BACnet

Cloud VAV Controller set with Room Unit of Choice and Integrated pressure sensor, controller and damper actuator for pressure-independent temperature control VAV, Simple VAV and Demand Control Ventilation applications in the comfort zone.

- NFC interface for Smartphone Powerless Commissioning
- Workforce Efficiency Improvement with Cloud operation
- BACnet MS/TP Integration
- With AI for CO_2 or T sensor
- Standardized Control Applications for easy implimentations.

NMV-BAC-001

NMV-BAC-002

22RT-A001

22RT-A011

22RT-A002

22RT-A003

Occupancy contact only available with Model 22RT-A001, 22RT-A011 and 22RT-A003
LCD Display only availalble with Model 22RT-A001 and 22RT-A011

Brief description

Application	The ZoneEase VAV has PI control characteristics and is used for pressure-independent temperature control of VAV units in the comfort zone.
Pressure measurement	The integrated maintenance-free Belimo D3 pressure valve sensor is also suitable for very small volumetric flows. It is for this reason that it enables versatile applications in the comfort zone, e.g. in offices, hospitals, hotels, residential construction, cruise ships, etc.
VAV – Temperature control	For pressure-independent temperature control VAV applications, room temperature is obtained rom Room Unit. Room Temperature Setpoint is obtained from the Room Unit through manual buttons (22RT-A001 only) or APP or from command through BACnet MS/TP. The operating range $\dot{V}$min …$\dot{V}$max or reheating valve or electric reheater are controlled based on heating demand or cooling demand, depending on temperature difference (setpoint minus actual), P-Band value (adjustable) and Tn value (adjustable Integral gain)
VAV/CAV – variable/constant volumetric flow control	For variable volumetric flow applications with a modulating reference variable, The operating range $\dot{V}_{min}$ …$\dot{V}_{max}$ can be controlled via BACnet, APP or Room Unit (22RT-A001)
VAV – Demand Control Ventilation (DCV)	For DCV applications, The operating range $\dot{V}$min …$\dot{V}$max are controlled based on demand, dependng on CO_2 difference (setpoint minus actual), Tn_CO_2 value (adjustable)and Tn_CO_2 value (adjustable)
Integration	BACnet MS/TP integration
BACnet function	Addressable from 1 to 127 in a singular BACnet MS/TP network. Recommended to have repeater for every 32 BACnet Devices. Entire BACnet internetwork address limited by 4194303 device, as according to BACnet Limitation.
Additional Sensor integration	A CO_2 Sensor can be connected to the ZoneEase Compact Controller for data collection purpose in Temperature controlled applications and as an control input for DCV application.
Operating and service devices	Actuator and Room Unit NFC interface for Android Smartphone Belimo Assistant App.
Test function / test display	The ZoneEase VAV features two LEDs which shows power status, bus communication, adaptation
OEM factory settings	The ZoneEase VAV is mounted on the VAV box unit by the unit manufacturer, who adjusts and tests it according to the application.

System Technical Data

Electrical Data

Nominal voltage	AC 24V, 50/60Hz
Operating range	AC 19.2 … 28.8 V
Power consumption	4 W / 7 VA (with NMV-BAC-002 and Room Unit), DO Full load connected
	3 W / 5.5 VA (with NMV-BAC-001 and Room Unit)

Ambient Conditions

Operating Temperature/Humidity	0...50°C / 5% tp 95% non-condensing
Storage Temperature	-40…80°C (NMV-BAC-001 / NMV-BAC-002 / 22RT-A002 / 22RT-A003)
	0…60°C (22RT-A001)

