

REACT V BMBd

Instructions for Use

20240109
Art. 1546122

Symbol key

Symbols on the machine

This product complies with applicable EU directives

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 extract 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 insulated on the outside 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

Size Ød (mm)	A (mm)	B (mm)	C (mm)	E (mm)	Torque (Nm)	Weight (kg)	Flow range						Tolerance Q* ±5% with at least ±x		
							Min.			Max = Vnom*)					
							l/s	m³/h	cfm	l/s	m³/h	cfm	l/s	m³/h	cfm
100	475	485	190	50	5	1.6	5	18	11	58	209	123	2	7	4
125	475	485	215	50	5	1.8	9	32	19	97	349	206	2	7	4
160	475	485	255	50	5	2.1	16	58	34	170	612	360	2	7	4
200	475	485	300	50	5	2.7	25	90	53	272	979	576	3	11	6
250	525	535	350	50	5	3.4	40	144	85	438	1577	928	5	18	11
315	560	570	415	50	10	4.8	63	227	133	710	2556	1504	8	29	17
400	695	705	505	60	10	6.8	102	367	216	1155	4158	2447	13	47	28
500	820	840	605	60	10	9.4	164	590	347	1850	6660	3920	20	72	42
630	915	935	735	60	20	14.4	300	1080	636	2920	10512	6187	32	115	68

*)Vnom at 120 Pa in pressure reading.

*Installed according to the instructions.

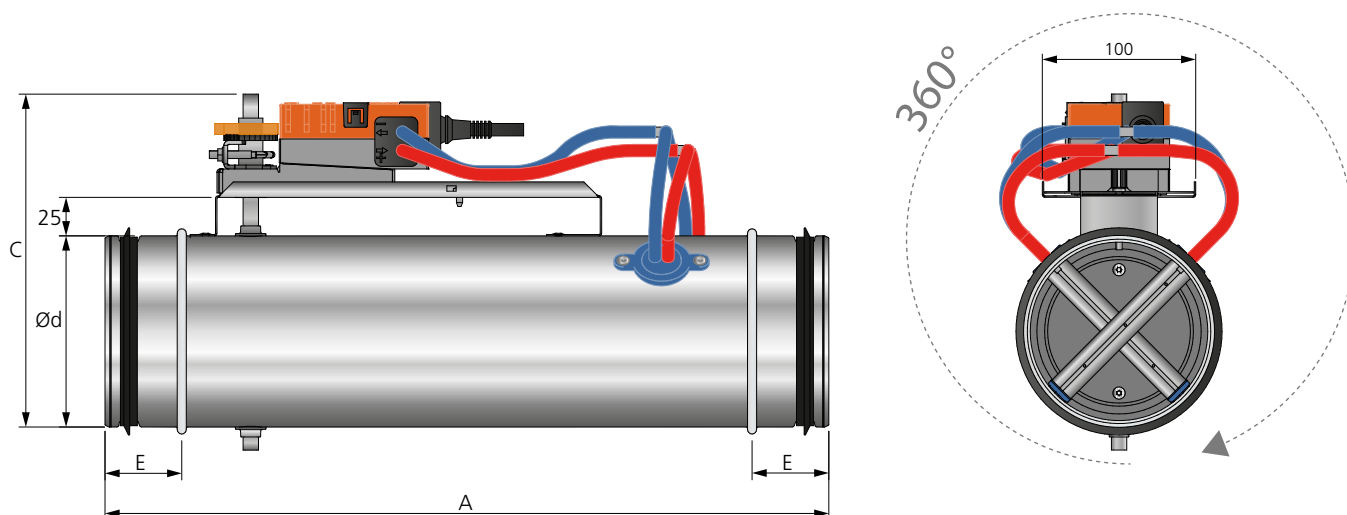


Figure 1. Dimensions (mm), REACT V BMB circular. The damper can be installed at an optional angle.

