

REACT_a

Installation – Commissioning – Maintenance

20200605

Installation

Air flow measuring of REACT requires a straight section of duct before the unit (in air flow direction), according to installation figures. Modbus tables are available in a separate document (REACTa_Modbus-m).

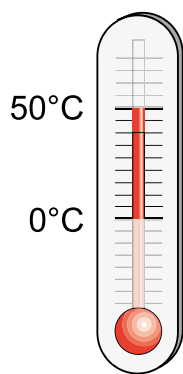


Figure 1. Permissible ambient temperature.

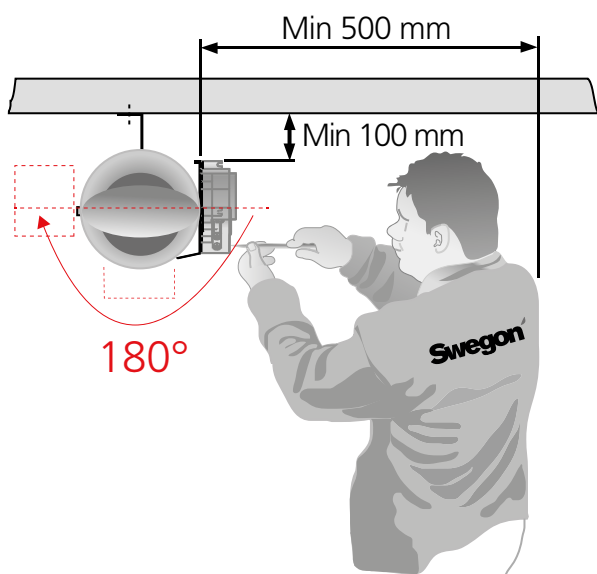


Figure 2. Space required for installation.

Installation – circular version

Legend to figures 3-5:

1. Circular Variable-flow damper REACT
2. Clamp, FSR
3. Sound attenuator with baffle

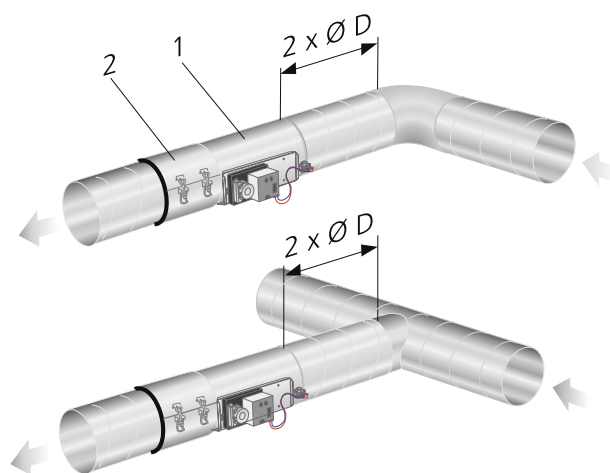


Figure 3. Straight section requirements, circular ducts.

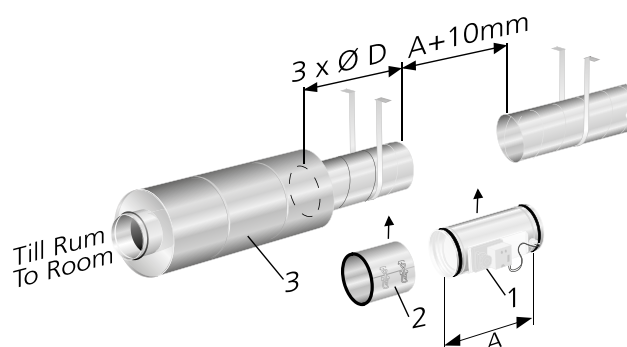


Figure 4. REACT requires a duct of $\geq 3 \times \text{ØD}$ between the REACT and a sound attenuator fitted with baffles. NOTE: Ducts must be fixed on both sides of REACT.

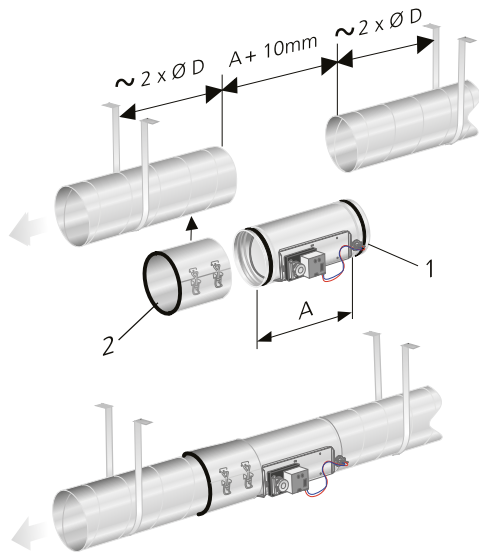


Figure 5. Installation in a duct system. The ducts must be firmly fixed to the frame of the building on each side of the REACT unit.

Installation measurements – circular version

Size	A (mm)	Inst. measurements (A + 10 mm)
100	472	482
125	472	482
160	472	482
200	472	482
250	522	532
315	552	562
400	695	705
500*	822	842
630*	1200	1220

*Size 500, 630 has installation dimension A+20 mm.

Installation – rectangular version

Measurement B in the figure and table below can be found on page 11, in the table; "Dimension, air-flow and k-factors – rectangular version".

Straight sections before REACT for rectangular ducts

Type of obstruction	E (m ₂ =5%)	E (m ₂ =10%)
One 90°-bend	E = 3 x B	E = 2 x B
One T-piece	E = 3 x B	E = 2 x B

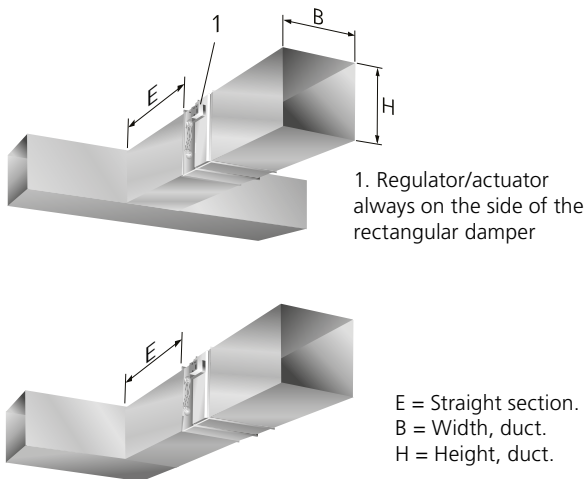


Figure 6. Straight section requirements, rectangular ducts. Dimensions B and H (B = Width, H = Height) can be read off the label on the delivered product.

