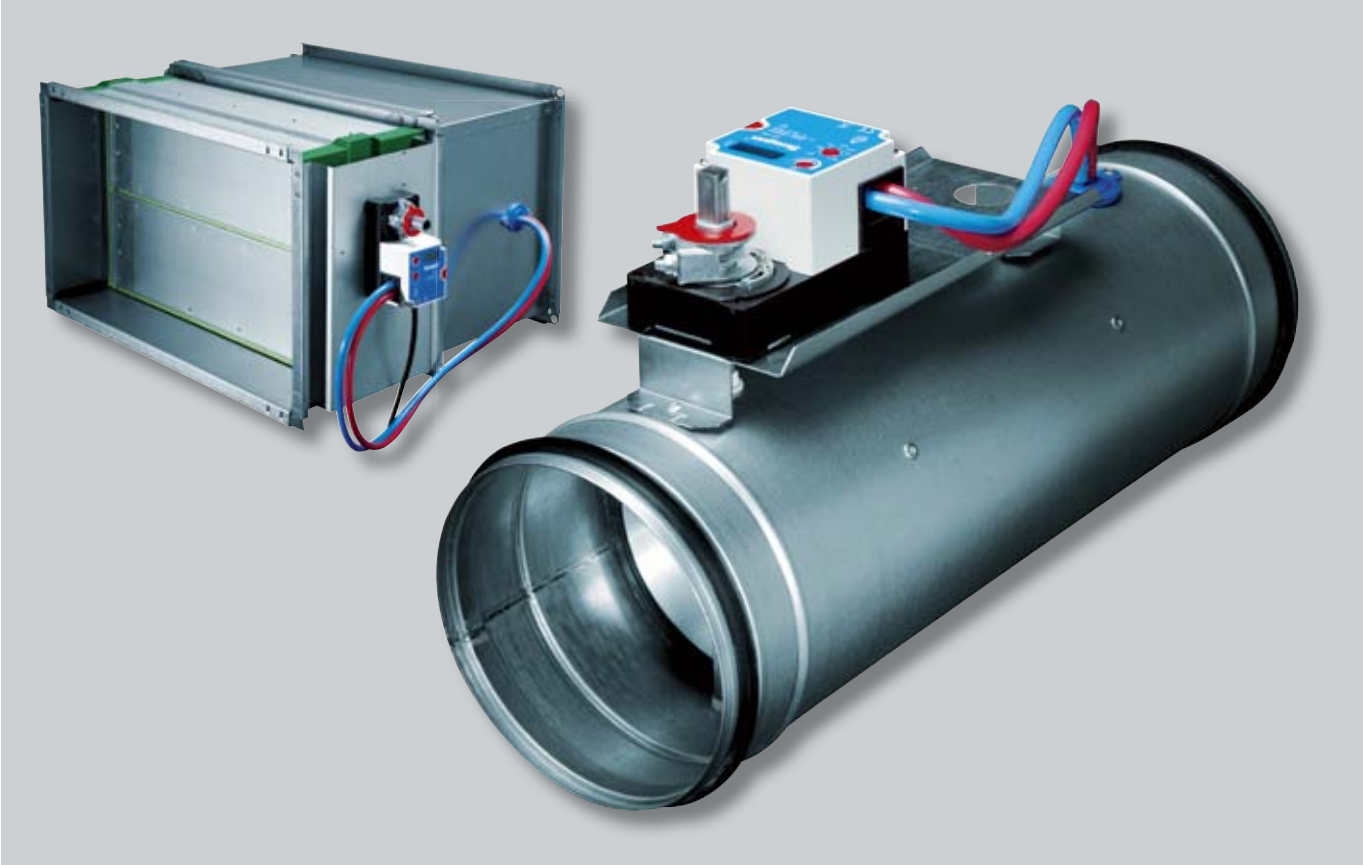
REACT

Variable-flow commissioning damper



Quick Facts

- Damper for pressure-independent air flow regulation
- Can be used for variable or constant flow
- Can be forced to fully open or fully closed position
- Provides integrated flow measuring
- Quick and easy reading through the controllers display
- User friendly and easy to commission, all you need is a screw driver.
- Can easily be condensation isolated in duct systems
- Circular sizes: Ø100-500
- Rectangular versions: up to 1600x700 mm

Quick guide

FLOW RANGE		
REACT	l/s	
Size	min	max (nom)
100	12	58
125	19	95
160	35	170
200	55	272
250	89	438
315	142	695
400	228	1117
500	367	1797

Technical description

Design

- Variable-flow commissioning damper with control and measurement function
- Equipped with a compact regulator (motor included).
- The controller has a display enabling direct reading.
- Easy commissioning and handling without the need for a separate hand unit. All you need is screw driver.
- Available in the following designs:
  – Circular version
  – Rectangular version

Features

- Intended for heated spaces (0 - 50 °C).
- Storage and transportation, -20 - 50 °C
- Ductwork Leakage Classes in accordance with SS-EN 1751
  – Circular version: class 4
  – Rectangular version: class 3
- Air flow is measured over one or more measuring rods. (unaffected by interference and smirching)
- All settings are displayd in actual values.
- Changes of min. and max flows are made directly in the controller through potentiometers.
- Distance inbetween the motor shelf and the damper (30 mm) is dimensioned for easy condensation isolation in duct systems.