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

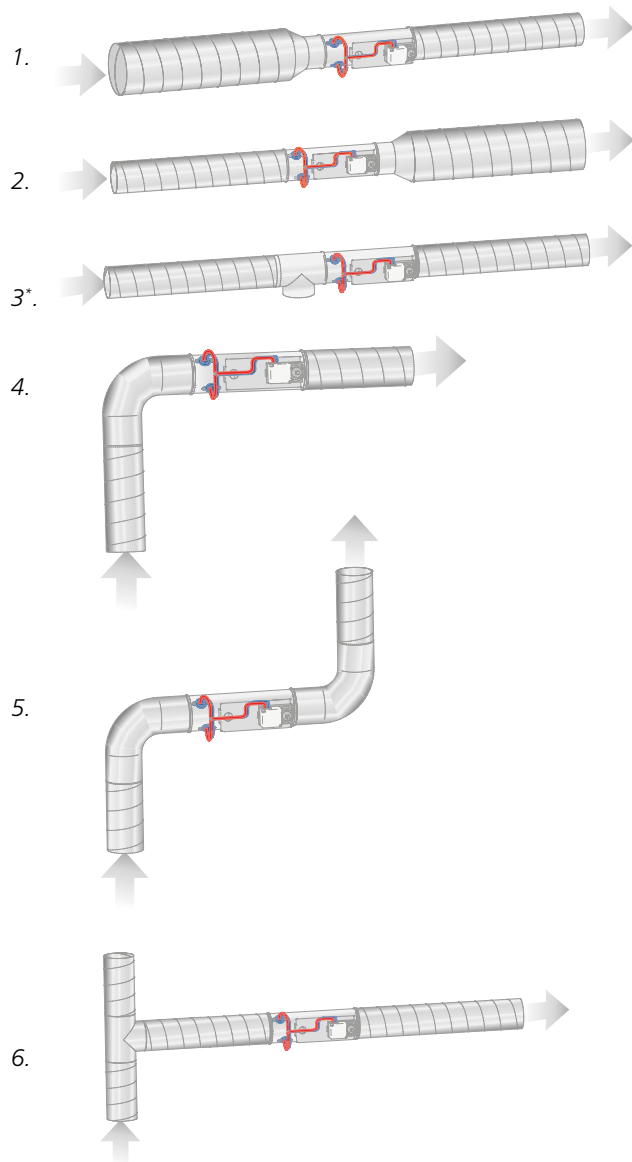


Figure 2. Straight duct section requirements in circular ducts, number of \emptyset before product:
Image 1-5 require no straight duct section (image 3* illustrates a T piece with a cleaning hatch).
Image 6 requires a straight duct section before the damper equivalent to $4 \times$ the diameter of the duct.

Straight duct section requirements in case of sound attenuator with baffle

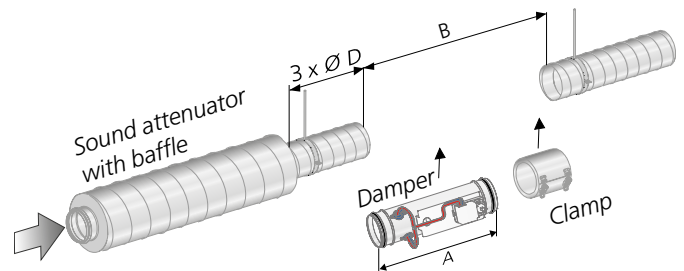


Figure 3. Straight duct section requirements $3 \times \emptyset$ in case of sound attenuator with baffle or centre body.

Installation in the duct system

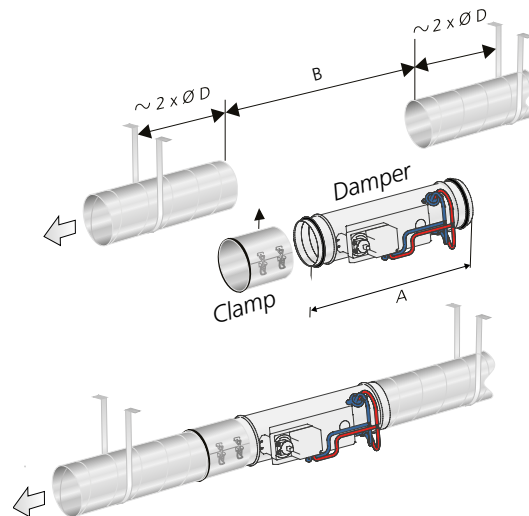


Figure 4. Installation in the duct system. The ducts must be firmly fixed to the frame of the building on each side of the product.

