REACT V BBAC

Instructions for Use

REACT V BBACa (circular), REACT V BBACb (rectangular)

20240916
Art. 1546112

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 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 BBAC

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	l/s	m³/h	l/s	m³/h
100	475	485	190	50	5	1.6	5	18	58	209	2	7
125	475	485	215	50	5	1.8	9	32	97	349	2	7
160	475	485	255	50	5	2.1	16	58	170	612	2	7
200	475	485	300	50	5	2.7	25	90	272	979	3	11
250	525	535	350	50	5	3.4	40	144	438	1577	5	18
315	560	570	415	50	10	4.8	63	227	710	2556	8	29
400	695	705	505	60	10	6.8	102	367	1155	4158	13	47
500	820	840	605	60	10	9.4	164	590	1850	6660	20	72
630	915	935	735	60	20	14.4	300	1080	2920	10512	32	115

*)Vnom at 120 Pa in pressure reading.

*Installed according to the instructions.

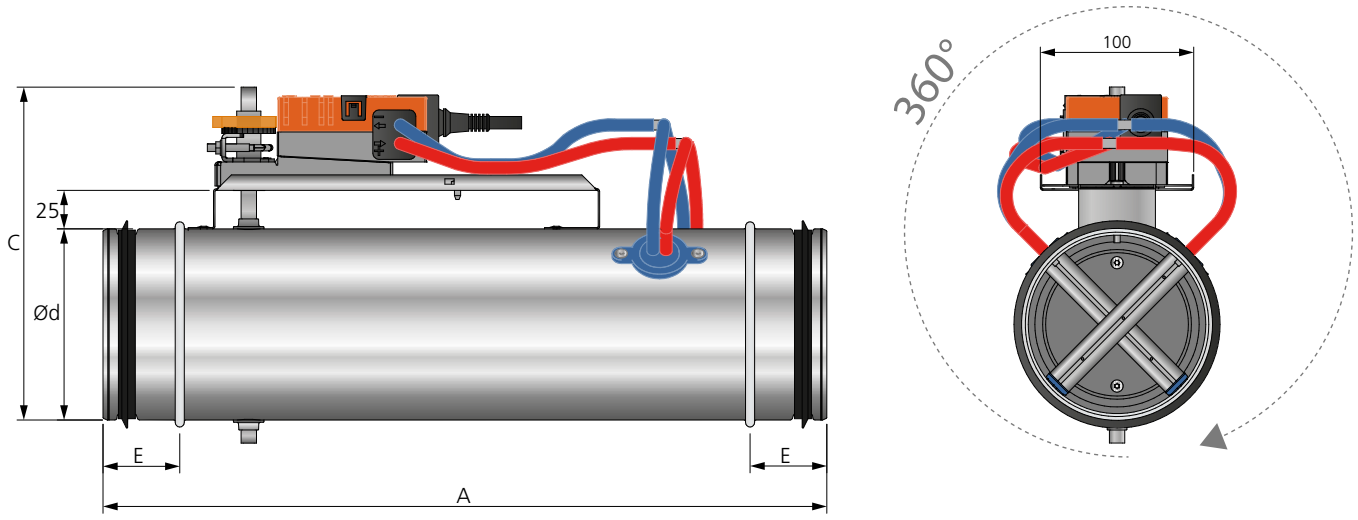

Figure 1. Dimensions (mm), REACT V BBAC circular. The damper can be installed at an optional angle.

