REACT V BMB

Instructions for Use

REACT V BMBa (circular), REACT V BMBb (rectangular)

20250311
Art. 1546392

Symbol key

Symbols on the machine

This product complies with applicable EU directives

CE

Symbols in this user manual

Warning/Caution!

Risk of crushing

Application area

The product is a variable flow damper or constant flow damper designed for comfort ventilation indoors. The product is used to regulate the supply air or exhaust air flow in ventilation ducts.

The product may not be used for anything other than its intended use.

General

Read through the entire instructions for use before you install/use the product and save the instructions for future reference. It is not permissible to make changes or modify this product other than those specified in this document.

The packaging contains the following items

1 x REACT V BMB

1 x Instructions for use

Protective equipment

Always use appropriate personal protective equipment for the work in question, in the form of gloves, respirators and protective glasses during handling, installation, cleaning and service/maintenance.

Electrical safety

Permitted voltage, see "Electrical data". It is not permissible to insert foreign objects into the product's contactor connections or the electronics's ventilation openings; risk for short circuiting.

24 V isolation transformer to be connected should comply with the provisions of IEC 61558-1.

Cable sizing must be carried out for cabling between the product and the power supply source.

Disconnect the power supply when working on products that are not required to run in production.

Always follow the local/national rules for who shall be permitted to carry out this type of electrical installation.

Other risks

When the product is voltage fed, the damper will either open or close. This can entail a certain risk of pinch injuries to the fingers, for example, if these are placed between the damper blade and ventilation duct when the damper blade is rotating. The product's actuator is equipped with a release button that permits manual control of the damper blade, always ensure this is activated before working on the internal parts of the damper.

Handling

- Always use appropriate transport and lifting devices when the product is to be handled to reduce ergonomic loads.
- The product must be handled with care.
- It is not permissible to carry the product by the measuring tube.

Installation

- Moist, cold and aggressive environments must be avoided.
- Avoid installing the product near a heat source.
- Assemble the product according to applicable industry regulations.
- Install the product so that it is not accessible by unauthorized persons, for example above a suspended ceiling.
- Install the product for easy access during service/maintenance.
- Supplement the duct system with a cleaning hatch in the vicinity of the product to facilitate cleaning.
- If the product is mounted above a fixed ceiling, the inspection hatch must be located so that the product is accessible for inspection.
- If the product is mounted so that it is possible to gain access to the inside of the product, it must be supplemented with appropriate protection, for example, a ventilation unit.
- If the product is mounted in cold areas, the whole product must be externally insulated against condensation.
- For installation, the accessory FSR is recommended.
- The product can be installed position independent.
- It is recommended that the product be installed so that the front is visible.
- The product must be laid down prior to installation so that it cannot fall over.
- Check to make sure that the product does not have any visible defects.
- Make sure that the product is properly secured after it has been installed.
- Use the product's eyes to secure the cables with cable ties.
- Make sure all cables are properly secured after installation.
- Check that the actuator/controller is properly mounted.

The document was originally written in Swedish

Swegon

Installation, torque, dimensions and weights

Circular design

Dimensions

REACT V BMB Size	Duct size (Nominal) Ød (in)	Inlet diameter Ød (in)	A (in)	B (in)	C (in)	E (in)	Torque (lbf. In.)	Weight (lb)	Flow range (cfm)		Tolerance Q[2] ±5% (cfm)
									Min.	Max = Vnom[1]	
100	4	3.9	18.7	19.1	7.5	2	4	3.5	11	123	4
125	5	4.9	18.7	19.1	8.5	2	4	4.0	19	206	4
160	6	5.9*	18.7	19.1	10.0	2	4	4.6	34	360	4
200	8	7.8	18.7	19.1	11.8	2	4	6.0	53	576	6
250	10	9.8	20.7	21.1	13.8	2	4	7.5	85	928	11
315	12	11.8*	22.0	22.4	16.3	2	7	10.6	133	1504	17
400	16	15.7	27.4	27.8	19.9	2.4	7	15.0	216	2447	28
500	20	19.6	32.3	33.1	23.8	2.4	7	20.7	347	3920	42
630	24	23.8*	36.0	36.8	28.9	2.4	15	31.8	636	6187	68

*Dimensions including DUCT ADAPTER.

[1]Vnom at 0.5 inWG in pressure reading.

[2]Installed according to the instructions.

