Constant & Variable air volume controllers

Air volume the smart way

systemair

Spread the secret of better air!

Since 1974, Systemair has been taking care of a vital resource. Today, the company is one of the global leaders in the field of ventilation technology. A success story which started in Skinnskatteberg, Sweden which has revolutionised the world of ventilation with the invention of the circular duct fan.

Table of contents

Since then, the company has continued to grow, and today it offers a complete range of standard-setting ventilation technologies. Whether it is the ventilation concept for a shopping mall, the controlled residential ventilation of a single-family home or the ventilation of tunnels and metro stations - Systemair experts are familiar with the conditions and have the necessary know-how. More than 3000 employees in more than 60 subsidiaries in over 40 countries ensure the necessary proximity to the customer. We invite you to join us in discovering the world of ventilation technology in this brochure.

systemair

Systemair worldwide

Skinnskatteberg, Sweden:
Systemair AB, the Systemair group head office is in Skinnskatteberg, Sweden. The production is virtually fully automated with modern machinery featuring advanced computer support. Also located here is the company's most advanced test installation for measuring technical data.

Windischbuch, Germany:
Production facility for fans and modular air handling units, specialized on engineered products (e.g. tunnel and jet fans). Distribution center.

Hässleholm, Sweden:
VEAB is the leading European manufacturer of electric duct heaters. Production of heating and cooling coils, electric and water based.

Ukmerge, Lithuania :
Production of smaller air handling units with energy recovery systems.

Maribor, Slovenia:
Specialized in centrifugal smoke extract fans, EN certified.

Hasselager, Denmark:
Production of modular air handling units.

Bratislava, Slovakia:
The factory in Bratislava manufactures air distribution products and EN certified fire and smoke dampers.

systemair

Quality:

Systemair is certified in accordance with ISO 9001; ISO 14001 and ATEX. Our research and development laboratories are one of the most modern in Europe; measurements are made in accordance with international standards like AMCA and ISO.

Save energy, lower running cost!

Our label "Green Ventilation" features products with a high energy saving potential.All products labelled with "Green Ventilation" combine energy economy with energy efficiency.

Kuala Lumpur, Malaysia :

Manufacturing of products for the Asian market.

Madrid, Spain:

Production of air handling units.

Dal, Eidsvoll, Norway:

Production of air handling units for the Norwegian market.

New Delhi, India:

The factories in New Delhi and Hyderabad manufacturing grilles, diffusers, fire dampers, air handling units and assembling axial fans.

Bouctouche, Canada:

Our main North American production facility of air handling units and inline fans for commercial and residential applications is located in Bouctouche.

Kansas City, USA:

Production of fans for the US market.

Milan, Italy:

Our factory in Italy, Systemair AC, develops and manufactures a wide range of air conditioner.

Istanbul, Turkey:

Production of air handling units.

systemair

Offices

Office buildings generally require good ventilation during the day as well as heat and cooling recovery and reconditioning of supply air depending on external conditions. Ventilation systems with demand control should be considered for offices where staffing levels vary. As a rule, offices develop an excess of heat produced by people, lighting, solar radiation, computer equipment, etc. In many cases there is a need to cool the air and prevent uncomfortable high temperatures. In larger buildings that accumulate heat energy easily, you should consider employing night cooling. If the office is in a city environment, a higher filtration class should be used. In an office environment, there is also considerable need to reduce the noise generated by the ventilation system.

Schools and nurseries

A school environment means a lot of people present at certain times of the day, i.e. generally there are relatively large variations. This means that it should be possible to use demand control for the ventilation system. Normally, with heat and/or cool recovery is warranted. There will be short periods during the year when heating may be required. However if there is effective sunscreening, then air reconditioning is rarely required. High demand for low noise levels. At day nurseries, activities such as cooking that create odours are common, so there is often a need for supply air and extract air to be kept separate. There must be heat recovery in the form of a plate heat exchanger, for example.

Shops

As a rule, the number of people in a shop changes constantly throughout the day, making a control-on-demand ventilation system the sensible option. Recirculating air in combination with carbon dioxide control (CO_2) and heat recovery can be one optimised solution for these types of premises. When there are few people present, CO_2 levels will be low and an increased amount of return air can be mixed into the system. As the number of people present increases, the amount of return air is reduced and replaced with fresh outdoor air. If heating is required at night-time, the premises are warmed up using 100% recirculating air.

Industry

Industrial premises will often have high airflows if the work carried out there generates high levels of air pollution. If the pollutants are also aggressive, there may be requirements that affect the choice of material used. Systemair offers products for different environmental classes that can cope with tough environments. Filtration of processed air can be adapted to suit specific demands.

Hotels

The requirements for conditioning in hotels are characterised by demands relating to fire protection, demand control and low noise levels. The choice of air handling unit will probably be affected by these demands. What is important here is good functions for speed control and quiet operation. In addition to quiet air handling units with demand control, Systemair can also supply fans and dampers for fire protection.

Healthcare premises

Healthcare premises can encompass numerous activities, everything from operating theatres to wards. The activity determines the requirements. Operating theatres will have stringent demands for cleanliness and ventilation. Wards require low noise levels. If several areas are served by the same system, the unit must have demand control and possibly even subsystems. Systemair's range of air handling units can satisfy all requirements relating to healthcare premises, whether these have to do with air cleanliness, noise levels or demand control.

General Description

In Variable Air Volume (VAV) systems, supply of cool air increases as the cooling load increases, and the air supply decreases as the load decreases.

VAV systems are the most modern, energy efficient all air systems available for comfort air conditioning. VAV systems require less fan capacity than a comparable constant volume system because with VAV only the required air is used. Typically a VAV system fan volume is 60% of a CAV system.

Control of air flow in a VAV system is accomplished through an electronic device, which regulate the amount of supply air to the space in response to a proportional room/space temperature controller.

Pressure Independent

Systemair VAV units are pressure independent The accurate volume control achieved by pressure independent VAV units results in substantial energy savings as well as increased comfort to the occupant. Conditioned air volume is precisely regulated according to demand. A maximum air volume setting avoids drafty air distribution; a minimum air volume setting avoids cold air dumping and stuffiness.

Minimum and Maximum air flow requirements are set to suit the space application. “Pressure independent units have controls consisting of an inlet duct sensor, damper, controller/actuator and room temperature controller”. The VAV device controls the air supply volume through the inlet duct velocity pressure sensor to maintain air flow, as the air-conditioning load in the space changes the thermostat signal will reset the VAV controller to change the supply air volume to suit the space requirements. At any given setting, the controller will maintain the required air volume regardless of inlet static pressure changing. This mode of operation is called “Pressure Independent”.

Variable Air Volume units allow the design to take full advantage of shifting loads from lights, occupancy, solar and equipment diversity, which typically leads up to a 40% saving in the total air volume required. Consequently, the central plant and ducting would cost less, thus compensating for the additional cost of VAV terminal units and fan speed controls.

Systemair offers complete range of VAV’s factory tested and calibrated. The VAV range offered are as following:

1. Round single skin VAV units (Optima-R), used in installations for return or supply air in low pressure systems as single-zone control
2. Round double skin VAV units (Optima-R-I), used in installations for return or supply air in medium to high pressure systems as single-zone control
3. Round to rectangular single skin insulated VAV units (Optima-RS), used in installations for return or supply air in medium to high pressure systems as multi-zone control

Benefits

The VAV system offers some advantage and benefits over conventional systems as given below

- Fan energy savings from longhour usage at reduced volumes, also installed fan horsepower reductions.
- Greater flexibility in respect to varying loads, which are easier zoned, resulting in occupancy controlled comfort and energy saving.
- Reduced installation and set-up cost.
- Reduced system energy consumption cost.
- Single unit for easy mounting.
- Integrated high efficiency sound attenuator.
- Suited for mounting of all controls according to customer specification.
- Accurate air volume control with centre averaging multi-point airflow differential cross velocity pressure sensor.

RDA

Self regulating constant air volume

Function

The air flow regulator RDA is an element placed inside the duct in order to obtain a constant flow within a pressure range from 50 to 200 Pascal. It is used in ventilation or air conditioning systems for supply or return air. The air is forced to pass through predetermined space in which a flap can change the position according to the specified air flow. The flap is attached on to a calibrated spring and therefore no auxiliary power is needed.

Design

RDA is made from plastic material (polystyrene) classified M1 in grey colour. Maximum temperature is 60°C.

Mounting

RDA is inserted directly into a horizontal or vertical circular duct. It is fixed and kept airtight by a lip seal. Arrow indicates the airflow. If the unit is placed in supply duct, the space between the diffuser and the unit must be at least 3x diameter of the duct. If used for return air the space must be 1x diameter of the duct.

Ordering Code

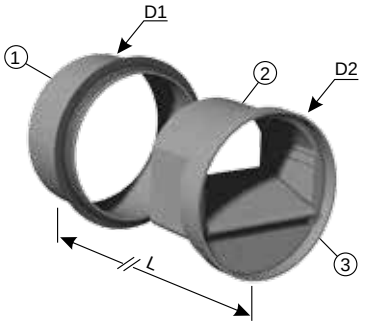
	RDA-
Size	ØD
Air volume	m³/h

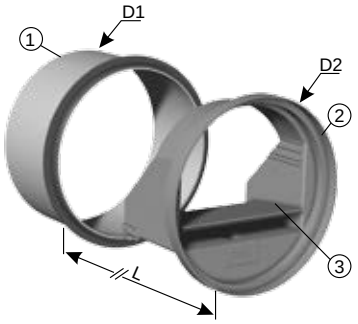
Flow regulators are characterized by their noise level in dB(A).

Airflow (m³/h)	Lw dB(A)			
	50 Pa	100 Pa	150 Pa	200 Pa
15	25	29	32	35
30	26	31	35	38
45	27	33	36	39
60	32	37	39	42
75	32	37	40	42
90	32	38	41	44
120	30	34	39	42
150	33	37	41	45
180	34	40	44	47
210	34	40	42	44
240	35	41	44	47
270	37	43	45	49
300	33	37	42	45

Tests reports : CETIAT 2315002 for air flow RD Ø80 to RD Ø125 mm

Dimensions



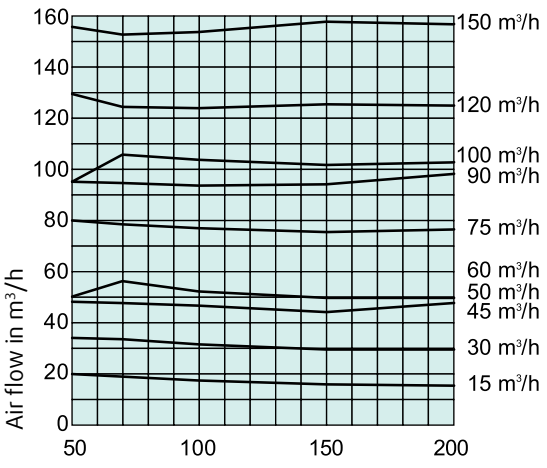


Size	L (mm)	D1 (mm)	D2 (mm)
80	55	76	73
100	60	96	93
125	90	120	117
160	89	456	147

Other dimensions available upon request (Ø200 and Ø250)

*spacer = special body without spacers
1* air flow = special shims with air flow ref.

Diagram



ΔPT, Differential pressure in Pa

systemair

A flow regulator can provide several flow rates by simply changing the number of calibrated Shims positioned within the casing. The tables below show the relationship between the number of Shims, Spacers required to achieve the flow rates.

Shims

RD Ø80	15 m^3/h	2 Shims
	30 m^3/h	1 Shim
	45 m^3/h	Without any Shim

Note: The RD unit is shipped as standard in one complete unit including all spacers and shims to achieve the airflow required. If another air flow than standard setting is required, then on site the Shims can be removed to achieve higher airflows. (Eg. RD-80 is standard dispatched at 15m^3/h airflow, by removing 2 shims, the airflow of 45m^3/h is achieved)

Spacer

RD Ø100 (1 Spacer)	15 m^3/h	2 Shims
	30 m^3/h	1 Shim
	45 m^3/h	Without any Shim

RD Ø100	60 m^3/h	2 Shims
	75 m^3/h	1 Shim
	90 m^3/h	Without any Shim

RD Ø125 (2 Spacers)	15 m^3/h	2 Shims
	30 m^3/h	1 Shim
	45 m^3/h	Without any Shim

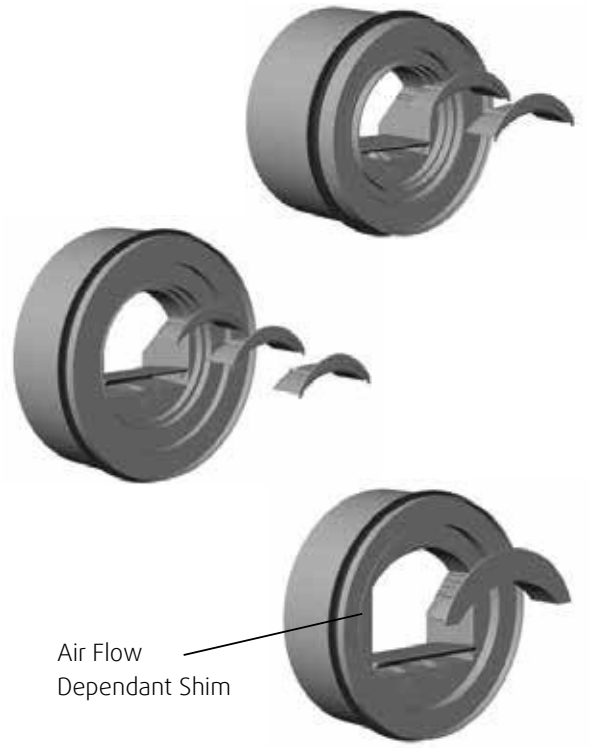
RD Ø125 (1 Spacer)	60 m^3/h	2 Shims
	75 m^3/h	1 Shim
	90 m^3/h	Without any Shim

RD Ø125	120 m^3/h	2 Shims
	150 m^3/h	1 Shim
	180 m^3/h	Without any Shim

RD Ø150/160 (2 Spacers)	60 m^3/h	2 Shims
	75 m^3/h	1 Shim
	90 m^3/h	Without any Shim

RD Ø150/160 (1 Spacer)	120 m^3/h	2 Shims
	150 m^3/h	1 Shim
	180 m^3/h	Without any Shim

RD Ø150/160	210 m^3/h	3 Shims
	240 m^3/h	2 Shims
	270 m^3/h	1 Shim
	300 m^3/h	Without any Shim



RD Ø200 (2 Spacers)	120 m³/h	2 Shims
	150 m³/h	1 Shim
	180 m³/h	Without any Shim

RD Ø200 (1 Spacer)	210 m³/h	3 Shims
	240 m³/h	2 Shims
	270 m³/h	1 Shim
	300 m³/h	Without any Shim

RD Ø200	350 m³/h	1 Air Flow Dependant Shim
	400 m³/h	1 Air Flow Dependant Shim
	450 m³/h	1 Air Flow Dependant Shim
	500 m³/h	Without any Shim

RD Ø250 (3 Spacers)	120 m³/h	2 Shims
	150 m³/h	1 Shim
	180 m³/h	Without any Shim

RD Ø250 (2 Spacers)	210 m³/h	3 Shims
	240 m³/h	2 Shims
	270 m³/h	1 Shim
	300 m³/h	Without any Shim

RD Ø250 (1 Spacer)	350 m³/h	1 Air Flow Dependant Shim
	400 m³/h	1 Air Flow Dependant Shim
	450 m³/h	1 Air Flow Dependant Shim
	500 m³/h	Without any Shim

RD Ø250	550 m³/h	3 Shims
	600 m³/h	2 Shims
	650 m³/h	1 Shim
	700 m³/h	Without any Shim

RPK-R

Single skin constant volume regulator

Description

RPK-R is a single skin round pressure independent constant air flow regulator. RPK-R is used for supply or exact of constant air to a zone by a self regulating mechanical setting without the need of any other energy in low to medium system pressure applications

RPK-R is characterized by:

- Accuracy of regulation
- wide range of air volume setting per size
- Easy installation
- Maintenance free
- Connections with rubber gasket for low leakage

Design

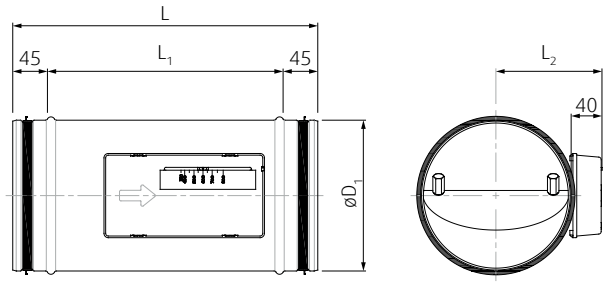
The RPK-R is manufactured from galvanized sheet metal only the blade is from aluminium. All steel parts are zinc plated, spring is made from high quality steel. Sliding bearing is suitable for high temperatures and doesn´t require any lubrication. The cover of adjusting mechanism is made from ABS plastic and the plastic functional parts are from PA plastic.

Function

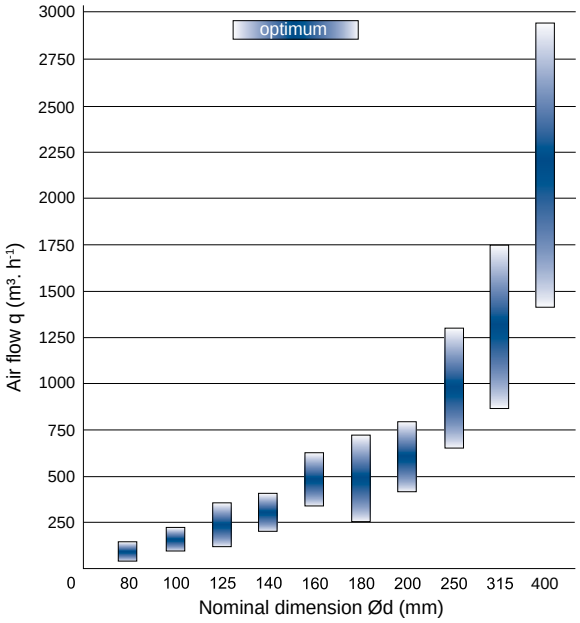
The RPK-R enables regulation of individually required amounts of air in separate ventilation system zones. RPK-R works in temperature from -20 to 80°C and relative humidity up to 80%. Recommended air flow velocity is from 3 to 8 meters per second at pressure difference to Δp 500 Pa. Accuracy is ±5 %(±10% for outer settings).

Mounting

Regulator can be mounted to horizontal, diagonal or vertical duct. The blade must be always horizontal. It is necessary to pay attention to correct direction of mounting, so that the air is entering the regulator according to the arrow direction, which is located on regulator casing. Connecting the duct and the regulator is done according to its size with self-taping screws ø3,2x13 to ø3,9x16, or with rivets of the same diameters and the connection is sealed with sealing tape. After mounting, set the required air volume by turning the working screw on the controller box.



RPK-R main dimensions



Ordering Code

	RPK-R-
Size	ØD
Optional	RAL

Size	V (m/s)	Q (m^3/h)	øD (mm)	$øD_2$ (mm)	L (mm)	L1 (mm)	L2 (mm)	L3 (mm)	m (kg)	m(i) (kg)
80	4,3-8,4	75-140	78	170	350	260	76	123	0,8	1,7
100	3,7-7,5	100-200	98	190	350	260	86	136	1	2,1
125	3,2-7,1	125 - 300	123	215	360	270	100	148	1,2	2,4
140	3,6-6,4	190-340	138	230	370	280	107	156	1,4	2,8
160	4,3-8,9	300 - 620	158	250	380	290	117	166	1,6	3,2
180	2,8-8,1	250 - 720	178	270	390	300	128	176	1,9	3,6
200	3,2-7,3	350-800	198	290	400	310	138	186	2,1	4
250	3,8-7,5	650-1300	248	340	425	335	164	208	3,3	5,8
315	3,1-6,0	850-1650	313	405	500	410	196	243	5	8,3
400	3,3-6.5	1450-2900	397	490	500	410	238	286	6	10,4

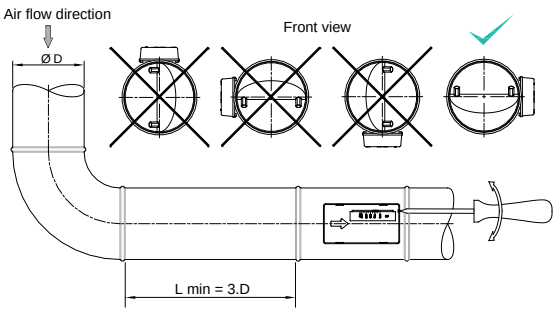
Note:
M ... weight of the RPK-R controller, Mi ... weight of the RPK-R-I controller
Tab. 1: Dimensions of the RPK-R controller

Technical part

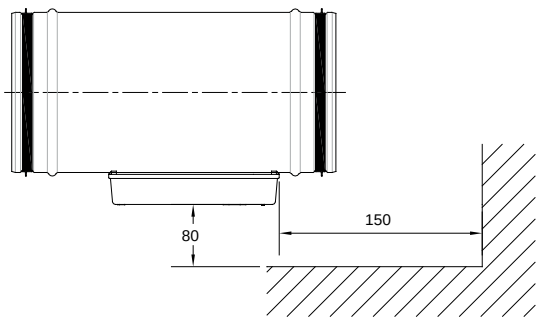
Size	RPK-R		
	Q (m^3/h)	Accuracy (%)	$\Delta p_{RPKmin.}$ (Pa)
80	75	15	100
	100	15	100
	120	10	100
	140	10	100
100	100	15	100
	150	10	70
	175	10	50
	200	10	50
125	125	12	100
	200	8	50
	250	6	50
	300	10	50
140	190	10	100
	250	7	50
	300	6	50
	340	7	60
160	300	10	70
	400	6	50
	500	7	50
	620	10	50

Size	RPK-R		
	Q (m^3/h)	Accuracy (%)	$\Delta p_{RPKmin.}$ (Pa)
180	250	10	70
	400	6	50
	600	7	50
	720	10	70
200	350	10	50
	500	5	50
	700	5	50
	800	10	70
250	650	10	50
	900	5	50
	1100	5	50
	1300	10	60
315	850	10	50
	1200	5	50
	1500	5	50
	1750	10	70
400	1450	10	100
	2000	6	50
	2450	6	50
	2900	10	80

Tab. 2: Working range, tolerance and minimal working pressure loss of the RPK-R controller



Way of mounting RPK-R



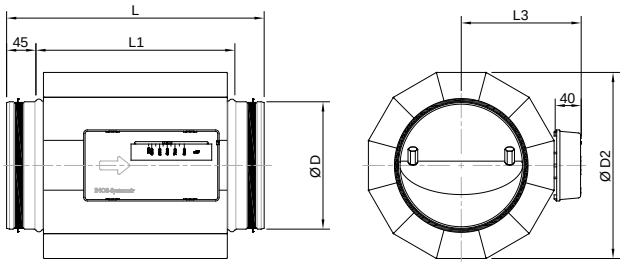
RPK-R: Installation Min distance to parameter walls

RPK-R-I

Double skin constant volume regulator

Description

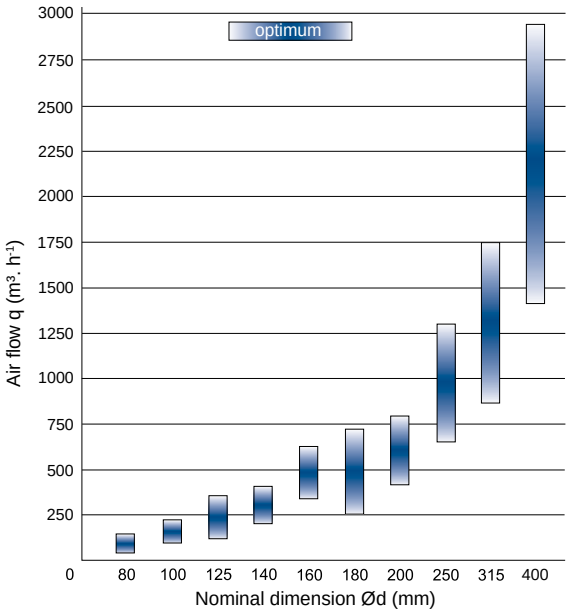
RPK-R-I is a double skin round pressure independent constant air flow regulator. RPK-R-I is used for supply or exact of constant air to a zone by a self regulating mechanical setting without the need of any other energy in medium to high system pressure applications. The external of the regulator is insulated with 50mm mineral wool and another sheet steel to reduce the radiated sound power levels.



