

Technical data sheet

327 VAV Compact

Description

Compact controller for pressure and volumetric air flow control

- Pressure sensor, controller and servomotor in one device
- Conversion of sensor signals into pressure or volume flow
- Parameterization via service connector using handheld (GUIV3-M) or PC-software (WIN-VAV2 with interfaces GUIV3-S or GUIV3-M)
- Communication via BACnet MS/TP, Modbus RTU or analog control



Detailed description

Application	The compact VAV controllers of the 327 series are used for pressure and volumetric air flow control of VAV dampers in HVAC installations.
Sensor	The differential pressure sensor is available as dynamic version (500 1500 Pa) or static version (400 600 1000 Pa).
Actuator	There are three different gearboxes available (5 10 15 Nm).
Control function	Pressure control linear, volume air flow control linear or 'Open-Loop' continuous control possible.
Pressure or volumetric air flow control	Reference value (min...max) via analog setpoint or digital communication (for example BMS).
Building management system	BACnet or Modbus-System for example with itaMAX system.
Communication	The servomotor is available with a BACnet MS/TP (including Modbus RTU), Modbus RTU or as an analog controller. The device receives a setpoint via system and reports the actual status. Different hybrid types are possible.
Parameterization	Settings via Service connector possible by using handheld (GUIV3-M) or PC-software (WIN-VAV2 with Interface GUIV3-S or GUIV3-M).
Operating and service devices	Setting tool GUIV3-M, PC interface GUIV3-S + PC software WIN-VAV2.
Electrical connection	See electrical installation.

Detailed description

Sales, mounting & setting

The servomotors will be mounted by VAV manufacturers (OEM). The settings are adjusted and calibrated according to the application. Therefore 327 VAV servomotors are sold exclusively to VAV damper manufacturers (OEM).

Technical data

Electrical data	Nominal voltage	24 VAC/DC, 50/60 Hz
	Voltage range	19...29 VAC/DC
	Power consumption motor	< 3,0 W
	Power consumption standby	< 2,0 W
	Wire sizing	< 5,5 VA
	Control	- Analog: (0)2...10 V DC / Ri > (100 kΩ) 50 kΩ (0)4...20 mA / with Rext. = 500 Ω - BACnet MS/TP - Modbus RTU
	Feedback signal	- Analog: (0)2...10 V DC max. 5 mA Actual volume air flow/pressure (factory setting); damper position (parameterizable) - Bus: BACnet MS/TP Modbus RTU - Hybrid operation: Analog and bus are available in parallel
	Priority control	close / min / btw / max / open / stop
	Connection motor	cable 1000 mm, 4 x 0,75 mm ² (halogen free) or screw terminals 0,5..1,5 mm ²
	Connection GUIV	via service connection
BACnet	Protocol	BACnet MS/TP
	Medium	cable 1000 mm, 2 x 0,38 mm ² (halogen free) RS-485, not electrically isolated or screw terminal

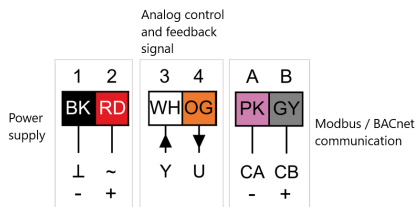
Technical data

BACnet	Number of nodes	max. 128
	Baud rates	9600 / 19200 / 38400 / 57600 / 76800 / 115200
	Termination	external (120 Ω)
	Standard parameter	38400 Bd
Modbus	Protocol	Modbus RTU
	Medium	cable 1000 mm, 2 x 0,38 mm ² (halogen free) RS-485, not electrically isolated or screw terminal
	Number of nodes	max. 128
	Baud rates	1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 76800 / 115200 Bd
	Byte sequence	MSB / LSB
	Byte format	1 start bit, 8 data bits, 2 stop bits, none parity 1 start bit, 8 data bits, 1 stop bit, even parity 1 start bit, 8 data bits, 1 stop bit, odd parity
	Termination	external (120 Ω)
	Response time	≤ 10 ms + delay
	Standard parameter	19200 Bd, 1 start bit, 8 data bits, 1 stop bit, even parity, 0 ms delay
Sensor	Sensor	differential pressure sensor dynamic version (500 1500 Pa) static version (400 600 1000 Pa)
	Burst pressure	1 bar
	Nominal value	damper manufacturer specific value min / btw / max based on nominal
	Medium	air -40°C...85°C / 5...95% r.H., non condensing
	Mounting position	independent of position
	Material	PA, glass, LCPT (dynamic version) Tygon-ST (R-3607), PA66 GF25 V0 (static version)
	Connection	tube clip Ø 4-6 mm
Functional data	Torque	
	Synchronized speed	± 5%
	Direction of rotation	adjustable