Control function (application number)	**- VAV-Demand Control Ventilation by CO_2 (8)**
	- VAV-CAV (9)
	- VAV-Temperature Control
	No Application Selected (1)
	Cooling Only (2)
	Cooling/Heating Only (3)
	Cooling with Reheat 1 Stage (4)
	Cooling with Reheat 2 Stage (5)
	Cooling with on-off Reheat Valve (6)
	Cooling with Modulating Reheat Valve (7)
	Cooling with Parallel Fan (10)
	Cooling with Parallel Fan+Reheat 1 Stage (11)
	Cooling with Parallel Fan+Reheat 1/2 Stage (12)
	Cooling with Parallel Fan+Reheat on-off Valve (13)
	Cooling with Parallel Fan+Reheat Modulating Valve (14)
	Cooling with Series Fan (15)
	Heating or Cooling with Series Fan (16)
	Cooling with Series Fan plus Reheat 1 Stage (17)
	Cooling with Series Fan plus Reheat 1/2 Stage (18)
	Cooling with Series Fan plus Reheat On-Off valve (19)
	Cooling with Series Fan plus Reheat Modulating valve (20)

Safety

Protection class	III Safety extra-low voltage
Degree of protection	IP20 (overall), IP30 (Room unit)
EMC	CE according to 89/336/EEC, EN60730-1:2000 + A2:2008, EN60730-2-14:1997 + A2:2008 EN61000-6-2:05 and EN61000-6-3:07 + A1:11, EN60730-2-9:2010
Mode of operation	Type 1 (in acc. with EN 60730-1)
Rated impulse voltage	0.8 kV (in accordance with EN 60730-1)
Control pollution degree	2 (in accordance with EN 60730-1)
Maintenance	Maintenance-free

Data for BACnet

Protocol	BACnet MS/TP (RS-485), not galvanically isolated
Number of nodes	Addressable from 1 to 127, 32 nodes per repeater
Baudrates	9 600, 19 200, 38 400 (Default), 76 800, 115 200 Bd
End of Line Termination Resistor	Required, 120 Ω typical
Parameterisation	Belimo Cloud Business Application (Access by www.ZoneEase.com or ZoneEase.Cloud.Belimo.com)
	Belimo ZoneEase VAV App (Google Play Store (www.google.xx) or Baidu Mobile Assistant (shouji.baidu.com) or 360 Mobile Assistant (sj.360.cn)
	BACnet MS/TP (Please refers to datapoint list)
Protocol Implementation Conformance Statement (PICS)	Please refers to BACnet Testing Laboratories. http://www.bacnetinternational.net/btl/index.php?m=87

ZoneEase VAV Controller Actuator

Actuator	Brushless, non-blocking actuator with power-save mode
Torque	10Nm
Inputs / Outputs	Analogue Input for CO_2/Temperature sensor connection, 0-10V
	3 x Digital Triac Output, 24VAC, max. 500 mA@room temperature
Speed	60s max full span (Boost, Manual Override), 150s max full span
Direction of rotation	cw / ccw (configurable)
Adaptation	Capture of setting range and resolution to control range
Gear disengagement	Push-button lockable/self-resetting
Sound power level	max. 35 dB (A) normal operation, max 50 dB (A) in boost mode and manual override, adaptation/ Synchronization
Angle of rotation	95° , adjustable mechanical
Spindle holder	- Spindle clamp, spindle round 10 ... 20 mm / spindle square 8 ... 16 mm
NFC Communication	Yes
Connection	Pluggable terminals 0.5mm2 to 2.5 mm2 (20AWG to 14 AWG), 0.33 mm2 (22AWG) with bullet terminal or cable lug
Differential pressure sensor	
Type, principle of operation	Belimo D3 sensor, dynamic response
Operating range	-20 … 500 Pa
Accuracy	-20Pa to 20Pa (±1Pa), 20Pa to 500Pa (±5% of measured value)
Overload capability	±3000 Pa
Measuring air conditions	0...+50°C / 5...95% rH, non-condensating
Installation position	Any, no reset necessary
Materials in contact with medium	Glass, epoxy resin, PA, TPE
Operation and servicing	Actuator and Room Unit NFC interface for Android Smartphone ZoneEase VAV App
Push-button	Adaption
LED display	Display Power, Status and Communication
Room Unit Wall / Room Unit Ceiling	
Operation Mode	Active, Off, Eco, Boost, Anti-frost (built-in, self triggered), Occupancy (triggered by external occupancy sensor if available)[#]
Color	White
LCD Display	Backlight (White)[&]
Setpoint range	10…30°C (High/low limit configurable)
Sensing element accuracy	+/-0.3 °C at 15...30°C
Display resolution	+/-0.5 °C
NFC Communication	Yes
Wiring terminals	toolless push-in terminal, 0.5mm2 to 1.5 mm2 (20 AWG to 16 AWG)
Power supply for external device	10W, such as presence detector
Datapoint list (BACnet, APP, Cloud)	Refers to Datapoint list document

Connection

Connecting terminals   The connection is made using the pluggable terminals to the ZoneEase VAV device.