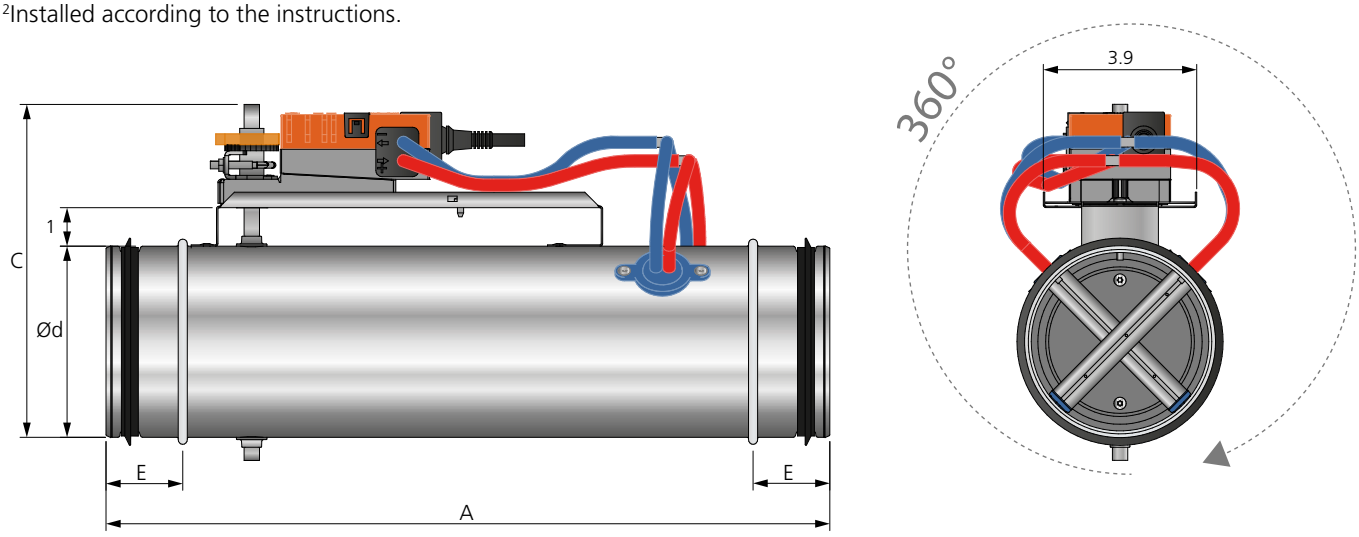

Figure 1. Dimensions (in), REACT V BMB circular. The damper can be installed at an optional angle.

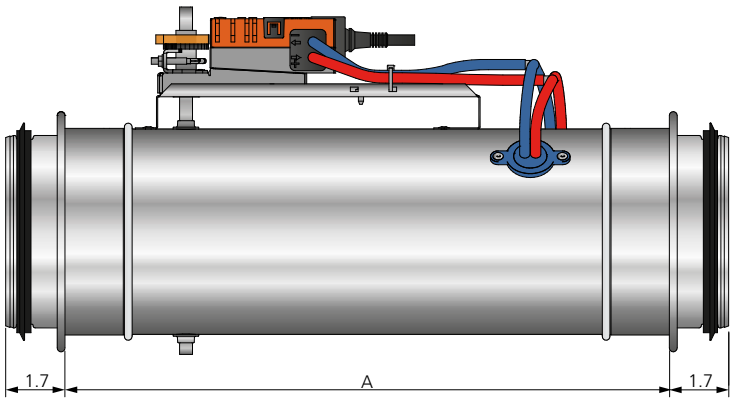

Figure 2. Dimensions with DUCT ADAPTER installed (in), REACT V BMB circular.

Installation

- The product's air flow measurement requires a straight duct section as per the installation figures.
- In unfavourable conditions before or with disruption, the product's tolerances cannot be guaranteed.
- Installation is position independent.
- The product can be installed horizontally or vertically.
- Instructions for Use are supplied with the product on delivery, but can also be downloaded from www.swegon.com.