RPK-R-I main dimensions

RPK-R-I is characterized by:

- Accuracy of regulation
- wide range of air volume setting per size
- Easy installation
- Maintenance free
- Connections with rubber gasket for low leakaget



Design

The RPK-R-I is manufactured from galvanized sheet metal only the blade is from aluminium. All steel parts are zinc plated, spring is made from high quality steel. Sliding bearing is suitable for high temperatures and doesn´t require any lubrication. The cover of adjusting mechanism is made from ABS plastic and the plastic functional parts are from PA plastic. The outside insulation is made from 50 mm thick glass fiber material with outside steel casing.

Function

The RPK-R-I enables regulation of individually required amounts of air in separate ventilation system zones. RPK-R works in temperature from -20 to 80°C and relative humidity up to 80%. Recommended air flow velocity is from 3 to 8 meters per second at pressure difference to Δp 500 Pa. Accuracy is ±5 %(±10% for outer settings).

Ordering Code

	RPK-R-I-
Size	ØD
Optional	RAL

Mounting

Regulator can be mounted to horizontal, diagonal or vertical duct. The blade must be always horizontal. It is necessary to pay attention to correct direction of mounting, so that the air is entering the regulator according to the arrow direction, which is located on regulator casing. Connecting the duct and the regulator is done according to its size with self-taping screws ø3,2x13 to ø3,9x16, or with rivets of the same diameters and the connection is sealed with sealing tape. After mounting, set the required air volume by turning the working screw on the controller box.

Size	V (m/s)	Q (m^3/h)	øD (mm)	$øD_2$ (mm)	L (mm)	L1 (mm)	L2 (mm)	L3 (mm)	m (kg)	m(i) (kg)
80	4,3-8,4	75-140	78	170	350	260	76	123	0,8	1,7
100	3,7-7,5	100-200	98	190	350	260	86	136	1	2,1
125	3,2-7,1	125 - 300	123	215	360	270	100	148	1,2	2,4
140	3,6-6,4	190-340	138	230	370	280	107	156	1,4	2,8
160	4,3-8,9	300 - 620	158	250	380	290	117	166	1,6	3,2
180	2,8-8,1	250 - 720	178	270	390	300	128	176	1,9	3,6
200	3,2-7,3	350-800	198	290	400	310	138	186	2,1	4
250	3,8-7,5	650-1300	248	340	425	335	164	208	3,3	5,8
315	3,1-6,0	850-1650	313	405	500	410	196	243	5	8,3
400	3,3-6.5	1450-2900	397	490	500	410	238	286	6	10,4

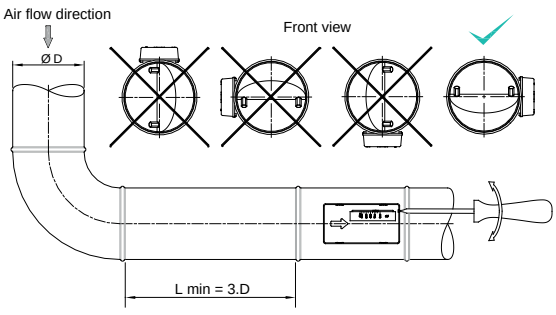
Note:
M ... weight of the RPK-R-I controller, Mi ... weight of the RPK-R-I controller
Tab. 1: Dimensions of the RPK-R-I controller

Technical part

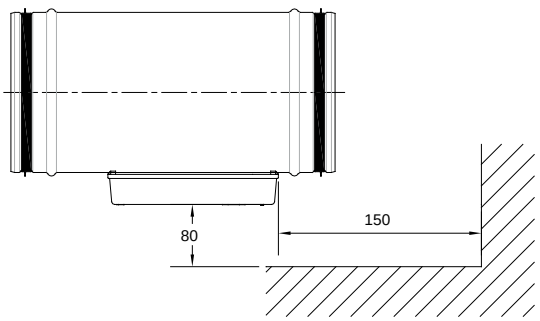
Size	RPK-R-I		
	Q (m^3/h)	Accuracy (%)	$\Delta p_{RPKmin.}$ (Pa)
80	75	15	100
	100	15	100
	120	10	100
	140	10	100
100	100	15	100
	150	10	70
	175	10	50
	200	10	50
125	125	12	100
	200	8	50
	250	6	50
	300	10	50
140	190	10	100
	250	7	50
	300	6	50
	340	7	60
160	300	10	70
	400	6	50
	500	7	50
	620	10	50

Size	RPK-R-I		
	Q (m^3/h)	Accuracy (%)	$\Delta p_{RPKmin.}$ (Pa)
180	250	10	70
	400	6	50
	600	7	50
	720	10	70
200	350	10	50
	500	5	50
	700	5	50
	800	10	70
250	650	10	50
	900	5	50
	1100	5	50
	1300	10	60
315	850	10	50
	1200	5	50
	1500	5	50
	1750	10	70
400	1450	10	100
	2000	6	50
	2450	6	50
	2900	10	80

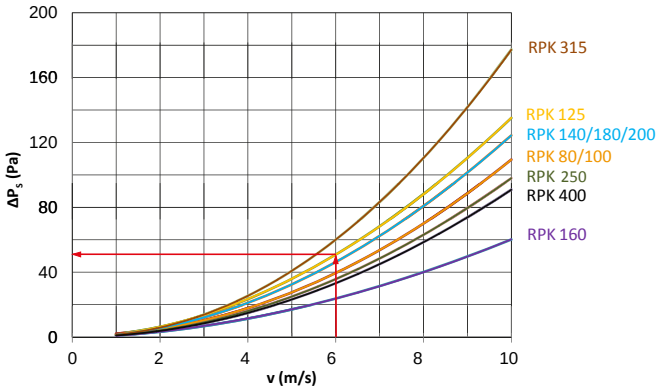
Tab. 2: Working range, tolerance and minimal working pressure loss of the RPK-R-I controller



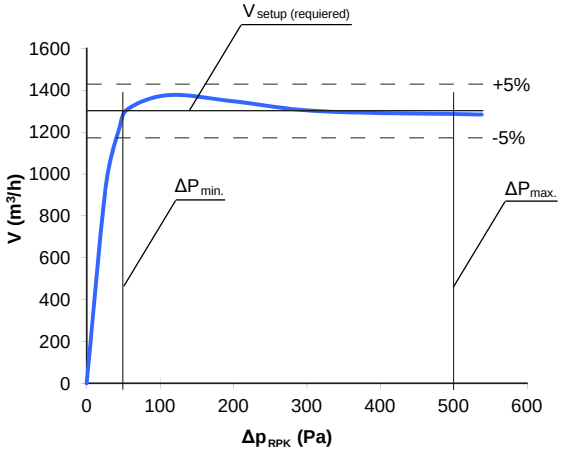
Way of mounting RPK-R-I



RPK-R-I: Installation Min distance to parameter walls

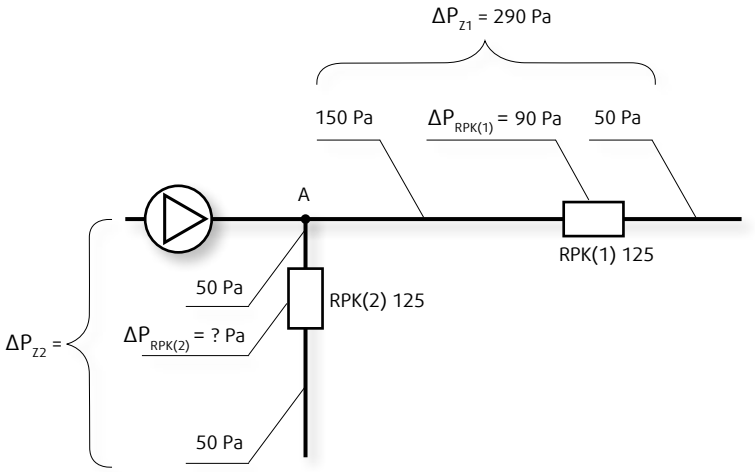


Minimal pressure drop ΔPs(Pa) of RPK in open position related on entering speed o fair (m/s)



Working range of RPK

Example



What is pressure drop on RPK(2) Ø125mm for above mentioned example, when speed on RPK(1) 125 is v = 6 m/s (265 m³/h)

Result:

Minimal pressure drop of RPK(1) 125 from graph 2: $\Delta P_{S(1)}$ = 50 Pa
Minimal operating pressure drop of RPK(1) 125 from tab: $\Delta P_{RPK(1)min.}$ = 90 Pa; $\Delta P_{RPK(1)min.} > \Delta P_{S(1)}$
Calculating pressure drop of RPK(1) 125: $\Delta P_{RPK(1)}$ = 90 Pa

Pressure drop of duct system 1 calculating to point „A": $\Delta P_{Z1} = \Delta P_{Z1'} + \Delta p_{RPK(1)} + \Delta P_{Z1''}$ = 150 + 90 +50 = 290 Pa
Pressure drop of duct system 2 calculating to point „A": $\Delta P_{Z2} = \Delta P_{Z1} = \Delta P_{Z2'} + \Delta P_{RPK(2)} + \Delta P_{Z2''}$

Pressure drop of RPK(2) 125 calculating to point „A": $\Delta P_{RPK(2)} = \Delta P_{Z1} - (\Delta P_{Z2'} + \Delta P_{Z2''})$ = 290 – (50 + 50) = 190 Pressure
drop of RPK(2) 125 is between working range: 50 Pa ≤ 190 Pa ≤ 500 Pa

$\Delta P_{RPK(1)}$ ... pressure drop of RPK(1) 125
$\Delta P_{RPK(2)}$ ... pressure drop of RPK(2) 125
ΔP_{Z1} ... Total pressure drop of duct system 1 to point „A"
ΔP_{Z2} ... Total pressure drop of duct system 2 to point „A"
$\Delta P_{Z1'}$ ... Pressure drop of duct system in front of RPK(1)
$\Delta P_{Z1''}$ ...Pressure drop of duct system behind RPK(1)
$\Delta P_{Z2'}$ ... Pressure drop of duct system in front of RPK(2)
$\Delta P_{Z2''}$ ... Pressure drop of duct system behind RPK(2)
$\Delta P_{RPKmin.}$ ... Minimal operating pressure drop is 50Pa

RPK-S

Single skin constant volume regulator

Description

RPK-S is a single skin round pressure independent constant air flow regulator. RPK-S is used for supply or exact of constant air to a zone by a self regulating mechanical setting without the need of any other energy in low to medium system pressure applications.

RPK-S is characterized by:

- Accuracy of regulation
- wide range of air volume setting per size
- Easy installation
- Maintenance free

Design

The RPK-S is manufactured from galvanized sheet metal only the blade is from aluminium. All steel parts are zinc plated, spring is made from high quality steel. Sliding bearing is suitable for high temperatures and doesn´t require any lubrication. The cover of adjusting mechanism is made from ABS plastic and the plastic functional parts are from PA plastic. The outside insulation is made from 50 mm thick glass fiber material with outside steel casing.

Function

The RPK-S enables regulation of individually required amounts of air in separate ventilation system zones. RPK-S works in temperature from -20 to 80°C and relative humidity up to 80%. Recommended air flow velocity is from 3 to 8 meters per second at pressure difference to Δp 500 Pa. Accuracy is ±5 %(±10% for outer settings).

Mounting

Regulator can be mounted to horizontal, diagonal or vertical duct. The blade must be always horizontal. It is necessary to pay attention to correct direction of mounting, so that the air is entering the regulator according to the arrow direction, which is located on regulator casing. Connecting the duct and the regulator is with flanges. After mounting, set the required air volume by turning the working screw on the controller box.

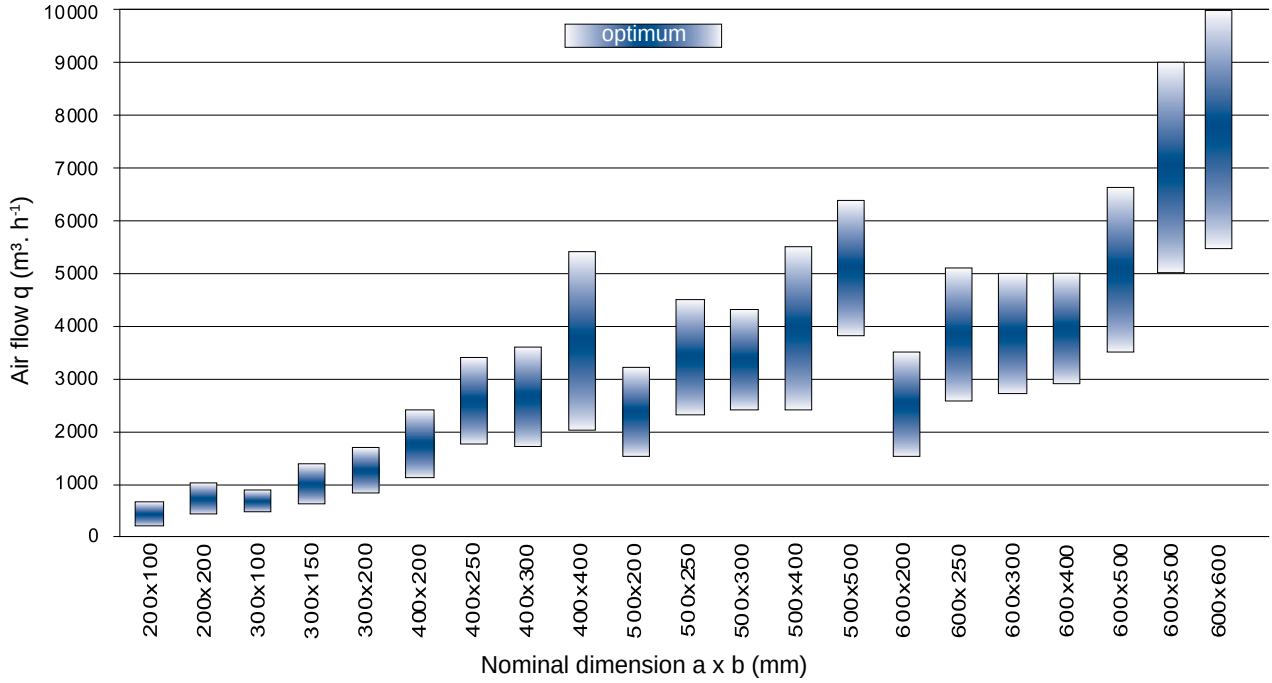
Size	Q (m^3/h)	a (mm)	b (mm)	m (kg)	m(i) (kg)
200x100	330 – 620	200	100	2,9	5,3
200x200	510 – 1020		200	3,7	6,6
300x100	470 - 850	300	100	3,7	6,6
300x150	700 – 1350		150	4,1	7,2
300x200	800 - 1600		200	4,6	8,0
400x200	1100 – 2400	400	200	5,4	9,3
400x250	1750 - 3400		250	6,1	10,1
400x300	1700 – 3600		300	6,5	10,8
400x400	2000 – 5400		400	9,0	13,7
500x200	1500 - 3200	500	200	6,2	10,5
500x250	2300 - 4400		250	6,7	11,0
500x300	2400 – 4300		300	7,0	11,7
500x400	2400 – 5500		400	10,1	15,1
500x500	3800 - 6300		500	13,0	18,6
600x200	1650 - 3600	600	200	7,0	12,3
600x250	2550 - 5100		250	7,4	12,8
600x300	2700 – 5000		300	10,2	15,3
600x400	2900 – 5000		400	11,4	17,0
600x500	3500 – 6500		500	14,6	20,7
600x500	5000 - 9000		500	14,6	20,7
600x600	5500 – 10000		600	15,8	22,6

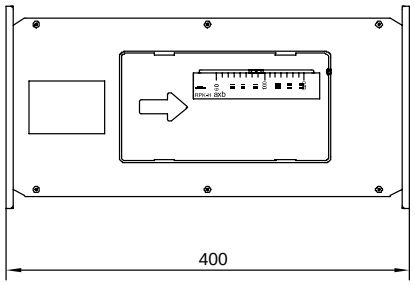
RPK-S-

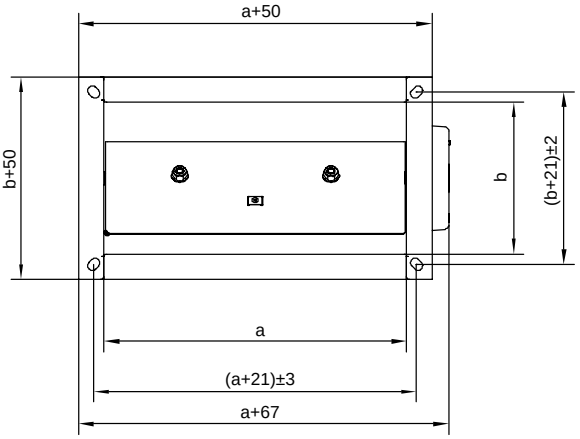
Size L x H

Optional RAL

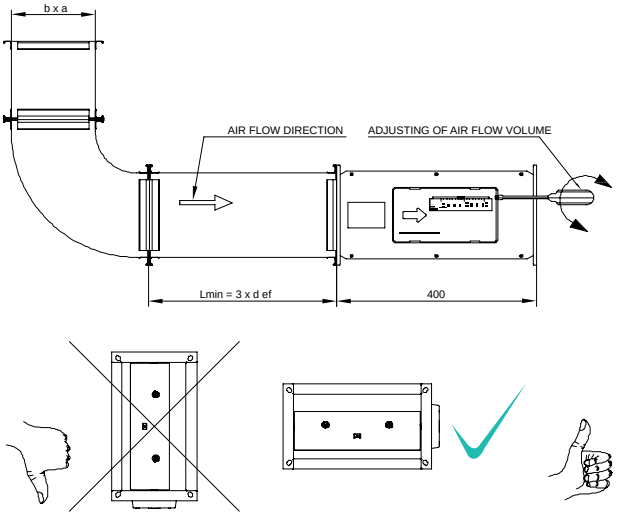
systemair







Main dimension of RPK-S



Way of mounting RPK-S

RPK-S-I

Double skin constant volume regulator

Description

RPK-S-I is a double skin round pressure independent constant air flow regulator. RPK-S-I is used for supply or exact of constant air to a zone by a self regulating mechanical setting without the need of any other energy in medium to high system pressure applications. The external of the regulator is insulated with 50mm mineral wool and another sheet steel to reduce the radiated sound power levels.

RPK-S-I is characterized by:

- Accuracy of regulation
- wide range of air volume setting per size
- Easy installation
- Maintenance free

Design

The RPK-S-I is manufactured from galvanized sheet metal only the blade is from aluminium. All steel parts are zinc plated, spring is made from high quality steel. Sliding bearing is suitable for high temperatures and doesn´t require any lubrication. The cover of adjusting mechanism is made from ABS plastic and the plastic functional parts are from PA plastic. The outside insulation is made from 50 mm thick glass fiber material with outside steel casing.

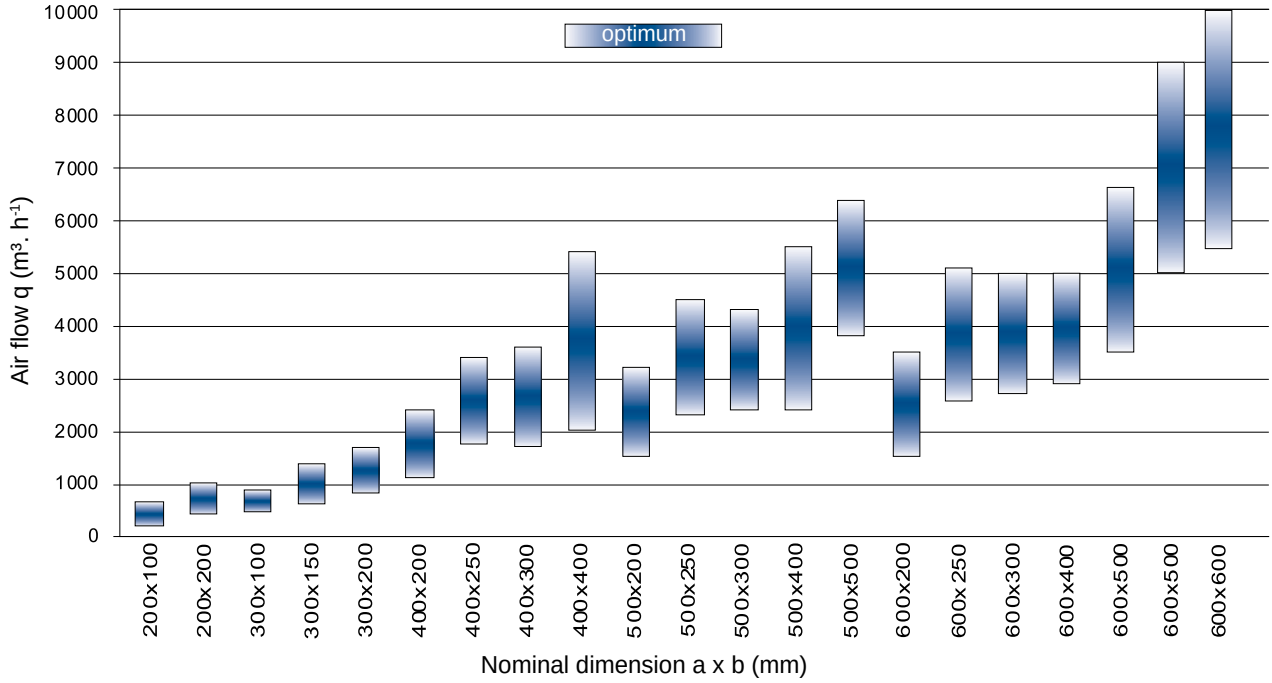
Function

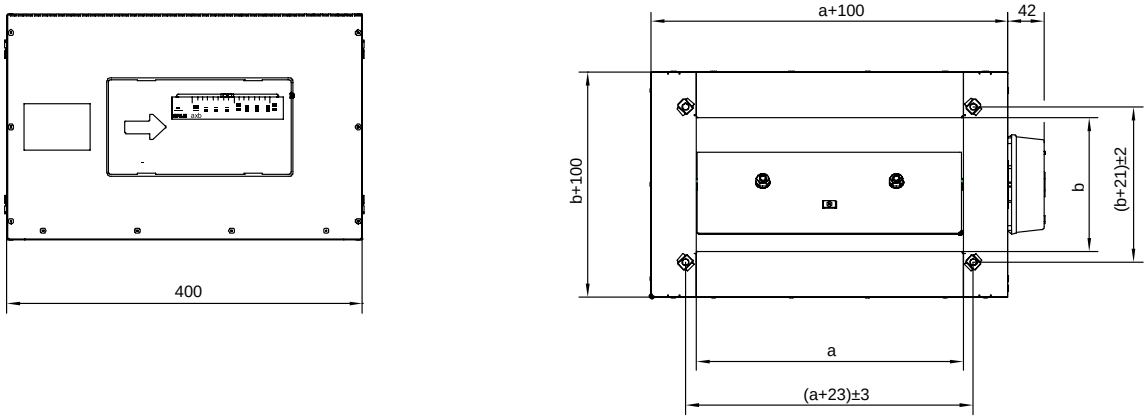
The PKI-S-I enables regulation of individually required amounts of air in separate ventilation system zones. RPK-S works in temperature from -20 to 80°C and relative humidity up to 80%. Recommended air flow velocity is from 3 to 8 meters per second at pressure difference to Δp 500 Pa. Accuracy is ±5 %(±10% for outer settings).