Technical data

Functional data	Manual override	gear de-clutch with pushbutton, lockable
	Angle of rotation	0°...max. 95° can be limited with adjustable mechanical end stops
	Running time	5 Nm: 100 s / 90° (adjustable 20...120 s / 90°) 10 & 15 Nm: 150 s / 90° (adjustable 70...420 s / 90°)
	Sound power level	< 35 dB(A) @ standard running time
	Shaft coupling	universal clamp (Ø 20 mm) or form fit Ø 8/10/12 mm
	Position indication	mechanical with pointer
	Service life	> 100 000 cycles (0°...95°...0°) > 1 500 000 cycles (max. ± 5°)
Safety	Protection class	III (safety extra-low voltage)
	Degree of protection	IP 42 (cable downwards, tube clip connected) IP 20 (with screw terminals)
	Cable mounting type	Type Z (EN 60730-1)
	EMC	CE (2014/30/EU)
	LVD	CE (2014/35/EU)
	RoHS	CE (2011/65/EU - 2015/863/EU - 2017/2101/EU)
	Mode of operation	Type 1.AA B (EN 60730-1)
	Rated impulse voltage supply / control	0,5 kV
	Control pollution degree	3 (EN 60730-1)
	Ambient temperature normal operation	0°C...+50°C
	Storage temperature	-20°C...+80°C
	Ambient humidity	5...95% r.H., non-condensing
	Maintenance	maintenance free
Dimensions / Weight	Dimensions	155 x 67 x 66 mm
	Weight	5 Nm: 600 g 10/15 Nm: 700 g

Connection



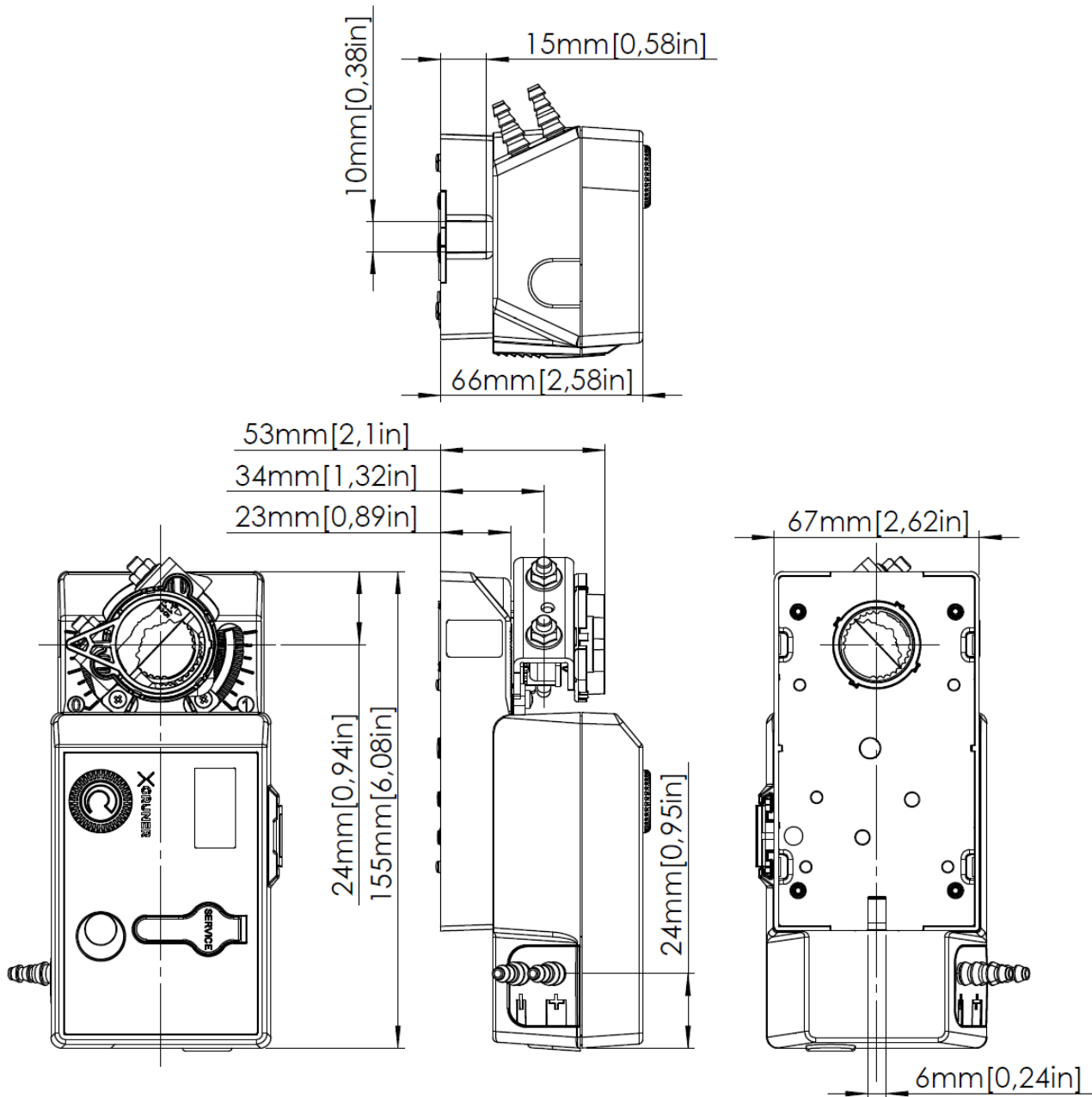
No.	Designation	Wire colour	Function
1	-	black	Power supply 24 VAC/DC
2	+	red	
3	Y	white	Setpoint signal 0-10 VDC
4	U	orange	Feedback signal 0-10 VDC
A	CA -	pink	BACnet MS/TP Modbus RTU connection (RS485)
B	CB +	grey	