Straight duct section requirements

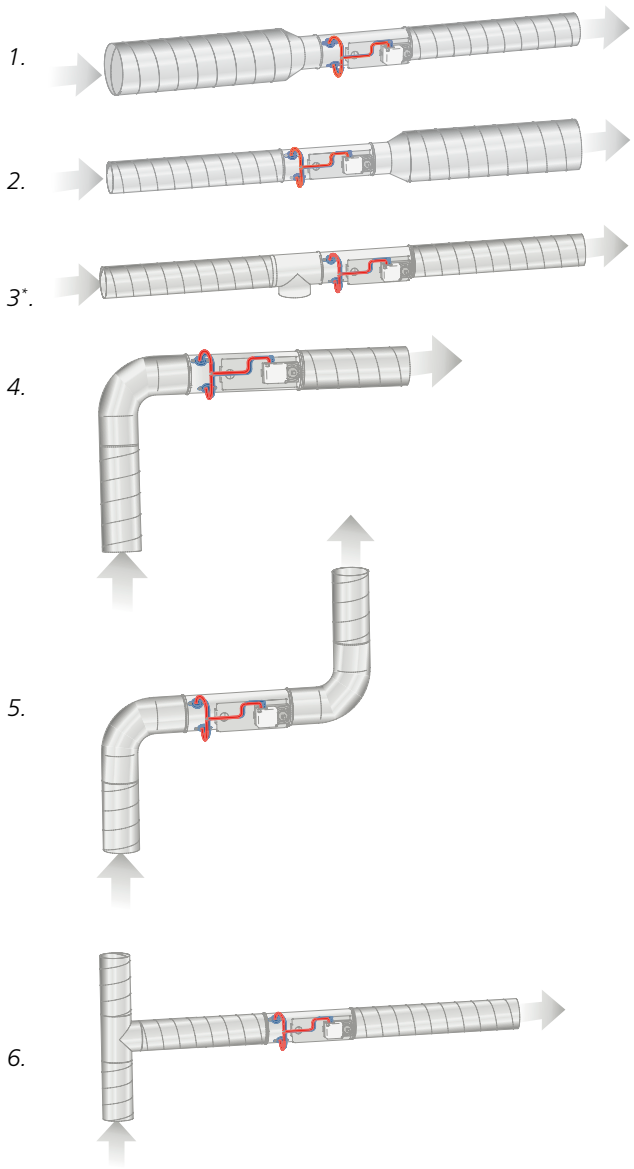

Figure 3. Straight duct section requirements in circular ducts, number of Ø before product:
Image 1-5 require no straight duct section (image 3 illustrates a T piece with a cleaning hatch).*
Image 6 requires a straight duct section before the damper equivalent to 4 x the diameter of the duct.

Straight duct section requirements in case of sound attenuator with baffle

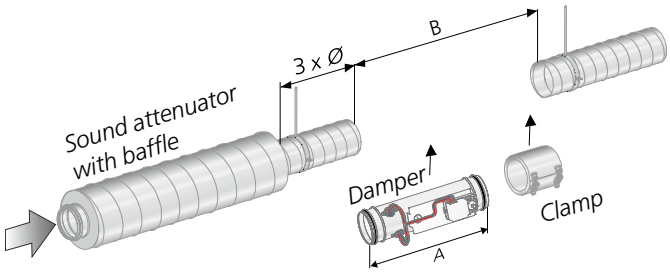

Figure 4. Straight duct section requirements 3 x Ø in case of sound attenuator with baffle or centre body.

Installation in the duct system

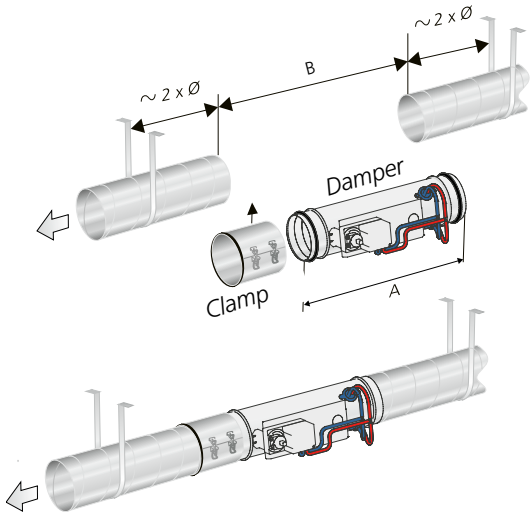

Figure 5. Installation in the duct system. The ducts must be firmly fixed to the frame of the building on each side of the product.