Mounting

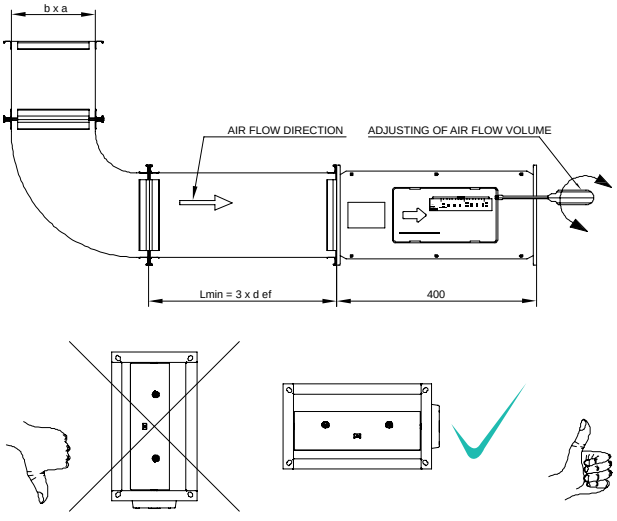
Regulator can be mounted to horizontal, diagonal or vertical duct. The blade must be always horizontal. It is necessary to pay attention to correct direction of mounting, so that the air is entering the regulator according to the arrow direction, which is located on regulator casing. Connecting the duct and the regulator is with flanges. After mounting, set the required air volume by turning the working screw on the controller box.

Size	Q (m^3/h)	a (mm)	b (mm)	m (kg)	m(i) (kg)
200x100	330 – 620	200	100	2,9	5,3
200x200	510 – 1020		200	3,7	6,6
300x100	470 - 850	300	100	3,7	6,6
300x150	700 – 1350		150	4,1	7,2
300x200	800 - 1600		200	4,6	8,0
400x200	1100 – 2400	400	200	5,4	9,3
400x250	1750 - 3400		250	6,1	10,1
400x300	1700 – 3600		300	6,5	10,8
400x400	2000 – 5400		400	9,0	13,7
500x200	1500 - 3200	500	200	6,2	10,5
500x250	2300 - 4400		250	6,7	11,0
500x300	2400 – 4300		300	7,0	11,7
500x400	2400 – 5500		400	10,1	15,1
500x500	3800 - 6300		500	13,0	18,6
600x200	1650 - 3600	600	200	7,0	12,3
600x250	2550 - 5100		250	7,4	12,8
600x300	2700 – 5000		300	10,2	15,3
600x400	2900 – 5000		400	11,4	17,0
600x500	3500 – 6500		500	14,6	20,7
600x500	5000 - 9000		500	14,6	20,7
600x600	5500 – 10000		600	15,8	22,6

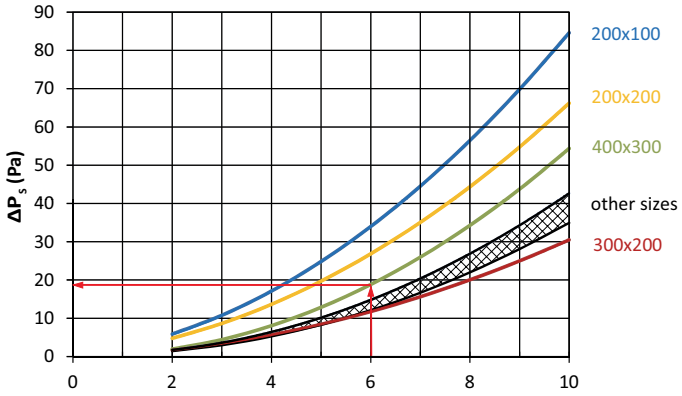




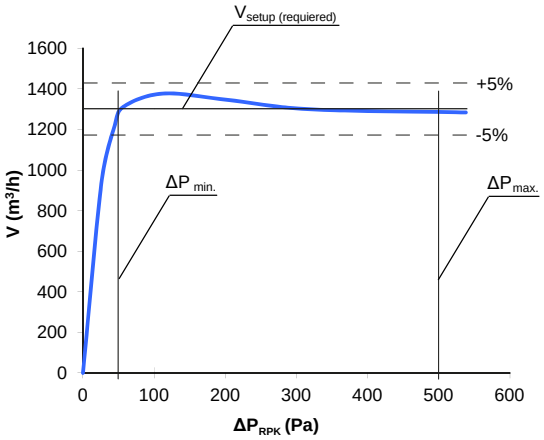
Main dimension of RPK-S-I



Way of mounting RPK-S-I

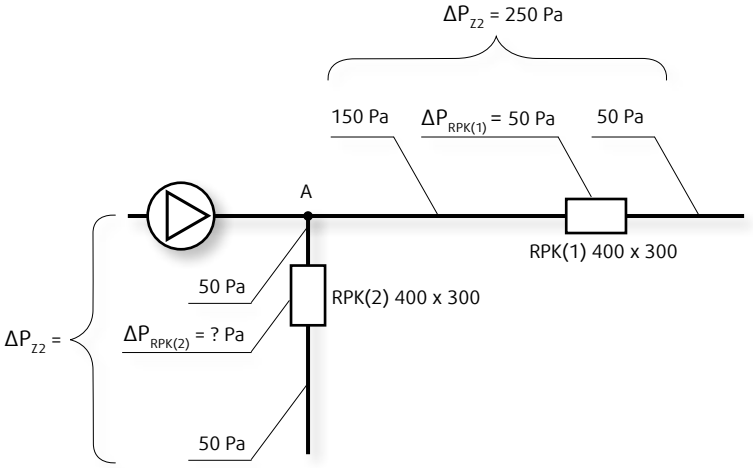


Minimal pressure drop ΔPs(Pa) of RPK in open position related on entering speed o fair (m/s)



Working range of RPK

Example



What is pressure drop on RPK(2) 400x300 for above mentioned example, when speed on RPK(1) 400x300 is v = 6 m/s (2.592 m³/h)

Result:

Minimal pressure drop of RPK(1) 400x300 from graph 2: $\Delta P_{S(1)}$ = 18 Pa

Minimal operating pressure drop of RPK(1) 400x300 from tab: $\Delta P_{RPK(1)min.}$ = 50 Pa; $\Delta P_{RPK(1)min.} > \Delta P_{S(1)}$ = 18 Pa

Calculating pressure drop of RPK(1) 400 x 300: $\Delta P_{RPK(1)}$ = 50 Pa

Pressure drop of duct system 1 calculating to point „A": $\Delta P_{Z1} = \Delta P_{Z1'} + \Delta P_{RPK(1)} + \Delta P_{Z1''}$ = 150 + 50 +50 = 250 Pa

Pressure drop of duct system 2 calculating to point „A": $\Delta P_{Z2} = \Delta P_{Z1} = \Delta P_{Z2'} + \Delta P_{RPK(2)} + \Delta P_{Z2''}$

Pressure drop of RPK(2) 400x300 calculating to point „A": $\Delta P_{RPK(2)} = \Delta P_{Z1} - (\Delta P_{Z2'} + \Delta P_{Z2''})$ = 250 – (50 + 50) = 150 Pressure

drop of RPK(2) 400x300 is between working range: 50 Pa ≤ 150 Pa ≤ 500 Pa

pressure drop of RPK(1) 400x300
pressure drop of RPK(2) 400x300
Total pressure drop of duct system 1 to point „A"
Total pressure drop of duct system 2 to point „A"
Pressure drop of duct system in front of RPK(1)
Pressure drop of duct system behind RPK(1)
Pressure drop of duct system in front of RPK(2)
Pressure drop of duct system behind RPK(2)
Minimal operating pressure drop is 50Pa

Optima-R

Single skin circular variable air volume unit

Highlights:

- Damper tightness class 4 according to EN 1751
- Casing tightness class C according to EN 1751
- ILH Hygienic certification VDI 6022 & VDI 3803 for Standard Ventilation & Clean room application
- High measuring accuracy of:
  10-20% of V_{max} air flow rate has an accuracy error rate of: ±25%
  20-40% of V_{max} air flow rate has an accuracy error rate of: <±10%
  40-100% of V_{max} air flow rate has an accuracy error rate of: <±4%
- Air volume range of 36 to 14589 m³/h
- Operating range of up to 1500Pa

Function

Single skin circular VAV terminal units are commonly used for return air applications or for supply applications at low system pressures. Optima terminal units are ideal for single zone control with supply and return in Master and Slave setup such as offices, hotel rooms or meeting rooms where the required cooling and heating load will vary on demand.

Design

VAV unit housing is constructed from galvanized sheet steel. Special design of multi-point averaging cross flow sensor assures an accurate air flow readings even in difficult installations.

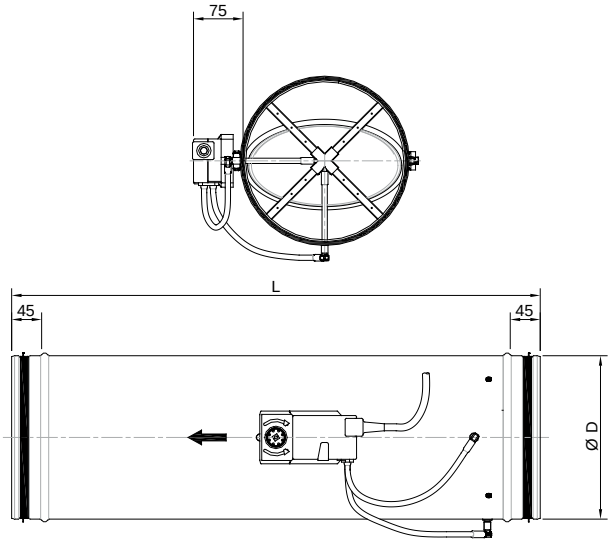
Available Sizes:

Inlet/outlet : from Ø80 to Ø630 mm

Controls:

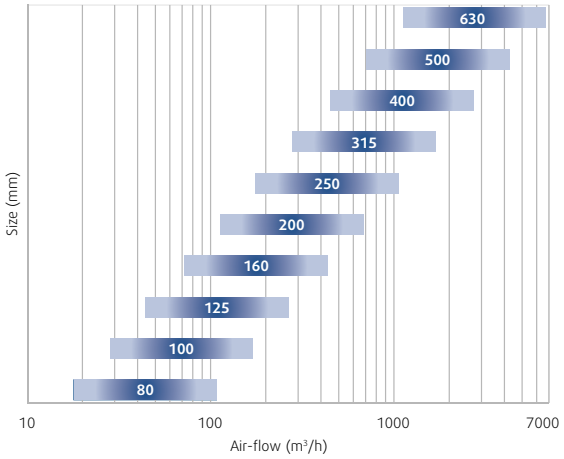
The VAV terminal units are as standard equipped with BLC (Belimo compact) controllers (LMV-D3 or NMV-D3) without any MP or LON communication capability to be used as stand alone or in master and slave setting.
The compact controllers are equally available with MP-Bus, ModBus and LON communication capability. On demand as alternative, Gateway communication units can be provided and can be connected later in time to building management systems to create a zone control by creating bus-rings solutions (only possible if MP-Bus communication is installed).

Dimensions



VAV and Compact controllers are factory calibrated as standard to the air volume indicated in the table or upon request can be adjusted to site required settings prior to dispatch on Vmin and Vmax range. The air volumes can also be readjusted on site with ZTH-Gen hand held service tool. If specific air volumes for Vmin and Vmax would be required, this must be indicated prior to order of the units for adequate calibration in the factory.

BLC1= Belimo LMV-D3 compact controller WITH MP-Bus communication
BLC4= Belimo LMV-D3 compact controller WITHOUT MP-Bus communication
BLC1-MOD= Belimo LMV-D3 compact controller WITH MODBUS communication



Dimensions and Air Volume range

Code	Size	ØD (mm)	L (mm)	Air volume *(m³/h)		Air volume *(l/s)	
				V_{min}	V_{max}	V_{min}	V_{max}
Optim-R-08-BLC_	80	78	400	36	235	10	65
Optim-R-10-BLC_	100	98	400	57	368	16	102
Optim-R-12-BLC_	125	123	400	88	574	25	160
Optim-R-16-BLC_	160	158	400	145	941	40	261
Optim-R-20-BLC_	200	198	600	226	1470	63	408
Optim-R-25-BLC_	250	248	800	353	2297	98	638
Optim-R-31-BLC_	315	313	800	561	3647	156	1013
Optim-R-40-BLC_	400	398	800	905	5881	251	1634
Optim-R-50-BLC_	500	498	1000	1414	9189	393	2553
Optim-R-63-BLC_	630	623	1000	2244	14589	623	4052

* Note = Standard factory air volume setting if not indicated upon order

Accuracy:
10 - 20% of V_{max} air flow rate has an accuracy error rate of: ±25%
20 - 40% of V_{max} air flow rate has an accuracy error rate of: <±10%
40 - 100% of V_{max} air flow rate has an accuracy error rate of: <±4%

Ordering codes

Optima - Type - Size- Controller Type - V_{min} - V_{max}

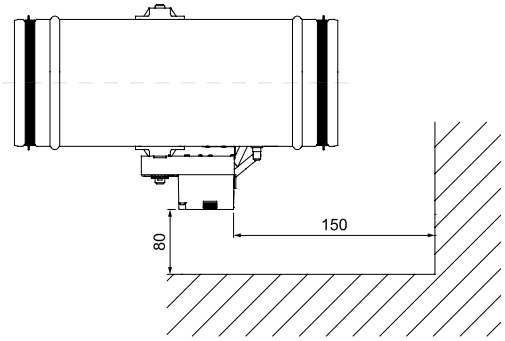
Type R

Code 08 to 63
(ØD-80 to ØD-630mm)

BLC4
BLC1
BLC1-MOD

m³/h or l/s*

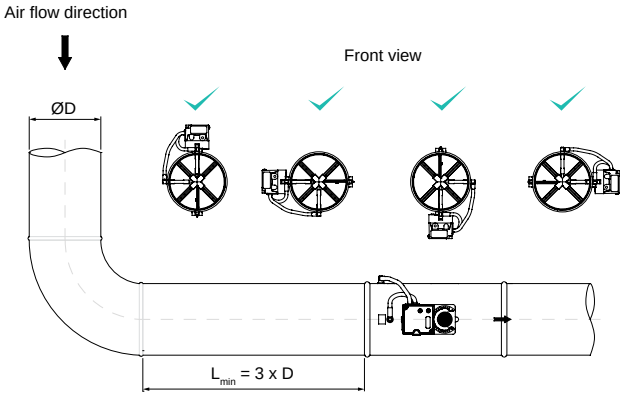
m³/h or l/s*



Optima-R-BLC_ installation Min distance to parameter walls

*** Note:**

1. If the air volumes are not given during the ordering process, then standard Factory setting will be applied according to table
2. Vmin can also be set to 0m³/h if required by demand upon ordering
3. The standard input signal on the controller is set to 2-10V, upon request 0-10V can also be selected



Ordering example:

OPTIMA-R-25-353(m³/h)-2297(m³/h)-BLC4
The above order example is set for V_{min} and V_{max} air volume setting for Ø250 with Belimo compact controller having NO comminucation capability.

Discharged Sound Power levels

Optima-R	Air Volume			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔPmin [Pa]	63	125	250	500	1000	2000	4000	8000	L_w dB(A)	63	125	250	500	1000	2000	4000	8000	L_w dB(A)
Ø80	5	18	1	18	26	29	28	26	20	16	11	30	24	32	35	33	31	26	22	16	36
	15	54	6	29	37	40	39	37	31	27	22	41	35	43	46	45	43	37	33	28	47
	25	90	17	35	43	45	44	42	37	33	27	46	41	48	51	50	48	42	38	33	52
	35	127	34	38	46	49	47	45	40	36	30	50	44	52	55	53	51	46	42	36	55
	50	181	69	42	50	52	51	49	44	40	34	53	48	55	58	57	55	49	45	40	59
Ø100	8	28	1	22	29	32	31	29	23	19	14	33	27	35	38	37	35	29	25	20	39
	24	85	6	32	40	43	42	39	34	30	25	44	38	46	49	47	45	40	36	30	50
	39	141	16	37	45	48	47	44	39	35	30	49	43	51	54	52	50	45	41	35	55
	55	198	31	41	48	51	50	48	42	38	33	52	46	54	57	56	54	48	44	39	58
	79	283	63	44	52	55	53	51	46	42	36	56	50	58	61	59	57	52	48	42	61
Ø125	12	44	1	24	32	35	34	32	26	22	17	36	30	38	41	40	37	32	28	23	42
	37	133	5	35	42	45	44	42	36	32	27	46	41	48	51	50	48	42	38	33	52
	61	221	14	39	47	50	49	47	41	37	32	51	45	53	56	55	53	47	43	38	57
	86	309	28	43	50	53	52	50	44	40	35	54	48	56	59	58	56	50	46	41	60
	123	442	56	46	54	57	55	53	48	44	38	57	52	60	62	61	59	54	50	44	63
Ø160	20	72	1	27	35	38	36	34	29	25	19	39	33	41	44	42	40	35	31	25	45
	60	217	4	37	45	47	46	44	39	35	29	48	43	51	53	52	50	45	41	35	54
	101	362	12	41	49	52	51	49	43	39	34	53	47	55	58	57	54	49	45	40	59
	141	507	24	44	52	55	54	52	46	42	37	56	50	58	61	60	57	52	48	43	62
	201	724	49	47	55	58	57	55	49	45	40	59	53	61	64	63	61	55	51	46	65
Ø200	31	113	1	30	34	33	30	27	24	22	14	33	35	40	38	36	33	29	28	20	38
	94	339	4	41	46	44	42	39	35	33	26	44	46	51	50	47	44	41	39	31	50
	157	565	11	46	51	49	47	44	40	39	31	49	52	57	55	53	50	46	44	36	55
	220	792	21	50	55	53	50	48	44	42	34	53	55	60	58	56	53	49	48	40	58
	314	1131	42	53	58	56	54	51	48	46	38	57	59	64	62	60	57	53	51	44	62
Ø250	49	177	1	34	38	37	34	31	28	26	18	37	39	44	43	40	37	34	32	24	43
	147	530	3	44	49	47	45	42	38	36	29	47	50	55	53	51	48	44	42	34	53
	245	884	9	49	54	52	49	47	43	41	33	52	55	59	58	55	52	49	47	39	58
	344	1237	17	52	57	55	53	50	46	44	36	55	58	63	61	58	56	52	50	42	61
	491	1767	36	55	60	58	56	53	49	48	40	58	61	66	64	62	59	55	53	46	64
Ø315	78	281	1	37	42	40	38	35	31	29	22	40	43	48	46	44	41	37	35	28	46
	234	842	3	46	51	49	47	44	40	39	31	49	52	57	55	53	50	47	45	37	56
	390	1403	7	50	55	54	51	48	45	43	35	54	57	61	60	57	54	51	49	41	60
	546	1964	14	53	58	56	54	51	47	46	38	56	59	64	62	60	57	54	52	44	63
	779	2806	29	56	61	59	57	54	50	49	41	59	62	67	65	63	60	57	55	47	66
Ø400	126	452	1	39	44	42	40	37	34	32	24	43	46	51	49	47	44	40	38	30	49
	377	1357	2	47	52	51	48	45	42	40	32	51	54	59	57	55	52	48	46	38	57
	628	2262	5	51	56	54	52	49	45	44	36	54	58	62	61	58	55	52	50	42	61
	880	3167	11	54	58	57	54	51	48	46	38	57	60	65	63	61	58	54	53	45	63
	1257	4524	22	56	61	59	57	54	51	49	41	59	63	68	66	63	61	57	55	47	66
Ø500	196	707	1	41	46	44	42	39	35	33	25	44	47	52	51	48	45	42	40	32	51
	589	2121	2	48	53	51	49	46	42	40	32	51	54	59	58	55	52	49	47	39	58
	982	3534	5	51	56	54	52	49	45	43	36	54	58	63	61	59	56	52	50	42	61
	1374	4948	11	53	58	56	54	51	47	46	38	56	60	65	63	61	58	54	52	45	63
	2356	8482	31	57	61	60	57	54	51	49	41	60	63	68	66	64	61	58	56	48	67
Ø630	312	1122	1	41	46	44	42	39	36	34	26	45	48	53	51	49	46	43	41	33	52
	935	3367	2	47	52	50	48	45	41	40	32	50	54	59	57	55	52	48	47	39	57
	1559	5611	5	50	55	53	51	48	44	42	35	53	57	62	60	58	55	51	49	42	60
	2182	7855	11	52	57	55	52	50	46	44	36	55	59	64	62	60	57	53	51	43	62
	3117	11222	22	54	58	57	54	51	48	46	38	57	61	66	64	61	59	55	53	45	64

ΔPmin (Pa), Minimum pressure loss exerted on the system with Damper fully open
L_w dB(A), Discharged or Re-generated Sound Power levels in dB(A)
ΔP= 100 Pa, Soud power levels at system atatic pressure level Pa per Octave Hz

Discharged Sound Power levels

Optima-R	Air Volume			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	DPmin [Pa]	63	125	250	500	1000	2000	4000	8000	L_w dB(A)	63	125	250	500	1000	2000	4000	8000	L_w dB(A)
Ø80	5	18	1	30	38	41	39	37	32	28	22	41	33	41	44	43	40	35	31	26	45
	15	54	6	41	49	52	50	48	43	39	33	53	44	52	55	54	52	46	42	37	56
	25	90	17	46	54	57	56	54	48	44	39	58	50	58	60	59	57	52	47	42	61
	35	127	34	50	58	60	59	57	52	48	42	61	53	61	64	62	60	55	51	45	65
	50	181	69	53	61	64	63	61	55	51	46	65	57	65	67	66	64	59	55	49	68
Ø100	8	28	1	33	41	44	43	40	35	31	26	45	37	44	47	46	44	38	34	29	48
	24	85	6	44	52	55	53	51	46	42	36	55	47	55	58	57	55	49	45	40	59
	39	141	16	49	57	60	58	56	51	47	41	60	52	60	63	62	60	54	50	45	64
	55	198	31	52	60	63	62	59	54	50	45	64	56	63	66	65	63	57	53	48	67
	79	283	63	56	64	66	65	63	58	54	48	67	59	67	70	68	66	61	57	51	71
Ø125	12	44	1	36	44	47	45	43	38	34	28	48	40	47	50	49	47	41	37	32	51
	37	133	5	46	54	57	56	54	48	44	39	58	50	58	61	59	57	52	48	42	61
	61	221	14	51	59	62	60	58	53	49	44	63	55	62	65	64	62	56	52	47	66
	86	309	28	54	62	65	64	62	56	52	47	66	58	66	68	67	65	60	56	50	69
	123	442	56	58	65	68	67	65	59	55	50	69	61	69	72	70	68	63	59	53	73
Ø160	20	72	1	39	47	50	48	46	41	37	31	50	42	50	53	52	50	44	40	35	54
	60	217	4	49	57	59	58	56	51	46	41	60	52	60	63	61	59	54	50	45	64
	101	362	12	53	61	64	63	60	55	51	46	65	57	65	67	66	64	59	55	49	68
	141	507	24	56	64	67	66	63	58	54	49	68	60	68	70	69	67	62	57	52	71
	201	724	49	59	67	70	69	67	61	57	52	71	63	71	74	72	70	65	61	55	74
Ø200	31	113	1	41	45	44	41	38	35	33	25	44	44	49	47	45	42	38	36	28	47
	94	339	4	52	57	55	53	50	46	44	37	55	55	60	58	56	53	49	48	40	58
	157	565	11	57	62	60	58	55	52	50	42	61	60	65	64	61	58	55	53	45	64
	220	792	21	61	66	64	62	59	55	53	45	64	64	69	67	65	62	58	56	49	67
	314	1131	42	64	69	68	65	62	59	57	49	68	68	72	71	68	65	62	60	52	71
Ø250	49	177	1	45	50	48	46	43	40	38	30	49	49	54	52	49	47	43	41	33	52
	147	530	3	56	60	59	56	53	50	48	40	59	59	64	62	60	57	53	51	44	62
	245	884	9	60	65	63	61	58	55	53	45	64	64	69	67	65	62	58	56	48	67
	344	1237	17	64	68	67	64	61	58	56	48	67	67	72	70	68	65	61	59	52	70
	491	1767	36	67	72	70	68	65	61	59	51	70	70	75	73	71	68	65	63	55	74
Ø315	78	281	1	49	54	52	50	47	43	42	34	52	53	58	56	54	51	47	45	37	56
	234	842	3	58	63	61	59	56	53	51	43	62	62	67	65	63	60	56	54	47	65
	390	1403	7	63	67	66	63	60	57	55	47	66	66	71	69	67	64	61	59	51	69
	546	1964	14	65	70	69	66	63	60	58	50	69	69	74	72	70	67	63	61	54	72
	779	2806	29	68	73	72	69	66	63	61	53	72	72	77	75	73	70	66	64	57	75
Ø400	126	452	1	52	57	55	53	50	47	45	37	56	56	61	59	57	54	50	48	41	59
	377	1357	2	60	65	63	61	58	55	53	45	64	64	69	67	65	62	58	57	49	67
	628	2262	5	64	69	67	65	62	58	56	49	67	68	73	71	69	66	62	60	52	71
	880	3167	11	67	71	70	67	64	61	59	51	70	70	75	73	71	68	65	63	55	74
	1257	4524	22	69	74	72	70	67	63	62	54	72	73	78	76	74	71	67	65	58	76
Ø500	196	707	1	54	59	57	55	52	49	47	39	57	58	63	61	59	56	52	51	43	61
	589	2121	2	61	66	64	62	59	56	54	46	64	65	70	68	66	63	59	58	50	68
	982	3534	5	64	69	68	65	62	59	57	49	68	68	73	72	69	66	63	61	53	72
	1374	4948	11	67	71	70	67	64	61	59	51	70	71	75	74	71	68	65	63	55	74
	2356	8482	31	70	75	73	71	68	64	62	55	73	74	79	77	75	72	68	66	59	77
Ø630	312	1122	1	55	60	58	56	53	50	48	40	59	59	64	63	60	57	54	52	44	63
	935	3367	2	61	66	64	62	59	56	54	46	65	65	70	69	66	63	60	58	50	69
	1559	5611	5	64	69	67	65	62	58	56	49	67	68	73	71	69	66	62	61	53	71
	2182	7855	11	66	71	69	67	64	60	58	50	69	70	75	73	71	68	64	62	55	73
	3117	11222	22	68	73	71	69	66	62	60	52	71	72	77	75	73	70	66	64	56	75