Rectangular design

Dimensions

Size BxH (mm)	Torque (Nm)	Weight (kg)	Flow range						Tolerance Q* ±5% with at least ±x		
			Min.			Max = Vnom*)					
			l/s	m³/h	cfm	l/s	m³/h	cfm	l/s	m³/h	cfm
200 x 200	5	7.2	67	241	142	365	1314	773	8	29	17
300 x 200	5	8.4	100	360	212	548	1973	1161	12	43	25
400 x 200	5	9.9	133	479	282	730	2628	1547	17	61	36
500 x 200	5	11.4	167	601	354	913	3287	1934	21	76	44
600 x 200	5	12.9	200	720	424	1095	3942	2320	25	90	53
700 x 200	5	14.4	233	839	494	1278	4601	2708	29	104	61
800 x 200	5	15.4	267	961	566	1460	5256	3093	33	119	70
1000 x 200	10	18.7	333	1199	706	1825	6570	3867	42	151	89
300 x 300	5	10.9	152	547	322	834	3002	1767	19	68	40
400 x 300	5	12.4	203	731	430	1112	4003	2356	25	90	53
500 x 300	5	13.9	254	914	538	1390	5004	2945	32	115	68
600 x 300	5	15.4	305	1098	646	1668	6005	3534	38	137	81
700 x 300	10	17.1	355	1278	752	1946	7006	4123	44	158	93
800 x 300	10	18.7	406	1462	860	2224	8006	4712	51	184	108
1000 x 300	10	21.7	508	1829	1076	2780	10008	5890	63	227	133
400 x 400	5	14.0	273	983	578	1495	5382	3168	34	122	72
500 x 400	10	16.3	341	1228	723	1869	6728	3960	43	155	91
600 x 400	10	17.7	409	1472	867	2243	8075	4752	51	184	108
700 x 400	10	19.9	478	1721	1013	2616	9418	5543	60	216	127
800 x 400	10	21.4	546	1966	1157	2990	10764	6335	68	245	144
1000 x 400	10	24.5	682	2455	1445	3738	13457	7920	85	306	180
1200 x 400	20	27.6	819	2948	1735	4485	16146	9503	102	367	216
1400 x 400	20	30.7	955	3438	2023	5233	18839	11088	119	428	252
1600 x 400	20	33.7	1092	3931	2314	5980	21528	12670	136	490	288
500 x 500	10	18.8	429	1544	909	2347	8449	4973	54	194	114
600 x 500	10	20.8	514	1850	1089	2816	10138	5967	64	230	136
700 x 500	10	22.9	600	2160	1271	3286	11830	6962	75	270	159
800 x 500	10	24.9	686	2470	1453	3755	13518	7956	86	310	182
1000 x 500	20	29.0	857	3085	1816	4694	16898	9946	107	385	227
1200 x 500	20	33.1	1028	3701	2178	5633	20279	11935	129	464	273
1400 x 500	20	37.2	1200	4320	2543	6572	23659	13925	150	540	318
1600 x 500	20	41.2	1371	4936	2905	7510	27036	15912	171	616	362
600 x 600	10	23.0	618	2225	1309	3388	12197	7178	77	277	163
700 x 600	10	25.1	722	2599	1530	3952	14227	8373	90	324	191
800 x 600	20	27.2	825	2970	1748	4517	16261	9571	103	371	218
1000 x 600	20	31.3	1031	3712	2184	5646	20326	11963	129	464	273
1200 x 600	20	35.4	1237	4453	2621	6775	24390	14355	155	558	328
1400 x 600	20	39.6	1443	5195	3057	7904	28454	16747	180	648	381
1600 x 600	20	43.8	1649	5936	3494	9033	32519	19139	206	742	436
700 x 700	20	28.0	844	3038	1788	4622	16639	9793	105	378	222
800 x 700	20	30.7	964	3470	2043	5282	19015	11192	121	436	256
1000 x 700	20	35.3	1205	4338	2553	6602	23767	13988	151	544	320
1200 x 700	20	41.0	1446	5206	3064	7923	28523	16787	181	652	384
1400 x 700	20	46.1	1688	6077	3577	9243	33275	19584	211	760	447

*Vnom at 120 Pa in pressure reading.