Rectangular design

Dimensions

REACT V BMB Size	Duct size (Nominal) (in)	Inlet dimensions BxH (in)	Torque (lbf. in.)	Weight (lb)	Flow range (cfm)		Tolerance Q* ±5% (cfm)
					Min.	Max = Vnom*)	
200x200	8x8	7.9x7.9	44	13.2	142	773	17
300x200	12x8	11.8x7.9	44	15.9	212	1161	25
400x200	16x8	15.7x7.9	44	18.3	282	1547	36
500x200	20x8	19.7x7.9	44	20.9	354	1934	44
600x200	24x8	23.6x7.9	44	23.2	424	2320	53
700x200	28x8	27.6x7.9	44	25.8	494	2708	61
800x200	32x8	31.5x7.9	44	28.4	566	3093	70
1000x200	39x8	39.4x7.9	89	33.5	706	3867	89
300x300	12x12	11.8x11.8	44	19.4	322	1767	40
400x300	16x12	15.7x11.8	44	22.1	430	2356	53
500x300	20x12	19.7x11.8	44	24.9	538	2945	68
600x300	24x12	23.5x11.8	44	27.8	646	3534	81
700x300	28x12	27.6x11.8	44	30.2	752	4123	93
800x300	32x12	31.5x11.8	44	33.3	860	4712	108
1000x300	39x12	39.4x11.8	89	39.0	1076	5890	133
400x400	16x16	15.7x15.7	44	26.5	578	3168	72
500x400	20x16	19.7x15.7	44	29.5	723	3960	91
600x400	24x16	23.5x15.7	44	32.4	867	4752	108
700x400	28x16	27.6x15.7	44	35.9	1013	5543	127
800x400	32x16	31.5x15.7	89	39.2	1157	6335	144
1000x400	39x16	39.4x15.7	89	45.2	1445	7920	180
1200x400	47x16	47.2x15.7	89	51.6	1735	9503	216
1400x400	55x16	55.1x15.7	89	57.8	2023	11088	252
1600x400	63x16	63.0x15.7	89	63.9	2314	12670	288
500x500	20x20	19.7x19.7	44	33.5	909	4973	114
600x500	24x20	23.5x19.7	44	36.8	1089	5967	136
700x500	27x20	27.6x19.7	89	40.6	1271	6962	159
800x500	32x20	31.5x19.7	89	43.9	1453	7956	182
1000x500	39x20	39.4x19.7	89	50.7	1816	9946	227
1200x500	47x120	47.2x19.7	89	57.6	2178	11935	273
1400x500	55x20	55.1x19.7	89	64.6	2543	13925	318
1600x500	63x20	63.0x19.7	89	71.4	2905	15912	362
600x600	24x24	23.5x23.5	89	41.9	1309	7178	163
700x600	27x24	27.6x23.5	89	45.9	1530	8373	191
800x600	32x24	31.5x23.5	89	49.4	1748	9571	218
1000x600	39x24	39.4x23.5	89	57.1	2184	11963	273
1200x600	47x24	47.2x23.5	89	64.6	2621	14355	328
1400x600	55x24	55.1x19.7	89	71.4	3057	16747	381
1600x600	63x24	63.0x19.7	89	79.6	3494	19139	436
700x700	28x28	27.6x27.6	89	49.2	1788	9793	222
800x700	32x28	31.5x27.6	89	54.5	2043	11192	256
1000x700	39x28	39.4x27.6	89	62.6	2553	13988	320
1200x700	47x28	47.2x27.6	89	70.6	3064	16787	384
1400x700	55x28	55.1x27.6	89	78.9	3577	19584	447

*)Vnom at 0.5 inWG in pressure reading.

*Installed according to the instructions.

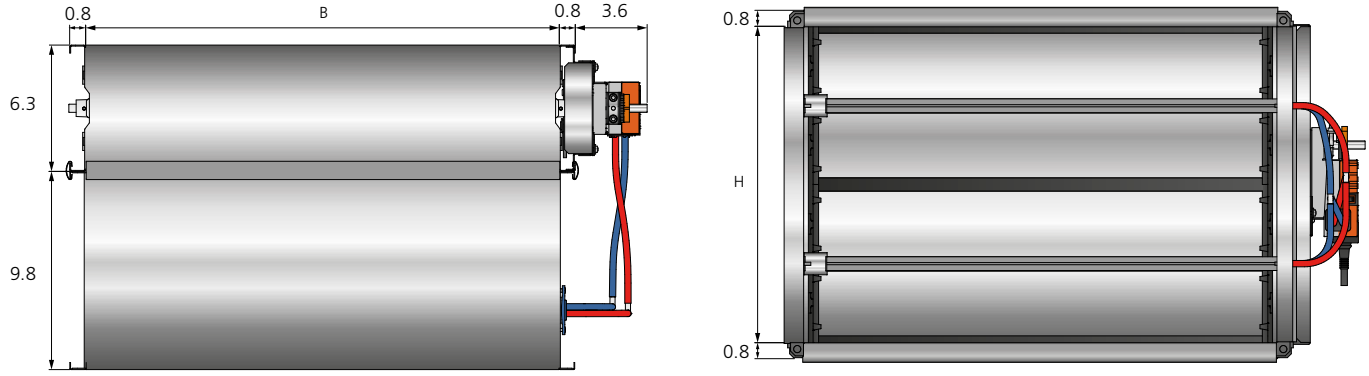

Figure 6. Dimensions (in), REACT V BMB rectangular.

Installation

- The product's air flow measurement requires a straight duct section as per the installation figures.
- In unfavourable conditions before or with disruption, the product's tolerances cannot be guaranteed.
- Damper shafts must be installed horizontally.
- For rectangular ducts, the damper is always installed so that the controller/actuator is placed along the side of the duct.
- Instructions for Use are supplied with the product on delivery, but can also be downloaded from www.swegon.com.