Straight sections before/after REACT – Sound attenuator with baffles

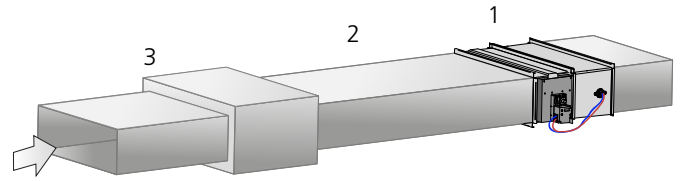


Figure 7. Straight section requirements, rectangular REACT and sound attenuator with baffles. Installation with a length of straight duct applies to both the supply air and the extract air.

- 1 = Rectangular Variable-flow damper REACT.
- 2 = ≥ 3xB length of straight duct.
- 3 = Sound attenuator with baffles.

Dimensions and weights

REACT – circular version and FSR

Size	Dimensions (mm)				Weight (kg)		
	ØD	Ød	A	C	REACT	REACT GUAC	FSR
100	125	99	472	45	1.9	2,9	0.4
125	150	124	472	45	2.0	3,0	0.4
160	185	159	472	45	2.1	3,1	0.6
200	225	199	472	45	2.3	3,3	0.6
250	275	249	522	45	3.4	4,4	0.7
315	340	314	552	45	4.4	6,0	0.8
400	425	399	695	57	6.0	7,6	1.2
500	525	499	822	57	9.0	10,6	1.4
630	655	629	1200	57	17	19	1,5

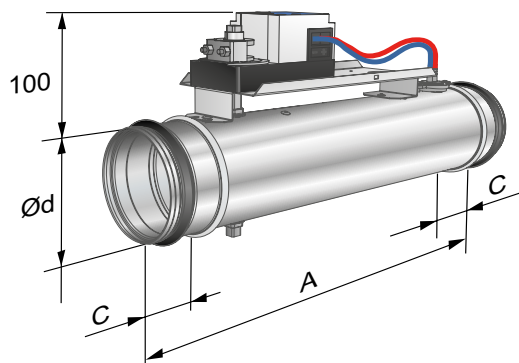


Figure 8. Circular REACT and REACT MB.

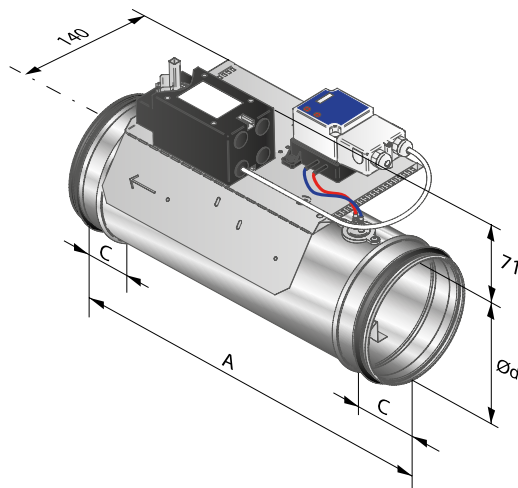


Figure 11. Circular REACT GUAC with spring return actuator.

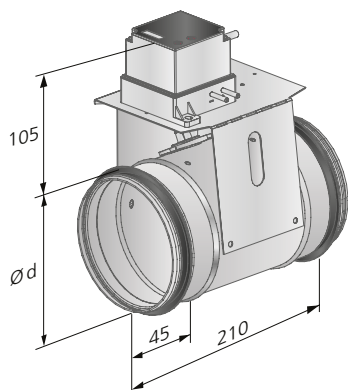


Figure 9. REACT CU, circular and rectangular versions.

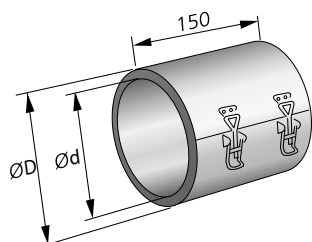


Figure 10. FSR.

REACT insulated – circular version

Size	Dimensions (mm)						Weight (kg)		
	A	Ød	E	F	G	J*	REACT	REACT GUAC	FSR
100	45	99	180	401	245	472	4,1	4,7	0,4
125	45	124	180	401	245	472	4,3	4,9	0,4
160	45	159	215	401	285	472	5,1	5,7	0,6
200	45	199	255	401	335	472	6,2	6,8	0,6
250	45	249	305	451	395	522	8,2	8,8	0,7
315	45	314	370	481	465	552	10,7	11,3	0,8
400	57	399	462	595	553	695	15,6	16,2	1,2
500	57	499	563	723	653	822	22,4	23	1,4
630	57	629	695	1110	785	1200	44	46	1,5

*Both versions.

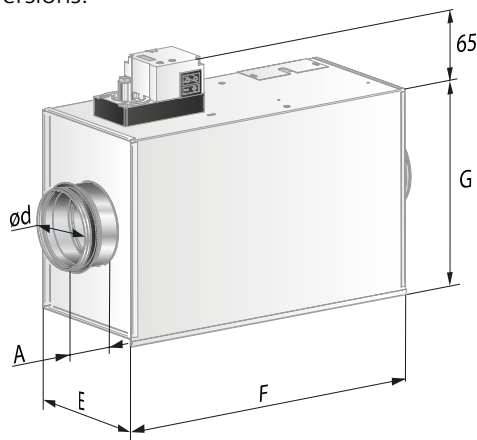


Figure 12. REACT and REACT MB insulated, circular.

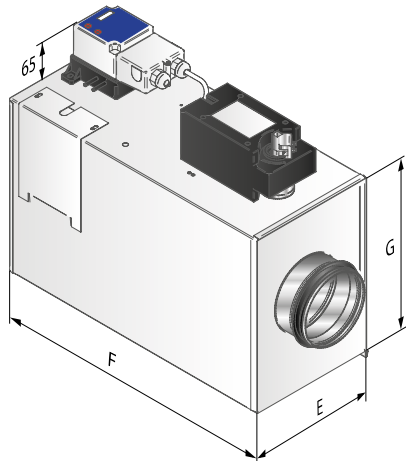


Figure 13. REACT insulated GUAC - circular design.