*Installed according to the instructions.

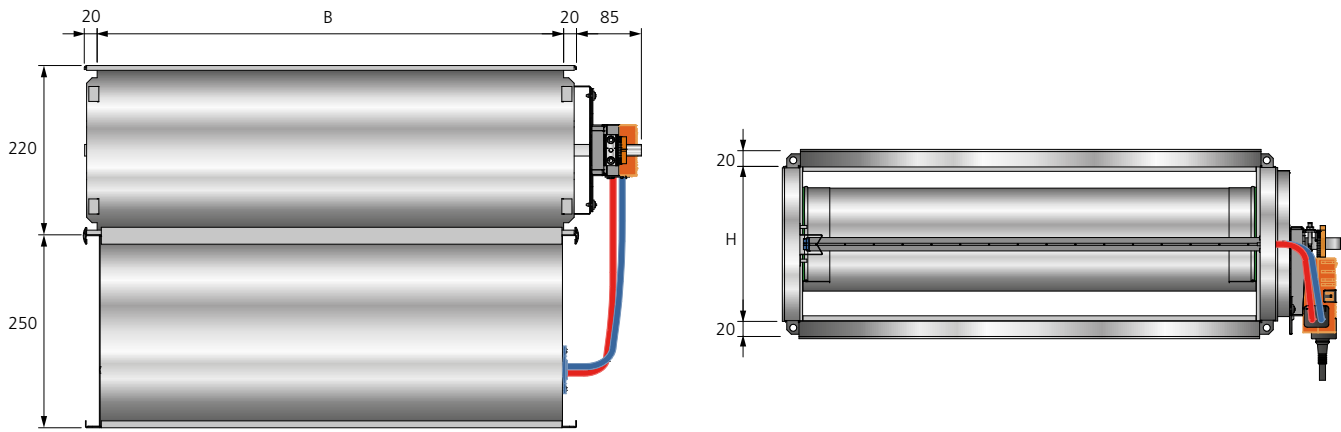


Figure 5. Dimensions (mm), REACT V BMB rectangular.

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 spindles 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	$E = 3 \times B$	$E = 2 \times B$
T piece	$E = 3 \times B$	$E = 2 \times B$

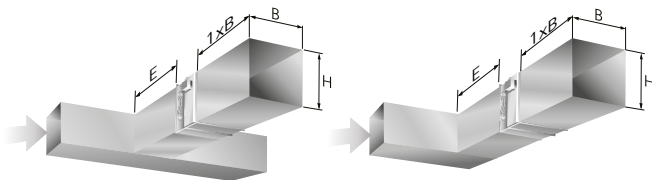


Figure 6. Straight duct section requirements in rectangular ducts.

E = Straight duct section

B = Width of duct

H = Height of duct

Straight duct section requirements in case of sound attenuator with baffle

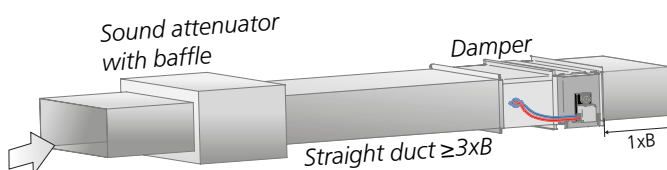


Figure 7. Straight duct section requirements $3 \times B$ in case of sound attenuator with baffle. Applies to both supply and extract air.

Connections

- 1-2 – Supply voltage

3 – Control signal (Y)

5 – Actual value signal (U)

6 – Modbus (C₁ = D- = A)

7 – Modbus (C₂ = D+ = B)
- 24 V AC/DC

0..10/(2..10) V DC

0..10/(2..10) V DC
- 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.

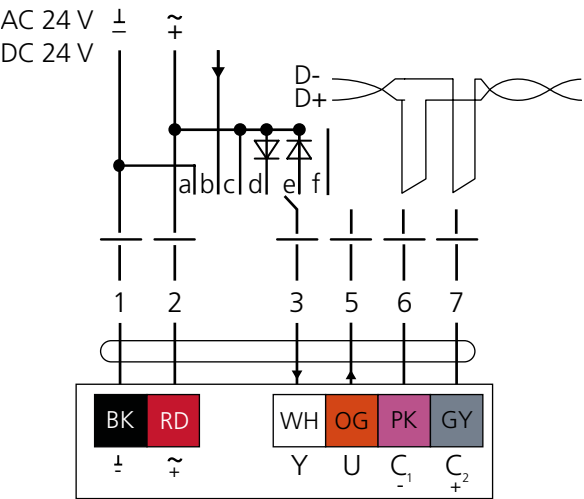


Figure 8. Wiring diagram.