Safety instructions

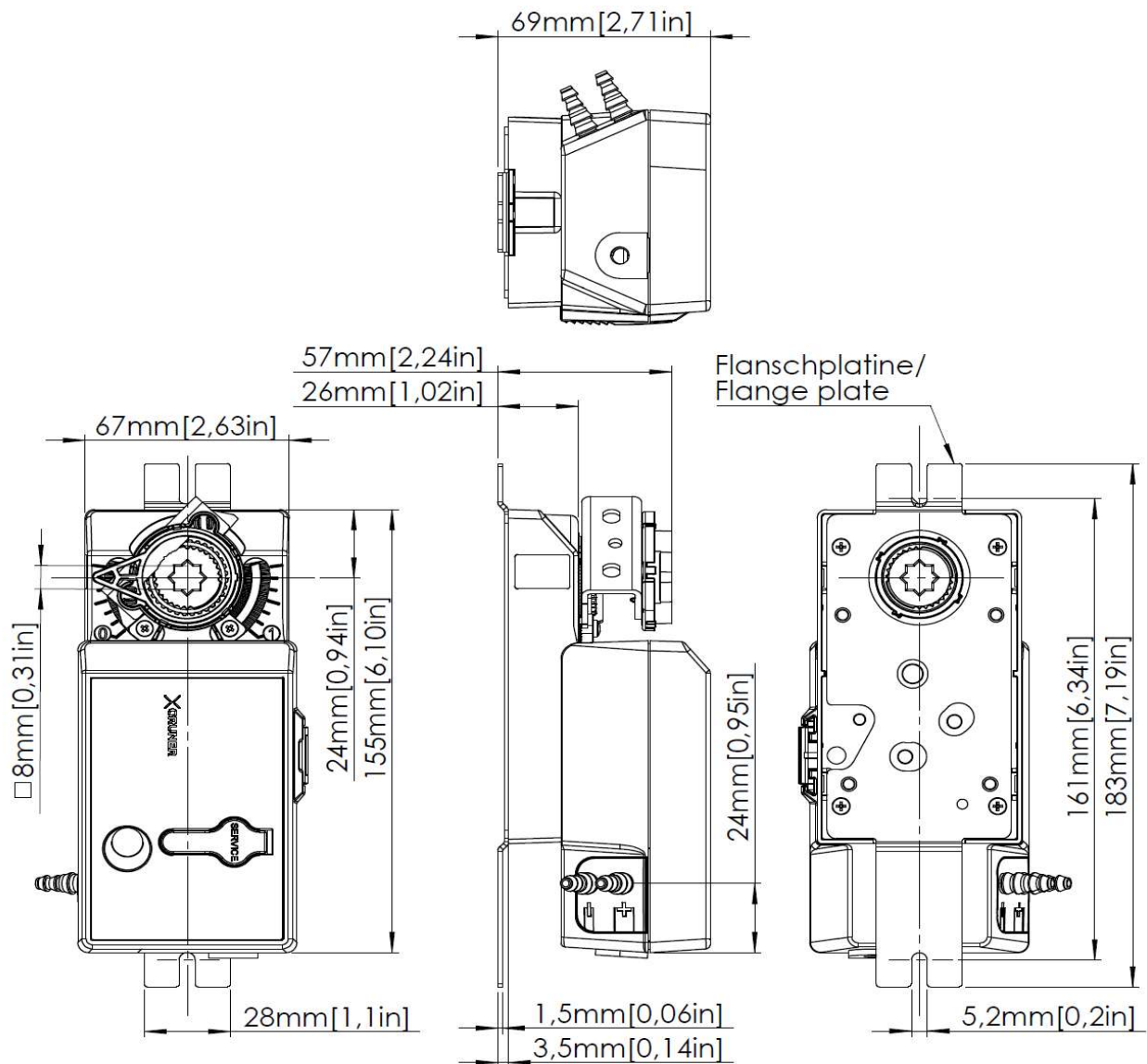
Safety remarks

- Connect via safety isolation transformer!
- The device is not allowed to be used outside the specified field of application, especially in airplanes.
- Outdoor use is only possible if the device is not directly exposed to water, seawater, snow, ice, sunlight or aggressive gases and it is ensured that the ambient conditions remain within the limit values specified in the data sheet at all times.
- 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.
- Cables must not be removed from the device.
- The cable of this servomotor cannot be replaced. If the cable is damaged, the servomotor should be scrapped.