Note
– Supply via safety isolating transformer!
– Connections 1 and 2 (AC 24V) and
5 (MP signal) must be routed to accessible
terminals (ZoneEase Wall Unit, 22RT-A001,
22RT-A011 or ZoneEase Ceiling Unit, 22RT-
A002 or 22RT-A003) for temperature sensing in
order to enable access with the tool for
diagnostic and service work.

NMV-BAC-001

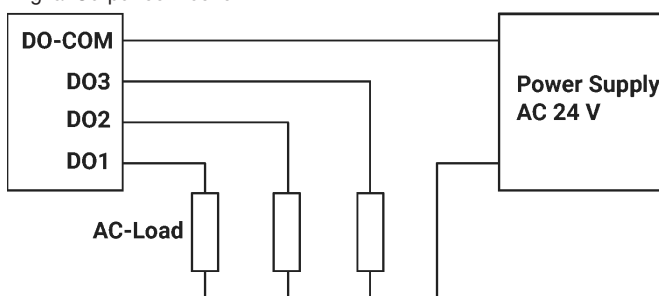**BACnet   AC 24 V / AI / MP**

| D+ | D- | ⊥ | ~ | S | MP |

Designatio	Function
D+	BACnet +
D-	BACnet -
⊥	− ⎫
~	+ ⎰ AC 24V supply
S	CO2 input
MP	– MP-Bus connection
1	Digital Output 1
2	Digital Output 2
3	Digital Output 3
COM	Digital Output Common

NMV-BAC-002

BACnet	**AC 24 V**	**Room Unit**	**Analog IN / MP**	**Digital OUT**
D+ D- ⊥	⊥ ~	⊥ ~ MP	S ⊥ ~ MP	1 2 3 COM

Digital Output connection

DO-COM
DO3
DO2
DO1

**Power Supply
AC 24 V**

AC-Load

BACnet MS/TP

BACnet STP cable (22 AWG, 0.33 mm^2)
and EOL termination as according to BACnet

GND
D+
D-

EOL
resistor

1 2 3 5 6 7   1 2 3 5 6 7

⊥ ~   D+ D-   ⊥ ~   D+ D-
AC 24 V   **AC 24 V**
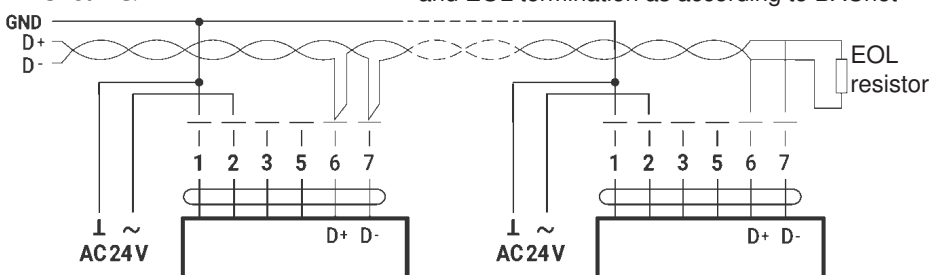
Dimensioning of supply and connecting cable

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, Shielded Paired or Shielded layer stranded cables improve immunity to interference, refers to BACnet Standard and recommendations.

24 V supply, dimensioning and cabling   The dimensioning and installation of the 24V 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:

– 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   For Portable Testing and Commisioning of the VAV unit, the ZoneEase VAV can be operated via the integrated NFC interface using the Smartphone ZoneEase APP.