ΔPmin (Pa), Minimum pressure loss exerted on the system with Damper fully open
L_w dB(A), Discharged or Re-generated Sound Power levels in dB(A)
ΔP= 100 Pa, Soud power levels at system atatic pressure level Pa per Octave Hz

Radiated Sound Power levels

Optima-R	Air Volume			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	DPmin [Pa]	63	125	250	500	1000	2000	4000	8000	L_w dB(A)	63	125	250	500	1000	2000	4000	8000	L_w dB(A)
Ø80	5	18	1	3	5	3	6	0	0	0	0	<20	7	10	8	10	5	2	0	2	<20
	15	54	6	14	17	15	18	12	9	8	10	<20	19	21	19	22	16	14	12	14	23
	25	90	17	20	22	20	23	17	15	13	15	24	24	27	25	27	22	19	17	19	28
	35	127	34	23	26	24	27	21	18	17	19	28	28	30	28	31	25	23	21	23	32
	50	181	69	27	30	28	30	25	22	20	22	32	32	34	32	35	29	26	25	27	36
Ø100	8	28	1	5	7	5	8	2	0	0	0	<20	9	11	9	12	6	4	2	4	<20
	24	85	6	17	19	17	20	14	12	10	12	21	21	23	21	24	18	15	14	16	25
	39	141	16	22	25	23	25	20	17	16	17	27	26	28	26	29	23	21	19	21	30
	55	198	31	26	28	26	29	23	21	19	21	30	30	32	30	33	27	24	23	25	34
	79	283	63	30	32	30	33	27	25	23	25	34	33	36	34	37	31	28	27	29	38
Ø125	12	44	1	7	10	8	10	5	2	0	2	<20	10	13	11	14	8	5	4	6	<20
	37	133	5	19	22	20	22	17	14	12	14	24	22	25	23	26	20	17	16	18	27
	61	221	14	25	27	25	28	22	20	18	20	29	28	30	28	31	25	23	21	23	32
	86	309	28	28	31	29	32	26	23	22	24	33	32	34	32	35	29	26	25	27	36
	123	442	56	32	35	33	35	30	27	26	27	37	35	38	36	39	33	30	29	31	40
Ø160	20	72	1	14	12	10	9	7	5	3	0	<20	20	17	16	14	13	10	8	2	<20
	60	217	4	25	23	21	20	19	16	14	8	24	31	28	27	25	24	21	19	13	29
	101	362	12	30	28	26	25	24	21	19	13	29	36	33	32	30	29	26	24	18	34
	141	507	24	34	31	30	28	27	24	22	16	32	39	37	35	33	32	30	28	22	37
	201	724	49	37	35	33	32	31	28	26	20	36	43	40	39	37	36	33	31	25	41
Ø200	31	113	1	19	17	15	13	12	9	8	1	<20	25	22	21	19	18	15	13	7	23
	94	339	4	29	27	25	23	22	20	18	11	27	35	32	31	29	28	25	23	17	33
	157	565	11	34	31	30	28	27	24	22	16	32	39	37	36	34	33	30	28	22	38
	220	792	21	37	35	33	31	30	27	25	19	35	43	40	39	37	36	33	31	25	41
	314	1131	42	40	38	36	34	33	31	29	23	38	46	43	42	40	39	36	34	28	44
Ø250	49	177	1	23	21	19	17	16	13	12	5	21	29	27	25	23	22	19	18	11	27
	147	530	3	32	30	28	26	25	23	21	15	30	38	36	34	32	31	29	27	21	36
	245	884	9	36	34	33	31	30	27	25	19	35	42	40	38	37	36	33	31	25	41
	344	1237	17	39	37	35	34	32	30	28	22	37	45	43	41	39	38	36	34	28	43
	491	1767	36	42	40	38	36	35	33	31	25	40	48	46	44	42	41	39	37	31	46
Ø315	78	281	1	26	24	22	21	20	17	15	9	25	33	30	29	27	26	23	21	15	31
	234	842	3	34	32	31	29	28	25	23	17	33	41	38	37	35	34	31	29	23	39
	390	1403	7	38	36	34	33	32	29	27	21	37	45	42	41	39	38	35	33	27	43
	546	1964	14	41	39	37	35	34	31	29	23	39	47	45	43	41	40	38	36	29	45
	779	2806	29	43	41	40	38	37	34	32	26	42	50	47	46	44	43	40	38	32	48
Ø400	126	452	1	29	27	25	23	22	19	18	11	27	35	33	32	30	29	26	24	18	34
	377	1357	2	36	34	32	30	29	27	25	18	34	43	40	39	37	36	33	31	25	41
	628	2262	5	39	37	36	34	33	30	28	22	38	46	44	42	40	39	37	35	28	44
	880	3167	11	42	39	38	36	35	32	30	24	40	48	46	44	43	42	39	37	31	46
	1257	4524	22	44	42	40	38	37	34	33	26	42	51	48	47	45	44	41	39	33	49
Ø500	196	707	1	31	28	27	25	24	21	19	13	29	37	35	34	32	31	28	26	20	36
	589	2121	2	37	34	33	31	30	27	25	19	35	44	41	40	38	37	34	32	26	42
	982	3534	5	40	37	36	34	33	30	28	22	38	47	44	43	41	40	37	35	29	45
	1374	4948	11	42	39	38	36	35	32	30	24	40	48	46	45	43	42	39	37	31	47
	2356	8482	31	45	42	41	39	38	35	33	27	43	52	49	48	46	45	42	40	34	50
Ø630	312	1122	1	31	29	28	26	25	22	20	14	30	39	36	35	33	32	29	27	21	37
	935	3367	2	37	34	33	31	30	27	25	19	35	44	42	40	38	37	34	32	26	42
	1559	5611	5	39	37	35	33	32	30	28	22	37	46	44	42	41	40	37	35	29	45
	2182	7855	11	41	38	37	35	34	31	29	23	39	48	46	44	42	41	38	37	30	46
	3117	11222	22	42	40	39	37	36	33	31	25	41	50	47	46	44	43	40	38	32	48

ΔPmin (Pa), Minimum pressure loss exerted on the system with Damper fully open
L_w dB(A), Discharged or Re-generated Sound Power levels in dB(A)
ΔP= 100 Pa, Soud power levels at system atatic pressure level Pa per Octave Hz

Radiated Sound Power levels

Optima-R	Air Volume			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	DPmin [Pa]	63	125	250	500	1000	2000	4000	8000	L_w dB(A)	63	125	250	500	1000	2000	4000	8000	L_w dB(A)
Ø80	5	18	1	11	14	12	15	9	6	5	7	<20	14	16	14	17	11	9	7	9	Ø
	15	54	6	23	26	24	26	21	18	16	18	27	26	28	26	29	23	20	19	21	30
	25	90	17	28	31	29	32	26	23	22	24	33	31	33	31	34	28	26	24	26	35
	35	127	34	32	35	33	35	30	27	25	27	36	35	37	35	38	32	29	28	30	39
	50	181	69	36	38	36	39	33	31	29	31	40	38	41	39	41	36	33	32	33	43
Ø100	8	28	1	12	15	13	16	10	7	6	8	<20	15	17	15	18	12	9	8	10	<20
	24	85	6	24	27	25	27	22	19	17	19	29	26	29	27	30	24	21	20	22	31
	39	141	16	30	32	30	33	27	25	23	25	34	32	34	32	35	29	27	25	27	36
	55	198	31	33	36	34	36	31	28	27	28	38	35	38	36	39	33	30	29	31	40
	79	283	63	37	40	38	40	35	32	30	32	41	39	42	40	42	37	34	33	34	44
Ø125	12	44	1	14	16	14	17	11	8	7	9	<20	15	18	16	18	13	10	9	10	<20
	37	133	5	26	28	26	29	23	20	19	21	30	27	30	28	30	25	22	21	22	32
	61	221	14	31	34	32	34	29	26	24	26	35	33	35	33	36	30	28	26	28	37
	86	309	28	35	37	35	38	32	30	28	30	39	37	39	37	40	34	31	30	32	41
	123	442	56	39	41	39	42	36	34	32	34	43	40	43	41	44	38	35	34	36	45
Ø160	20	72	1	25	23	21	19	18	15	14	7	23	28	26	24	22	21	19	17	11	26
	60	217	4	36	34	32	30	29	27	25	18	34	39	37	35	34	32	30	28	22	37
	101	362	12	41	39	37	35	34	32	30	24	39	44	42	40	39	38	35	33	27	43
	141	507	24	45	42	41	39	38	35	33	27	43	48	45	44	42	41	38	36	30	46
	201	724	49	48	46	44	42	41	39	37	31	46	51	49	47	46	45	42	40	34	50
Ø200	31	113	1	30	28	26	25	24	21	19	13	29	34	31	30	28	27	24	22	16	32
	94	339	4	40	38	37	35	34	31	29	23	39	44	41	40	38	37	34	32	26	42
	157	565	11	45	43	41	39	38	36	34	28	43	48	46	45	43	42	39	37	31	47
	220	792	21	48	46	44	43	42	39	37	31	46	52	49	48	46	45	42	40	34	50
	314	1131	42	51	49	48	46	45	42	40	34	50	55	53	51	49	48	45	43	37	53
Ø250	49	177	1	35	33	31	29	28	25	24	17	33	38	36	35	33	32	29	27	21	37
	147	530	3	44	42	40	38	37	35	33	26	42	48	45	44	42	41	38	36	30	46
	245	884	9	48	46	44	43	42	39	37	31	47	52	50	48	46	45	42	40	34	50
	344	1237	17	51	49	47	45	44	42	40	34	49	55	52	51	49	48	45	43	37	53
	491	1767	36	54	52	50	48	47	45	43	37	52	58	55	54	52	51	48	46	40	56
Ø315	78	281	1	39	37	35	33	32	29	27	21	37	43	40	39	37	36	33	31	25	41
	234	842	3	47	45	43	41	40	38	36	29	45	51	48	47	45	44	41	39	33	49
	390	1403	7	51	49	47	45	44	41	39	33	49	55	52	51	49	48	45	43	37	53
	546	1964	14	53	51	49	48	47	44	42	36	52	57	55	53	51	50	48	46	39	55
	779	2806	29	56	54	52	50	49	47	45	38	54	60	57	56	54	53	50	48	42	58
Ø400	126	452	1	42	40	38	36	35	33	31	24	40	46	44	42	40	39	36	35	28	44
	377	1357	2	49	47	45	44	43	40	38	32	48	53	51	49	47	46	44	42	35	51
	628	2262	5	53	50	49	47	46	43	41	35	51	56	54	53	51	50	47	45	39	55
	880	3167	11	55	52	51	49	48	45	43	37	53	59	56	55	53	52	49	47	41	57
	1257	4524	22	57	55	53	51	50	48	46	40	55	61	59	57	55	54	51	50	43	59
Ø500	196	707	1	44	42	40	39	38	35	33	27	43	48	46	44	43	42	39	37	31	47
	589	2121	2	51	48	47	45	44	41	39	33	49	55	52	51	49	48	45	43	37	53
	982	3534	5	53	51	50	48	47	44	42	36	52	57	55	54	52	51	48	46	40	56
	1374	4948	11	55	53	51	50	49	46	44	38	54	59	57	55	54	53	50	48	42	58
	2356	8482	31	58	56	55	53	52	49	47	41	57	62	60	59	57	56	53	51	45	61
Ø630	312	1122	1	46	43	42	40	39	36	34	28	44	50	48	46	44	43	40	39	32	48
	935	3367	2	51	49	47	45	44	42	40	33	49	55	53	51	50	49	46	44	38	53
	1559	5611	5	53	51	50	48	47	44	42	36	52	58	55	54	52	51	48	46	40	56
	2182	7855	11	55	53	51	49	48	46	44	37	53	59	57	55	54	53	50	48	42	58
	3117	11222	22	57	54	53	51	50	47	45	39	55	61	59	57	55	54	51	50	43	59

ΔPmin (Pa), Minimum pressure loss exerted on the system with Damper fully open
L_w dB(A), Discharged or Re-generated Sound Power levels in dB(A)
ΔP= 100 Pa, Soud power levels at system atatic pressure level Pa per Octave Hz

Optima-R-I

Double skin circular variable air volume unit

Highlights:

- Damper tightness class 4 according to EN 1751
- Casing tightness class C according to EN 1751
- ILH Hygienic certification VDI 6022 & VDI 3803 for Standard Ventilation & Clean room application
- High measuring accuracy of :
  10-20% of V_{max} air flow rate has an accuracy error rate of: ±25%
  20-40% of V_{max} air flow rate has an accuracy error rate of: <±10%
  40-100% of V_{max} air flow rate has an accuracy error rate of: <±4%
- Air volume range of 36 to 14589 m³/h
- Operating range of up to 1500Pa
- External 50mm insulation with sheet steel cover

Function

Double skin circular VAV terminal units are commonly used for supply or return air applications at medium to high system pressures. Terminal units are ideal for single zone control with supply and return in master and slave setup such as offices, hotel rooms or meeting rooms where the required cooling and heating load will vary on demand.

Design

VAV unit housing is constructed from galvanized steel sheet with external thermal insulation of fiber glass material. The insulation is once again covered by a secondary galvanized sheet steel to protect the insulation and to add to the low frequency sound radiated in high pressure systems. Special design of multi-point pressure sensor assures an accurate air flow readings even in difficult installations.

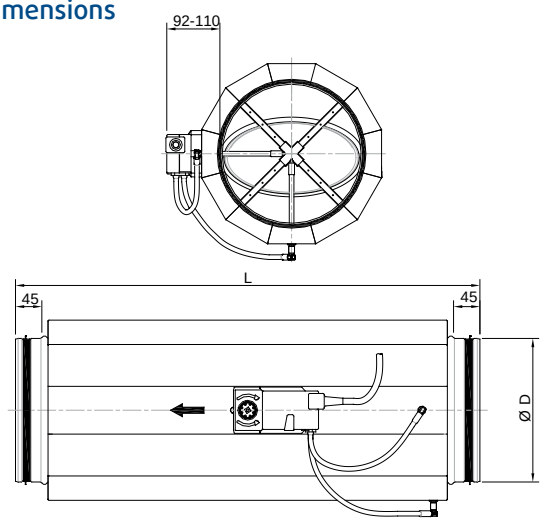
Available Sizes

Inlet/outlet : from ø 80 to ø 630 mm

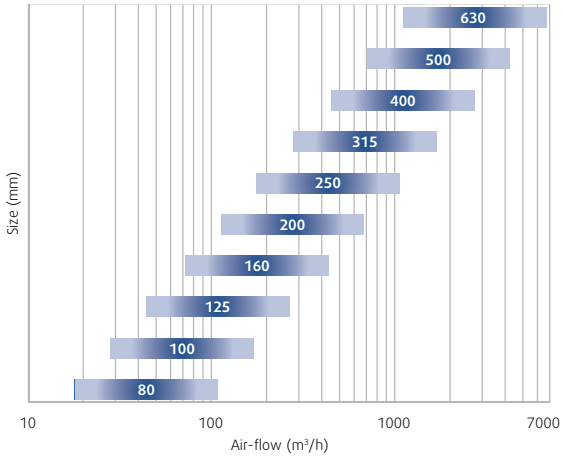
Controls:

The VAV terminal units are as standard equipped with BLC (Belimo compact) controllers (LMV-D3 or NMV-D3) without any MP or LON communication capability to be used as stand alone or in master and slave setting.
The compact controllers are equally available with MP-Bus, ModBus and LON communication capability. On demand as alternative, Gateway communication units can be provided and can be connected later in time to building management systems to create a zone control by creating bus-rings solutions (only possible if MP-Bus communication is installed). VAV and Compact controllers are factory calibrated as standard to the air volume indicated in the table or upon request can be adjusted to site required settings prior to dispatch on Vmin and Vmax range. The air volumes can also be readjusted on site with ZTH-Gen hand held service tool. If specific air volumes for Vmin and Vmax would be required, this must be indicated prior to order of the units for adequate calibration in the factory.

Dimensions



BLC1= Belimo LMV-D3 compact controller WITH MP-Bus communication
BLC4= Belimo LMV-D3 compact controller WITHOUT MP-Bus communication
BLC1-MOD= Belimo LMV-D3 compact controller WITH MODBUS communication



Dimensions and Air Volume range

Code	Size	Ø D (mm)	L (mm)	Air volume *(m³/h)		Air volume *(l/s)	
				V_{min}	V_{max}	V_{min}	V_{max}
Optim-R-I-08-BLC_	80	78	400	36	235	10	65
Optim-R-I-10-BLC_	100	98	400	57	368	16	102
Optim-R-I-12-BLC_	125	123	400	88	574	25	160
Optim-R-I-16-BLC_	160	158	400	145	941	40	261
Optim-R-I-20-BLC_	200	198	600	226	1470	63	408
Optim-R-I-25-BLC_	250	248	800	353	2297	98	638
Optim-R-I-31-BLC_	315	313	800	561	3647	156	1013
Optim-R-I-40-BLC_	400	398	800	905	5881	251	1634
Optim-R-I-50-BLC_	500	498	1000	1414	9189	393	2553
Optim-R-I-63-BLC_	630	623	1000	2244	14589	623	4052

* Note = Standard factory air volume setting if not indicated upon order

Accuracy:
10-20% of V_{max} air flow rate has an accuracy error rate of: ±25%
20-40% of V_{max} air flow rate has an accuracy error rate of: <±10%
40-100% of V_{max} air flow rate has an accuracy error rate of: <±4%

Ordering codes

Optima - Type - Size- Controller Type - V_{min} - V_{max}

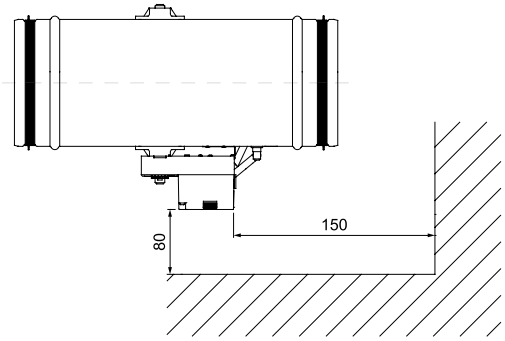
Type R-I

Code 08 to 63
(ØD-80 to ØD-630mm)

BLC4
BLC1
BLC1-MOD

m³/h or l/s*

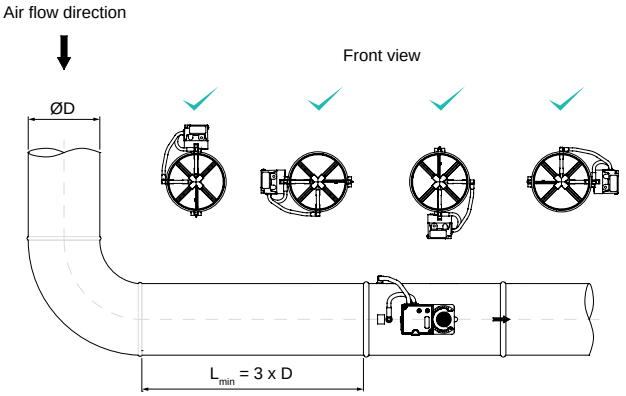
m³/h or l/s*



Optima-R-I-BLC_ installation Min distance to parameter walls

*** Note:**

1. If the air volumes are not given during the ordering process, then standard Factory setting will be applied according to table
2. Vmin can also be set to 0m³/h if required by demand upon ordering
3. The standard input signal on the controller is set to 2-10V, upon request 0-10V can also be selected



Ordering example:

OPTIMA-R-I-25-353(m³/h)-2297(m³/h)-BLC4
The above order example is set for V_{min} and V_{max} air volume setting for Ø250 with Belimo compact controller having NO comminucation capability.