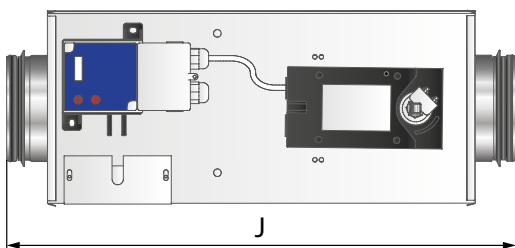


Figure 14. REACT insulated GUAC - circular design.

REACT – rectangular version

Dimensions B and H (B = Width, H = Height), can be found in the table; "Air flows and measures – rectangular version", see page 11.

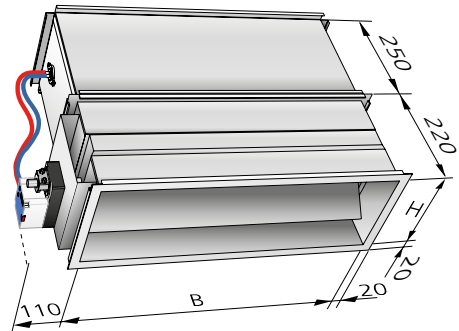


Figure 15 REACT and REACT MB, rectangular version.

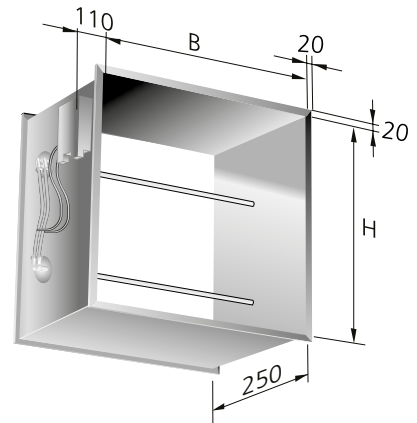


Figure 16. REACT CU, rectangular version.

Technical data

To obtain the correct functionality, it is very important that the following is taken into account:

- REACT may only be installed in spaces with an ambient temperature in the range 0-50°C.
- All interconnected regulating equipment must have the same polarity, i.e. the neutral wire must be correctly connected.
- The product should always be installed with its flow meter facing downstream, see air direction arrows on the product label.
- REACT is not suitable for use in explosive environments.
- All service must be carried out with the power supply disconnected.

Operating data

Ambient air temperature:	0° – +50°C
Air-flow temperature:	0° – +50°C
Running time open/close (90 degrees):	5 Nm - 100 s 10 Nm - 150 s 15 Nm - 150 s
Spring return actuator, running time electricity:	5 Nm - 100 s 10 Nm - 150 s
Running time spring max:	20 s (90 degrees)

Storage and transport

Ambient temperature:	-20° – +80°C
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Electrical data

Supply voltage	24 V AC/DC +-20%, 50/60 Hz	
Power consumption, for transformer rating:		
REACT 5 Nm	2.5 W	4 VA
REACT 10 Nm	2,5 W	4,5 VA
REACT 15 Nm	3 W	4,5 VA
GUAC DM3 controller	0,6 W	1,3 VA
Spring return actuator 5 Nm	6,5 W (standby 2 W)	7,5 VA
Spring return actuator 10 Nm	5 W (standby 2 W)	8 VA
REACT CU flow unit	0,6 W	1,3 VA

Mechanical opening/closing of the spring return actuator

Mechanical handling of dampers can only be performed if the actuator is de-energized. The supplied key (attached to the motor cable) or a 2.5 mm hex key, is used for mechanical handling.

Spring return actuators on REACT GUAC are supplied as standard from the factory with the spring return of the damper set to de-energized/closed.

Wiring, standard version

1-2 – Operating voltage	24 V AC/DC
1-3 – Control signal	0..10/(2..10) V
1-4 – Feedback signal	0..10/(2..10) V
Load for output GY: max 0.5 mA	

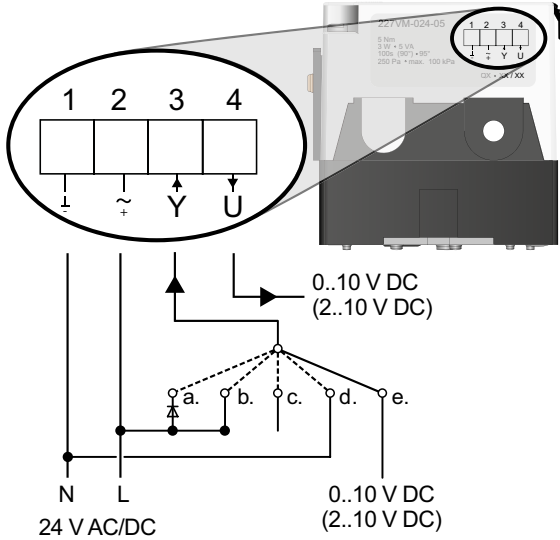


Figure 17. Wiring diagram, standard version.

Wiring, Modbus version

1-2 – Operating voltage	24 V AC/DC
1-3 – Control signal	0..10/(2..10) V
1-4 – Feedback signal	0..10/(2..10) V
Load for output GY: max 0.5 mA	

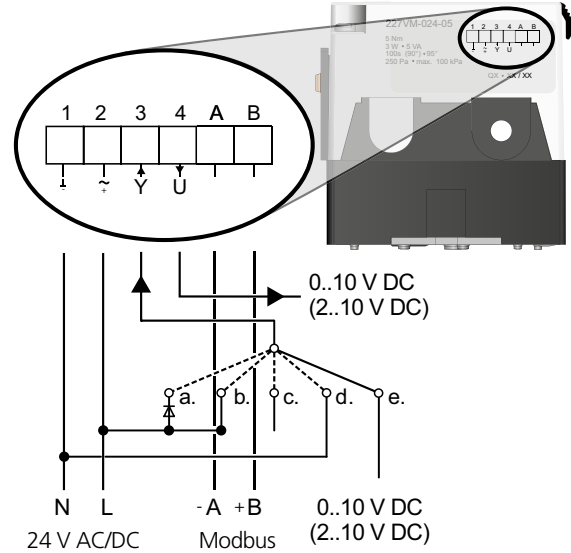


Figure 19. Wiring diagram, Modbus version.