- The device is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- When calculating the required torque, the specifications supplied by the damper manufacturer's (cross-section, design, installation site), and the air flow conditions must be observed.

Technical Drawing

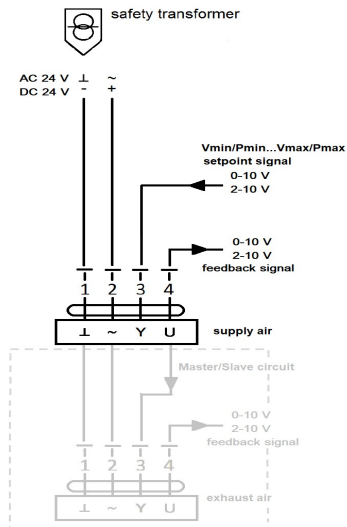


Technical Drawing



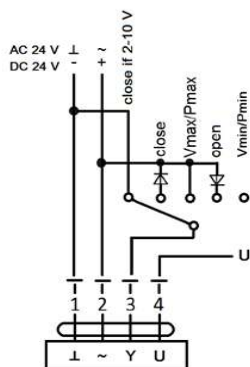
Connection VAV/CAV

VAV – Variable operation min ... max



- Mode 2-10 V:
Damper closed < 0,8 V (adjustable via WIN-VAV2;
0,2 V ... 1,8 V)
- Master/Slave circuit possible

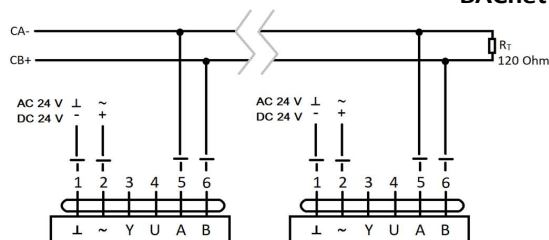
CAV – step operation close / min / btw / max / open



Signal/Function	Min	Max	Btw	Open	Close	Stop
Open line	X					
GND (2...10 V)					X	
Full-wave		X				
Pos. half-wave				X		
Neg. half-wave					X	

The override matrix can be changed via WIN-VAV2 software.