Discharged Sound Power levels

Optima-R-I	Air Volume			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔPmin [Pa]	63	125	250	500	1000	2000	4000	8000	L_w dB(A)	63	125	250	500	1000	2000	4000	8000	L_w dB(A)
Ø80	5	18	1	18	26	29	28	26	20	16	11	30	24	32	35	33	31	26	22	16	36
	15	54	6	29	37	40	39	37	31	27	22	41	35	43	46	45	43	37	33	28	47
	25	90	17	35	43	45	44	42	37	33	27	46	41	48	51	50	48	42	38	33	52
	35	127	34	38	46	49	47	45	40	36	30	50	44	52	55	53	51	46	42	36	55
	50	181	69	42	50	52	51	49	44	40	34	53	48	55	58	57	55	49	45	40	59
Ø100	8	28	1	22	29	32	31	29	23	19	14	33	27	35	38	37	35	29	25	20	39
	24	85	6	32	40	43	42	39	34	30	25	44	38	46	49	47	45	40	36	30	50
	39	141	16	37	45	48	47	44	39	35	30	49	43	51	54	52	50	45	41	35	55
	55	198	31	41	48	51	50	48	42	38	33	52	46	54	57	56	54	48	44	39	58
	79	283	63	44	52	55	53	51	46	42	36	56	50	58	61	59	57	52	48	42	61
Ø125	12	44	1	24	32	35	34	32	26	22	17	36	30	38	41	40	37	32	28	23	42
	37	133	5	35	42	45	44	42	36	32	27	46	41	48	51	50	48	42	38	33	52
	61	221	14	39	47	50	49	47	41	37	32	51	45	53	56	55	53	47	43	38	57
	86	309	28	43	50	53	52	50	44	40	35	54	48	56	59	58	56	50	46	41	60
	123	442	56	46	54	57	55	53	48	44	38	57	52	60	62	61	59	54	50	44	63
Ø160	20	72	1	27	35	38	36	34	29	25	19	39	33	41	44	42	40	35	31	25	45
	60	217	4	37	45	47	46	44	39	35	29	48	43	51	53	52	50	45	41	35	54
	101	362	12	41	49	52	51	49	43	39	34	53	47	55	58	57	54	49	45	40	59
	141	507	24	44	52	55	54	52	46	42	37	56	50	58	61	60	57	52	48	43	62
	201	724	49	47	55	58	57	55	49	45	40	59	53	61	64	63	61	55	51	46	65
Ø200	31	113	1	30	34	33	30	27	24	22	14	33	35	40	38	36	33	29	28	20	38
	94	339	4	41	46	44	42	39	35	33	26	44	46	51	50	47	44	41	39	31	50
	157	565	11	46	51	49	47	44	40	39	31	49	52	57	55	53	50	46	44	36	55
	220	792	21	50	55	53	50	48	44	42	34	53	55	60	58	56	53	49	48	40	58
	314	1131	42	53	58	56	54	51	48	46	38	57	59	64	62	60	57	53	51	44	62
Ø250	49	177	1	34	38	37	34	31	28	26	18	37	39	44	43	40	37	34	32	24	43
	147	530	3	44	49	47	45	42	38	36	29	47	50	55	53	51	48	44	42	34	53
	245	884	9	49	54	52	49	47	43	41	33	52	55	59	58	55	52	49	47	39	58
	344	1237	17	52	57	55	53	50	46	44	36	55	58	63	61	58	56	52	50	42	61
	491	1767	36	55	60	58	56	53	49	48	40	58	61	66	64	62	59	55	53	46	64
Ø315	78	281	1	37	42	40	38	35	31	29	22	40	43	48	46	44	41	37	35	28	46
	234	842	3	46	51	49	47	44	40	39	31	49	52	57	55	53	50	47	45	37	56
	390	1403	7	50	55	54	51	48	45	43	35	54	57	61	60	57	54	51	49	41	60
	546	1964	14	53	58	56	54	51	47	46	38	56	59	64	62	60	57	54	52	44	63
	779	2806	29	56	61	59	57	54	50	49	41	59	62	67	65	63	60	57	55	47	66
Ø400	126	452	1	39	44	42	40	37	34	32	24	43	46	51	49	47	44	40	38	30	49
	377	1357	2	47	52	51	48	45	42	40	32	51	54	59	57	55	52	48	46	38	57
	628	2262	5	51	56	54	52	49	45	44	36	54	58	62	61	58	55	52	50	42	61
	880	3167	11	54	58	57	54	51	48	46	38	57	60	65	63	61	58	54	53	45	63
	1257	4524	22	56	61	59	57	54	51	49	41	59	63	68	66	63	61	57	55	47	66
Ø500	196	707	1	41	46	44	42	39	35	33	25	44	47	52	51	48	45	42	40	32	51
	589	2121	2	48	53	51	49	46	42	40	32	51	54	59	58	55	52	49	47	39	58
	982	3534	5	51	56	54	52	49	45	43	36	54	58	63	61	59	56	52	50	42	61
	1374	4948	11	53	58	56	54	51	47	46	38	56	60	65	63	61	58	54	52	45	63
	2356	8482	31	57	61	60	57	54	51	49	41	60	63	68	66	64	61	58	56	48	67
Ø630	312	1122	1	41	46	44	42	39	36	34	26	45	48	53	51	49	46	43	41	33	52
	935	3367	2	47	52	50	48	45	41	40	32	50	54	59	57	55	52	48	47	39	57
	1559	5611	5	50	55	53	51	48	44	42	35	53	57	62	60	58	55	51	49	42	60
	2182	7855	11	52	57	55	52	50	46	44	36	55	59	64	62	60	57	53	51	43	62
	3117	11222	22	54	58	57	54	51	48	46	38	57	61	66	64	61	59	55	53	45	64

ΔPmin (Pa), Minimum pressure loss exerted on the system with Damper fully open
L_w dB(A), Discharged or Re-generated Sound Power levels in dB(A)
ΔP= 100 Pa, Soud power levels at system atatic pressure level Pa per Octave Hz

Discharged Sound Power levels

Optima-R-I	Air Volume			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	DPmin [Pa]	63	125	250	500	1000	2000	4000	8000	L_w dB(A)	63	125	250	500	1000	2000	4000	8000	L_w dB(A)
Ø80	5	18	1	30	38	41	39	37	32	28	22	41	33	41	44	43	40	35	31	26	45
	15	54	6	41	49	52	50	48	43	39	33	53	44	52	55	54	52	46	42	37	56
	25	90	17	46	54	57	56	54	48	44	39	58	50	58	60	59	57	52	47	42	61
	35	127	34	50	58	60	59	57	52	48	42	61	53	61	64	62	60	55	51	45	65
	50	181	69	53	61	64	63	61	55	51	46	65	57	65	67	66	64	59	55	49	68
Ø100	8	28	1	33	41	44	43	40	35	31	26	45	37	44	47	46	44	38	34	29	48
	24	85	6	44	52	55	53	51	46	42	36	55	47	55	58	57	55	49	45	40	59
	39	141	16	49	57	60	58	56	51	47	41	60	52	60	63	62	60	54	50	45	64
	55	198	31	52	60	63	62	59	54	50	45	64	56	63	66	65	63	57	53	48	67
	79	283	63	56	64	66	65	63	58	54	48	67	59	67	70	68	66	61	57	51	71
Ø125	12	44	1	36	44	47	45	43	38	34	28	48	40	47	50	49	47	41	37	32	51
	37	133	5	46	54	57	56	54	48	44	39	58	50	58	61	59	57	52	48	42	61
	61	221	14	51	59	62	60	58	53	49	44	63	55	62	65	64	62	56	52	47	66
	86	309	28	54	62	65	64	62	56	52	47	66	58	66	68	67	65	60	56	50	69
	123	442	56	58	65	68	67	65	59	55	50	69	61	69	72	70	68	63	59	53	73
Ø160	20	72	1	39	47	50	48	46	41	37	31	50	42	50	53	52	50	44	40	35	54
	60	217	4	49	57	59	58	56	51	46	41	60	52	60	63	61	59	54	50	45	64
	101	362	12	53	61	64	63	60	55	51	46	65	57	65	67	66	64	59	55	49	68
	141	507	24	56	64	67	66	63	58	54	49	68	60	68	70	69	67	62	57	52	71
	201	724	49	59	67	70	69	67	61	57	52	71	63	71	74	72	70	65	61	55	74
Ø200	31	113	1	41	45	44	41	38	35	33	25	44	44	49	47	45	42	38	36	28	47
	94	339	4	52	57	55	53	50	46	44	37	55	55	60	58	56	53	49	48	40	58
	157	565	11	57	62	60	58	55	52	50	42	61	60	65	64	61	58	55	53	45	64
	220	792	21	61	66	64	62	59	55	53	45	64	64	69	67	65	62	58	56	49	67
	314	1131	42	64	69	68	65	62	59	57	49	68	68	72	71	68	65	62	60	52	71
Ø250	49	177	1	45	50	48	46	43	40	38	30	49	49	54	52	49	47	43	41	33	52
	147	530	3	56	60	59	56	53	50	48	40	59	59	64	62	60	57	53	51	44	62
	245	884	9	60	65	63	61	58	55	53	45	64	64	69	67	65	62	58	56	48	67
	344	1237	17	64	68	67	64	61	58	56	48	67	67	72	70	68	65	61	59	52	70
	491	1767	36	67	72	70	68	65	61	59	51	70	70	75	73	71	68	65	63	55	74
Ø315	78	281	1	49	54	52	50	47	43	42	34	52	53	58	56	54	51	47	45	37	56
	234	842	3	58	63	61	59	56	53	51	43	62	62	67	65	63	60	56	54	47	65
	390	1403	7	63	67	66	63	60	57	55	47	66	66	71	69	67	64	61	59	51	69
	546	1964	14	65	70	69	66	63	60	58	50	69	69	74	72	70	67	63	61	54	72
	779	2806	29	68	73	72	69	66	63	61	53	72	72	77	75	73	70	66	64	57	75
Ø400	126	452	1	52	57	55	53	50	47	45	37	56	56	61	59	57	54	50	48	41	59
	377	1357	2	60	65	63	61	58	55	53	45	64	64	69	67	65	62	58	57	49	67
	628	2262	5	64	69	67	65	62	58	56	49	67	68	73	71	69	66	62	60	52	71
	880	3167	11	67	71	70	67	64	61	59	51	70	70	75	73	71	68	65	63	55	74
	1257	4524	22	69	74	72	70	67	63	62	54	72	73	78	76	74	71	67	65	58	76
Ø500	196	707	1	54	59	57	55	52	49	47	39	57	58	63	61	59	56	52	51	43	61
	589	2121	2	61	66	64	62	59	56	54	46	64	65	70	68	66	63	59	58	50	68
	982	3534	5	64	69	68	65	62	59	57	49	68	68	73	72	69	66	63	61	53	72
	1374	4948	11	67	71	70	67	64	61	59	51	70	71	75	74	71	68	65	63	55	74
	2356	8482	31	70	75	73	71	68	64	62	55	73	74	79	77	75	72	68	66	59	77
Ø630	312	1122	1	55	60	58	56	53	50	48	40	59	59	64	63	60	57	54	52	44	63
	935	3367	2	61	66	64	62	59	56	54	46	65	65	70	69	66	63	60	58	50	69
	1559	5611	5	64	69	67	65	62	58	56	49	67	68	73	71	69	66	62	61	53	71
	2182	7855	11	66	71	69	67	64	60	58	50	69	70	75	73	71	68	64	62	55	73
	3117	11222	22	68	73	71	69	66	62	60	52	71	72	77	75	73	70	66	64	56	75

ΔPmin (Pa), Minimum pressure loss exerted on the system with Damper fully open
L_w dB(A), Discharged or Re-generated Sound Power levels in dB(A)
ΔP= 100 Pa, Soud power levels at system atatic pressure level Pa per Octave Hz

Radiated Sound Power levels

Optima-R-I	Air Volume			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	DPmin [Pa]	63	125	250	500	1000	2000	4000	8000	L_w dB(A)	63	125	250	500	1000	2000	4000	8000	L_w dB(A)
Ø80	5	18	1	9	8	6	6	1	0	0	0	<20	13	12	10	11	6	1	0	0	Ø
	15	54	6	21	19	17	18	13	8	6	5	<20	25	24	22	22	17	13	10	9	21
	25	90	17	26	25	23	23	18	14	11	10	23	30	29	27	28	23	18	15	14	27
	35	127	34	29	28	26	27	22	17	15	14	27	34	33	31	31	26	22	19	18	31
	50	181	69	33	32	30	31	26	21	18	17	31	38	36	35	35	30	25	23	22	35
Ø100	8	28	1	11	10	8	8	4	0	0	0	<20	15	14	12	12	7	2	0	0	<20
	24	85	6	23	22	20	20	15	11	8	7	20	27	25	23	24	19	14	12	11	25
	39	141	16	28	27	25	26	21	16	13	13	26	32	31	29	29	25	20	17	16	30
	55	198	31	32	31	29	29	24	20	17	16	30	36	35	33	33	28	23	21	20	34
	79	283	63	36	35	33	33	28	24	21	20	34	39	38	36	37	32	27	25	24	38
Ø125	12	44	1	13	12	10	11	6	1	0	0	<20	16	15	13	14	9	4	1	1	<20
	37	133	5	25	24	22	23	18	13	10	9	23	28	27	25	26	21	16	13	13	28
	61	221	14	31	30	28	28	23	19	16	15	28	34	33	31	31	26	22	19	18	33
	86	309	28	35	33	31	32	27	22	20	19	32	38	37	35	35	30	25	23	22	37
	123	442	56	38	37	35	36	31	26	23	23	36	42	40	38	39	34	29	27	26	40
Ø160	20	72	1	14	13	11	12	7	2	0	0	<20	20	19	17	17	12	7	5	4	<20
	60	217	4	25	24	22	23	18	13	10	9	25	31	30	28	28	23	18	16	15	30
	101	362	12	30	29	27	28	23	18	15	15	31	36	35	33	33	28	24	21	20	36
	141	507	24	34	33	31	31	26	22	19	18	34	39	38	36	37	32	27	24	23	39
	201	724	49	37	36	34	35	30	25	22	22	38	43	42	40	40	35	30	28	27	43
Ø200	31	113	1	19	18	16	16	11	7	4	3	<20	25	24	22	22	17	12	10	9	22
	94	339	4	29	28	26	27	22	17	14	13	27	35	34	32	32	27	23	20	19	32
	157	565	11	34	33	31	31	26	22	19	18	32	39	38	36	37	32	27	25	24	37
	220	792	21	37	36	34	34	29	25	22	21	35	43	41	40	40	35	30	28	27	41
	314	1131	42	40	39	37	38	33	28	25	24	39	46	45	43	43	38	34	31	30	44
Ø250	49	177	1	23	22	20	20	15	11	8	7	<20	29	28	26	26	21	17	14	13	24
	147	530	3	32	31	29	30	25	20	17	16	29	38	37	35	36	31	26	23	22	34
	245	884	9	36	35	33	34	29	24	21	21	33	42	41	39	40	35	30	27	27	39
	344	1237	17	39	38	36	37	32	27	24	23	36	45	44	42	43	38	33	30	29	42
	491	1767	36	42	41	39	40	35	30	27	26	40	48	47	45	46	41	36	33	32	45
Ø315	78	281	1	26	25	23	24	19	14	11	11	<20	33	32	30	30	25	20	18	17	26
	234	842	3	35	33	31	32	27	22	20	19	29	41	40	38	38	33	29	26	25	35
	390	1403	7	38	37	35	36	31	26	23	23	34	45	44	42	42	37	32	30	29	40
	546	1964	14	41	40	38	38	33	29	26	25	37	47	46	44	45	40	35	32	31	43
	779	2806	29	43	42	40	41	36	31	29	28	40	50	49	47	47	42	38	35	34	46
Ø400	126	452	1	29	28	26	26	21	17	14	13	21	36	34	32	33	28	23	21	20	27
	377	1357	2	36	35	33	34	29	24	21	20	30	43	42	40	40	35	30	28	27	36
	628	2262	5	39	38	36	37	32	27	25	24	34	46	45	43	43	39	34	31	30	40
	880	3167	11	42	41	39	39	34	29	27	26	37	48	47	45	46	41	36	33	32	43
	1257	4524	22	44	43	41	41	36	32	29	28	40	51	49	48	48	43	38	36	35	46
Ø500	196	707	1	31	29	28	28	23	18	16	15	22	37	36	34	35	30	25	22	22	28
	589	2121	2	37	36	34	34	29	25	22	21	30	44	43	41	41	36	31	29	28	36
	982	3534	5	40	39	37	37	32	27	25	24	34	47	45	44	44	39	34	32	31	40
	1374	4948	11	42	41	39	39	34	29	27	26	36	48	47	45	46	41	36	34	33	43
	2356	8482	31	45	44	42	42	37	32	30	29	41	52	50	48	49	44	39	37	36	47
Ø630	312	1122	1	31	30	28	29	24	19	17	16	22	39	38	36	36	31	26	24	23	28
	935	3367	2	37	36	34	34	29	24	22	21	29	44	43	41	41	36	32	29	28	36
	1559	5611	5	39	38	36	37	32	27	24	23	33	46	45	43	44	39	34	31	31	40
	2182	7855	11	41	40	38	38	33	29	26	25	36	48	47	45	45	40	36	33	32	42
	3117	11222	22	42	41	39	40	35	30	28	27	38	50	49	47	47	42	37	35	34	45

ΔPmin (Pa), Minimum pressure loss exerted on the system with Damper fully open
L_w dB(A), Discharged or Re-generated Sound Power levels in dB(A)
ΔP= 100 Pa, Soud power levels at system atatic pressure level Pa per Octave Hz

Radiated Sound Power levels

Optima-R-I	Air Volume			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	DPmin [Pa]	63	125	250	500	1000	2000	4000	8000	L_w dB(A)	63	125	250	500	1000	2000	4000	8000	L_w dB(A)
Ø80	5	18	1	17	16	14	15	10	5	2	2	<20	20	19	17	17	12	8	5	4	<20
	15	54	6	29	28	26	27	22	17	14	13	25	32	31	29	29	24	19	17	16	28
	25	90	17	35	33	31	32	27	22	20	19	31	37	36	34	34	30	25	22	21	34
	35	127	34	38	37	35	36	31	26	23	22	35	41	40	38	38	33	28	26	25	38
	50	181	69	42	41	39	39	34	30	27	26	39	44	43	41	42	37	32	29	29	42
Ø100	8	28	1	18	17	15	16	11	6	3	3	<20	21	20	18	18	13	8	6	5	<20
	24	85	6	30	29	27	28	23	18	15	14	29	32	31	29	30	25	20	17	17	32
	39	141	16	36	35	33	33	28	24	21	20	35	38	37	35	35	30	26	23	22	37
	55	198	31	39	38	36	37	32	27	24	24	38	42	40	38	39	34	29	27	26	41
	79	283	63	43	42	40	41	36	31	28	27	42	45	44	42	43	38	33	30	30	45
Ø125	12	44	1	20	18	17	17	12	7	5	4	21	21	20	18	19	14	9	6	6	23
	37	133	5	32	30	28	29	24	19	17	16	32	33	32	30	31	26	21	18	18	35
	61	221	14	37	36	34	35	30	25	22	21	38	39	38	36	36	31	27	24	23	40
	86	309	28	41	40	38	38	33	29	26	25	41	43	42	40	40	35	30	28	27	44
	123	442	56	45	44	42	42	37	32	30	29	45	46	45	43	44	39	34	32	31	48
Ø160	20	72	1	25	24	22	22	18	13	10	9	24	28	27	25	26	21	16	13	12	27
	60	217	4	36	35	33	33	29	24	21	20	35	39	38	36	37	32	27	24	23	38
	101	362	12	41	40	38	39	34	29	26	25	40	44	43	41	42	37	32	29	29	43
	141	507	24	45	43	42	42	37	32	30	29	44	48	47	45	45	40	35	33	32	47
	201	724	49	48	47	45	46	41	36	33	32	47	51	50	48	49	44	39	36	36	50
Ø200	31	113	1	30	29	27	28	23	18	15	15	27	34	33	31	31	26	21	19	18	30
	94	339	4	40	39	37	38	33	28	25	25	38	44	43	41	41	36	32	29	28	41
	157	565	11	45	44	42	43	38	33	30	29	43	48	47	45	46	41	36	34	33	46
	220	792	21	48	47	45	46	41	36	33	32	46	52	50	49	49	44	39	37	36	49
	314	1131	42	52	50	48	49	44	39	37	36	49	55	54	52	52	47	43	40	39	52
Ø250	49	177	1	35	34	32	32	27	23	20	19	30	38	37	35	36	31	26	23	23	33
	147	530	3	44	43	41	42	37	32	29	28	40	48	47	45	45	40	35	33	32	43
	245	884	9	48	47	45	46	41	36	33	33	44	52	51	49	49	44	40	37	36	47
	344	1237	17	51	50	48	49	44	39	36	35	47	55	54	52	52	47	42	40	39	51
	491	1767	36	54	53	51	52	47	42	39	38	51	58	57	55	55	50	45	43	42	54
Ø315	78	281	1	39	38	36	36	31	27	24	23	32	43	41	39	40	35	30	28	27	35
	234	842	3	47	46	44	44	40	35	32	31	41	51	50	48	48	43	38	36	35	45
	390	1403	7	51	50	48	48	43	39	36	35	46	55	53	51	52	47	42	40	39	49
	546	1964	14	53	52	50	51	46	41	38	38	48	57	56	54	54	50	45	42	41	52
	779	2806	29	56	55	53	53	49	44	41	40	52	60	59	57	57	52	47	45	44	55
Ø400	126	452	1	42	41	39	40	35	30	27	26	33	46	45	43	43	38	34	31	30	37
	377	1357	2	49	48	46	47	42	37	34	33	42	53	52	50	51	46	41	38	37	46
	628	2262	5	53	52	50	50	45	40	38	37	46	56	55	53	54	49	44	41	41	50
	880	3167	11	55	54	52	52	47	43	40	39	49	59	58	56	56	51	46	44	43	53
	1257	4524	22	57	56	54	55	50	45	42	41	52	61	60	58	58	53	49	46	45	56
Ø500	196	707	1	44	43	41	42	37	32	29	29	34	48	47	45	46	41	36	33	33	38
	589	2121	2	51	49	47	48	43	38	36	35	43	55	53	52	52	47	42	40	39	47
	982	3534	5	53	52	50	51	46	41	38	38	47	57	56	54	55	50	45	42	42	50
	1374	4948	11	55	54	52	53	48	43	40	40	49	59	58	56	57	52	47	44	44	53
	2356	8482	31	58	57	55	56	51	46	43	43	53	62	61	59	60	55	50	47	47	57
Ø630	312	1122	1	46	45	43	43	38	34	31	30	35	50	49	47	47	42	38	35	34	39
	935	3367	2	51	50	48	48	44	39	36	35	43	55	54	52	53	48	43	40	39	47
	1559	5611	5	53	52	50	51	46	41	39	38	47	58	57	55	55	50	45	43	42	51
	2182	7855	11	55	54	52	53	48	43	40	39	49	59	58	56	57	52	47	44	44	53
	3117	11222	22	57	56	54	54	49	45	42	41	52	61	60	58	58	54	49	46	45	56

ΔPmin (Pa), Minimum pressure loss exerted on the system with Damper fully open
L_w dB(A), Discharged or Re-generated Sound Power levels in dB(A)
ΔP= 100 Pa, Soud power levels at system atatic pressure level Pa per Octave Hz

OPTIMA-RM

Zone air supply / extract total ratio control system

Highlights:

- The body tightness class C acc. to EN 1751
- Hygienic certificate acc. to VDI 6022 and VDI 3803
- High accuracy up to 5%
  0-20% of V_{max} air flow rate has an accuracy error rate of: ±25%
  20-40% of V_{max} air flow rate has an accuracy error rate of: <±10%
  40-100% of V_{max} air flow rate has an accuracy error rate of: <±4%
- Flow measuring range 0 to 10974 m^3/h
- Fit for static pressure of 1000 Pa

Function

The flow transmitter Optima-RM is a part of a system that maintains a proper ratio between the supply and extract of a zone with individual flow control in air supply branches. The information about the total zone supply air flow is forwarded as a request for total zone extract air flow control. This helps avoiding undesired effects like too large air exchange, air suction into zone in non standard locations or air drought. The system consists from the air flow measuring transmitter in the common zone air supply duct (the product Optima-RM itself) and an especially adjusted air flow controller (VAV Optima-R) in the common zone extract air duct. The air extract controller is proportionally adjusted by the measured flow value on the air supply by the measuring transmitter Optima-RM.
This value is represented by the signal DC 0-10V.

Design

The measuring unit body is produced from galvanized steel sheet. The construction of the measuring cross assures accurate reedings of the air flow also in complicated installations.

Available Sizes

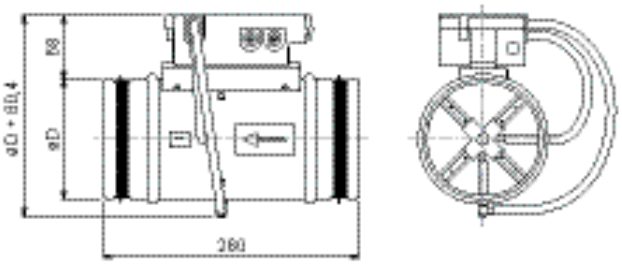
inlet / outlet: ø 80 to ø 630 mm

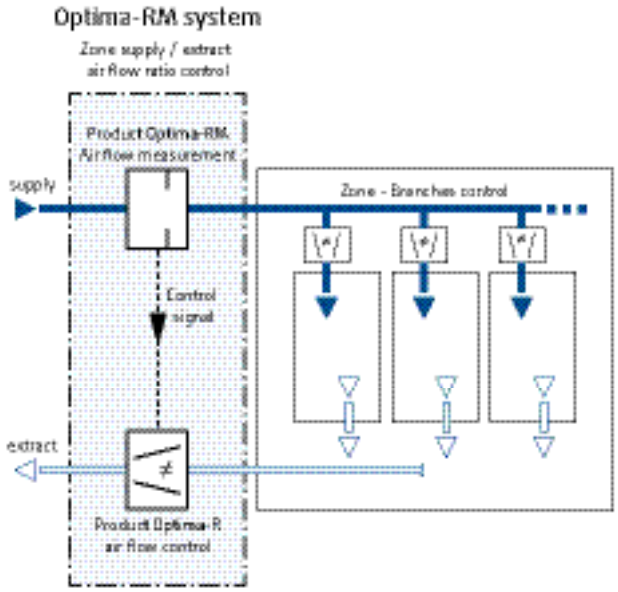
Accessories for Optima-RM:

• Attenuators Optima-ASA

Attenuators applicable for reduction of the generated noise.