Straight duct section requirements

Type of disruption	E (m_2=5%)	E (m_2=10%)
One 90° bend	E = 3 x B	E = 2 x B
T piece	E = 3 x B	E = 2 x B

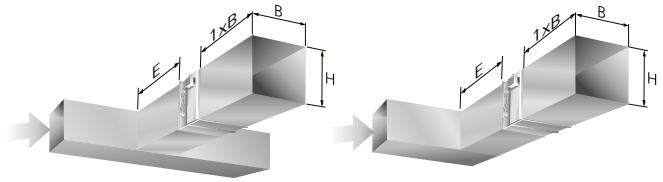

Figure 7. Straight duct section requirements in rectangular ducts.
E = Straight duct section
B = Width of duct
H = Height of duct

Straight duct section requirements in case of sound attenuator with baffle

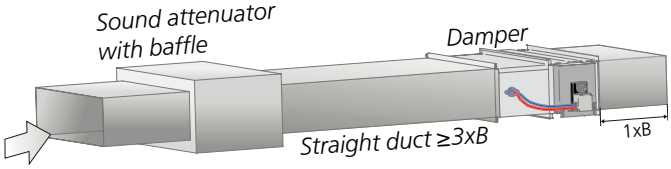

Figure 8. Straight duct section requirements 3 x B in case of sound attenuator with baffle. Applies to both supply and exhaust air.

Connections

1-2 – Supply voltage	24 V AC/DC
3 – Control signal (Y)	0..10/(2..10) V DC
5 – Actual value signal (U)	0..10/(2..10) V DC
6 – Modbus (C_1 = D- = A)	
7 – Modbus (C_2 = D+ = B)	

Supply voltage and communication are not galvanically isolated.

For further calculations of Y and U see the formulas on page 10.

Load on output 5: max 0.5 mA.

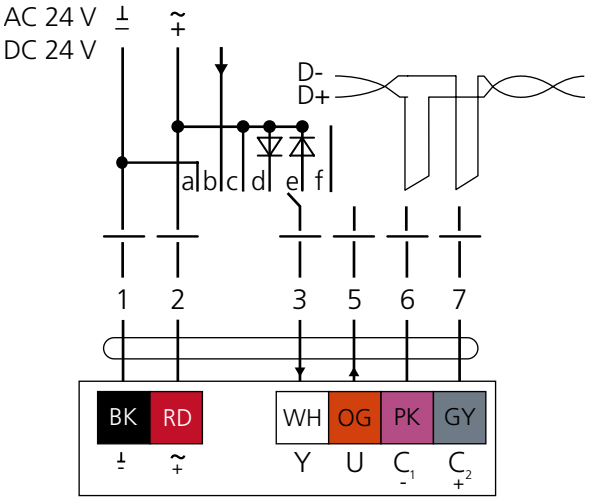

Figure 9. Wiring diagram.

Regulation and forced control via analog control signal

See connection in the wiring diagram, Figure 9.

Signal	a	b	c	d	e	f
	⊥ – 3	3	~ + 3	~ 3	~ 3	3
Mode 2...10 V	Closed	Vmin[1]	Vmax	Open[2]	Closed [3]	Vmin
Mode 0...10 V	Vmin	Vmin[1]	Vmax	Open[2]	Closed [3]	Vmin

[1] Control signal 0-10 V DC / 2-10 V DC
[2] Positive half-wave, only AC
[3] Negative half-wave, only AC

Mode 2-10 V: Closed damper < 0.1 V

Handling

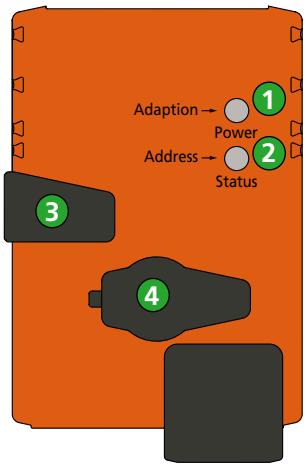

Figure 10. Belimo actuator.

1 Pushbutton and LED lighting green

Off:	No power or fault
On:	In operation
Flashing:	In address mode: The pulse corresponds to the set address (1…16) At start-up: Reset to the factory setting (Communication)
Button press:	In standard mode: Activates rotation angle adaptation In address mode: Confirmation of set address (1…16)

2 Pushbutton and LED lighting yellow

Off:	Normal operation
On:	Adaptation or synchronisation process is active Alternatively the actuator is in address mode (LED 1 flashing green)
Flickering:	BACnet/Modbus communication activated
Button press:	In operation (>3 s): Turns the address mode on and off In address mode: Setting of address by pressing the button several times At start-up (>5 s): Reset to the factory setting (Communication)

3 Release button

Pressed button:	The actuator is disengaged, the motor stops, manual overriding possible
Released button:	Synchronisation starts, followed by standard mode

4 Service port

For connection of the hand-held terminal Belimo ZTH EU and PC-Tool

Rapid addressing

1. Press and hold "*Address*" (button 2) until "*Adaption*" (button 1) no longer glows green. "*Adaptation*" (button 1) flashes in accordance with the previously set address.
2. Set the address by pressing "*Address*" (button 2) the number of times that corresponds to the address (1…16).
3. "*Adaption*" (button 1) flashes green in accordance with the address that has been specified (1…16).
   Incorrect address can be reset according to step 2.
4. Confirm the address setting by pressing "*Adaption*" (button 1).