Regulation and forced control via analogue control signal

See connection in the wiring diagram, Figure 8.

	a	b	c	d	e	f
Signal	1		~	~	~	
	-		+			
	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

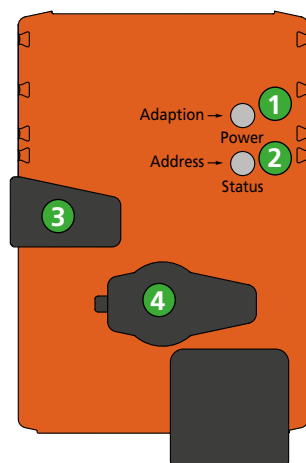


Figure 9. Belimo actuator.

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 ZTH EU and PC-Tool

Rapid addressing

- Press and hold "Address" (button 2) until "Adaption" (button 1) no longer glows green. "Adaption" (button 1) flashes in accordance with the previously set address.
- Set the address by pressing "Address" (button 2) the number of times that corresponds to the address (1...16).
- "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.
- 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).

ZTH EU / PC-Tool

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

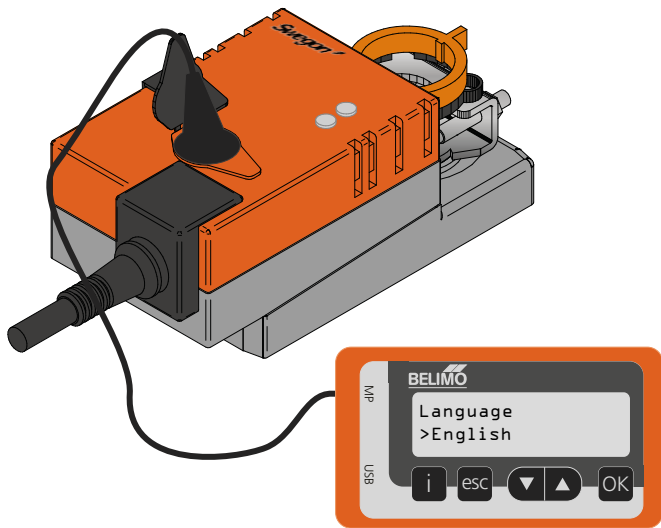


Figure 10. ZTH EU – Hand-held terminal for setting and reading the actuator's parameters.

- Browses up or down, and changes values/status
- Confirms selected value/goes to selected sub menu
- Cancels change/leaves the sub menu
- Shows additional information, if available

Settings for hand-held terminal 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	Change of language
English Deutsch	
Flow (Air) >l/s	Change of unit
l/s m ³ /h cfm	
Expert mode >Yes	Activation of expert mode
Yes No	
Advanced mode >Yes	Activation of advanced mode
Yes No	
Backlight >Timeout 30sec	Duration of background lighting
Always on 1...255sec	
Empty cache >No	Clearing of the memory
No Yes	

Settings for actuator

Display text	Description
LMV-D3-M/B SWN	Identification of actuator
Serial number Type Firmware Designation Position	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	Shows the actual value Forced control
Auto Stop V'max V'mid V'min Close Open	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	Direction of rotation. Available in advanced mode.
ccw cw	Anti-clockwise (standard, may not be changed) Clockwise
Set to original values? >No	Factory reset Available in expert and advanced mode
No Yes	
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	Choice of transfer speed
9600 19200 38400 76800 115200	
Parity >1-8-N-2	Parity
1-8-N-1 1-8-N-2 1-8-O-1 1-8-E-1	
Termination >Off	Internal termination
Off On	
Bus Protocol >Modbus	Choice of bus protocol
Modbus BACnet	
Setpoint source >Analog	Choice of bus control or analogue control
Bus Analog	