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

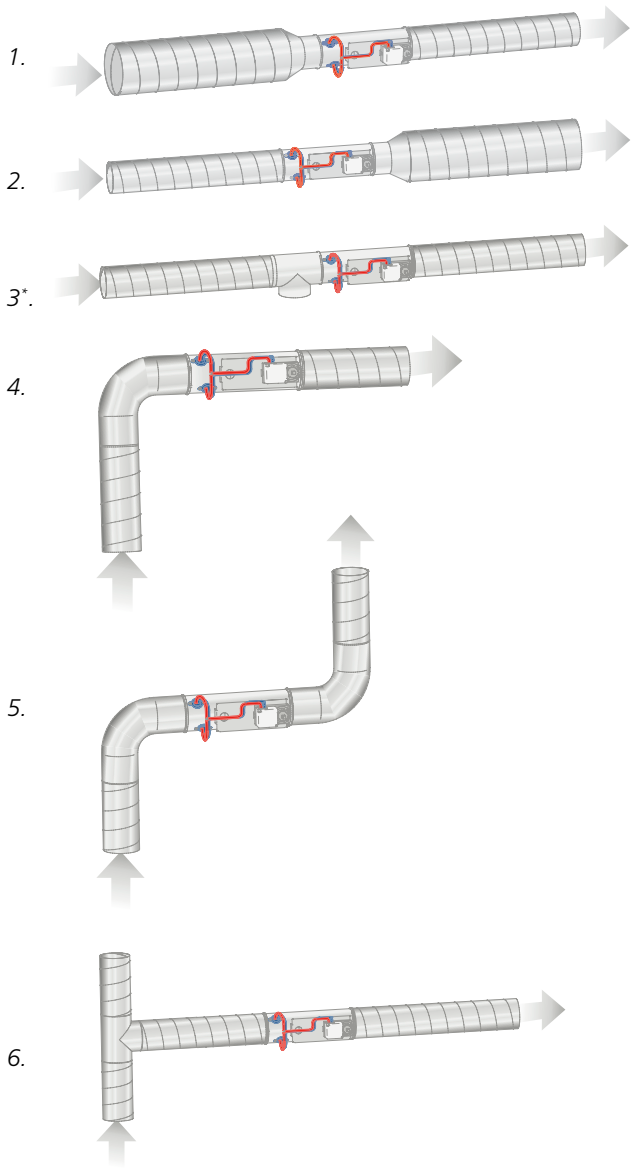

Figure 2. Straight duct section requirements in circular ducts, number of Ø before product:
Image 1-5 require no straight duct section (image 3 illustrates a T piece with a cleaning hatch).*
Image 6 requires a straight duct section before the damper equivalent to 4 x the diameter of the duct.

Straight duct section requirements in case of sound attenuator with baffle

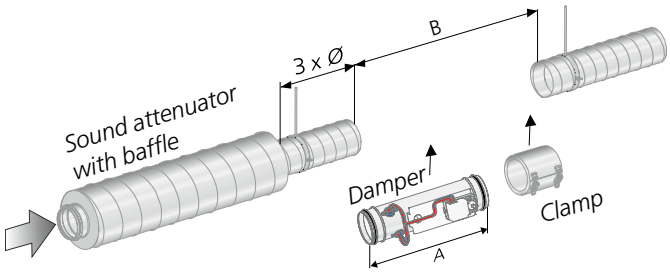

Figure 3. Straight duct section requirements 3 x Ø in case of sound attenuator with baffle or centre body.

Installation in the duct system

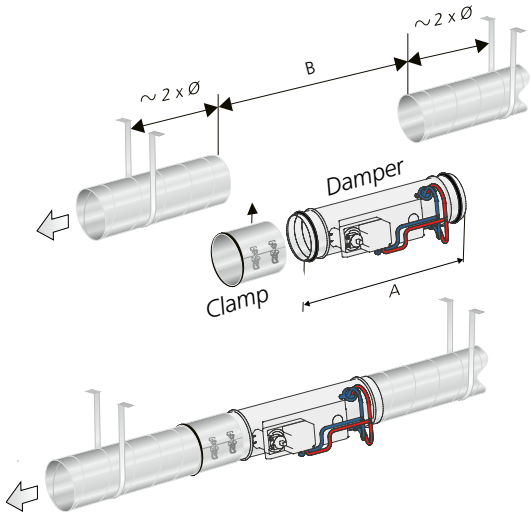

Figure 4. Installation in the duct system. The ducts must be firmly fixed to the frame of the building on each side of the product.