Connection GUAC version

Connections are made in accordance with the left-hand circuit diagram GUAC, see label on the inside of the cover.

1-2 – Operating voltage	24 V AC/DC
1-3 – Control signal	0..10/(2..10) V
1-4 – Feedback signal	0..10/(2..10) V
Load for output GY: max 0.5 mA	

NOTE! Electrical connection of the spring-return actuator installed at the factory.

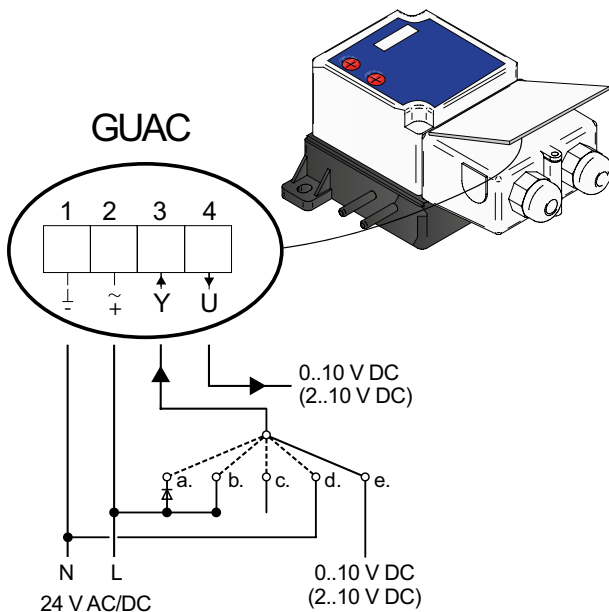


Figure 18. Wiring diagram, GUAC version.

Override control and control signal

Various options for control can be preset.

See the relevant wiring diagram in figure 17-19.

- a. Damper opens fully, 24 V AC (positive rectified half-wave).
- b. V_{max} 24 V AC/DC.
- c. V_{min} no signal, Mode: 0..10 V.
- d. Damper closes fully, groundearth (-): 0..10 V – CLOSED if $V_{min} = 0$. 2..10 V – CLOSED.
- e. Regulation with the control signal, default 0..10 V (alt. 2..10 V).

Connection REACT CU

1-2 – Operating voltage:	24 V AC/DC
1-4 – Feedback signal:	0..10/(2..10) V
Load for output GY: max 0,5 mA	

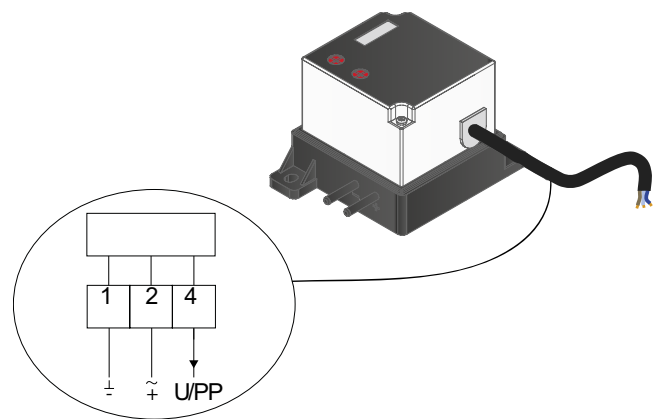


Figure 20. Wiring diagram, REACT CU.

Handling

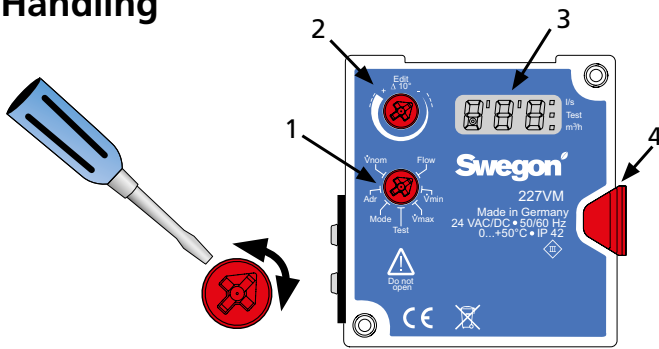


Figure 21. The REACT interface.

- 1 – Select desired mode by turning the "Mode" wheel.
- 2 – Set values and select sub-settings by turning the "Edit" wheel.
- 3 – The displayed value blinks twice when a new value is accepted.
- 4 – "Gear release" button

Menus



Flow

- Toggle between l/s and m³/h using the edit wheel.
- Illuminated "dot" in the display indicates the selected mode.



Vmin

- Select new value for Vmin with the edit wheel.
- Vmin value should be lower than Vmax.



Vmax

- Select new value for Vmax with the edit wheel.
- Vmax value should be greater than Vmin



Test

- Automatic disconnection after 10 hours.
- Turn the edit wheel to select between:
 - oFF** – Test mode is off, actuator resumes control.
 - on** – Test mode is on, damper stays in current position.
 - oP** – Opens the damper fully.
 - cL** – Closes the damper fully.
 - Lo** – Low flow, forces the actuator to Vmin.
 - Hi** – High flow, forces the actuator to Vmax.
 - 123** – Displays current software version.



Mode

- Displays selected input and reference signal.
- Toggle between 0-10 and 2-10 V using the edit wheel.



Adr

- Used for Modbus. for particulars on how to use Modbus, see next page.



Vnom

- Used for factory configuration.

Maintenance

REACT is maintenance-free. Cleaning should only be done by vacuuming with a brush nozzle or dry wiping with a damp cloth. When cleaning the duct system, REACT must be dismantled, unless cleaning hatches are situated near the unit. Cleaning tools, such as feather dusters or soft brushes and the like must not be drawn through the damper.

Commissioning – Flows

- REACT is factory-calibrated and preset for a nominal airflow.
- The set values can be read off the product, see label on the product.
- It is extremely important that the requirement for the lengths of straight duct upstream or downstream are complied with.
- Providing only half the required length of straight duct, may result in up to 20% lower accuracy in flow calculations.