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 spindle.
- Check that the damper motor works by pressing in the motor's release button, turn the damper spindle, 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

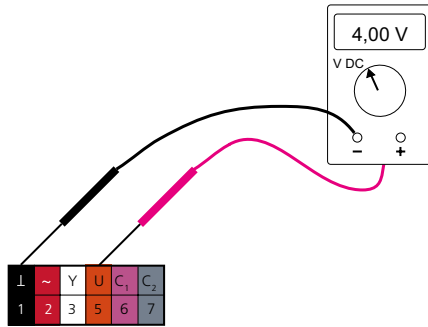


Figure 11. Shows connection of a voltmeter to check the actual value.

Formulas for calculating air flow

The following applies for analogue 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):

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

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

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

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):

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

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

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

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

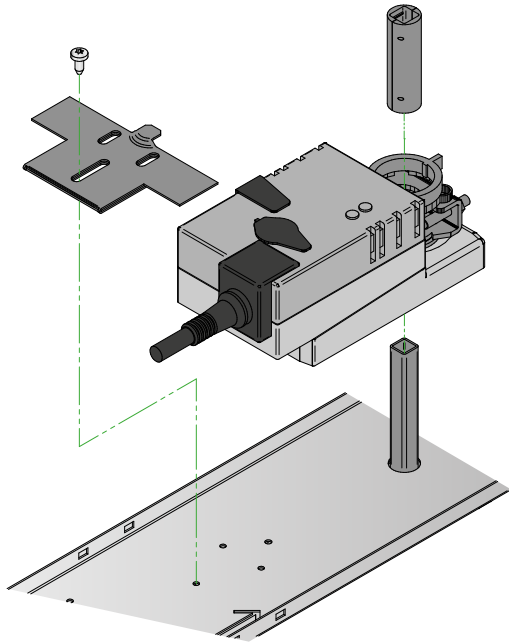


Figure 12. Dismantling the damper motor.

1. Disconnect the cable.
2. Disconnect the measuring tubes.
3. Set damper motor to the open position.
4. Loosen the nuts on the spindle 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 spindle adapter (The rectangular design has a round damper spindle and no spindle adapter).
7. Reassemble in the reverse order.

Note! Positioning of the damper blade and locking strip, see figures 13 and 14.

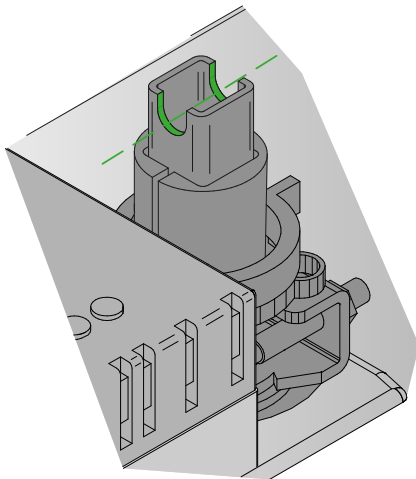


Figure 13. Recess in the damper spindle indicates the position of the damper.

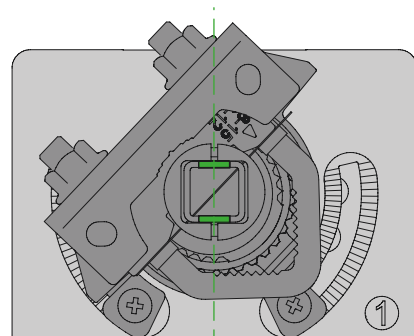


Figure 14. Damper open. Jumper to the left.

Technical data

IP class:	IP54
Corrosivity class:	C3
Pressure class:	A
Leakage classes according to SS-EN 1751	C
- Leakage class, casing:	4
- Leakage class circular damper, closed:	3
- Leakage class rectangular damper, closed:	
Running times open/close (90°):	
5 Nm:	100 s
10 / 20 Nm:	150 s
Ambient temperature	
Operation:	0 – +50°C
Storage:	-20°C – +80°C
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 0.75 mm ²	
Power consumption, for transformer rating:		
REACT V BMB 5 Nm	2.0 W	4.0 VA
REACT V BMB 10 Nm	3.0 W	5.0 VA
REACT V BMB 20 Nm	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



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