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	l/s	m³/h	l/s	m³/h
200 x 200	5	6.0	67	241	365	1314	8	29
300 x 200	5	7.2	100	360	548	1973	12	43
400 x 200	5	8.3	133	479	730	2628	17	61
500 x 200	5	9.5	167	601	913	3287	21	76
600 x 200	5	10.5	200	720	1095	3942	25	90
700 x 200	5	11.7	233	839	1278	4601	29	104
800 x 200	5	12.9	267	961	1460	5256	33	119
1000 x 200	10	15.2	333	1199	1825	6570	42	151
300 x 300	5	8.8	152	547	834	3002	19	68
400 x 300	5	10.0	203	731	1112	4003	25	90
500 x 300	5	11.3	254	914	1390	5004	32	115
600 x 300	5	12.6	305	1098	1668	6005	38	137
700 x 300	5	13.7	355	1278	1946	7006	44	158
800 x 300	5	15.1	406	1462	2224	8006	51	184
1000 x 300	10	17.7	508	1829	2780	10008	63	227
400 x 400	5	12.0	273	983	1495	5382	34	122
500 x 400	5	13.4	341	1228	1869	6728	43	155
600 x 400	5	14.7	409	1472	2243	8075	51	184
700 x 400	5	16.3	478	1721	2616	9418	60	216
800 x 400	10	17.8	546	1966	2990	10764	68	245
1000 x 400	10	20.5	682	2455	3738	13457	85	306
1200 x 400	10	23.4	819	2948	4485	16146	102	367
1400 x 400	10	26.2	955	3438	5233	18839	119	428
1600 x 400	10	29.0	1092	3931	5980	21528	136	490
500 x 500	5	15.2	429	1544	2347	8449	54	194
600 x 500	5	16.7	514	1850	2816	10138	64	230
700 x 500	10	18.4	600	2160	3286	11830	75	270
800 x 500	10	19.9	686	2470	3755	13518	86	310
1000 x 500	10	23.0	857	3085	4694	16898	107	385
1200 x 500	10	26.1	1028	3701	5633	20279	129	464
1400 x 500	10	29.3	1200	4320	6572	23659	150	540
1600 x 500	10	32.4	1371	4936	7510	27036	171	616
600 x 600	10	19.0	618	2225	3388	12197	77	277
700 x 600	10	20.8	722	2599	3952	14227	90	324
800 x 600	10	22.4	825	2970	4517	16261	103	371
1000 x 600	10	25.9	1031	3712	5646	20326	129	464
1200 x 600	10	29.3	1237	4453	6775	24390	155	558
1400 x 600	10	33.2	1443	5195	7904	28454	180	648
1600 x 600	10	36.1	1649	5936	9033	32519	206	742
700 x 700	10	22.1	844	3038	4622	16639	105	378
800 x 700	10	24.7	964	3470	5282	19015	121	436
1000 x 700	10	28.4	1205	4338	6602	23767	151	544
1200 x 700	10	32.0	1446	5206	7923	28523	181	652
1400 x 700	10	35.8	1688	6077	9243	33275	211	760

*)Vnom at 120 Pa in pressure reading.

*Installed according to the instructions.

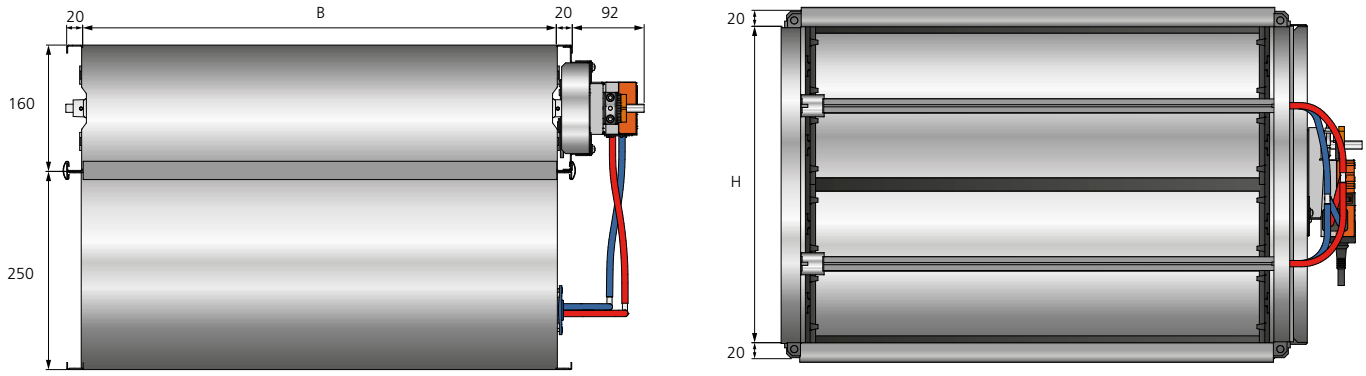

Figure 5. Dimensions (mm), REACT V BBAC rectangular.