If no confirmation is given within 60 seconds, addressing will be terminated. The addressing that has been initiated will be discarded.
Set BACnet MS/TP and Modbus RTU address consists of the set basic address plus the short address (e.g. 100+7 = 107).

Belimo ZTH EU / PC-Tool

Settings and diagnostics for the actuator can be carried out using Belimo PC-Tool or the hand-held terminal Belimo ZTH EU. When using the PC-Tool software, ZTH EU (USB) acts as an interface converter.

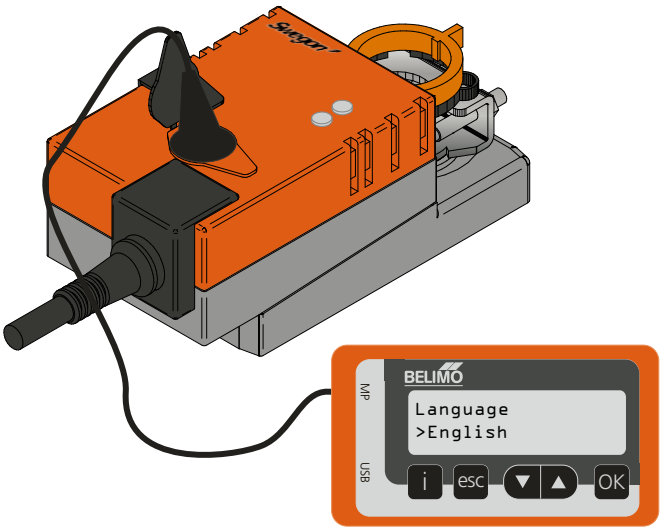

Figure 11. Belimo ZTH EU – Hand-held terminal for setting and reading the actuator's parameters.

▼ ▲ Browses up or down, and changes values/status

OK Confirms selected value/goes to selected sub menu

esc Cancels change/leaves the sub menu

i Shows additional information, if available

Settings for hand-held terminal Belimo ZTH EU

To access the settings, press and hold OK and power up the hand-held terminal. Exit with esc.

Display text	Description
Language >English English Deutsch	Change of language
Flow (Air) >l/s l/s m³/h cfm	Change of unit
Expert mode >Yes Yes No	Activation of expert mode
Advanced mode >Yes Yes No	Activation of advanced mode
Backlight >Timeout 30sec Always on 1...255sec	Duration of background lighting
Empty cache >No No Yes	Clearing of the memory

Settings for actuator

Display text	Description
LMV-D3-M/B SWN Serial number Type Firmware Designation Position	Identification of actuator Serial number Actuator type Software version Designation Position
Volume x l/s Setpoint x l/s	Shows the actual value Shows the set point value
Volume x l/s Δp: x Pa	Shows the actual value Shows Δp
Volume x l/s Position x%	Shows the actual value Shows damper position
Volume x l/s Step >Auto Auto Stop V'max V'mid V'min Close Open	Shows the actual value Forced control Normal operation Actuator stops in the current position Damper regulates to selected max. value Damper regulates to selected intermediate position Damper regulates to selected min. value Closes the damper fully Opens the damper fully
Rotation direct. >ccw ccw cw	Direction of rotation. Available in advanced mode. Anti-clockwise **(standard, may not be changed)** Clockwise
Set to original values? >No No Yes	Factory reset Available in expert and advanced mode
V'min x l/s	Adjusts to desired min. value Min. value must be lower than the max. value
V'mid x l/s	Adjusts to desired intermediate value Available in expert mode
V'max x l/s	Adjusts to desired max. value Max. value must be higher than the min. value
V'nom x l/s	Shows the nominal air flow
Δp@V'nom 120 Pa	Pressure on which nominal air flow is based Available in expert mode
ALT.installation 0 m	Number of metres above sea level Available in advanced mode
Address: 1	Address 1…127
Base Address: 0	Base address 0…200 Available in advanced mode
Baudrate >38400 9600 19200 38400 76800 115200	Choice of transfer speed
Parity >1-8-N-2 1-8-N-1 1-8-N-2 1-8-O-1 1-8-E-1	Parity
Termination >Off OFF ON	Internal termination
Bus Protocol >Modbus Modbus BACnet	Choice of bus protocol
Setpoint source >Analog Bus Analog	Choice of bus control or analog control

Trouble shooting

The product does not communicate over Modbus

- Make sure that the product is energized.
- Check the product's Modbus connection.
- Check the product's communication settings.
- Check that the product has the correct, unique Modbus address.

The product shows incorrect/no air flow

- Make sure that the product is energized.
- Check that the product's set size corresponds with the physical size.
- Make sure that the product is installed according to the recommended distance to disruptions, see "Installation".
- Check that there is an air flow.
- Make sure that the product is correctly oriented in terms of air direction. The air flow must follow the instructions on the product.
- Check that the measuring tube is mounted correctly, plus to plus (red), minus to minus (blue).
- Check that the measuring tubes are undamaged and not creased.
- Check with the help of the k-factor and pressure difference between the red and blue measuring tubes that the flow is within the product's measurement range.