Dimensions





Control diagram. Zone air flow control by Optima-RM system

Ordering codes

Optima-RM - □

Size — code 08 - 63 (øD 80 - 630 mm)

Ordering code example:

Optima-RM - 40
Optima-RM, size 400, control voltage DC 10V.

Dimensions

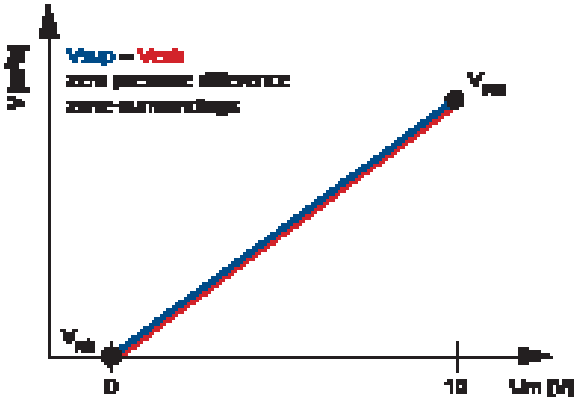
Size DN	øD (mm)	m (kg)	L (mm)	V_{min} (m^3/h) (Um = 0V, v = 0 m/s)	V_{max} (m^3/h) (Um = 10 V, v = 10 m/s)
80	78	1,15	260	0	172
100	98	1,27	260	0	272
125	123	1,49	260	0	428
140	138	1,60	260	0	538
160	158	1,73	260	0	706
180	178	1,87	260	0	896
200	198	2,00	260	0	1108
225	223	2,18	260	0	1406
250	248	2,68	260	0	1739
280	278	2,93	260	0	2185
315	313	3,21	260	0	2770
355	353	3,54	260	0	3523
400	398	3,91	260	0	4479
500	498	4,74	260	0	7012
630	623	5,80	260	0	10974

Tab. 1: Optima-RM table of dimensions and air volume range

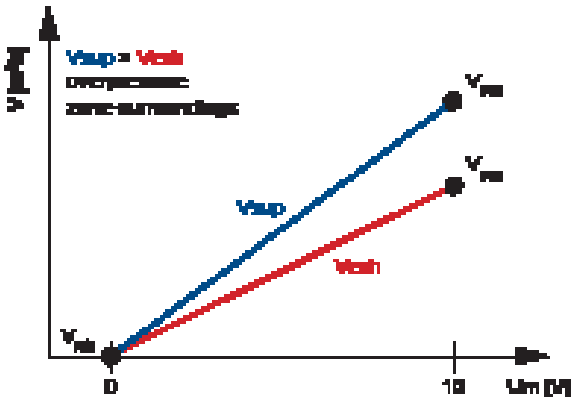
Accuracy :
0 - 20% of V_{max} air flow rate has an accuracy error rate of: ±25%
20 - 40% of V_{max} air flow rate has an accuracy error rate of: <±10%
40 - 100% of V_{max} air flow rate has an accuracy error rate of: <±4%

Control

The main function of Optima-RM is maintaining the overall parameters of air flow and pressure in the controlled zone - that means maintaining the desired proportion between the air flow on the air supply and on the air extract of the zone. The actual flow value measured on the zone air supply represents a sum of air flow in all branches in the zone - so their actual control position. The zone air extract flow value is controlled according to the flow value on the zone air supply. The signal of the flow measurement on the zone air supply is linked to the VAV controller on the zone extract as the desired air flow control value.



For the proportional control the basic parameters of the air flow measurement on the zone supply are identical with the basic parameters of the control at the zone extract and defined as follows:



Zone air supply:

Measuring transmitter Optima-RM

- Signal of the measured flow value DC 0 - 10 V
- Lower limit of measured flow Vmin = 0 % of measuring range (signal DC 0 V) corresponds to the flow velocity 0 m/s

- Upper limit of measured flow Vmax = 100 % of the measuring range (signal DC 10 V) corresponds to the flow velocity 10 m/s

Zone air exhaust:

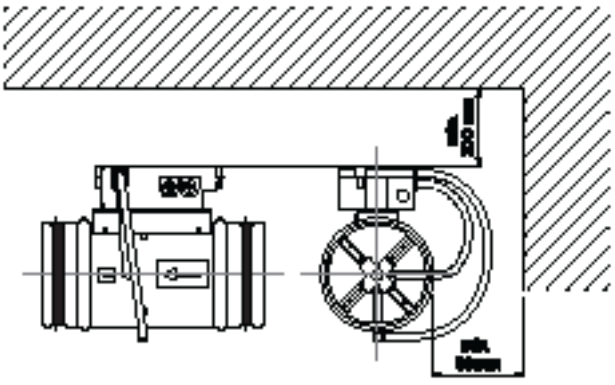
VAV controller Optima-R, Optima-R-GO (or other)

- Desired flow valiue signal DC 0 - 10 V
- Lower limit of flow control V_{min} = 0 % of the control
- range (signal DC 0 V) corresponds to flow velocity 0 m/s
- Upper limit of flow control V_{max} = 100 % of the control range (signal DC 10 V) corresponds to flow velocity 10 m/s

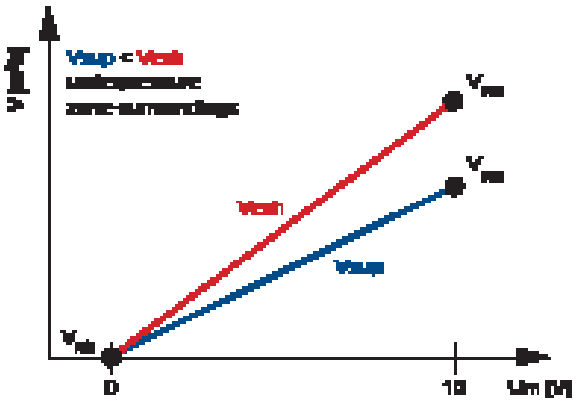
These are the factory settings regarding the use of Systemair products Optima-RM and Optima-R or Optima-R-GO with identical nominal sizes.
So for the chosen flow velocities the identical values of the air flow on supply and extract are achieved (Tab.1).
By adjusting the parameters of minimal and maximal air flow volume of the VAV-controller on the air extract it is possible to set the proportion supply/extract.
This generates zero pressure difference between zone and surroundings, overpreessure or underpressure.

Mounting

Measuring track length after Elbow or a T-branch etc. installations, L to be min. 3 times duct diameter. If L can not be respected, then minimum of 2 × diameter with perforated equalizing grid should be installed.



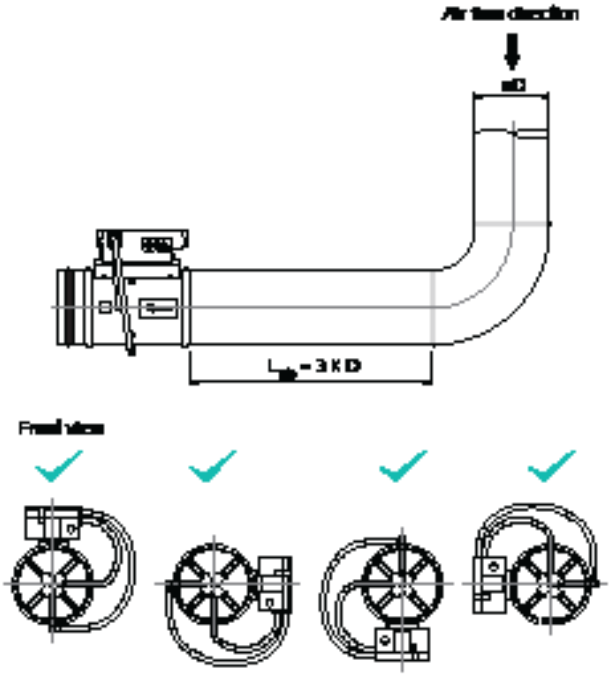
Optima-RM: Installation Min distance to parameter walls



Legend

Vsup	- Zone supply flow (measurement Optima-RM)
Vexh	- Zone extract flow (VAV control)

Settings for zone air flow ratio supply / extract



Optima-RM positioning and definition of measuring track length

Optima-RS

Single skin variable air volume unit round inlet and rectanglar oulet

Highlights:

- Damper tightness class 4 according to EN 1751
- Casing tightness class C according to EN 1751
- High measuring accuracy of 5% accuracy expanded
  10-20% of V_{max} air flow rate has an accuracy error rate of: ±25%
  20-40% of V_{max} air flow rate has an accuracy error rate of: <±10%
  40-100% of V_{max} air flow rate has an accuracy error rate of: <±4%
- Air volume range of 57 to 5881 m^3/h
- Operating range of up to 1500Pa
- 30 mm high density insulation with cleanable protection tissue cover

Function

Single skin round to square VAV terminal units is commonly used for supply air applications or for return air applications at low to medium system pressures. Optima-RS VAV terminal units are ideal for multizone control with supply and return in master and slave setup such as offices, hotel rooms or meeting rooms where the required cooling and heating load will vary on demand.

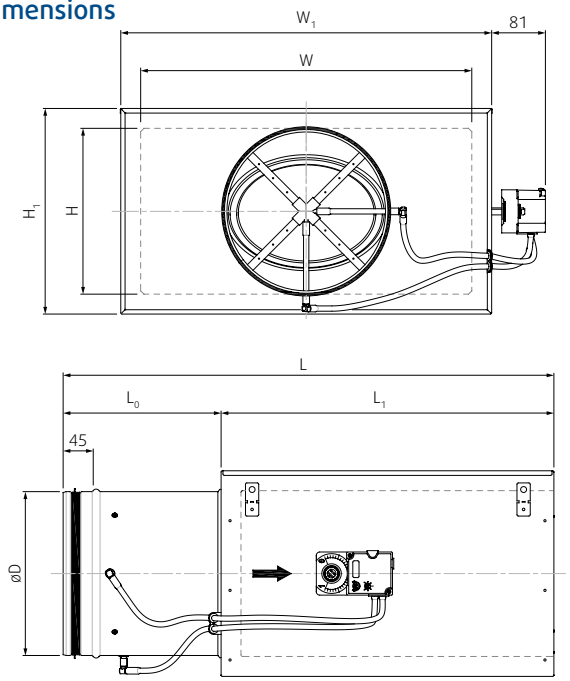
Design

VAV unit housing constructed of galvanized steel sheet, large surface pleated for extra stiffness. Internal thermal acoustic insulation of fibre glass material, dual density insulation cover tissue is used to protect the fiberglass insulation to protect the deterioration of the insulation for air speeds of 20-25m/s.
Acoustic insulation in the housing has aerodynamic flow for extra low sound level. Double skin low leakage damper with airtight neoprene gasket seal.
Special design of centre averaging multi-point airflow differential cross velocity pressure sensor assures an accurate air flow readings even in difficult installations. Button punch snap lock seams, lock form with airtight nylon bearings to assure low casing leakage.
Rectangular outlet with M8 riveted nuts, suited for connecting to duct flange. 12 mm aluminium shaft with nylon bearings

Available Sizes

Inlet: from ø 100 to ø 400 mm

Dimensions



Controls:

The VAV terminal units are as standard equipped with BLC (Belimo compact) controllers (LMV-D3 or NMV-D3) without any MP or LON communication capability to be used as stand alone or in master and slave setting.
The compact controllers are equally available with MP-Bus, ModBus and LON communication capability. On demand as alternative, Gateway communication units can be provided and can be connected later in time to building management systems to create a zone control by creating bus-rings solutions (only possible if MP-Bus communication is installed). VAV and Compact controllers are factory calibrated as standard to the air volume indicated in the table or upon request can be adjusted to site required settings prior to dispatch on Vmin and Vmax range. The air volumes can also be readjusted on site with ZTH-Gen hand held service tool. If specific air volumes for Vmin and Vmax would be required, this must be indicated prior to order of the units for adequate calibration in the factory.

BLC1= Belimo LMV-D3 compact controller WITH MP-Bus communication
BLC4= Belimo LMV-D3 compact controller WITHOUT MP-Bus communication
BLC1-MOD= Belimo LMV-D3 compact controller WITH MODBUS communication

Dimensions and Air Volume range

Code	Size	ØD (mm)	L (mm)	L0 (mm)	L1 (mm)	W (mm)	H (mm)	W1 (mm)	H1 (mm)	m (kg)	Air volume *(m³/h)		Air volume *(l/s)	
											V_{min}	V_{max}	V_{min}	V_{max}
Optim-RS-10-BLC_	100	98	450	149	303	200	200	260	260	5	57	368	16	102
Optim-RS-12-BLC_	125	123	450	149	303	200	200	260	260	5	88	574	25	160
Optim-RS-16-BLC_	160	158	600	200	403	250	200	310	260	7	145	941	40	261
Optim-RS-20-BLC_	200	198	700	200	503	400	200	460	260	10	226	1470	63	408
Optim-RS-25-BLC_	250	248	750	249	503	500	250	560	310	12	353	2297	98	638
Optim-RS-31-BLC_	315	313	950	249	703	600	350	660	410	19	561	3647	156	1013
Optim-RS-40-BLC_	400	398	950	249	703	700	400	760	460	25	905	5881	251	1634

* Note = Standard factory air volume setting if not indicated upon order

Accuracy:
10 - 20% of V_{max} air flow rate has an accuracy error rate of: ±25%
20 - 40% of V_{max} air flow rate has an accuracy error rate of: <±10%
40 - 100% of V_{max} air flow rate has an accuracy error rate of: <±4%

Ordering codes

Optima - Type - Size- Controller Type - V_{min} - V_{max}

- Type: RS
- Code 10 to 40 (ØD-100 to ØD-400mm)
- BLC4 / BLC1 / BLC1-MOD
- m³/h or l/s*
- m³/h or l/s*

*** Note:**

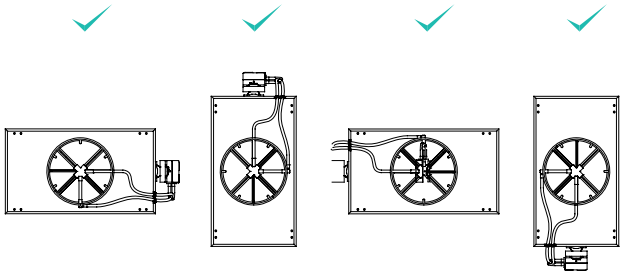
1. If the air volumes are not given during the ordering process, then standard Factory setting will be applied according to table
2. Vmin can also be set to 0m³/h if required by demand upon ordering
3. The standard input signal on the controller is set to 2-10V, upon request 0-10V can also be selected

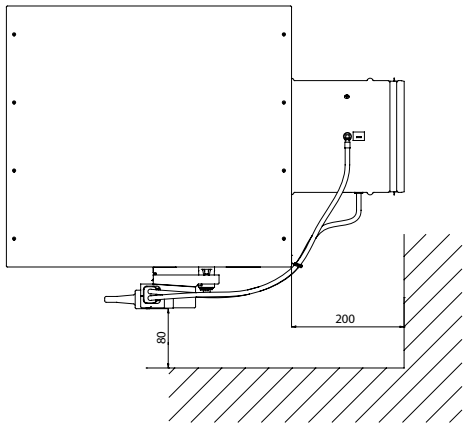
Ordering example:

OPTIMA-RS-25-353(m³/h)-2297(m³/h)-BLC4

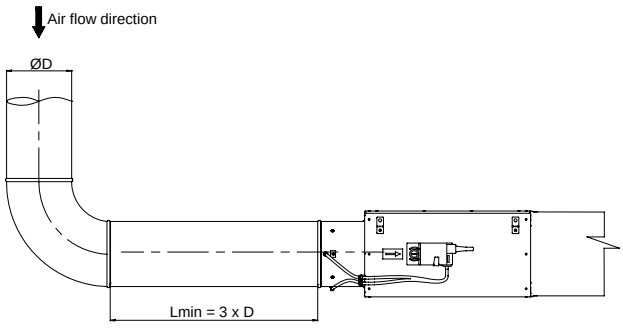
The above order example is set for V_{min} and V_{max} air volume setting for Ø250 with Belimo compact controller having NO comminucation capability.

Front View





Optima-RS-BLC_ installation Min distance to parameter walls



OPTIMA-RS Discharged sound power level

Optima RS	Discharged			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔPmin [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
100	8	28	1	24	25	31	26	21	18	16	13	28	31	32	38	32	28	24	23	20	35
	24	85	2	33	35	41	35	31	27	26	23	38	40	41	48	42	38	34	33	30	45
	39	141	6	38	39	45	40	35	32	30	27	42	45	46	52	46	42	38	37	34	49
	55	198	13	41	42	48	43	38	34	33	30	45	48	49	55	49	45	41	40	37	52
	79	283	26	44	45	51	46	41	38	36	33	48	51	52	58	52	48	44	43	40	55
125	12	44	1	26	27	33	27	23	19	18	15	30	32	34	40	34	30	26	25	22	37
	37	133	2	35	36	42	37	32	28	27	24	39	42	43	49	43	39	35	34	31	46
	61	221	6	39	40	47	41	37	33	32	29	43	46	47	53	48	44	40	39	35	50
	86	309	11	42	43	49	44	40	36	35	31	46	49	50	56	51	46	43	41	38	53
	123	442	23	45	46	52	47	43	39	38	34	49	52	53	59	54	50	46	44	41	56
160	20	72	1	27	28	35	29	25	21	20	17	31	34	35	42	36	32	28	27	24	39
	60	217	2	36	37	44	38	34	30	29	26	41	43	44	51	45	41	37	36	33	48
	101	362	5	40	42	48	42	38	34	33	30	45	47	49	55	49	45	41	40	37	52
	141	507	10	43	44	51	45	41	37	36	33	47	50	51	58	52	48	44	43	40	55
	201	724	21	46	47	53	48	44	40	39	35	50	53	54	61	55	51	47	46	42	57
200	31	113	1	28	30	36	30	26	22	21	18	33	36	37	43	37	33	29	28	25	40
	94	339	2	37	38	45	39	35	31	30	27	42	44	45	52	46	42	38	37	34	49
	157	565	5	41	42	49	43	39	35	34	31	46	48	50	56	50	46	42	41	38	53
	220	792	9	44	45	51	46	42	38	36	33	48	51	52	59	53	49	45	44	40	55
	314	1131	19	47	48	54	49	44	40	39	36	51	54	55	61	56	52	48	46	43	58
250	49	177	1	30	31	37	31	27	23	22	19	34	37	38	44	38	34	30	29	26	41
	147	530	2	38	39	45	40	36	32	30	27	42	45	46	53	47	43	39	38	35	50
	245	884	4	42	43	49	44	40	36	34	31	46	49	50	57	51	47	43	42	39	54
	344	1237	8	45	46	52	46	42	38	37	34	49	52	53	59	54	49	45	44	41	56
	491	1767	17	47	48	55	49	45	41	40	37	52	55	56	62	56	52	48	47	44	59
315	78	281	1	30	31	38	32	28	24	23	20	35	38	39	45	39	35	31	30	27	42
	234	842	1	39	40	46	40	36	32	31	28	43	46	47	53	48	44	40	38	35	50
	390	1403	4	42	44	50	44	40	36	35	32	47	50	51	57	52	47	43	42	39	54
	546	1964	7	45	46	52	47	43	39	37	34	49	52	54	60	54	50	46	45	42	57
	779	2806	15	48	49	55	49	45	41	40	37	52	55	56	62	57	53	49	48	44	59
400	126	452	1	31	32	38	33	29	25	23	20	35	39	40	46	40	36	32	31	28	43
	377	1357	1	39	40	46	41	37	33	31	28	43	47	48	54	48	44	40	39	36	51
	628	2262	3	43	44	50	44	40	36	35	32	47	50	51	58	52	48	44	43	40	55
	880	3167	7	45	46	53	47	43	39	38	35	49	53	54	60	54	50	46	45	42	57
	1257	4524	14	48	49	55	49	45	41	40	37	52	55	56	63	57	53	49	48	45	60

OPTIMA-RS Discharged sound power level

Optima RS	Discharged			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	ΔPmin [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
100	8	28	1	37	39	45	39	35	31	30	27	42	41	43	49	43	39	35	34	31	46
	24	85	2	47	48	54	49	45	41	39	36	51	51	52	58	53	48	45	43	40	55
	39	141	6	51	53	59	53	49	45	44	41	56	55	57	63	57	53	49	48	45	60
	55	198	13	54	55	62	56	52	48	47	44	59	58	59	66	60	56	52	51	48	63
	79	283	26	58	59	65	59	55	51	50	47	62	61	63	69	63	59	55	54	51	66
125	12	44	1	39	40	47	41	37	33	32	29	44	43	45	51	45	41	37	36	33	48
	37	133	2	49	50	56	50	46	42	41	38	53	53	54	60	54	50	46	45	42	57
	61	221	6	53	54	60	55	51	47	45	42	57	57	58	64	59	55	51	50	46	61
	86	309	11	56	57	63	58	53	49	48	45	60	60	61	67	62	57	54	52	49	64
	123	442	23	59	60	66	61	56	52	51	48	63	63	64	70	65	60	57	55	52	67
160	20	72	1	41	42	49	43	39	35	34	31	46	45	46	53	47	43	39	38	35	50
	60	217	2	50	51	58	52	48	44	43	40	55	54	56	62	56	52	48	47	44	59
	101	362	5	55	56	62	56	52	48	47	44	59	59	60	66	60	56	52	51	48	63
	141	507	10	57	58	65	59	55	51	50	47	62	61	62	69	63	59	55	54	51	66
	201	724	21	60	61	68	62	58	54	53	50	64	64	65	72	66	62	58	57	54	69
200	31	113	1	43	44	50	44	40	36	35	32	47	47	48	54	49	44	41	39	36	51
	94	339	2	52	53	59	53	49	45	44	41	56	56	57	63	57	53	49	48	45	60
	157	565	5	56	57	63	57	53	49	48	45	60	60	61	67	61	57	53	52	49	64
	220	792	9	58	59	66	60	56	52	51	48	63	63	64	70	64	60	56	55	52	67
	314	1131	19	61	62	69	63	59	55	54	50	65	65	66	73	67	63	59	58	55	70
250	49	177	1	44	45	51	46	42	38	37	33	48	48	49	56	50	46	42	41	38	53
	147	530	2	53	54	60	54	50	46	45	42	57	57	58	64	59	54	50	49	46	61
	245	884	4	57	58	64	58	54	50	49	46	61	61	62	68	62	58	54	53	50	65
	344	1237	8	59	60	67	61	57	53	52	48	63	63	65	71	65	61	57	56	53	68
	491	1767	17	62	63	69	64	59	56	54	51	66	66	67	74	68	64	60	59	56	70
315	78	281	1	45	46	53	47	43	39	38	35	49	50	51	57	51	47	43	42	39	54
	234	842	1	53	55	61	55	51	47	46	43	58	58	59	65	59	55	51	50	47	62
	390	1403	4	57	58	65	59	55	51	50	47	62	62	63	69	63	59	55	54	51	66
	546	1964	7	60	61	67	61	57	53	52	49	64	64	65	71	66	62	58	57	53	68
	779	2806	15	63	64	70	64	60	56	55	52	67	67	68	74	69	64	60	59	56	71
400	126	452	1	46	47	53	48	44	40	39	35	50	51	52	58	52	48	44	43	40	55
	377	1357	1	54	55	61	56	52	48	47	43	58	59	60	66	60	56	52	51	48	63
	628	2262	3	58	59	65	59	55	51	50	47	62	62	63	70	64	60	56	55	52	67
	880	3167	7	60	61	68	62	58	54	53	50	65	65	66	72	66	62	58	57	54	69
	1257	4524	14	63	64	70	65	60	56	55	52	67	67	68	75	69	65	61	60	57	72