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 x B	E = 2 x B
T piece	E = 3 x B	E = 2 x B

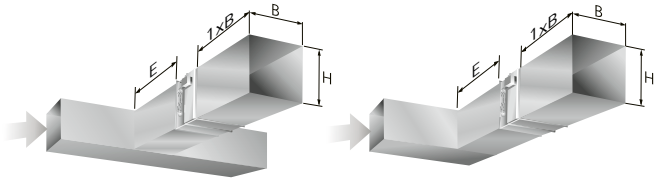

Figure 6. Straight duct section requirements in rectangular ducts.
E = Straight duct section
B = Width of duct
H = Height of duct

Straight duct section requirements in case of sound attenuator with baffle

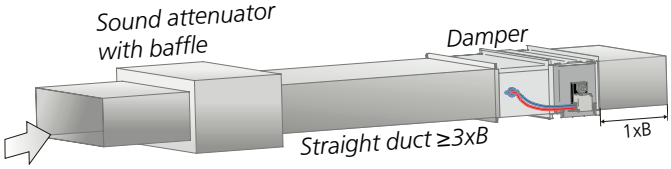

Figure 7. Straight duct section requirements 3 x B in case of sound attenuator with baffle. Applies to both supply and extract air.

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 – BACnet (C_1 = D- = A)

7 – BACnet (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

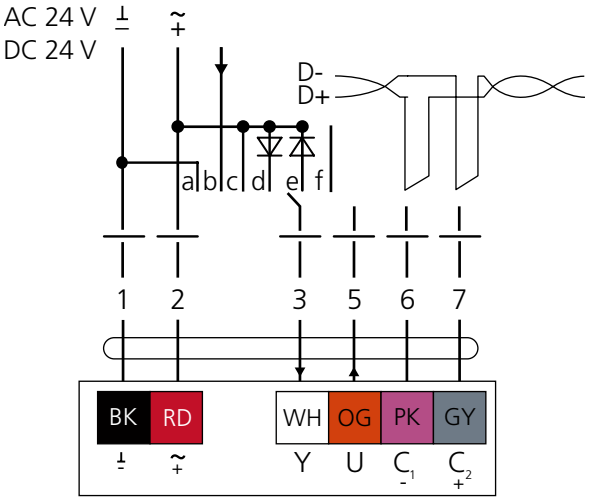

Figure 8. Wiring diagram.

Regulation and forced control via analogue control signal

See connection in the wiring diagram, Figure 8.

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

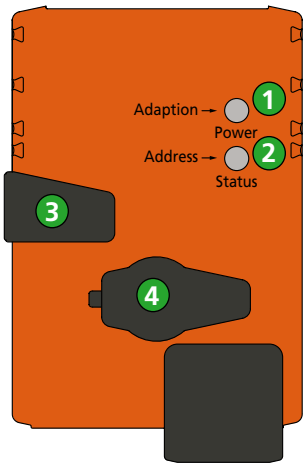

Figure 9. Belimo actuator.

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

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).

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.

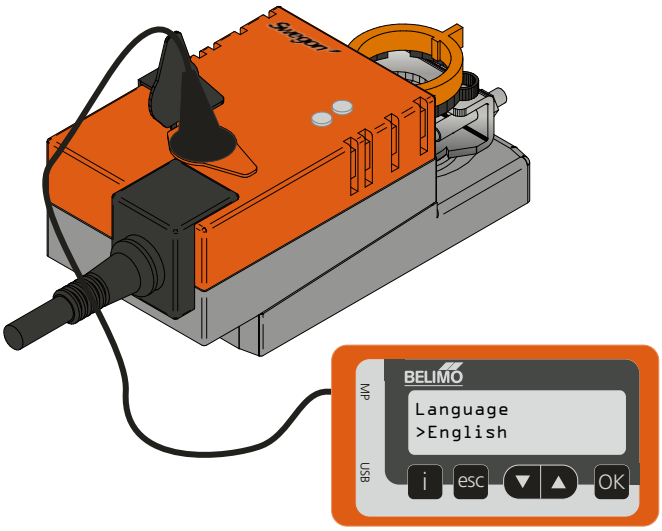

Figure 10. ZTH EU – Hand-held terminal for setting and reading the actuator's parameters.