The product does not regulate the air flow

- Make sure that the product is energized.
- Check that the damper motor has not become detached from the damper shaft.
- Check that the damper motor works by pressing in the motor's release button, turn the damper shaft, release the release knob and then see whether the damper motor starts to move.
- Check that the product is connected correctly.
- Check that the product is not force controlled.

The product does not regulate on the desired air flow

- Check that the settings for Vmin and Vmax correspond with the required regulation range.
- Check the electrical connection for the required function, see the wiring diagram in the document "REACT Belimo Description of functions & wiring diagram".
- Check that the product is connected correctly, check the "Y" signal and polarity on "G" and "G0". See "Connections".
- If Modbus communication is used for the damper, forced control may be active via the communication. Try disconnecting the Modbus cables and attempt to set the motor in automatic mode. See "Handling".

Cleaning

Ideally, the product should be cleaned in connection with the cleaning of the rest of the ventilation system.

Cleaning of electrical components

- If needed, use a dry cloth to clean the components.
- Never use water, detergent and cleaning solvent or a vacuum cleaner.

External cleaning

- If necessary use tepid water and a well-wrung cloth.
- Never use detergent and cleaning solvent or a vacuum cleaner.

Internal cleaning

- When cleaning the ventilation system, the product must be dismantled if there are no cleaning hatches close to the product.
- Cleaning equipment such as whisks and the like must not be fed through the product.
- If necessary remove dust and other particles that can be present in the product.
- Never use detergent and cleaning solvent or a vacuum cleaner.

Service/maintenance

- The product does not require any maintenance, except for any cleaning when necessary.
- In connection with a service, mandatory ventilation inspection or cleaning of the ventilation system, check that the general condition of the product appears to be good. Pay particular attention to the suspension, cables and that they sit firmly in place.
- It is not permissible to open or repair electrical components.
- If you suspect that the product or a component is defective, please contact Swegon.
- A defective product or component must be replaced by an original spare part from Swegon.

Materials and surface treatment

All sheet-metal parts are galvanized sheet steel (Z275).

Disposal

Waste must be handled according to local regulations.

Product warranty

The product warranty or service agreement will not be valid/will not be extended if: (1) the product is repaired, modified or changed, unless such repair, modification or change has been approved by Swegon AB; or (2) the serial number on the product has been made illegible or is missing.

Performance checks

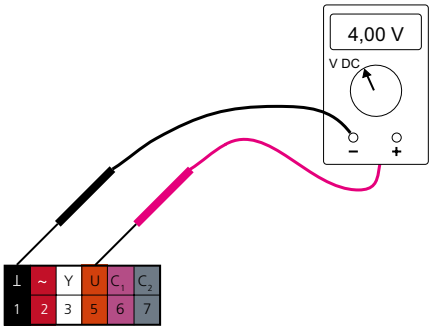

Figure 12. Shows connection of a voltmeter to check the actual value.

Formulas for calculating air flow

The following applies for analog control.

Control signal 0..10 V DC give the following formulas:

- Calculation of the current pressure (V_{act}) when you know the value of the control signal (Y):

$$V_{act} = V_{min} + \frac{Y}{10\ V\ DC} \bullet (V_{max} - V_{min})$$

- Calculation of the current actual value (U) when you know the value of the current flow (V_{act}):

$$U = 10\ V\ DC \bullet \frac{V_{act}}{V_{nom}}$$

Control signal 2..10 V DC gives the following formulas:

- Calculation of the current flow (V_{act}) when you know the value of the the control signal (Y):

$$V_{act} = V_{min} + \frac{Y - 2\ V\ DC}{8\ V\ DC} \bullet (V_{max} - V_{min})$$

- Calculation of the current actual value (U) when you know the value of the current flow (V_{act}):

$$U = 2\ V\ DC + 8\ V\ DC \bullet \frac{V_{act}}{V_{nom}}$$

Key to formulas opposite:

Y = control signal in [V] DC
U* = actual value signal in [V] DC, always refers to 0-V_{nom}.
V_{act} = current air flow in [l/s, m³/h]
V_{min} = set min. flow in [l/s, m³/h]
V_{max} = set max. flow in [l/s, m³/h]
V_{nom} = nominal flow in [l/s, m³/h], see tables on pages 2 and 4.

*Note! Does not indicate damper position.