OPTIMA-RS Radiated sound levels

Optima RS	Radiated			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔPmin [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
100	8	28	1	20	27	22	10	<5	<5	<5	<5	14	23	30	25	14	<5	<5	<5	<5	18
	24	85	2	34	41	36	25	12	4	3	7	29	37	45	39	28	15	7	6	10	32
	39	141	6	41	48	43	31	19	11	10	14	35	44	51	46	35	22	14	13	17	38
	55	198	13	45	52	47	36	23	15	14	18	40	48	56	50	39	26	18	18	21	43
	79	283	26	50	57	52	40	28	20	19	23	44	53	60	55	44	31	23	22	26	47
125	12	44	1	23	30	25	13	<5	<5	<5	<5	17	27	34	28	17	<5	<5	<5	<5	21
	37	133	2	36	43	38	27	14	6	5	9	31	40	47	42	31	18	10	9	13	35
	61	221	6	42	50	44	33	20	12	12	15	37	46	54	48	37	24	16	15	19	41
	86	309	11	46	54	48	37	24	17	16	20	41	50	58	52	41	28	20	20	23	45
	123	442	23	51	58	53	41	29	21	20	24	45	55	62	57	45	33	25	24	28	49
160	20	72	1	25	32	27	16	<5	<5	<5	<5	20	30	37	32	20	8	<5	<5	<5	24
	60	217	2	37	45	39	28	15	8	7	11	32	42	49	44	33	20	12	11	15	37
	101	362	5	43	50	45	34	21	13	12	16	38	48	55	50	39	26	18	17	21	43
	141	507	10	47	54	49	38	25	17	16	20	42	52	59	54	42	30	22	21	25	46
	201	724	21	51	58	53	42	29	21	20	24	46	56	63	58	46	34	26	25	29	50
200	31	113	1	26	34	28	17	<5	<5	<5	<5	21	32	39	34	22	10	<5	<5	5	26
	94	339	2	38	45	40	29	16	8	7	11	32	43	51	45	34	21	13	13	17	38
	157	565	5	43	51	45	34	21	13	12	16	38	49	56	51	39	27	19	18	22	43
	220	792	9	47	54	49	37	25	17	16	20	41	52	60	54	43	30	22	22	25	47
	314	1131	19	51	58	52	41	28	21	20	24	45	56	63	58	47	34	26	25	29	51
250	49	177	1	27	34	29	18	5	<5	<5	<5	22	33	41	35	24	11	<5	<5	6	28
	147	530	2	38	45	39	28	16	8	7	11	32	44	51	46	34	22	14	13	17	38
	245	884	4	43	50	44	33	20	13	12	16	37	49	56	51	39	27	19	18	22	43
	344	1237	8	46	53	48	36	24	16	15	19	40	52	59	54	43	30	22	21	25	47
	491	1767	17	49	57	51	40	27	19	19	22	44	56	63	57	46	33	26	25	29	50
315	78	281	1	27	34	29	17	5	<5	<5	<5	21	34	41	36	25	12	<5	<5	7	28
	234	842	1	37	44	38	27	15	7	6	10	31	44	51	45	34	22	14	13	17	38
	390	1403	4	41	48	43	32	19	11	10	14	36	48	55	50	39	26	18	17	21	43
	546	1964	7	44	51	46	35	22	14	13	17	39	51	58	53	42	29	21	20	24	46
	779	2806	15	47	55	49	38	25	17	16	20	42	54	62	56	45	32	24	23	27	49
400	126	452	1	26	33	28	17	<5	<5	<5	<5	21	34	41	36	24	12	<5	<5	7	28
	377	1357	1	35	42	37	25	13	<5	<5	8	29	43	50	44	33	20	13	12	16	37
	628	2262	3	39	46	41	29	17	9	8	12	33	47	54	48	37	25	17	16	20	41
	880	3167	7	41	49	43	32	19	12	11	15	36	49	57	51	40	27	19	19	22	44
	1257	4524	14	44	52	46	35	22	14	14	17	39	52	59	54	43	30	22	21	25	47

OPTIMA-RS Radiated sound levels

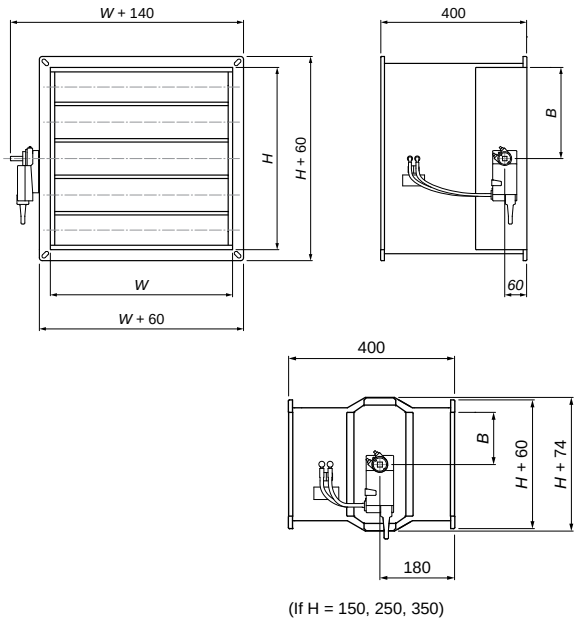
Optima RS	Radiated			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔPmin [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
100	8	28	1	16	17	24	18	14	10	9	6	21	18	19	26	20	16	12	11	8	23
	24	85	2	31	32	38	32	28	24	23	20	35	33	34	40	34	30	26	25	22	37
	39	141	6	37	38	45	39	35	31	30	27	42	39	40	47	41	37	33	32	29	43
	55	198	13	42	43	49	43	39	35	34	31	46	44	45	51	45	41	37	36	33	48
	79	283	26	46	47	54	48	44	40	39	36	51	48	49	56	50	46	42	41	38	52
125	12	44	1	21	22	28	22	18	14	13	10	25	23	24	30	25	21	17	16	12	27
	37	133	2	34	35	42	36	32	28	27	24	38	36	38	44	38	34	30	29	26	41
	61	221	6	40	42	48	42	38	34	33	30	45	43	44	50	44	40	36	35	32	47
	86	309	11	45	46	52	46	42	38	37	34	49	47	48	54	49	44	40	39	36	51
	123	442	23	49	50	56	51	46	43	41	38	53	51	52	59	53	49	45	44	41	55
160	20	72	1	25	26	32	26	22	18	17	14	29	28	29	35	29	25	21	20	17	32
	60	217	2	37	38	45	39	35	31	30	27	41	40	41	47	42	38	34	32	29	44
	101	362	5	43	44	50	45	41	37	35	32	47	46	47	53	47	43	39	38	35	50
	141	507	10	47	48	54	48	44	40	39	36	51	50	51	57	51	47	43	42	39	54
	201	724	21	51	52	58	53	48	44	43	40	55	54	55	61	55	51	47	46	43	58
200	31	113	1	28	29	35	29	25	21	20	17	32	31	32	38	33	28	24	23	20	35
	94	339	2	39	40	47	41	37	33	32	29	43	42	44	50	44	40	36	35	32	47
	157	565	5	45	46	52	46	42	38	37	34	49	48	49	55	49	45	41	40	37	52
	220	792	9	48	49	55	50	46	42	41	37	52	51	52	59	53	49	45	44	41	56
	314	1131	19	52	53	59	53	49	45	44	41	56	55	56	62	57	53	49	47	44	59
250	49	177	1	30	31	37	31	27	23	22	19	34	33	35	41	35	31	27	26	23	38
	147	530	2	40	42	48	42	38	34	33	30	45	44	45	51	46	42	38	37	33	48
	245	884	4	45	46	53	47	43	39	38	35	50	49	50	56	51	47	43	41	38	53
	344	1237	8	49	50	56	50	46	42	41	38	53	52	53	60	54	50	46	45	42	57
	491	1767	17	52	53	59	54	50	46	45	41	56	56	57	63	57	53	49	48	45	60
315	78	281	1	31	32	39	33	29	25	24	21	36	35	36	43	37	33	29	28	25	40
	234	842	1	41	42	48	43	38	35	33	30	45	45	46	52	47	43	39	38	34	49
	390	1403	4	45	47	53	47	43	39	38	35	50	50	51	57	51	47	43	42	39	54
	546	1964	7	48	50	56	50	46	42	41	38	53	53	54	60	54	50	46	45	42	57
	779	2806	15	52	53	59	53	49	45	44	41	56	56	57	63	57	53	49	48	45	60
400	126	452	1	32	33	39	34	29	26	24	21	36	37	38	44	38	34	30	29	26	41
	377	1357	1	41	42	48	42	38	34	33	30	45	45	46	53	47	43	39	38	35	50
	628	2262	3	45	46	52	46	42	38	37	34	49	49	50	57	51	47	43	42	39	54
	880	3167	7	47	49	55	49	45	41	40	37	52	52	53	59	54	50	46	44	41	56
	1257	4524	14	50	51	58	52	48	44	43	40	55	55	56	62	57	52	48	47	44	59

Optima-S

Single skin rectangular VAV units

Highlights:

- Damper tightness class 3 according to EN 1751
- Casing tightness class C according to EN 1751
- High measuring accuracy of:
  10-20% Of nominal air flow rate has an accuracy error rate of ±25%
  20-40% av nominell: <±10%
  40-100% av nominell: <±4% 5%
- Air volume range of 144 to 56160 m³/h
- Operating range of up to 1000Pa



(If H = 150, 250, 350)

Function

Single skin rectangular or square VAV terminal units is commonly used for supply air applications or for return air applications at low to medium system pressures. Optima-S VAV terminal units are ideal for multi-zone control with supply and return in Master and Slave setup such as offices, hotel rooms or meeting rooms where the required cooling and heating load will vary on demand.

Design

Optima-S units are constructed from sheet steel frame and blades. The frame construction contains a robust mounting frame to assure the sturdiness of the unit and to facilitate the mounting to upstream and downstream ducts.

The aerofoil blades are opposed action and are constructed from extruded aluminium and enforce corrosion-free throughout the blade to add rigidity and reduce the pressure loss and sound levels which may be contributed to airflow stream passing over the blades. The blade axe are sitting in self lubricating bearings which are connected together by a gear wheel to assure a smooth ratio and transition from blade to blade.

Available Sizes

200 x 100mm to 1200 x 1000mm with steps of 50mm in height and length

Controls

The VAV terminal units are as standard equipped with BLC (Belimo compact) controllers (LMV-D3 or NMV-D3) without any MP or LON communication capability to be used as stand alone or in master and slave setting.
The compact controllers are equally available with MP-Bus, ModBus and LON communication capability. On demand as alternative, Gateway communication units can be provided and can be connected later in time to building management systems to create a zone control by creating bus-rings solutions (only possible if MP-Bus communication is installed).

VAV and Compact controllers are factory calibrated as standard to the air volume indicated in the table or upon request can be adjusted to site required settings prior to dispatch on Vmin and Vmax range. The air volumes can also be readjusted on site with ZTH-Gen hand held service tool. If specific air volumes for Vmin and Vmax would be required, this must be indicated prior to order of the units for adequate calibration in the factory.

BLC1= Belimo LMV-D3 compact controller WITH MP-Bus communication

BLC4 = Belimo LMV-D3 compact controller WITHOUT MP-Bus communication

BLC1-MOD = Belimo LMV-D3 compact controller WITH MODBUS communication

GO = Gruner compact controller type WTHOUT communication

GO-MPD = Gruner compact controller type with MODBUS communication

Mounting

On duct installations after elbow, reduction, T-branch etc. L to be min. 3 times duct equivalent effective diameter (D_{eff}).
If L can not be respected, then minimum of 2 × D_{eff} with perforated equalizing grid should be installed

$$D_{eff} = \frac{2 \times W \times H}{W + H}$$

$$L_{min} = 3 \times D_{eff}$$

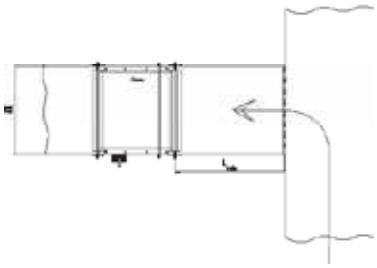


Fig. 1: Measuring track length after T-branch

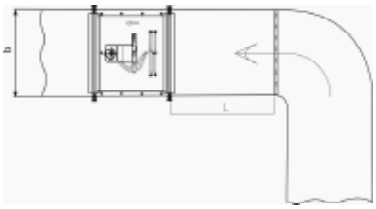


Fig. 2: Measuring track length after Elbow

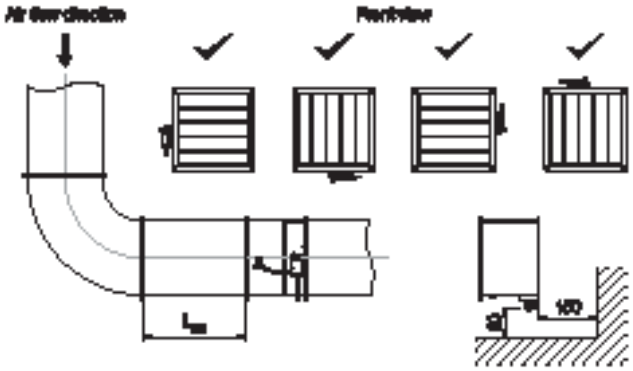


Fig. 3: Optima-S positioning and definition of measuring track length

NOTE:
A proper flange fixing method (e.g. flange clamps) and gasket shall be used by installer to maintain the corresponding tightness class.

Dimensions

H \ W	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
100	2	2	3	4	4	5	5	6	6												
150	4	5	5	6	6	6	7	7	8	9											
200	6	7	7	8	8	8	9	9	10	10	10	11	11	12	12						
250		7	7	9	9	9	9	9	10	10	11	12	12	13	14	14					
300		3C	8	9	10	9	9	10	10	11	12	13	14	15	19	19	21	21	22		
350			9	10	11	10	10	10	11	12	13	14	15	17	19	20	22	22	24	25	
400			Tightness class		12	12	11	11	12	13	14	15	17	19	20	23	25	26	27	28	29
450		4C				12	13	13	13	14	16	17	19	21	21	24	26	27	28	29	30
500							15	14	15	16	18	19	21	22	23	25	28	29	30	31	32
550								16	17	18	20	21	22	24	24	26	29	30	31	32	34
600									19	20	21	22	24	25	25	27	30	32	33	34	36
650										22	23	24	25	27	27	29	32	33	35	36	38
700											25	26	27	29	29	31	34	35	37	38	40
750												27	29	30	31	33	36	37	38	40	42
800													30	31	32	34	37	38	40	42	43
850														32	34	35	38	39	41	43	45
900															35	37	40	41	43	45	47
950																39	41	43	45	47	49
1000																	43	45	47	49	50

Tab. 2: OPTIMA-S table of weight

Tab. 3: OPTIMA-S-I table of weight

***m* (kg)**	5 Nm drive	✓	OPTIMA-S	✓	OPTIMA-S-GO
***m* (kg)**	10 Nm drive	✓	OPTIMA-S	✓	OPTIMA-S-GO
***m* (kg)**	20 Nm drive	✓	OPTIMA-S	×	OPTIMA-S-GO

Accessories

Silencers are available to reduce the discharge sound power levels when required. Multi-outlet insulated terminal units are available when multi-zone application is required.

Ordering codes

Optima - Type - Size- Controller Type - V_{min} - V_{max}

Type S

L x H
200x100 to 1200x 1000 (mm)

BLC1
BLC4
BLC1-MOD

m^3/h or l/s*

m^3/h or l/s*

*** Note:**

1. If the air volumes are not given during the ordering process, then standard Factory setting will be applied according to table

Ordering example:

OPTIMA-S-600x300-BLC1-1500(m^3/h)-5000(m^3/h)
The above order example is set for Vmin and Vmax air volume setting for size 600x300 with Belimo compact controller having MP Bus comminucation capability.

BLC1 controller is a compact controller with MP-Bus communication
BLC1-MOD is controller with builtin ModBus comminucation
BLC4 controller is a standalone controller without any communication

Optima-S Table of dimensions and weight

W	H	B	G
mm	mm	mm	kg
200	200	140	6
300			7
400			9
500			10
600			12
700			14
800			15
900			17
1000			18
1100			19
1200			21
200	300	51	7
300			8
400			10
500			12
600			14
700			16
800			17
900			19
1000			21
1100			22
1200			24
200	400	201	8
300			10
400			12
500			14
600			16
700			18
800			20
900			22
1000			25
1100			27
1200			29

W	H	B	G
mm	mm	mm	kg
200	500	290	8
300			11
400			13
500			15
600			18
700			20
800			22
900			25
1000			28
1100			30
1200			32
200	600	301	9
300			12
400			14
500			17
600			19
700			22
800			25
900			27
1000			30
1100			33
1200			36
200	700	390	10
300			13
400			16
500			19
600			22
700			25
800			28
900			30
1000			34
1100			37
1200			40

W	H	B	G
mm	mm	mm	kg
200	800	440	11
300			14
400			17
500			20
600			24
700			27
800			30
900			33
1000			37
1100			40
1200			43
200	900	451	12
300			15
400			19
500			22
600			25
700			29
800			32
900			35
1000			40
1100			43
1200			47
200	1000	540	13
300			16
400			20
500			23
600			27
700			31
800			34
900			38
1000			43
1100			47
1200			50

Optima-S Quick selection table

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
200	100	144	40	936	260
	150	216	60	1404	390
	200	288	80	1872	520
250	100	180	50	1170	325
	150	270	75	1755	488
	200	360	100	2340	650
	250	450	125	2925	813
300	100	216	60	1404	390
	150	324	90	2106	585
	200	432	120	2808	780
	250	540	150	3510	975
	300	648	180	4212	1170
	350	756	210	4914	1365
350	100	252	70	1638	455
	150	378	105	2457	683
	200	504	140	3276	910
	250	630	175	4095	1138
	300	756	210	4914	1365
	350	882	245	5733	1593
400	100	288	80	1872	520
	150	432	120	2808	780
	200	576	160	3744	1040
	250	720	200	4680	1300
	300	864	240	5616	1560
	350	1008	280	6552	1820
	400	1152	320	7488	2080
450	100	324	90	2106	585
	150	486	135	3159	878
	200	648	180	4212	1170
	250	810	225	5265	1463
	300	972	270	6318	1755
	350	1134	315	7371	2048
	400	1296	360	8424	2340
	450	1458	405	9477	2633
500	100	360	100	2340	650
	150	540	150	3510	975
	200	720	200	4680	1300
	250	900	250	5850	1625
	300	1080	300	7020	1950
	350	1260	350	8190	2275
	400	1440	400	9360	2600
	450	1620	450	10530	2925
	500	1800	500	11700	3250

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
550	100	396	110	2574	715
	150	594	165	3861	1073
	200	792	220	5148	1430
	250	990	275	6435	1788
	300	1188	330	7722	2145
	350	1386	385	9009	2503
	400	1584	440	10296	2860
	450	1782	495	11583	3218
	500	1980	550	12870	3575
	550	2178	605	14157	3933
600	100	432	120	2808	780
	150	648	180	4212	1170
	200	864	240	5616	1560
	250	1080	300	7020	1950
	300	1296	360	8424	2340
	350	1512	420	9828	2730
	400	1728	480	11232	3120
	450	1944	540	12636	3510
	500	2160	600	14040	3900
	550	2376	660	15444	4290
	600	2592	720	16848	4680
650	150	702	195	4563	1268
	200	936	260	6084	1690
	250	1170	325	7605	2113
	300	1404	390	9126	2535
	350	1638	455	10647	2958
	400	1872	520	12168	3380
	450	2106	585	13689	3803
	500	2340	650	15210	4225
	550	2574	715	16731	4648
	600	2808	780	18252	5070
	650	3042	845	19773	5493
700	200	1008	280	6552	1820
	250	1260	350	8190	2275
	300	1512	420	9828	2730
	350	1764	490	11466	3185
	400	2016	560	13104	3640
	450	2268	630	14742	4095
	500	2520	700	16380	4550
	550	2772	770	18018	5005
	600	3024	840	19656	5460
	650	3276	910	21294	5915
	700	3528	980	22932	6370

10 - 20% Of Vmax air flow rate has an accuracy error rate of: ±25%
20 - 40% Of Vmax air flow rate has an accuracy error rate of: <±10%
40 - 100% Of Vmax air flow rate has an accuracy error rate of: <±4%

Optima-S Quick selection table

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
750	200	1080	300	7020	1950
	250	1350	375	8775	2438
	300	1620	450	10530	2925
	350	1890	525	12285	3413
	400	2160	600	14040	3900
	450	2430	675	15795	4388
	500	2700	750	17550	4875
	550	2970	825	19305	5363
	600	3240	900	21060	5850
	650	3510	975	22815	6338
	700	3780	1050	24570	6825
	750	4050	1125	26325	7313
800	200	1152	320	7488	2080
	250	1440	400	9360	2600
	300	1728	480	11232	3120
	350	2016	560	13104	3640
	400	2304	640	14976	4160
	450	2592	720	16848	4680
	500	2880	800	18720	5200
	550	3168	880	20592	5720
	600	3456	960	22464	6240
	650	3744	1040	24336	6760
	700	4032	1120	26208	7280
	750	4320	1200	28080	7800
	800	4608	1280	29952	8320
850	200	1224	340	7956	2210
	250	1530	425	9945	2763
	300	1836	510	11934	3315
	350	2142	595	13923	3868
	400	2448	680	15912	4420
	450	2754	765	17901	4973
	500	3060	850	19890	5525
	550	3366	935	21879	6078
	600	3672	1020	23868	6630
	650	3978	1105	25857	7183
	700	4284	1190	27846	7735
	750	4590	1275	29835	8288
	800	4896	1360	31824	8840
	850	5202	1445	33813	9393
900	200	1296	360	8424	2340
	250	1620	450	10530	2925
	300	1944	540	12636	3510

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
900	350	2268	630	14742	4095
	400	2592	720	16848	4680
	450	2916	810	18954	5265
	500	3240	900	21060	5850
	550	3564	990	23166	6435
	600	3888	1080	25272	7020
	650	4212	1170	27378	7605
	700	4536	1260	29484	8190
	750	4860	1350	31590	8775
	800	5184	1440	33696	9360
	850	5508	1530	35802	9945
	900	5832	1620	37908	10530
950	250	1710	475	11115	3088
	300	2052	570	13338	3705
	350	2394	665	15561	4323
	400	2736	760	17784	4940
	450	3078	855	20007	5558
	500	3420	950	22230	6175
	550	3762	1045	24453	6793
	600	4104	1140	26676	7410
	650	4446	1235	28899	8028
	700	4788	1330	31122	8645
	750	5130	1425	33345	9263
	800	5472	1520	35568	9880
	850	5814	1615	37791	10498
	900	6156	1710	40014	11115
	950	6498	1805	42237	11733
1000	300	2160	600	14040	3900
	350	2520	700	16380	4550
	400	2880	800	18720	5200
	450	3240	900	21060	5850
	500	3600	1000	23400	6500
	550	3960	1100	25740	7150
	600	4320	1200	28080	7800
	650	4680	1300	30420	8450
	700	5040	1400	32760	9100
	750	5400	1500	35100	9750
	800	5760	1600	37440	10400
	850	6120	1700	39780	11050
	900	6480	1800	42120	11700
	950	6840	1900	44460	12350
	1000	7200	2000	46800	13000