Belimo Cloud Business Application support workforce efficiency improvement by creating a working platform for OEMs, SIs, Project Managers, Consultants and Building Owners to prepare, configure, calibrate, manage, review and maintain VAV system throughout the product lifecycle.

Smartphone – Belimo Assistant App

NFC-capable devices
– NMV-BAC-001, NMV-BAC-002, 22RT-001, 22RT-011, 22RT-002, 22RT-003, with NFC mark

The NFC antenna range of the ZoneEase VAV is located between Belimo or the OEM logo and the NFC mark.
Align NFC-capable Android Smartphone, with Assistant App loaded, in such a way on the ZoneEase VAV that the two NFC antennas are above one another.
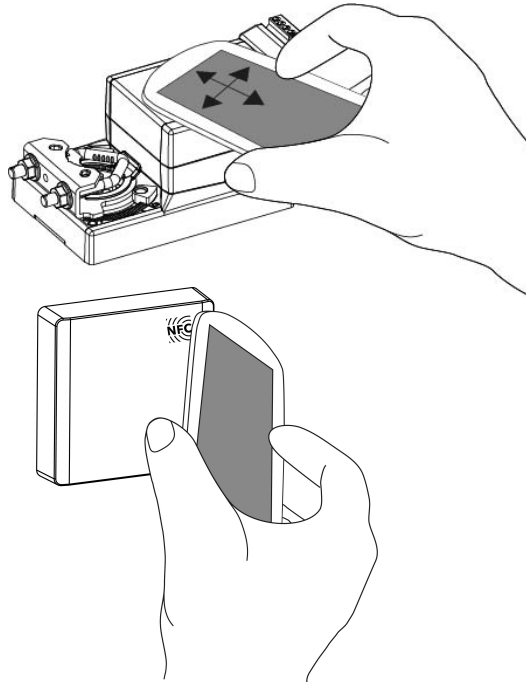
Depending on the model of the Smartphones, its antenna could be located at a different position
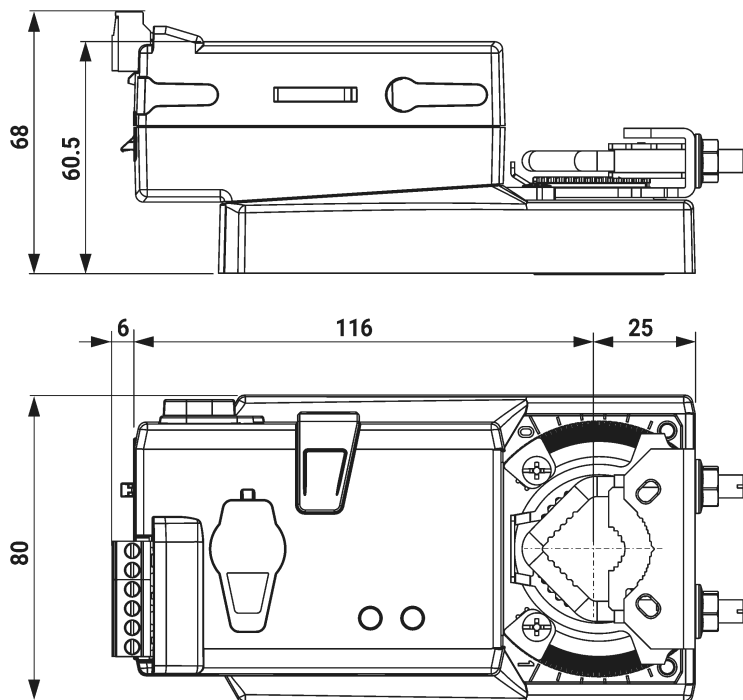(see documentation for the Smartphone).

Compatibility

Replacement devices   When replacement devices are ordered, they are parameterised with Mobile APP in accordance with the installed system.

Safety notes

⚠

- **The device is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.**
- **It may only be installed by suitably trained personnel. Legal regulations and regulations issued by authorities must be observed 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.**
- **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.**

Dimensions [mm]

Dimensional drawings NMV-BAC-001

Dimensional drawings NMV-BAC-002