Materials and surface treatment

- All sheet metal parts are made of galvanised sheet steel.
- Measurement rods are of extruded aluminum.

Accessories

- RTC – Room thermostat for temperature control of a room, (connects to the REACT regulator).
- DETECT Quality – Carbon dioxide sensor with integrated temperature sensor, for either room or duct installation.
- DETECT Occupancy – Presence detector for switching to minimum air flow when a room is unoccupied or two-flow control min-max.
- REACT CU – Sensor unit for slave control of one or more REACT units.
- FSR – Clamp/quick fit connector for simple dismantling when cleaning a circular REACT.

Commissioning and maintenance

See the separate commissioning document; "Installation-Commissioning-Maintenance".

Environment

Declaration of construction materials is available from www.swegon.com.

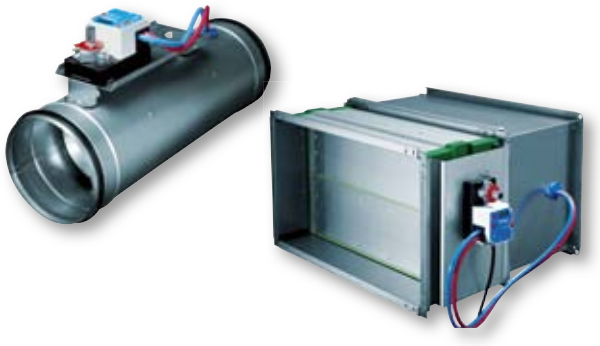


Figure 1. REACT, circular and rectangular design.

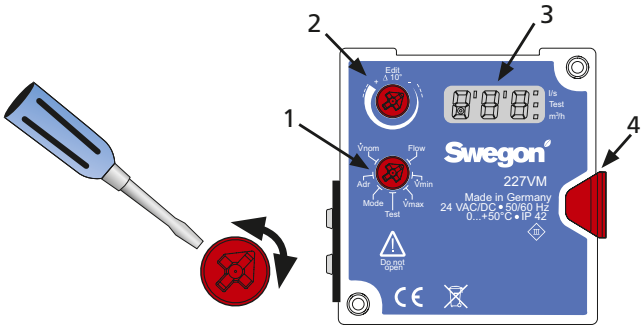


Figure 2. REACT, rectangular design. Explanations *of figure 2:*
1. Mode wheel.
2. Edit wheel.
3. Display.
4. Gear release button.

Figure 3. REACT CU, for slave control of REACT.

Figure 4. Accessories.

1. RTC – room thermostat.
2. DETECT Quality – carbon dioxide- and temperature sensor.
3. DETECT Occupancy – occupancy sensor.

Planning

General

- Designed for demand-controlled ventilation in rooms with variable loads.
- Intended for comfort ventilation.
- Humid, cold or aggressive environments should be avoided.
- Environmental and/or air temperatures should be within 0 - 50 °C.
- Can be installed in both supply and extraxt air systems.
- Pressure-independent but requires a minimum air flow equivalent to the open damper pressure drop to function properly.
- Factory calibrated with a nominal air flow (Q_{nom})
- When carrying out design work, the minimum air flow required by REACT has to be taken in to consideration.

Control

- Controlled by heat, carbon dioxide or occupancy.
- Delivered with the setting 0-100% for min. and max. air flow.
- Can be forced controlled to:
  – maximum and minimum air flow.
  – fully open or fully closed damper
- When used for slave control, slave and master units must be of the same dimension.
- Can be used as a constant flow damper. (Q_{max}= 0 and Q_{min} = desired constant flow)
- Delivered with 0 - 10V set value and actual value signal.
- Adjustable to 2 - 10V set value and actual value signal.
- REACT can be analogically connected to Building Management Systems (BMS)

Electrical data

NOTE: To obtain the correct functionality of the control and regulating equipment it is of great importance that all interconnected regulating equipment has the same polarity.