BACnet MS/TP / ModBus RTU

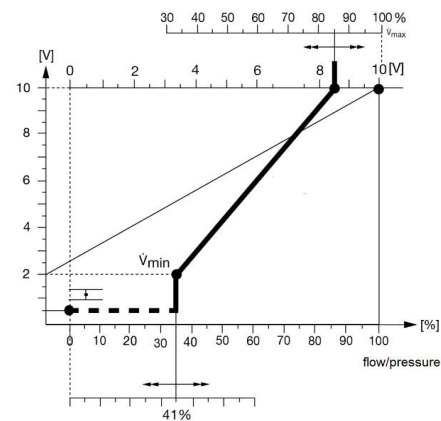
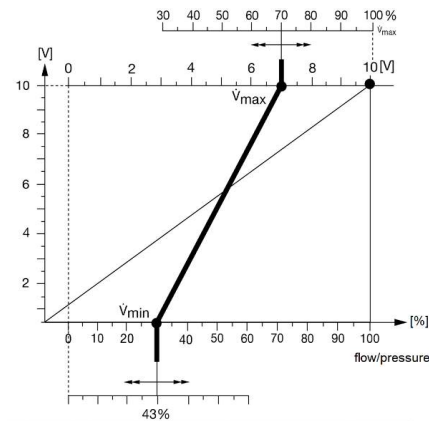


Note:

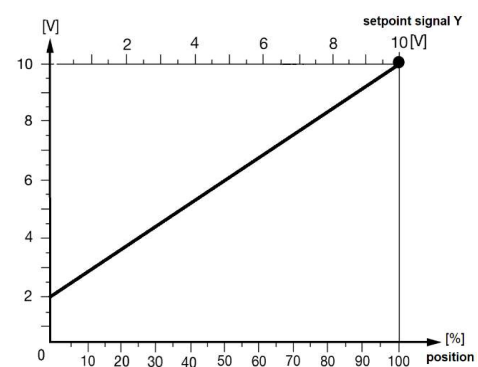
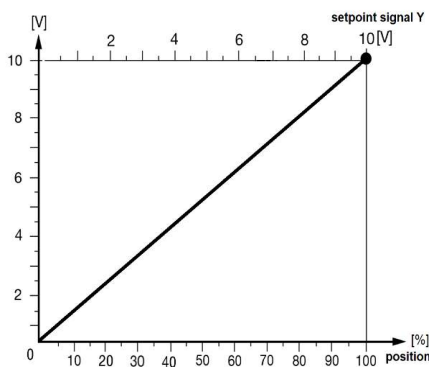
- The BACnet (MS/TP) / ModBus (RTU) line must be wired in accordance with the relevant RS485 guidelines.
- BACnet / ModBus: There is no electrical isolation between the power supply and communication. Connect the ground signals of the devices with each other.

Control functions - VAV / CAV

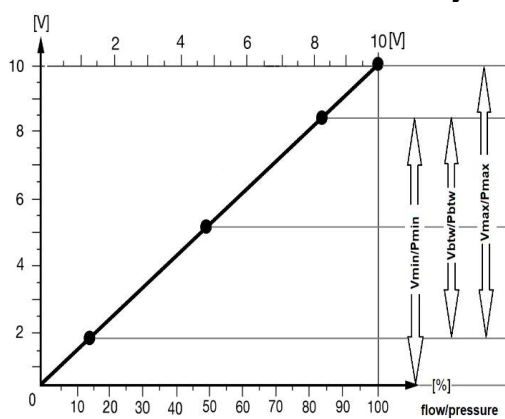
Control functions VAV



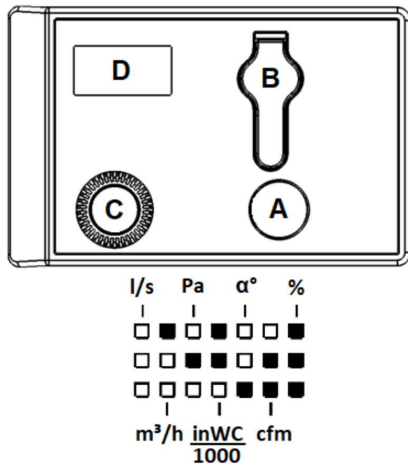
Open - Loop function 0-10 V / 2-10 V



CAV - adjustment



Display 327VM / GUIV3-M

**LED button (A)**

LED off - no power supply

LED on - servomotor is regulated

LED flashes - servomotor drives on position or has not reached its set values

Service connector (B)

The service connection, in combination with a GUIV, is used to parameterize and diagnose the controller.