Control signals

- REACT is preset for a signal range of 0-10 V DC (can be reset to 2-10 V DC).
- The Control of the air-flow, using a direct-wired room thermostat, is regulated by a control voltage of <0.5V for min. airflow and 10 V for max. airflow.
- When controlled from a HVAC central/controller, min/max air-flow settings are controlled by limiting the control signal, i.e. 2,3 - 7,6 V DC.
- If wired to a controller, the REACT is normally set to 0-100% of its operating range.
- At 2-10 V control the following applies:
 - 0 - 0.8 V closes the damper.
 - 0.8 - 2 V controls the the damper to min. air-flow.

Airflows

- REACT has a nominal air-flow, Q_{nom} for each size.
- Max. air-flow: 30-100% of Q_{nom} .
- Min. air-flow: 0-100% of Q_{nom} .
- NOTE: Min. value must always be lower than max value.
- At Q_{min} a measured pressure of 1 Pa is obtained and a measurement accuracy of $\pm 5-20$ % of the flow.

Wiring examples

When REACT is used for constant-flow regulation, only 24 AC is connected to the controller. Below and on page 9-10, different wiring examples are given, showing different types of control configuration.

CAV – Constant-flow regulation

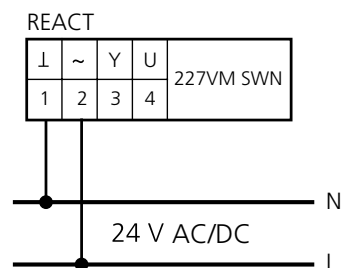




Figure 22. The wiring diagram shows the connections for constant-flow regulation. Q_{min} = required constant-flow and Q_{max} = 0 l/s.

How to use Modbus

Modbus tables are available in a separate document (REACTa_Modbus-m).

Function	Description
Adr (Modbus only)	 <p>Enables you to set the actuator's Modbus address, by turning the "edit wheel". It is possible to set the address from 1 till 247. If you turn the value selector to end stop "+", the display will show a "2". This makes it possible to select the second level. If you select the second level, this is indicated in the display by a small circle.</p>
	<p>The following functions are available at the second level:</p> <p>Flow Return to previous level</p> <p>V_{min} Not used</p> <p>V_{max} Normally shows "OFF"</p> <p>Test To start a test run, you must turn the Edit wheel until "ON" appears in the display.</p> <p>Mode Shows the angle of the rotation (0...255 digital 0...100%).</p> <p>Adr. Used for selecting communication settings for Modbus. See table below.</p> <p>V_{nom} Used for setting response delay for the Modbus communication (see separate documents)</p>
V_{nom}	 <p>Set V_{nom} according to the preset values for circular dampers and rectangular dampers according to the table on page 11 where $Q_{nom} = V_{nom}$. If 999 is shown in the display, it is possible to enter a user-specific V_{nom}. The V_{nom} value can only be set by Swegon using the Gruner winVAV Software (applies to the 15 Nm version only).. No password is required when entering the first settings. After entering the first settings, you must set the password to 201 and wait until the display flashes; then enter another password.</p>

Display number	EEPROM value	Communcation speed	Parity	Stopbits
1 ³	0	1200	None	2
2 ³	1	1200	Even	1
3 ³	2	1200	Odd	1
4	3	2400	None	2
5	4	2400	Even	1
6	5	2400	Odd	1
7	6	4800	None	2
8	7	4800	Even	1
9	8	4800	Odd	1
10	9	9600	None	2
11	10	9600	Even	1
12	11	9600	Odd	1
13	12	19200	None	2
14 ⁴	13	19200	Even	1
15	14	19200	Odd	1
16	15	38400	None	2
17	16	38400	Even	1
18	17	38400	Odd	1
*) 19 ^{2/3}	18	1200	None	1
*) 20 ²	19	2400	None	1
*) 21 ²	20	4800	None	1
*) 22 ²	21	9600	None	1
*) 23 ²	22	19200	None	1
*) 24 ^{1/2}	23	38400	None	1

¹ Default setting 309C-024-150-MB/SL8/ST15/SWE

² Not Modbus standard, but commonly used

³ Limited data length per reading of max. 8 register

⁴ Default setting 227VM-024-**-MB/SWE

*) Parameter list expanded to 24 numbers from 1160984 – 01 - 17/20, (year 17 week 20). The number is evident from the silver label on the side of the actuator.

Room thermostat

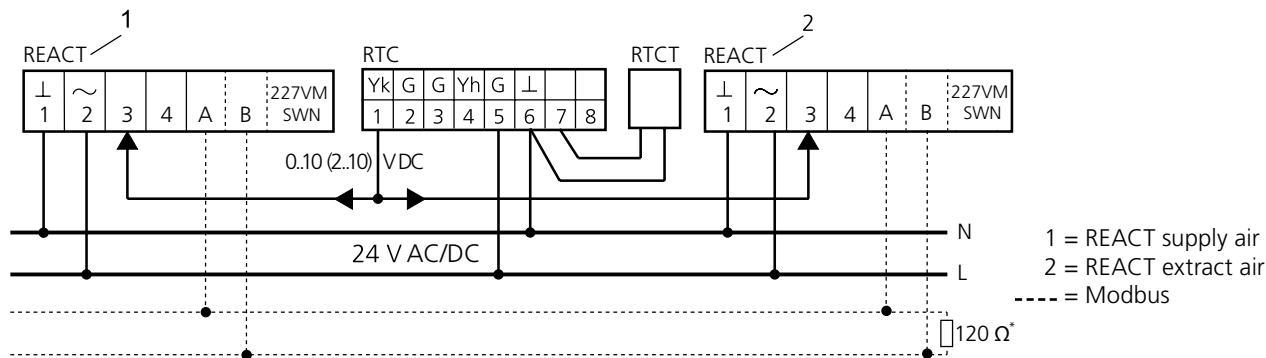


Figure 23. The diagram shows how to wire a RTC room unit with simultaneous control of the extract air. The figure also shows an alternative with RTCT duct temperature sensor.