Feed voltage		24 VDC/24 VAC , 50-60 Hz
		19.2 - 28.8 VAC
		19.2 - 30.0 VDC
Power consumption, for transformer rating:		
REACT 5 Nm	2.5 W	4 VA
REACT 10 Nm	4.0 W	6.5 VA
REACT 15 Nm	6.5 W	11.0 VA

Control – Example

Below, a couple of examples are shown of how REACT can work in a demand-controlled ventilation system. When regulation via a CO_2 sensor is chosen, the room thermostat is excluded as DETECT Q has an integrated temperature sensor that combines its output with the value from the CO_2 sensor. The greatest signal from DETECT Q is sent to REACT to regulate the air flow. With the help of the presence detector DETECT O, the 0-10 V signal can be susopended so that the REACT unit regulates down to a minimum air flow when a room is unoccupied. DETECT O can also be connected so that REACT shuts down completely.

Slave control - Example

A REACT unit can be slave controlled from another REACT or from REACT CU. Slave control can also be achieved by parallel connection, i.e. by connecting the room thermostat signal to both the extract and supply air units. Parallel connection is recommended because the control signals are sent to both units at the same time and air flow can be freely set within the working range of REACT. Slave control is limited as the slave unit cannot have a greater air flow than the master unit and because lower flows can only be obtained as a percentage of the master unit air flow. In systems with REACT CU as sensor unit, the slave control principle is always applicable.

Legend to figures 5-6:
R = RTC or DETECT Q
K = Controller
M = Damper
BF = Flow sensor

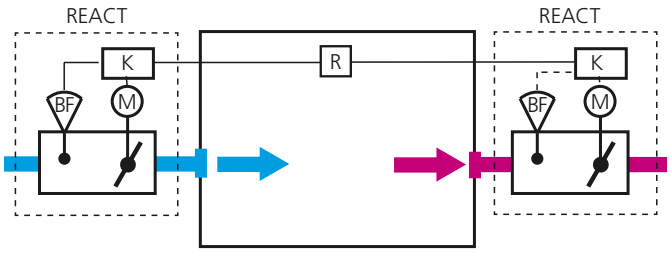


Figure 5. Air flow control with temperature sensor or CO_2 sensor (supply and extract air controlled in parallell by the temperature sensor).

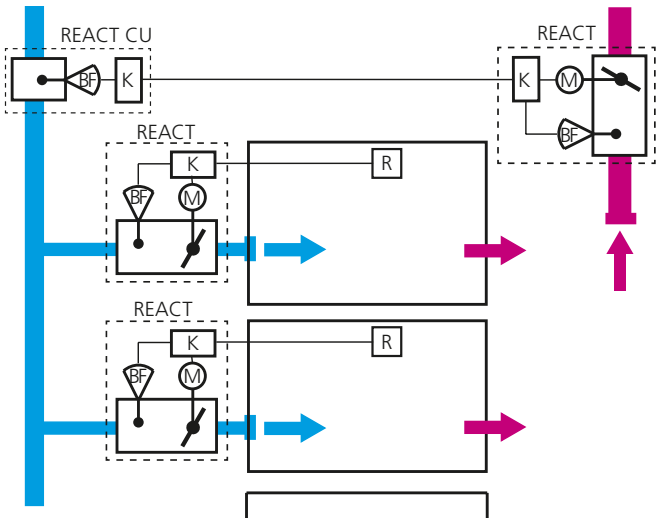


Figure 6. Individual room control with overflow air. Extract air is slave controlled by the total supply air volume.

Installation

- Air flow measuring of REACT requires a straight section of duct before the unit (in air flow direction), according to installation figures.
- Assembly instructions are included with the product on delivery but can also be downloaded from www.swegon.com.

Installation – circular version

Legend to figures 7-9:

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

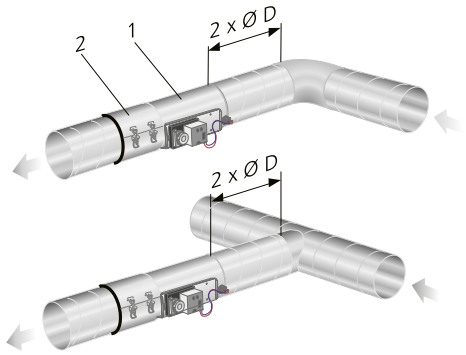


Figure 7. Straight section requirements, circular ducts.

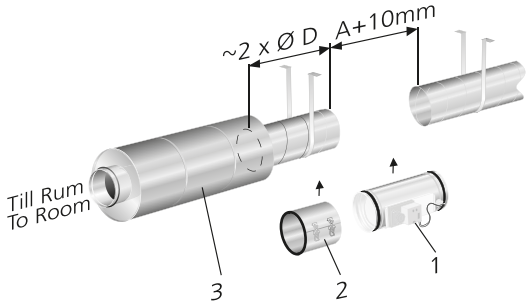


Figure 8. REACT requires a duct of ~2 x ØD between the VAR and a sound attenuator fitted with baffles.