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

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 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	Identification of actuator
Serial number	Serial number
Type	Actuator type
Firmware	Software version
Designation	Designation
Position	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	Normal operation
Stop	Actuator stops in the current position
V'max	Damper regulates to selected max. value
V'mid	Damper regulates to selected intermediate position
V'min	Damper regulates to selected min. value
Close	Closes the damper fully
Open	Opens the damper fully
Rotation direct. >ccw	Direction of rotation. Available in advanced mode.
ccw	Anti-clockwise **(standard, may not be changed)**
cw	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
Baudrate >38400	Choice of transfer speed
9600	
19200	
38400	
76800	
115200	
Termination >Off	Internal termination
OFF	
ON	
Instance Number 1	Unique identification number 0...4194302
Max Master 127	1...127
Bus Protocol >BACnet	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 BACnet

- Make sure that the product is energized.
- Check the product's BACnet connection.
- Check the product's communication settings.
- Check that the product has the correct, unique BACnet 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 BACnet communication is used for the damper, forced control may be active via the communication. Try disconnecting the BACnet 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

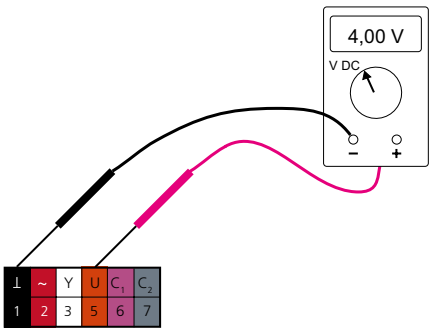

Figure 11. Shows connection of a voltmeter to check the actual value.

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):

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

- 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

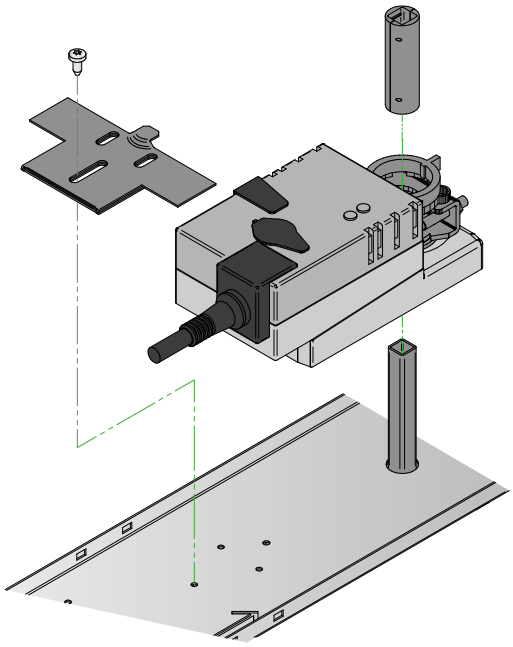

Figure 12. Dismantling the damper motor.

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.

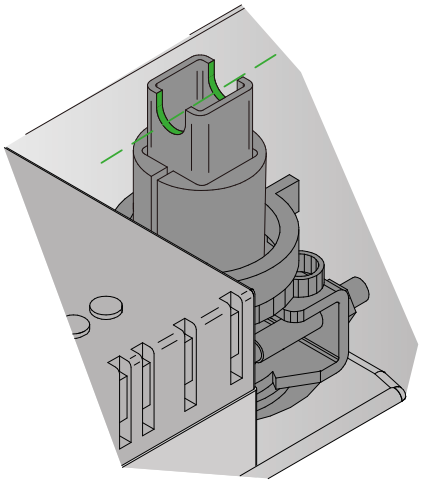

Figure 13. Recess in the damper spindle indicates the position of the damper.

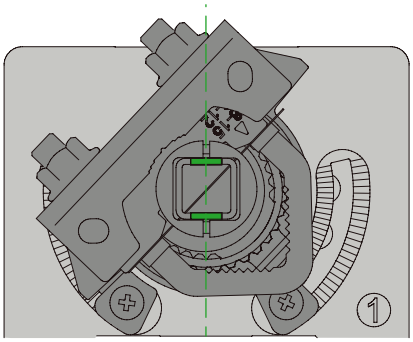

Figure 14. Damper open. Jumper to the left.

Technical data

IP class:	IP54
Corrosivity class:	C3
Pressure class:	A
Leakage classes according to SS-EN 1751	
- Leakage class, casing:	C
- Leakage class circular damper, closed:	4
- Leakage class rectangular damper, closed:	3
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 BBAC 5 Nm	2.0 W	4.0 VA
REACT V BBAC 10 Nm	3.0 W	5.0 VA
REACT V BBAC 20 Nm	3.0 W	5.5 VA

Declaration of Conformity

Swegon AB hereby affirms that:

REACT V BBACa 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 BBAC Product data sheet

REACT Belimo – Description of functions & wiring diagrams

REACT Belimo – BACnet settings