CO₂ and temperature control with occupancy detector

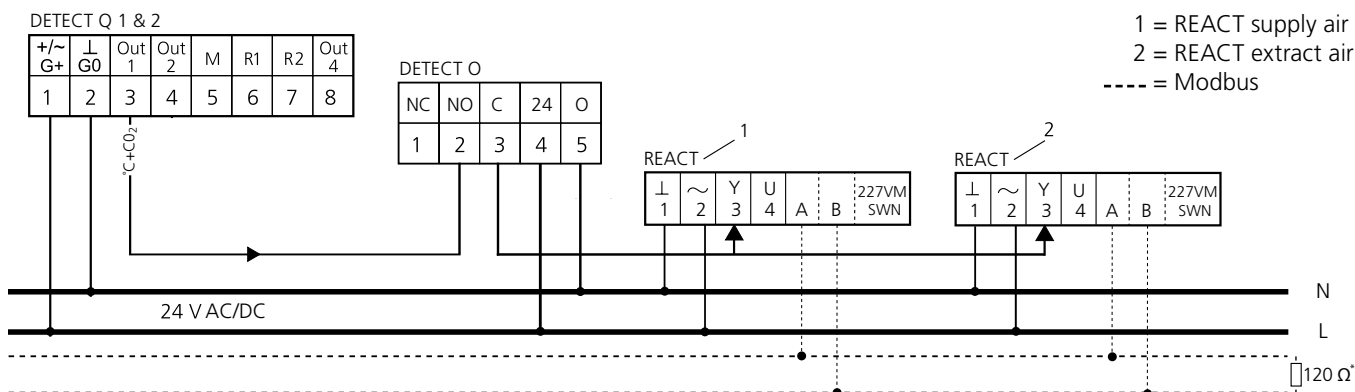


Figure 24. The diagram shows how to wire CO₂ sensor with combined temperature control DETECT Q, occupancy sensor DETECT O and simultaneous control of the extract air. VAV control is used for occupancy, otherwise min. airflow.

Two-flow control with presence detector

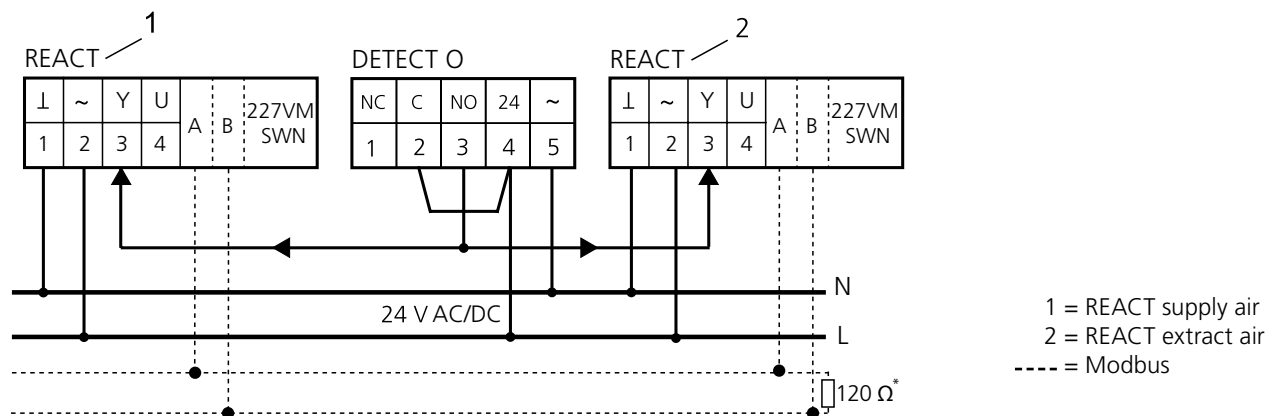


Figure 25. The diagram shows how to wire the DETECT O presence detector with simultaneous control of the extract air. Two-flow control, min. or max. airflow.

*Should only be used on the last REACT in the Modbus loop

VAV regulation with room thermostat and presence detector

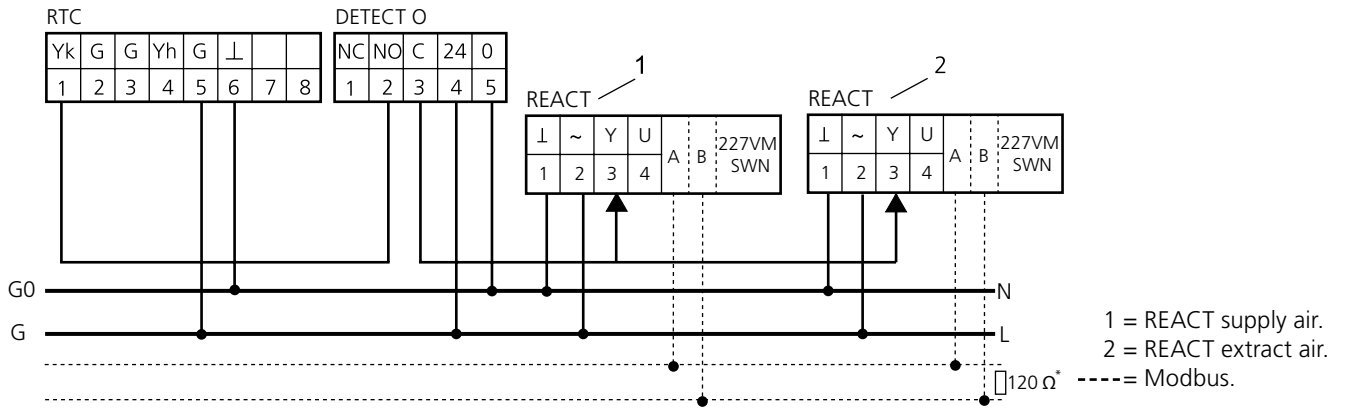


Figure 26. The diagram shows how to wire a RTC room unit and DETECT O with simultaneous control of the extract air. VAV is used for occupancy, otherwise min. airflow. The figure also shows the alternative with RTCT duct temperature sensor. *Should only be used on the last REACT in the Modbus loop