Value selector (C)

The rotary selector can be used to change the values shown in the display.

Display (D)

The display with backlight is used for setting different values directly on the servomotor without additional setting tools. The unit matrix can be read off the label or compared with the currently set value in the display.

l/s (volume air flow) = No square is shown in display

m³/h (volume air flow) = The top square is shown in the display

Pa (pressure) = The center square is shown in the display

inWC/1000 (pressure) = The top and middle squares are shown in the display

α° (angle) = The bottom square is shown in the display

cfm (volume air flow) = The middle and bottom square are shown in the display

Operation 327V

By pressing the LED button (< 2 s) a test drive starts. Pressing the LED button (> 2 s) starts an adaption drive.

Operation 327VM

By pressing the LED button (< 2 s) the next menu point can be selected.

Pressing the LED button (> 2 s) the menu point can be edited. Push LED button for confirming the selected value.

Menu points 327VM / GUIV3-M

- 1 Act. 
- Set. 
- 2 Min.
- 3 Max.

- 4 Diag.
- 5 Mode
- 6 Com.
- 7 Nom.

1.Act / Set

Shows actual value / setpoint (override function).

2.Min

Adjust the desired min value (setpoint Y = 0 / 2 V DC).

3.Max

Adjust the desired max value (setpoint Y = 10 V DC).

4.Diag

Diagnostic menu:

y/u – shows setpoint / feedback signal

off – return to first level

oP – opens the damper

cL – closes the damper

Hi – activates max. value

Lo – activates min. value

bE – activates between value

St – diagnostic mode on, motor off

Adp – adaption drive (only 15 Nm or BACnet / ModBus version)

123 – software version

5.Mode

0An (0-10 VDC analog control | normal direction of rotation)

2An (2-10 VDC analog control | normal direction of rotation)

0Ai (0-10 VDC analog control | inverse direction of rotation)

2Ai (2-10 VDC analog control | inverse direction of rotation)

0bn (0-10 VDC bus control | normal direction of rotation)

2bn (2-10 VDC bus control | normal direction of rotation)

0bi (0-10 VDC bus control | inverse direction of rotation)

2bi (2-10 VDC bus control | inverse direction of rotation)

6.Com

Setting the Modbus address (1...247) and communication parameters or setting the BACnet address (1...127) and communication parameters

7.Nom

Dynamic sensor:

Volume flow: Display and setting of Vnom depending on the flow rate

Pressure control: Display Pnom

Settings

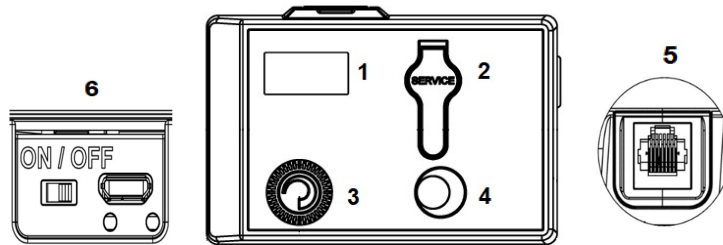
327 VAV servomotors can be set directly on the display. All 327 VAV servomotors can communicate via service connector with setting tool GUIV3-M setting tool or Win-VAV2 software. GUIV3-S is used as an interface for setting software WIN-VAV2.

Accessories

GUIV3-M – service connector + handheld tool GUIV3-M

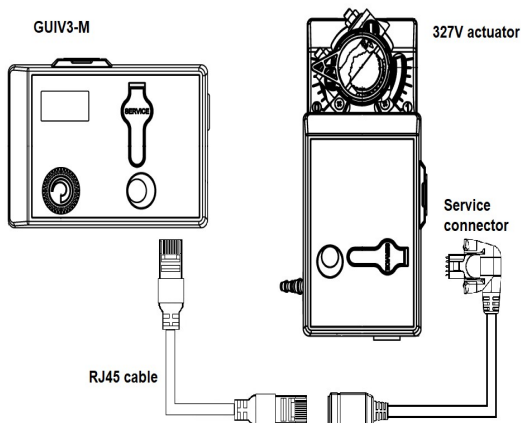
Win-VAV2-Bundle – service connector + PC interface GUIV3-S + WIN-VAV2 software.