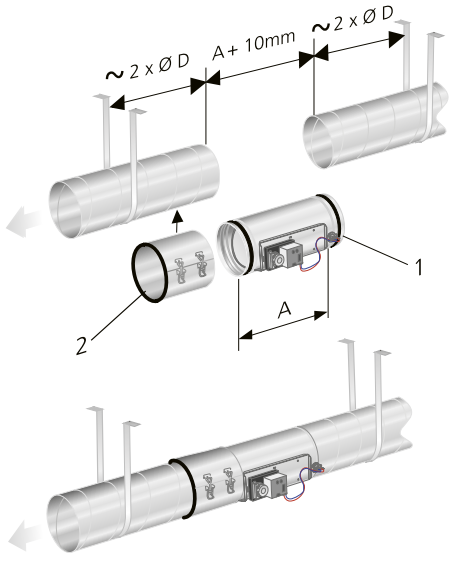


Figure 9. Installation in a duct system. The ducts must be firmly fixed to the frame of the building on each side of the REACT unit.

Installation measurements, circular version (mm)

Size	A	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	825	835

Installation – rectangular version

Measurement B in the figure and table below can be found on page 7, in the table; "Air flows and measures – rectangular version".

Legend to figures 10-11.

1. Rectangular Variable-flow damper REACT.
2. Sound attenuator with baffle

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
Sound attenuator with baffles	E = 3 x t	E = 2 x t

t = baffle width, m_2 = method error

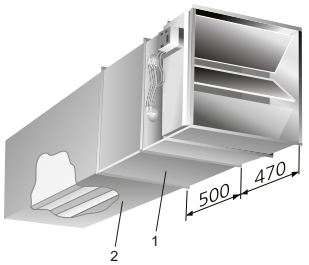


Figure 10. Straight section requirements, rectangular sound attenuators with baffles.

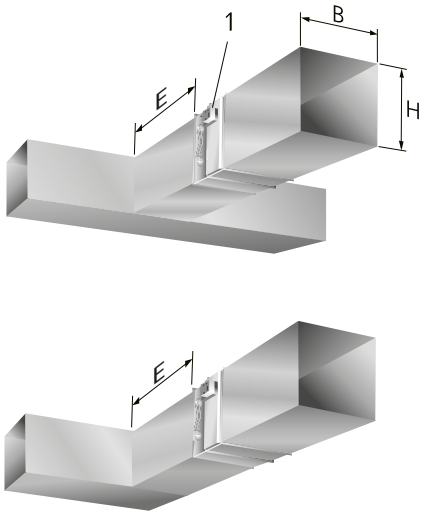


Figure 11. Straight section requirements, rectangular ducts.

Technical data

Air flows – all versions

- REACT has a nominal air flow, Q_{nom}, for each size.
- Maximum air flow can be set between 30 and 100 % of Q_{nom}.
- Minimum air flow is adjusted in relation to Q_{nom} and can be set between 0 and 100% of Q_{nom}.
- The regulators cannot handle air flows less than Q_{min}, as the measured pressure gets too low and regulation ceases.

Measurement accuracy – all versions

- At Q_{min} a measured pressure of 5 Pa is obtained and a measurement accuracy of ±10 % of the flow.
- Measured pressures in the range 1-5 Pa, gives an insecurity in the flow of ±20 to 50 %.
- Maximum air flow is Q_{nom}. On request, Q_{nom} can be increased to obtain increased Q_{max}. The consequence of an increased Q_{nom} is less accuracy in the lower flow area.
- NOTE: Increased Q_{nom} gives higher duct speeds and thereby generates higher sound levels.

Air flows – circular version

Size	Air flows. l/s		k-factor	Torque (Nm)
	Q_{min}	Q_{nom}		
100	12	58	5.3	5
125	19	95	8.7	5
160	35	170	15.5	5
200	55	272	24.8	5
250	89	438	40.0	5
315	142	695	63.4	10
400	228	1117	102.0	10
500	367	1797	164.0	10

Sound data – circular version

Sound power level

- Graphs show the total sound power (L_{Wtot}dB), as a function of the velocity and pressure drop across the damper.
- By correcting L_{Wtot} with the correction factors from the tables, the sound power levels for respective octave bands will be obtained($L_W = L_{Wtot} + K_{OK}$).