VAV regulation and heat regulation with thermo-actuators

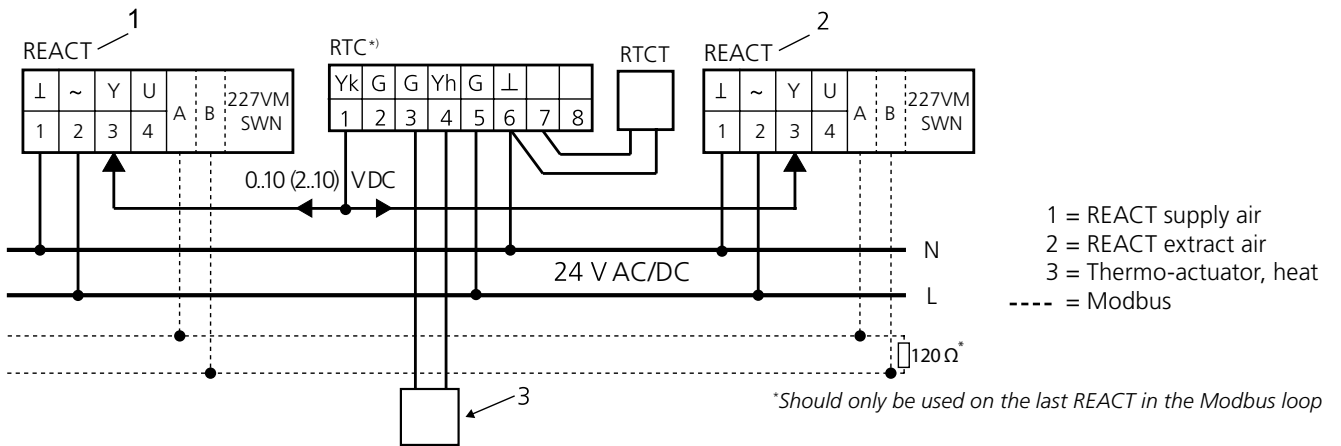


Figure 27. The diagram shows how to wire and refit jumpers of the RTC room thermostat enabling operation of the on/off 24 V VAC thermo-actuator on output YH (4).

*) The jumper connection in the RTC must be changed when wiring the thermo-actuator (3) to the system. More information is available in the Installation/Commissioning documentation for RTC.
NOTE: The unit must be de-energized before reconnecting any jumpers!

Slave control with REACT CU as a master

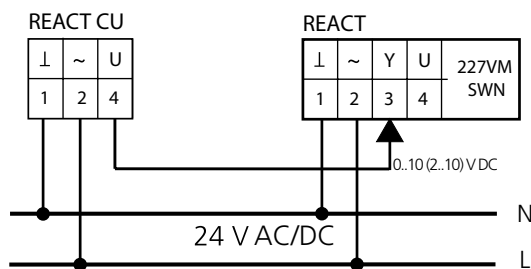
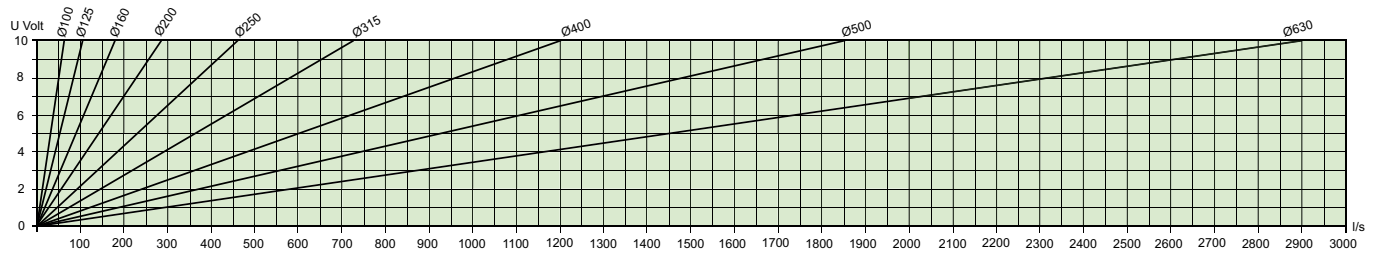


Figure 28. The diagram shows the connections between master – slave unit. In this wiring configuration, the REACT slave controller should be set to a flow range of 0-100% of the nominal airflow.

Diagram, true value voltage/airflow

The diagram only applies to factory-calibrated products for nominal air-flow, according to the Air-flow and K-factor table. U always refers to Q_{nom} . NOTE! Does not indicate damper position.



Dimension, air-flow and k-factors

All REACT variants - Standard, Modbus, spring return

Circular version

Size	Air-flow (l/s)		Air-flow (m ³ /h)		k-factor	Torque (Nm)
	Q _{min} *	Q _{nom}	Q _{min}	Q _{nom}		
100	5	62	18	223	5,3	5
125	9	102	33	367	8,7	5
160	16	176	58	634	15,5	5
200	25	280	90	1008	24,8	5
250	40	456	144	1642	40,0	5
315	63	730	227	2628	63,4	10
400	102	1200	367	4320	102,0	10
500	164	1850	590	6660	164,0	10
630	300	2892	1080	10410	264	15

*At Q_{min} a measurement pressure of 1 Pa is obtained with a measurement accuracy of ± 5-20%

Rectangular version – continued

Size (B x H, mm)	Air-flow (l/s)		Air-flow (m ³ /h)		k-factor	Torque (Nm)
	Q _{min}	Q _{nom}	Q _{min}	Q _{nom}		
400 x 400	304	1490	1094	5364	136,0	5
500 x 400	382	1873	1375	6743	171,0	10
600 x 400	458	2246	1649	8086	205,0	10
700 x 400	534	2618	1922	9425	239,0	10
800 x 400	610	2991	2196	10768	273,0	10
1000 x 400	762	3735	2743	13446	341,0	10
1200 x 400	915	4480	3294	16128	409,0	15
1400 x 400	1069	5236	3848	18850	478,0	15
1600 x 400	1221	5981	4396	21532	546,0	15
500 x 500	479	2344	1724	8438	214,0	10
600 x 500	575	2815	2070	10134	257,0	10
700 x 500	671	3286	2416	11830	300,0	10
800 x 500	767	3757	2761	13525	343,0	10
1000 x 500	959	4699	3452	16916	429,0	15
1200 x 500	1149	5631	4136	20272	514,0	15
1400 x 500	1342	6573	4831	23663	600,0	15
1600 x 500	1534	7515	5522	27054	686,0	15
600 x 600	691	3385	2488	12186	309,0	10
700 x 600	807	3955	2905	14238	361,0	10
800 x 600	921	4513	3316	16247	412,0	15
1000 x 600	1152	5642	4147	20311	515,0	15
1200 x 600	1382	6770	4975	24372	618,0	15
1400 x 600	1614	7909	5810	28472	722,0	15
1600 x 600	1845	9037	6642	32533	825,0	15
700 x 700	944	4623	3398	16643	422,0	15
800 x 700	1078	5280	3881	19008	482,0	15
1000 x 700	1348	6606	4853	23782	603,0	15
1200 x 700	1617	7920	5821	28512	723,0	15
1400 x 700	1887	9246	6793	33286	844,0	15
1600 x 700	2156	10560	7762	38016	964,0	15

