时，拆除VAV控制器上的压力管，使其不受影响。

使用压缩空气，例如吹除压差拾取装置或压力管

进行此项工作之前，从压差传感器上断开压差拾取装置或压力管。

连接压力管

为了确保压力管的正确安装，我们建议在拆卸前用+或-标记它们。

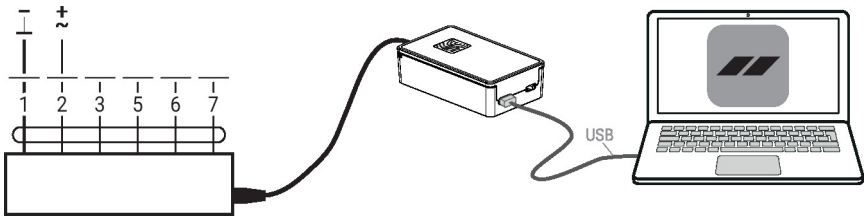
维护

使用搏力谋小助手2可修改设备参数。搏力谋小助手2可在智能手机、平板或电脑上操作。现有的连接选项取决于安装搏力谋小助手2的硬件。

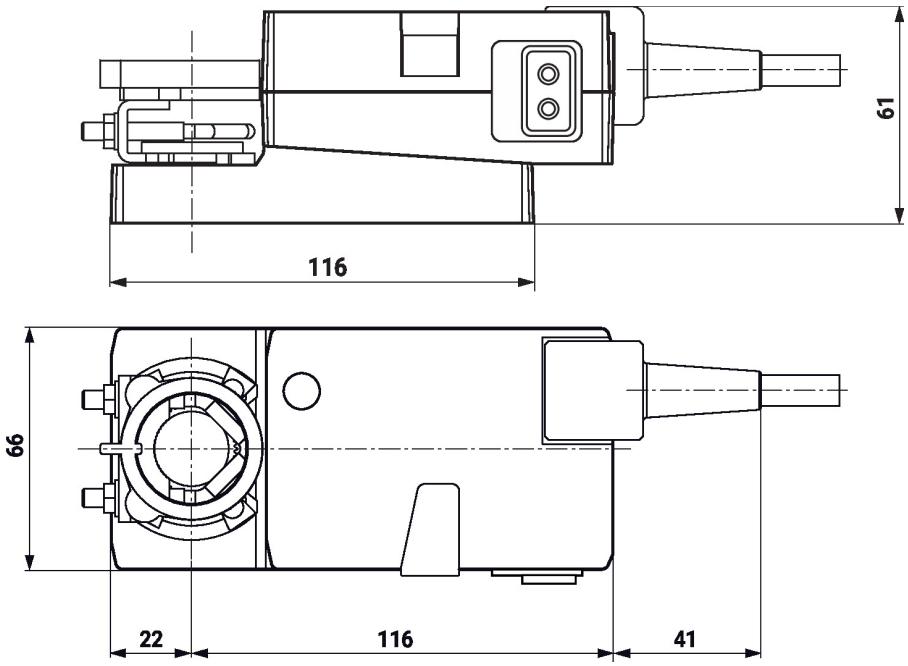
有关搏力谋小助手2的详情，请参阅 "快速指南——搏力谋小助手2"。

有线连接

Belimo devices can be accessed by connecting Belimo Assistant Link to the USB port on a PC or laptop and to the Service Socket or MP-Bus wire on the device.



尺寸规格



更多文档

- 适用于舒适应用的紧凑型VAV产品系列
- 工具连接
- 通用型VAV应用说明

搏力谋的体积流量和压力控制产品系列概览

- 快速入门指南 – 搏力谋小助手2