Transmitted sound

The sound transmitted from a circular REACT can be calculated using the following formula:

$$L_{W,\,out} = L_{W,\,duct} + K_{trans}$$

Correction factor K_{ok}

Size	Mid-frequency (Octave band) Hz							
	63	125	250	500	1000	2000	4000	8000
100	0	-5	-9	-16	-18	-25	-33	-39
125	0	-5	-9	-18	-19	-26	-33	-41
160	0	-5	-10	-17	-19	-24	-30	-39
200	0	-4	-10	-16	-17	-22	-29	-39
250	0	-5	-9	-13	-17	-21	-27	-37
315	0	-5	-9	-11	-14	-19	-26	-36
400	0	-6	-8	-11	-13	-17	-25	-32
500	0	-5	-7	-12	-13	-17	-26	-36
Tol ±	2	2	2	2	2	2	2	2

Correction factor K_{trans}

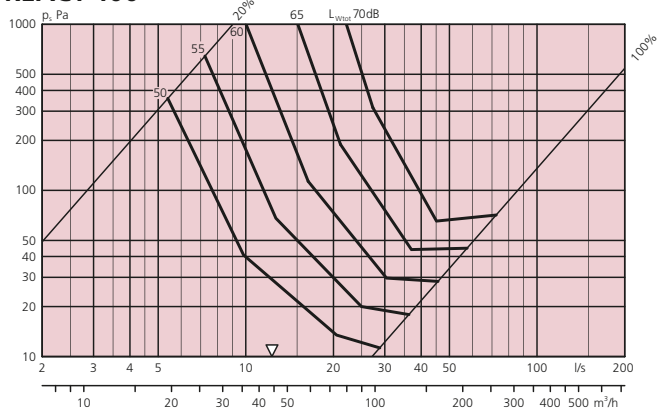
Size	Mid-frequency (Octave band) Hz							
	63	125	250	500	1000	2000	4000	8000
100	-5	-9	-7	-5	-2	0	1	0
125	-6	-10	-8	-6	-3	-1	0	-1
160	-7	-11	-9	-7	-4	-2	-1	-2
200	-8	-12	-10	-8	-5	-3	-2	-3
250	-9	-13	-11	-9	-6	-4	-3	-4
315	-10	-14	-12	-10	-7	-5	-4	-5
400	-11	-15	-13	-11	-8	-6	-5	-6
500	-12	-16	-15	-12	-9	-7	-6	-7

Engineering graphs – circular version

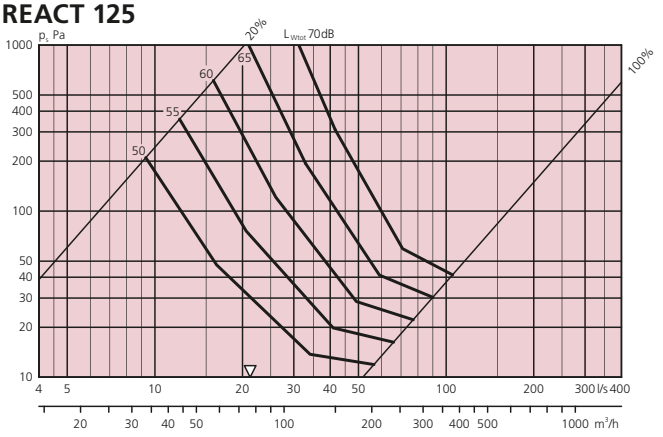
Air flow – Pressure drop – Sound level

- Presented sound levels, L_{wtot}: 50, 55, 60, 65 and 70 dB.
- Data applies for sound generated in ducts.
- ∇ = Min. airflow required for obtaining sufficient commissioning pressure.