Rectangular version

(B = Width, H = Height)

Size (B x H, mm)	Air-flow (l/s)		Air-flow (m ³ /h)		k-factor	Torque (Nm)
	Q _{min}	Q _{nom}	Q _{min}	Q _{nom}		
200 x 200	75	367	270	1321	33,5	5
300 x 200	112	548	403	1973	50,0	5
400 x 200	149	728	536	2621	66,5	5
500 x 200	187	915	673	3294	83,5	5
600 x 200	224	1095	806	3942	100,0	5
700 x 200	262	1282	943	4615	117,0	5
800 x 200	297	1457	1069	5245	133,0	5
1000 x 200	373	1829	1343	6584	167,0	10
300 x 300	170	833	612	2999	76,0	5
400 x 300	228	1117	821	4021	102,0	5
500 x 300	284	1391	1022	5008	127,0	5
600 x 300	340	1665	1224	5994	152,0	5
700 x 300	398	1950	1433	7020	178,0	10
800 x 300	454	2224	1634	8006	203,0	10
1000 x 300	568	2782	2045	10015	254,0	10

Checking performance – REACT

Checking the min. airflow

The easiest way to do this is by disconnecting the white cable marked 3. The damper will then move to the closed position. Measure the voltage U (between cables 1 and 4) and calculate the airflow using the formulas on this page.

Checking the max. airflow

Use the room thermostat, or some other control equipment, to override the system so the control voltage will be a 10 V input on the white cable 3. As an alternative, you can short circuit between cables 2 and 3. This will command the controller to go to the preset max. airflow setting. Before short circuiting, you must disconnect the cable from the room controller. If this is not done, you will destroy the output on the control equipment. The damper will move to the open position. Measure the voltage U (between cables 1 and 4) and calculate the airflow using the formulas on this page.

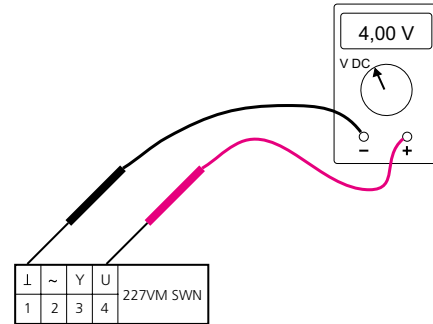


Figure 29. How to connect a voltmeter to check the true value.

Gear release

The controller of the 227VM SWN has a gear release button, enabling the damper shaft to be turned manually. Spring return actuators on REACT GUAC are supplied as standard from the factory with the spring return of the damper set to de-energized/closed.

Mechanical opening/closing of the spring return actuator

Mechanical handling of dampers can only be performed if the actuator is de-energized. The supplied key (attached to the motor cable) or a 2.5 mm hex key, is used for mechanical handling.

REACT as a constant-flow controller

When REACT is used as a constant-flow controller, the min. flow setting is used as the set point for the constant airflow. Only 24 V AC, should be connected to cable pair 1 and 2.

Troubleshooting – REACT

Incorrect polarity on control signal zero conductor

It is important that the neutral conductor follows the entire chain of connections from thermostat to controller. Check this, by measuring the control voltage between cables 1 and 3 on the REACT. Correctly wired it should be possible to vary the signal between 0-10 V DC. Incorrectly wired, the delivered signal is ~ 27.4 - 29.1 V DC.

Airflow does not correspond

Inaccurate air-flow is primarily due to disruptions in the duct system. Above all, the straight duct length requirements should be checked. If the ducting deviates from these requirements, the error can be as large as 20%. In systems with dusty air (mostly extract air systems) the unit's sensors can become soiled.

The sensor can be cleaned by blowing it with clean air in the opposite direction to the air-flow, i.e. in the tube connection. We recommend compressed air in a low-pressure aerosol tube. The duct must also be cleaned, to keep the measurement flange and the pressure tappings from blocking up.

Checking performance – REACT CU

Checking signals

Since the REACT CU only uses the controller's airflow measurement feature, no settings are needed. It is the true value signal from terminal 4 that must be wired further to the slave unit. This is not affected by the settings on the min./max. potentiometers.

Measure the voltage, U (between cables 1 and 4), and calculate the airflow using the formulas below for the relevant signal system; 0-10 or 2-10 V DC. REACT CU is normally supplied with a 0-10 true value signal. Check the marking, to see if it should be set for 2-10 V. For Q_{nom} see the tables on page 11.

REACT CU supplied factory set with 0-10 V actual value signal.

Formulas for calculating airflows.

A control signal of 0..10 V DC, gives the following formulas:

- To calculate the current actual flow (Q_{act}) when you know the value of the control signal (Y):

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

- To calculate the current true value (U) when you know the value of the actual flow (Q_{act}):

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

A control signal of 2..10 V DC gives the following formulas:

- To calculate the current actual flow (Q_{act}) when you know the value of the control signal (Y):

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

- To calculate the current true value (U) when you know the value of actual flow (Q_{act}):

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

Explanations of the formulas above:

Y = Control signal in [V] DC

U* = True value signal in [V] DC

Q_{act} = Actual flow in [l/s]

Q_{min} = Required min. airflow in [l/s]

Q_{max} = Required max. airflow in [l/s]

Q_{nom} = Nominal flow in [l/s], see tables page 11.

*Always refers to Q_{nom} . NOTE! Does not indicate damper position.