Replacing the damper motor

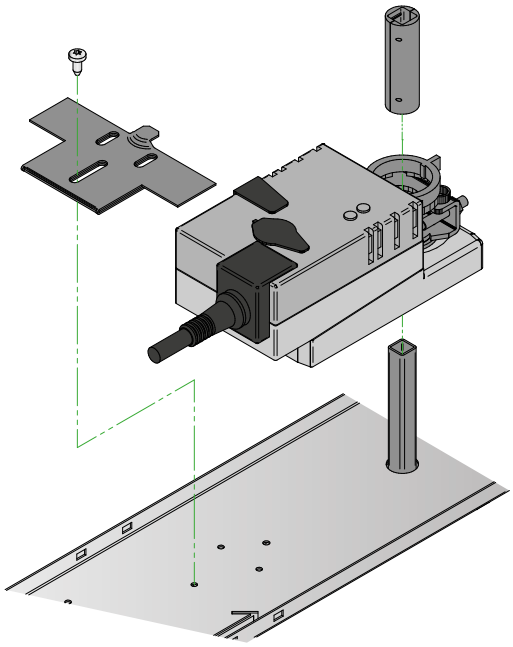

Figure 13. Dismantling the damper motor.

1. *Disconnect the cable.*
2. *Disconnect the measuring tubes.*
3. *Set damper motor to the open position.*
4. *Loosen the nuts on the shaft clamp (nuts: 8mm).*
5. *Remove 1 screw for the locking strip on the circular design and 2 screws for the locking strip on the rectangular design (screw: TX20).*
6. *Lift off the damper motor and shaft adapter (The rectangular design has a round damper shaft and no shaft adapter).*
7. *Reassemble in the reverse order.*
   Note! Positioning of the damper blade and locking strip, see figures 14 and 13.

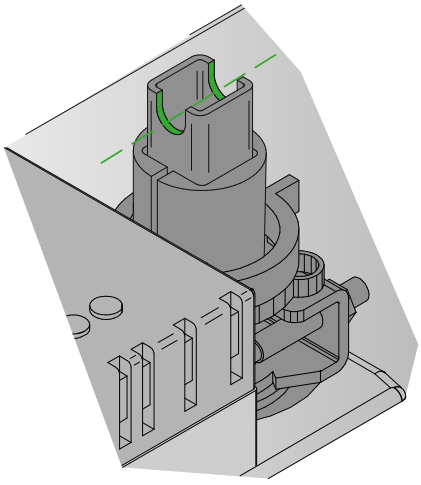

Figure 14. Recess in the damper shaft indicates the position of the damper.

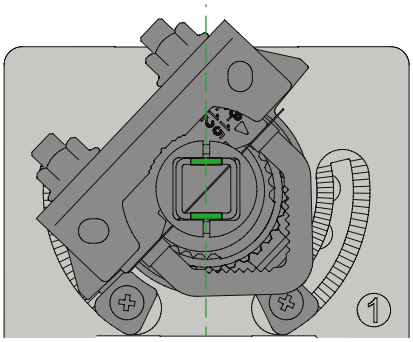

Figure 15. Damper open. Jumper to the left.

Technical data

IP class:	IP54
Corrosivity class:	C3
Pressure class:	A
Leakage classes according to SS-EN 1751	
- Leakage class, casing:	C
- Leakage class circular damper, closed:	4
- Leakage class rectangular damper, closed:	3
Running times open/close (90°):	
44 lbf. in:	100 s
89 / 177 lbf. in:	150 s
Ambient temperature	
Operation:	32 – 122°F
Storage:	-4 – 176°F
RH:	5 – 95% (non-condensing)
CE marking:	2006/42/EC (MD)
	2014/30/EU (EMC)
	2011/65/EU (RoHS2)

Electrical data

Power supply:	24 V AC/DC ±15% 50 - 60 Hz	
Fixed connection cable, 1000 mm with cable size.		6 x 18AWG
Power consumption, for transformer rating:		
REACT V BMB 44 lbf. in.	2.0 W	4.0 VA
REACT V BMB 89 lbf. in.	3.0 W	5.0 VA
REACT V BMB 177 lbf. in.	3.0 W	5.5 VA

Declaration of Conformity

Swegon AB hereby affirms that:

REACT V BMBa complies with the essential characteristic demands and relevant regulations specified in the directives, 2006/42/EC (MD), 2014/30/EU (EMC) and 2011/65 EU (RoHS2):

The following standards have been observed:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk mitigation
EN 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: Generic standards
EN 60730-1:2011	Automatic electrical controls for household and similar use - Part 1 Generic standards
EN 61000-6-2:2007	Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments
EN 61000-6-3:2007	Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments

CE

Person responsible for this declaration:

Name: Freddie Hansson, R&D Manager Tomelilla

Address: Industrigatan 5, 273 21 Tomelilla, Sweden

Date: 230427

This declaration is applicable only if the product has been installed according to the instructions in this document and if no modifications or changes have been made on this product.

References

www.swegon.com

Building Materials Declaration

REACT V BMB Product data sheet

REACT Belimo – Description of functions & wiring diagrams

REACT Belimo – Modbus settings