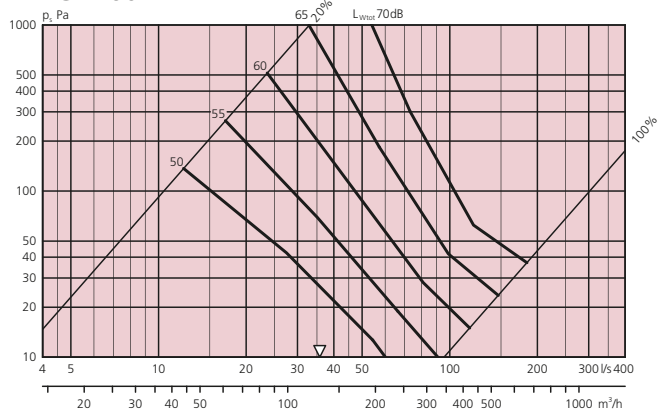
REACT 100



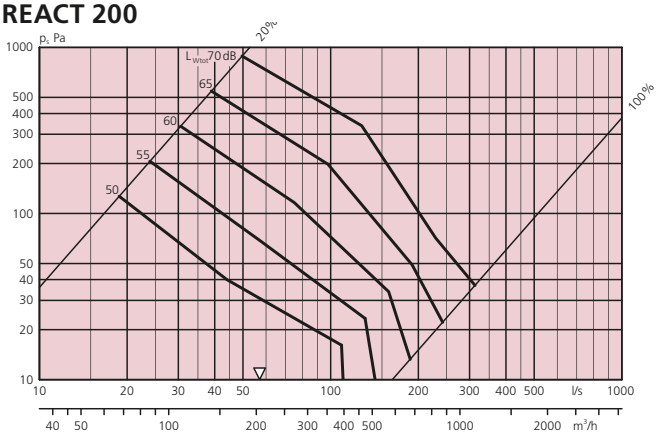
REACT 125



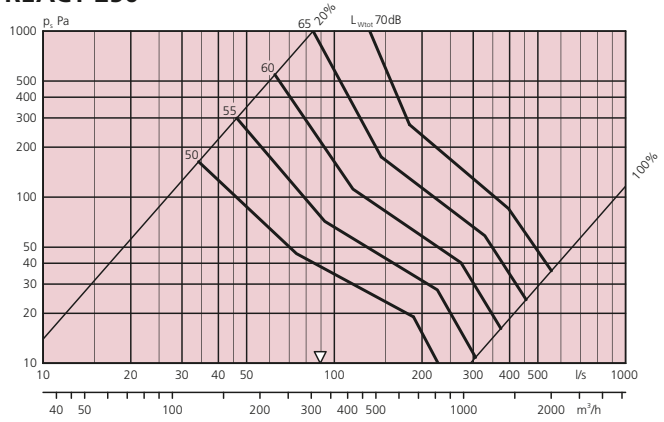
REACT 160



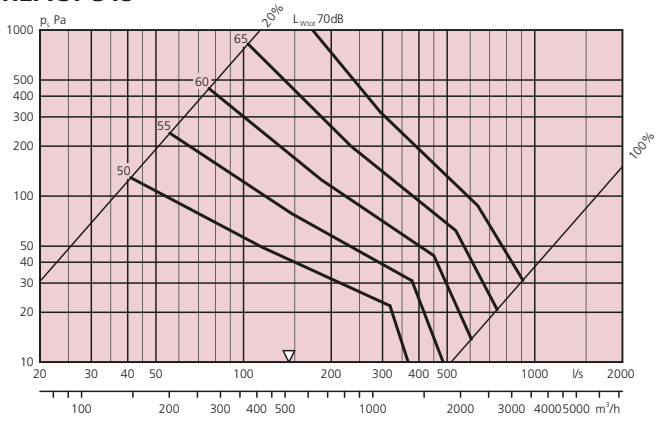
REACT 200



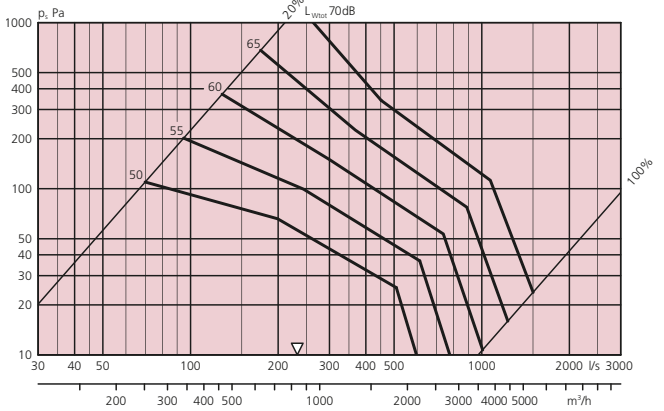
REACT 250



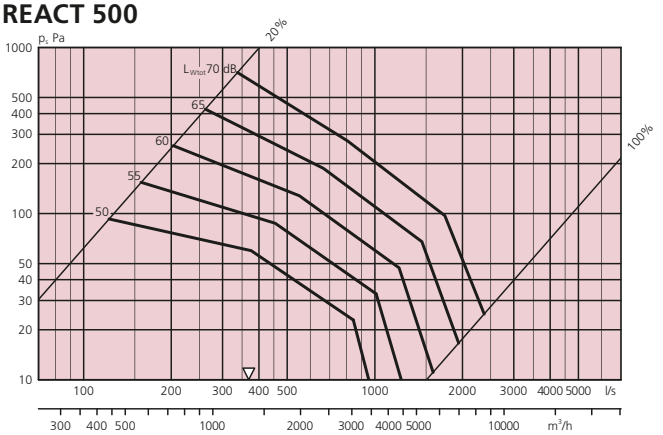
REACT 315



REACT 400



REACT 500



Air flows and measures – rectangular version

Size (W x H. mm)	Air flows. l/s Q_{min}	Q_{nom}	k-factor	Torque (Nm)
200 x 200	75	367	33.5	5
300 x 200	112	548	50.0	5
400 x 200	149	728	66.5	5
500 x 200	187	915	83.5	5
600 x 200	224	1095	100.0	5
700 x 200	262	1282	117.0	5
800 x 200	297	1457	133.0	5
1000 x 200	373	1829	167.0	10
300 x 300	170	833	76.0	5
400 x 300	228	1117	102.0	5
500 x 300	284	1391	127.0	5
600 x 300	340	1665	152.0	5
700 x 300	398	1950	178.0	10
800 x 300	454	2224	203.0	10
1000 x 300	568	2782	254.0	10
400 x 400	304	1490	136.0	5
500 x 400	382	1873	171.0	10
600 X 400	458	2246	205.0	10
700 x 400	534	2618	239.0	10
800 x 400	610	2991	273.0	10
1000 x 400	762	3735	341.0	10
1200 x 400	915	4480	409.0	15
1400 x 400	1069	5236	478.0	15
1600 x 400	1221	5981	546.0	15
500 x 500	479	2344	214.0	10
600 x 500	575	2815	257.0	10
700 x 500	671	3286	300.0	10
800 x 500	767	3757	343.0	10
1000 x 500	959	4699	429.0	15
1200 x 500	1149	5631	514.0	15
1400 x 500	1342	6573	600.0	15
1600 x 500	1534	7515	686.0	15
600 x 600	691	3385	309.0	10
700 x 600	807	3955	361.0	10
800 x 600	921	4513	412.0	15
1000 x 600	1152	5642	515.0	15
1200 x 600	1382	6770	618.0	15
1400 x 600	1614	7909	722.0	15
1600 x 600	1845	9037	825.0	15
700 x 700	944	4623	422.0	15