Settings and tool functions for 327V/VM via GUIV3-M



- 1) Display
- 2) Port for service-connector
- 3) Rotary selector switch

- 4) LED push button
- 5) RJ45 socket
- 6) On/off switch and micro-USB socket

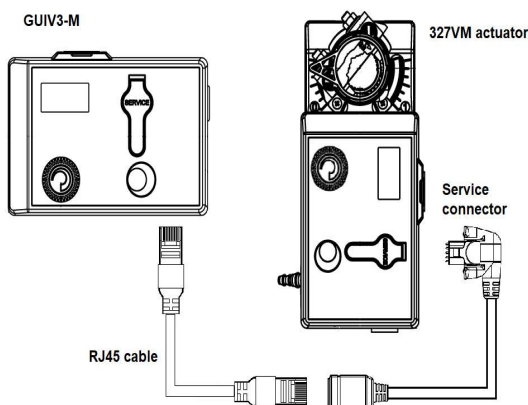


The GUIV is started via an on/off switch. If the GUIV is connected to an actuator, the data will be read out and shown in the display. The control panel is used to set various operating modes, override controls and change parameter settings.

The GUIV features a micro-USB interface. This allows the GUIV to be used as an interface converter between Win-VAV2 software and actuator or for charging the battery.

Menu items:

- Act/set – actual value/setpoint
- Min
- Max
- Diag – override control
- Mode – 0..10 V or 2..10 V | analog or bus
- Com – Modbus / BACnet address and parameters
- Nom – Setting Vnom / Display Pnom



Accessories

Accessories

Description

Fan speed controller

itaMax 24 8/1
(see data sheet itaMax)

Controller for optimization of the fan speed (supply + exhaust air) in a ventilation system with VAV controllers

Tools

WIN-VAV2

Windows Software

GUIV3-S

Interface WIN-VAV2 and PC

GUIV3-M

Manual setting device and interface for WIN-VAV2

Electrical accessories

Service connector

For service interface

Connection cable RJ45

Connection to service connector and GUIV3-M/GUIV3-S

Micro-USB to USB cable

Connection GUIV3-S and PC

Bundles

WIN-VAV2-A-Bundle

Includes WIN-VAV2 software, Micro-USB to USB cable, service connector, RJ45 cable, GUIV3-S, Manual

Order code

Basic type -	327 V M Z	Controller Volumetric air flow control With display Flange plate
Supply voltage -	024 T	24 VAC/DC supply voltage Terminal connection
Torque -	05 10 15	5 Nm torque 10 Nm torque 15 Nm torque
Sensor -	standard DD15 DS4 DS6 DS10	Pressure sensor dynamic 500 Pa Pressure sensor dynamic 1500 Pa Pressure sensor static 400 Pa Pressure sensor static 600 Pa Pressure sensor static 1500 Pa
Protocol -	MB BN	Modbus RTU Protocol (excl. BACnet MS/TP) BACnet MS/TP (incl. Modbus RTU)
Shaft coupling /	standard 8E8 8E10 8E12	Universal clamp 20 mm diameter Form fit insert 8x8 mm Form fit insert 10x10 mm Form fit insert 12x12 mm
Configuration /	CCOL CCPC	Control Open Loop Pressure Control

Example:

327VM-024-15-MB

volumetric flow control with display, 15 Nm torque, dynamic differential pressure sensor (500 Pa), universal clamp (Ø20mm) for shaft adaptation, Modbus RTU (excl. BACnet MS/TP)

327VM-024-05-BN

volumetric flow control with display, 5 Nm torque, dynamic differential pressure sensor (500 Pa), universal clamp (Ø20mm) for shaft adaptation, BACnet MS/TP (incl. Modbus RTU)

327VZ-024-10-DS4/8E8/CCPC

pressure control without display, flange plate, 10 Nm torque, static differential pressure sensor (400 Pa), form fit (□8 mm)