800 x 700	1078	5280	482.0	15
1000 x 700	1348	6606	603.0	15
1200 x 700	1617	7920	723.0	15
1400 x 700	1887	9246	844.0	15
1600 x 700	2156	10560	964.0	15

Sound data – rectangular version

Sound power level

- Graph shows the total sound power (L_{Wtot}dB), as a function of the velocity and pressure drop across the damper.
- By correcting L_{Wtot} with the correction factors from each table below, sound power levels for respective octave bands will be obtained($L_W = L_{Wtot} + K_{OK} + K_k$).

Correction factor K_{ok}

Size	Mid-frequency (Octave band) Hz							
	63	125	250	500	1000	2000	4000	8000
All	-1	-5	-7	-8	-13	-22	-31	-30
Tol. ±	4	4	3	2	2	2	2	2

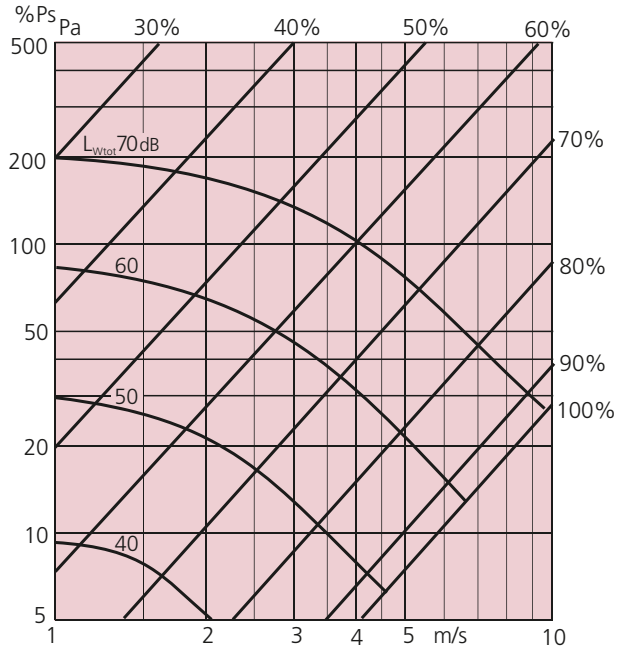
Correction factor K_k for the front face of the damper

Correction factor – area in m^2 of the front face								
Area m^2	0.1	0.15	0.25	0.4	0.6	1.0	1.6	2.5
K_k	-3	-2	0	2	4	6	8	10

Engineering graphs – rectangular version

Air flow – Pressure drop – Sound level

- Data applies for sound generated in ducts.
- Minimum flow applies at 1.5 m/s in the duct.
- Calculate the face velocity across the damper and read the sound data and pressure drop at an appropriate damper position.
- 100% corresponds to fully open damper.



Dimensions and weights

REACT – circular version and FSR

Size	Dimensions (mm)			Weight (kg)	
	Ød	A	C	REACT	FSR
100	99	472	45	1.9	0.4
125	124	472	45	2.0	0.4
160	159	472	45	2.1	0.6
200	199	472	45	2.3	0.6
250	249	522	45	3.4	0.7
315	314	552	45	4.4	0.8
400	399	695	60	6.0	1.2
500	499	825	60	9.0	1.4

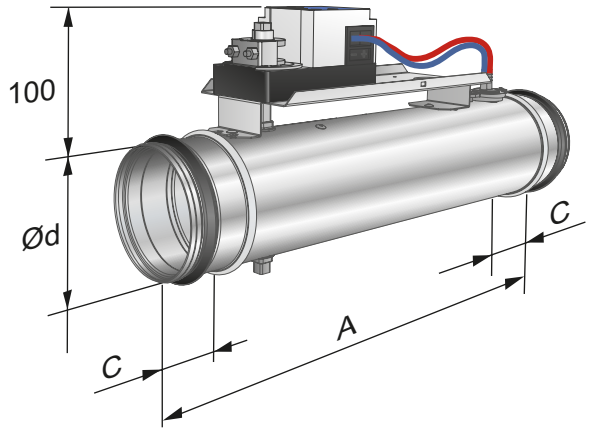


Figure 12. REACT, circular version.

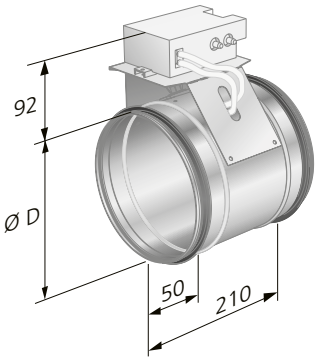


Figure 13. REACT CUa, circular version.

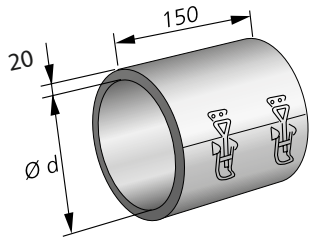


Figure 14. FSR.

REACT – rectangular version

Dimensions B and H (corresponding to WxH), can be in the table; "Air flows and measures – rectangular version", on the previous page.

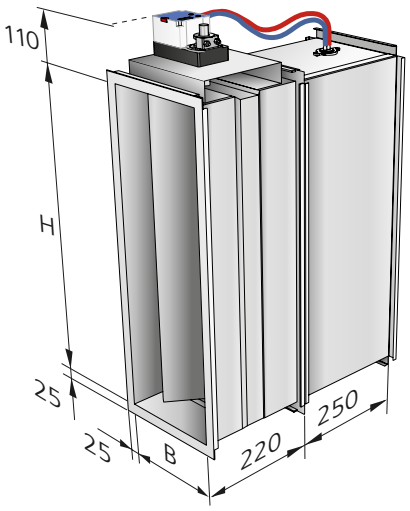


Figure 15. REACT, rectangular version.

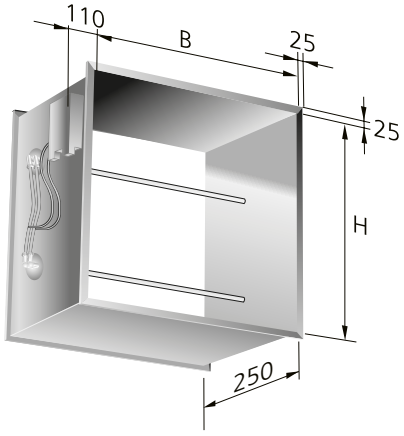


Figure 16. REACT CU, rectangular version.

Ordering key

Product designation

Circular design

Variable-flow commissioning damper in circular design	REACT	a	-bbb
Version			
Dimensions: 100, 125, 160, 200, 250, 315, 400, 500			

REACT is delivered with the settings max 100% = nom l/s and min = 0%.

Rectangular design

Variable-flow commissioning damper in rectangular design	REACT	a	-bbb-ccc
Version			
Dimensions: W x H (see table, page 7)			

REACT is delivered with the settings max 100% = nom l/s and min = 0%.

Accessories

Sensor unit for slave control of REACT in circular design	REACT CU	a	-bbb
Version			
Dimensions: 200, 250, 315, 400 och 500			

Sensor unit for slave control of REACT in rectangular design	REACT CU	a	-bbb-ccc
Version			
Dimensions: W x H (see table, page 7)			

Room thermostat	RTC
Carbon dioxide/temperature sensor for room	DETECT Q 1
Carbon dioxide/temperature sensor for duct	DETECT Q 2
Presence detector for wall installation	DETECT O V110
Presence detector for ceiling installation	DETECT O T360

Clamp for circular ventilation ducts	FSR	c	-aaa
Version			
Dimensions: 100, 125, 160, 200, 250, 315, 400 och 500			

Specification example

Swegon variable-flow commissioning damper, type REACT, with the following functions:

- Pressure independent VAV unit for demand-controlled ventilation
- Must be installed with minimum straight duct sections as stated in relevant product sheet data, only for temperatures between 0 and 50 °C

Size:	
REACT a - bbb	xx items
REACT a - bbb-ccc	xx items
REACT CU a -bbb-ccc	xx items

Accessories	
Room thermostat RTC	xx items
Carbon dioxide sensor DETECT Q with integrated temperature regulation	xx items
Clamp for circular ventilation ducts	xx items
Sensor unit REACT CU for slave control	xx items
Presence detector DETECT O	xx items

etc.