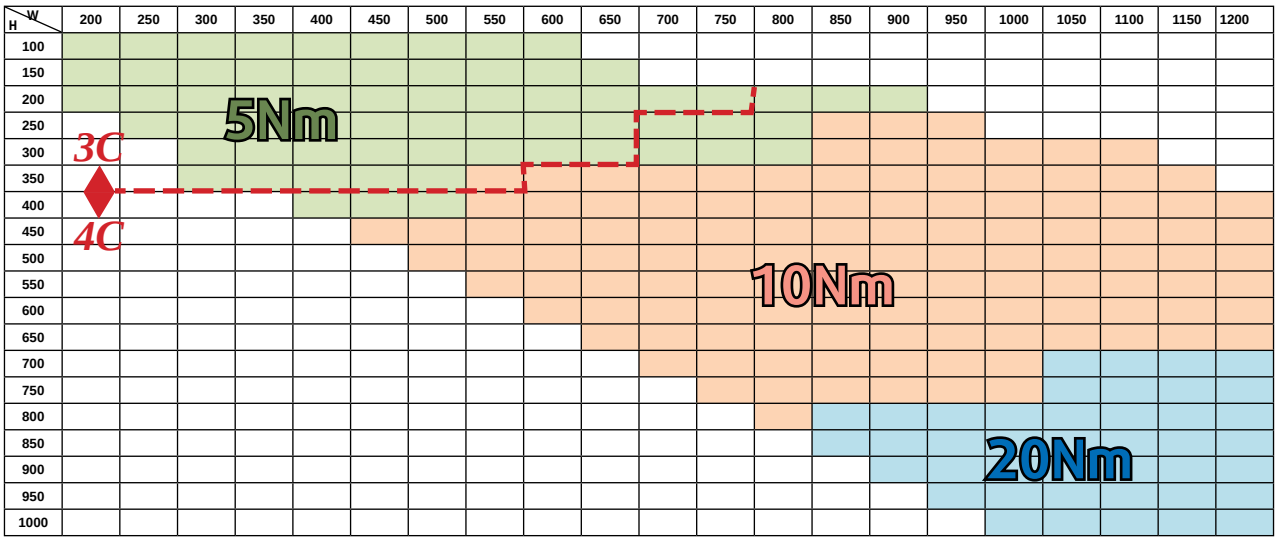
10 - 20% Of Vmax air flow rate has an accuracy error rate of: ±25%
20 - 40% Of Vmax air flow rate has an accuracy error rate of: <±10%
40 - 100% Of Vmax air flow rate has an accuracy error rate of: <±4%

Optima-S Quick selection table

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
1050	300	2268	630	14742	4095
	350	2646	735	17199	4778
	400	3024	840	19656	5460
	450	3402	945	22113	6143
	500	3780	1050	24570	6825
	550	4158	1155	27027	7508
	600	4536	1260	29484	8190
	650	4914	1365	31941	8873
	700	5292	1470	34398	9555
	750	5670	1575	36855	10238
	800	6048	1680	39312	10920
	850	6426	1785	41769	11603
	900	6804	1890	44226	12285
	950	7182	1995	46683	12968
	1000	7560	2100	49140	13650
1100	300	2376	660	15444	4290
	350	2772	770	18018	5005
	400	3168	880	20592	5720
	450	3564	990	23166	6435
	500	3960	1100	25740	7150
	550	4356	1210	28314	7865
	600	4752	1320	30888	8580
	650	5148	1430	33462	9295
	700	5544	1540	36036	10010
	750	5940	1650	38610	10725
	800	6336	1760	41184	11440
	850	6732	1870	43758	12155
	900	7128	1980	46332	12870
	950	7524	2090	48906	13585
	1000	7920	2200	51480	14300

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
1150	350	2898	805	18837	5233
	400	3312	920	21528	5980
	450	3726	1035	24219	6728
	500	4140	1150	26910	7475
	550	4554	1265	29601	8223
	600	4968	1380	32292	8970
	650	5382	1495	34983	9718
	700	5796	1610	37674	10465
	750	6210	1725	40365	11213
	800	6624	1840	43056	11960
	850	7038	1955	45747	12708
	900	7452	2070	48438	13455
	950	7866	2185	51129	14203
	1000	8280	2300	53820	14950
1200	400	3456	960	22464	6240
	450	3888	1080	25272	7020
	500	4320	1200	28080	7800
	550	4752	1320	30888	8580
	600	5184	1440	33696	9360
	650	5616	1560	36504	10140
	700	6048	1680	39312	10920
	750	6480	1800	42120	11700
	800	6912	1920	44928	12480
	850	7344	2040	47736	13260
	900	7776	2160	50544	14040
	950	8208	2280	53352	14820
	1000	8640	2400	56160	15600

Note :
value V_{min} = 0 can be always adjusted
value V_{max} can be adjusted also deside the standard range upon an agreement with the producer



OPTIMA-S Discharge Low Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
200x100	40	144	2	36	37	41	40	42	39	31	26	45	44	45	49	48	50	47	39	34	53
	260	936	81	47	49	53	51	53	50	42	38	57	55	57	61	59	61	58	50	46	65
200x150	60	216	2	36	37	41	40	42	39	31	26	45	44	46	49	48	50	47	39	34	53
	390	1404	90	47	49	53	51	53	50	43	38	57	55	57	61	59	61	59	51	46	65
200x200	80	288	2	36	38	41	40	42	39	31	26	45	44	46	49	48	50	47	39	34	54
	520	1872	97	47	49	53	52	54	51	43	38	57	55	57	61	60	62	59	51	46	65
250x100	50	180	2	36	37	41	40	42	39	31	26	45	44	45	49	48	50	47	39	34	53
	325	1170	86	47	49	53	51	53	50	43	38	57	55	57	61	59	61	58	51	46	65
250x150	75	270	2	36	38	41	40	42	39	31	26	45	44	46	49	48	50	47	39	34	53
	488	1755	95	47	49	53	52	54	51	43	38	57	55	57	61	60	62	59	51	46	65
250x200	100	360	2	36	38	41	40	42	39	31	26	46	44	46	49	48	50	47	39	34	54
	650	2340	103	48	49	53	52	54	51	43	38	57	56	57	61	60	62	59	51	46	65
250x250	125	450	3	36	38	41	40	42	39	31	26	46	44	46	50	48	50	47	39	35	54
	813	2925	109	48	50	53	52	54	51	43	38	57	56	58	61	60	62	59	51	46	66
300x100	60	216	2	36	37	41	40	42	39	31	26	45	44	46	49	48	50	47	39	34	53
	390	1404	90	47	49	53	51	53	50	43	38	57	55	57	61	59	61	59	51	46	65
300x150	90	324	2	36	38	41	40	42	39	31	26	46	44	46	49	48	50	47	39	34	54
	585	2106	100	48	49	53	52	54	51	43	38	57	56	57	61	60	62	59	51	46	65
300x200	120	432	3	36	38	41	40	42	39	31	26	46	44	46	49	48	50	47	39	35	54
	780	2808	108	48	50	53	52	54	51	43	38	57	56	58	61	60	62	59	51	46	65
300x250	150	540	3	36	38	42	40	42	39	31	27	46	44	46	50	48	50	47	39	35	54
	975	3510	113	48	50	53	52	54	51	43	38	58	56	58	61	60	62	59	51	46	66
300x300	180	648	3	36	38	42	40	42	39	31	27	46	44	46	50	48	50	47	40	35	54
	1170	4212	116	48	50	53	52	54	51	43	39	58	56	58	62	60	62	59	51	47	66
300x350	210	756	3	36	38	42	40	42	39	32	27	46	44	46	50	49	50	48	40	35	54
	1365	4914	117	48	50	54	52	54	51	43	39	58	56	58	62	60	62	59	52	47	66
350x100	70	252	2	36	38	41	40	42	39	31	26	45	44	46	49	48	50	47	39	34	53
	455	1638	93	47	49	53	51	53	51	43	38	57	55	57	61	60	62	59	51	46	65
350x150	105	378	2	36	38	41	40	42	39	31	26	46	44	46	49	48	50	47	39	34	54
	683	2457	104	48	49	53	52	54	51	43	38	57	56	58	61	60	62	59	51	46	65
350x200	140	504	3	36	38	41	40	42	39	31	27	46	44	46	50	48	50	47	39	35	54
	910	3276	112	48	50	53	52	54	51	43	38	58	56	58	61	60	62	59	51	46	66
350x250	175	630	3	36	38	42	40	42	39	31	27	46	44	46	50	48	50	47	40	35	54
	1138	4095	116	48	50	53	52	54	51	43	38	58	56	58	62	60	62	59	51	47	66
350x300	210	756	3	36	38	42	40	42	39	32	27	46	44	46	50	49	50	48	40	35	54
	1365	4914	117	48	50	54	52	54	51	43	39	58	56	58	62	60	62	59	52	47	66
350x350	245	882	3	36	38	42	40	42	40	32	27	46	44	46	50	49	51	48	40	35	54
	1593	5733	114	48	50	54	52	54	51	44	39	58	56	58	62	61	63	60	52	47	66
400x100	80	288	2	34	36	40	39	41	38	30	25	44	46	47	51	50	52	49	41	36	55
	520	1872	97	40	42	45	44	46	43	35	30	50	51	53	57	55	57	54	46	42	61
400x150	120	432	3	34	36	40	39	41	38	30	25	44	44	46	50	48	50	47	40	35	54
	780	2808	108	43	45	48	47	49	46	38	33	52	53	54	58	57	59	56	48	43	62
400x200	160	576	3	35	37	41	39	41	38	31	26	45	44	46	50	48	50	47	39	35	54
	1040	3744	115	45	47	51	50	52	49	41	36	55	54	56	60	59	61	58	50	45	64
400x250	200	720	3	36	38	42	40	42	39	31	27	46	44	46	50	48	50	48	40	35	54
	1300	4680	117	48	50	53	52	54	51	43	38	58	56	58	62	60	62	59	51	47	66
400x300	240	864	3	37	39	43	41	43	40	33	28	47	45	47	50	49	51	48	40	35	55
	1560	5616	115	50	52	56	54	56	54	46	41	60	58	60	63	62	64	61	53	48	68
400x350	280	1008	3	38	40	44	42	44	42	34	29	48	45	47	51	50	52	49	41	36	55
	1820	6552	109	52	54	58	57	59	56	48	43	62	60	61	65	64	66	63	55	50	69
400x400	320	1152	2	39	41	45	44	46	43	35	30	49	46	48	52	50	52	49	41	37	56
	2080	7488	98	54	56	60	59	61	58	50	45	64	61	63	67	65	67	64	56	52	71

OPTIMA-S Discharge Low Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
200x100	40	144	2	52	53	57	56	58	55	47	42	61	56	58	62	60	62	59	52	47	66
	260	936	81	63	65	69	67	69	66	58	54	73	68	70	73	72	74	71	63	58	77
200x150	60	216	2	52	54	57	56	58	55	47	42	61	56	58	62	61	63	60	52	47	66
	390	1404	90	63	65	69	67	69	67	59	54	73	68	70	74	72	74	71	63	59	78
200x200	80	288	2	52	54	57	56	58	55	47	42	62	57	58	62	61	63	60	52	47	66
	520	1872	97	64	65	69	68	70	67	59	54	73	68	70	74	72	74	71	64	59	78
250x100	50	180	2	52	53	57	56	58	55	47	42	61	56	58	62	60	62	60	52	47	66
	325	1170	86	63	65	69	67	69	66	59	54	73	68	70	73	72	74	71	63	58	78
250x150	75	270	2	52	54	57	56	58	55	47	42	62	57	58	62	61	63	60	52	47	66
	488	1755	95	63	65	69	68	70	67	59	54	73	68	70	74	72	74	71	64	59	78
250x200	100	360	2	52	54	57	56	58	55	47	42	62	57	59	62	61	63	60	52	47	66
	650	2340	103	64	66	69	68	70	67	59	54	73	68	70	74	73	75	72	64	59	78
250x250	125	450	3	52	54	58	56	58	55	47	43	62	57	59	62	61	63	60	52	47	67
	813	2925	109	64	66	69	68	70	67	59	54	74	69	70	74	73	75	72	64	59	78
300x100	60	216	2	52	54	57	56	58	55	47	42	61	56	58	62	61	63	60	52	47	66
	390	1404	90	63	65	69	67	69	67	59	54	73	68	70	74	72	74	71	63	59	78
300x150	90	324	2	52	54	57	56	58	55	47	42	62	57	58	62	61	63	60	52	47	66
	585	2106	100	64	65	69	68	70	67	59	54	73	68	70	74	72	74	72	64	59	78
300x200	120	432	3	52	54	58	56	58	55	47	43	62	57	59	62	61	63	60	52	47	67
	780	2808	108	64	66	69	68	70	67	59	54	74	69	70	74	73	75	72	64	59	78
300x250	150	540	3	52	54	58	56	58	55	48	43	62	57	59	62	61	63	60	52	47	67
	975	3510	113	64	66	70	68	70	67	59	55	74	69	71	74	73	75	72	64	59	79
300x300	180	648	3	52	54	58	57	59	56	48	43	62	57	59	63	61	63	60	52	48	67
	1170	4212	116	64	66	70	68	70	67	60	55	74	69	71	74	73	75	72	64	59	79
300x350	210	756	3	52	54	58	57	59	56	48	43	62	57	59	63	61	63	60	53	48	67
	1365	4914	117	64	66	70	69	71	68	60	55	74	69	71	75	73	75	72	64	60	79
350x100	70	252	2	52	54	57	56	58	55	47	42	62	57	58	62	61	63	60	52	47	66
	455	1638	93	63	65	69	68	70	67	59	54	73	68	70	74	72	74	71	63	59	78
350x150	105	378	2	52	54	57	56	58	55	47	43	62	57	59	62	61	63	60	52	47	66
	683	2457	104	64	66	69	68	70	67	59	54	73	68	70	74	73	75	72	64	59	78
350x200	140	504	3	52	54	58	56	58	55	48	43	62	57	59	62	61	63	60	52	47	67
	910	3276	112	64	66	69	68	70	67	59	55	74	69	71	74	73	75	72	64	59	78
350x250	175	630	3	52	54	58	57	58	56	48	43	62	57	59	63	61	63	60	52	48	67
	1138	4095	116	64	66	70	68	70	67	60	55	74	69	71	74	73	75	72	64	59	79
350x300	210	756	3	52	54	58	57	59	56	48	43	62	57	59	63	61	63	60	53	48	67
	1365	4914	117	64	66	70	69	71	68	60	55	74	69	71	75	73	75	72	64	60	79
350x350	245	882	3	53	54	58	57	59	56	48	43	62	57	59	63	62	64	61	53	48	67
	1593	5733	114	65	66	70	69	71	68	60	55	74	69	71	75	73	75	73	65	60	79
400x100	80	288	2	57	59	62	61	63	60	52	47	66	63	65	69	67	69	67	59	54	73
	520	1872	97	62	64	68	66	68	66	58	53	72	69	71	74	73	75	72	64	59	79
400x150	120	432	3	54	56	60	58	60	57	49	45	64	60	62	65	64	66	63	55	50	70
	780	2808	108	62	64	68	67	69	66	58	53	72	68	70	74	72	74	71	64	59	78
400x200	160	576	3	53	55	58	57	59	56	48	43	63	58	60	64	62	64	61	53	49	68
	1040	3744	115	63	65	69	67	69	66	59	54	73	68	70	74	73	75	72	64	59	78
400x250	200	720	3	52	54	58	57	59	56	48	43	62	57	59	63	61	63	60	53	48	67
	1300	4680	117	64	66	70	68	70	68	60	55	74	69	71	75	73	75	72	64	60	79
400x300	240	864	3	52	54	58	56	58	56	48	43	62	57	59	62	61	63	60	52	47	66
	1560	5616	115	65	67	71	70	72	69	61	56	75	70	72	75	74	76	73	65	60	80
400x350	280	1008	3	52	54	58	57	59	56	48	43	62	57	58	62	61	63	60	52	47	66
	1820	6552	109	67	68	72	71	73	70	62	57	76	71	73	76	75	77	74	66	61	80
400x400	320	1152	2	53	54	58	57	59	56	48	43	62	57	58	62	61	63	60	52	47	66
	2080	7488	98	68	70	73	72	74	71	63	58	77	72	73	77	76	78	75	67	62	81

OPTIMA-S Discharge Low Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
450x100	90	324	2	34	36	40	38	40	37	30	25	44	45	47	51	49	51	48	40	36	55
	585	2106	100	41	42	46	45	47	44	36	31	50	51	53	57	56	58	55	47	42	61
450x150	135	486	3	35	36	40	39	41	38	30	25	44	44	46	50	48	50	47	39	35	54
	878	3159	111	44	46	49	48	50	47	39	34	54	53	55	59	57	59	56	49	44	63
450x200	180	648	3	36	37	41	40	42	39	31	26	45	44	46	50	48	50	47	39	35	54
	1170	4212	116	47	49	52	51	53	50	42	37	56	55	57	61	59	61	58	51	46	65
450x250	225	810	3	37	39	42	41	43	40	32	27	47	45	46	50	49	51	48	40	35	54
	1463	5265	116	49	51	55	54	56	53	45	40	59	57	59	63	61	63	60	53	48	67
450x300	270	972	3	38	40	44	42	44	41	33	29	48	45	47	51	49	51	48	41	36	55
	1755	6318	111	52	54	57	56	58	55	47	42	62	59	61	65	63	65	62	54	50	69
450x350	315	1134	2	39	41	45	43	45	43	35	30	49	46	48	51	50	52	49	41	36	56
	2048	7371	100	54	56	60	58	60	57	50	45	64	61	63	66	65	67	64	56	51	71
450x400	360	1296	2	41	42	46	45	47	44	36	31	50	47	49	52	51	53	50	42	37	56
	2340	8424	83	56	58	62	61	63	60	52	47	66	63	64	68	67	69	66	58	53	72
450x450	405	1458	1	42	44	47	46	48	45	37	32	51	48	49	53	52	54	51	43	38	57
	2633	9477	61	58	60	64	63	64	62	54	49	68	64	66	70	68	70	67	60	55	74
500x100	100	360	2	34	36	40	38	40	37	30	25	44	45	47	50	49	51	48	40	35	54
	650	2340	103	41	43	47	45	47	45	37	32	51	52	54	57	56	58	55	47	42	62
500x150	150	540	3	35	37	40	39	41	38	30	25	45	44	46	50	48	50	47	39	35	54
	975	3510	113	45	47	50	49	51	48	40	35	55	54	56	59	58	60	57	49	44	64
500x200	200	720	3	36	38	42	40	42	39	31	27	46	44	46	50	48	50	48	40	35	54
	1300	4680	117	48	50	53	52	54	51	43	38	58	56	58	62	60	62	59	51	47	66
500x250	250	900	4	38	39	43	42	44	41	33	28	47	45	47	50	49	51	48	40	35	55
	1625	5850	111	51	53	56	55	57	54	46	41	61	58	60	64	62	64	62	54	49	68
500x300	300	1080	2	39	41	44	43	45	42	34	29	49	46	48	51	50	52	49	41	36	55
	1950	7020	104	54	55	59	58	60	57	49	44	63	60	62	66	64	66	64	56	51	70
500x350	350	1260	2	40	42	46	44	46	43	36	31	50	47	48	52	51	53	50	42	37	56
	2275	8190	89	56	58	61	60	62	59	51	46	66	62	64	68	66	68	65	58	53	72
500x400	400	1440	2	42	43	47	46	48	45	37	32	51	47	49	53	52	54	51	43	38	57
	2600	9360	66	58	60	64	62	64	61	53	49	68	64	66	69	68	70	67	59	55	74
500x450	450	1620	1	43	45	48	47	49	46	38	33	53	48	50	54	52	54	52	44	39	58
	2925	10530	35	60	62	66	64	66	63	56	51	70	66	68	71	70	72	69	61	56	75
500x500	500	1800	1	44	46	50	48	50	47	39	35	54	49	51	55	53	55	52	45	40	59
	3250	11700	34	62	64	68	66	68	65	57	53	72	67	69	73	71	73	71	63	58	77

OPTIMA-S Discharge Low Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
450x100	90	324	2	56	58	61	60	62	59	51	46	66	62	64	68	66	68	65	58	53	72
	585	2106	100	62	64	68	66	68	65	58	53	72	69	70	74	73	75	72	64	59	78
450x150	135	486	3	54	55	59	58	60	57	49	44	63	59	61	65	63	65	62	54	50	69
	878	3159	111	63	65	68	67	69	66	58	53	72	68	70	74	72	74	71	64	59	78
450x200	180	648	3	53	54	58	57	59	56	48	43	62	58	59	63	62	64	61	53	48	67
	1170	4212	116	64	66	69	68	70	67	59	54	73	69	71	74	73	75	72	64	59	78
450x250	225	810	3	52	54	58	57	58	56	48	43	62	57	59	62	61	63	60	52	47	67
	1463	5265	116	65	67	70	69	71	68	60	56	75	70	71	75	74	76	73	65	60	79
450x300	270	972	3	52	54	58	57	59	56	48	43	62	57	58	62	61	63	60	52	47	66
	1755	6318	111	66	68	72	70	72	70	62	57	76	70	72	76	75	77	74	66	61	80
450x350	315	1134	2	53	54	58	57	59	56	48	43	62	57	58	62	61	63	60	52	47	66
	2048	7371	100	68	69	73	72	74	71	63	58	77	71	73	77	76	78	75	67	62	81
450x400	360	1296	2	53	55	58	57	59	56	48	43	63	57	58	62	61	63	60	52	47	66
	2340	8424	83	69	71	74	73	75	72	64	59	79	72	74	78	77	79	76	68	63	82
450x450	405	1458	1	53	55	59	57	59	57	49	44	63	57	59	62	61	63	60	52	47	66
	2633	9477	61	70	72	75	74	76	73	65	60	80	73	75	79	78	80	77	69	64	83
500x100	100	360	2	55	57	61	59	61	58	50	46	65	61	63	67	65	67	64	57	52	71
	650	2340	103	62	64	68	66	68	65	58	53	72	68	70	74	73	74	72	64	59	78
500x150	150	540	3	53	55	59	57	59	56	48	44	63	58	60	64	63	65	62	54	49	68
	975	3510	113	63	65	69	67	69	66	58	54	73	68	70	74	72	74	72	64	59	78
500x200	200	720	3	52	54	58	57	59	56	48	43	62	57	59	63	61	63	60	53	48	67
	1300	4680	117	64	66	70	68	70	68	60	55	74	69	71	75	73	75	72	64	60	79
500x250	250	900	4	52	54	58	56	58	56	48	43	62	57	59	62	61	63	60	52	47	66
	1625	5850	111	66	68	71	70	72	69	61	56	75	70	72	76	74	76	73	65	61	80
500x300	300	1080	2	53	54	58	57	59	56	48	43	62	57	58	62	61	63	60	52	47	66
	1950	7020	104	67	69	73	71	73	70	62	58	77	71	73	77	75	77	74	66	62	81
500x350	350	1260	2	53	55	58	57	59	56	48	43	63	57	58	62	61	63	60	52	47	66
	2275	8190	89	69	70	74	73	75	72	64	59	78	72	74	78	76	78	75	68	63	82
500x400	400	1440	2	53	55	59	57	59	57	49	44	63	57	59	62	61	63	60	52	47	66
	2600	9360	66	70	72	75	74	76	73	65	60	80	73	75	79	77	79	77	69	64	83
500x450	450	1620	1	54	56	59	58	60	57	49	44	63	57	59	62	61	63	60	52	47	67
	2925	10530	35	71	73	77	75	77	74	66	62	81	74	76	80	78	80	78	70	65	84
500x500	500	1800	1	54	56	60	58	60	58	50	45	64	57	59	63	61	63	61	53	48	67
	3250	11700	34	72	74	78	77	79	76	68	63	82	75	77	81	80	82	79	71	66	85

OPTIMA-S Discharge Medium Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
550x100	110	396	2	35	37	37	37	41	38	30	25	44	45	47	47	47	51	48	40	35	54
	715	2574	106	42	44	45	44	49	46	38	33	52	53	54	55	54	59	56	48	43	62
550x150	165	594	3	36	37	38	37	42	39	31	26	45	44	46	47	46	51	48	40	35	54
	1073	3861	115	46	48	49	48	52	49	42	37	56	55	57	57	57	61	58	50	45	64
550x200	220	792	3	37	39	40	39	43	40	32	28	46	45	47	47	47	51	48	40	35	54
	1430	5148	117	50	51	52	51	56	53	45	40	59	57	59	60	59	64	61	53	48	67
550x250	275	990	3	39	40	41	40	45	42	34	29	48	46	48	48	48	52	49	41	36	55
	1788	6435	110	53	54	55	54	59	56	48	43	62	60	62	62	62	66	63	55	50	69
550x300	330	1188	2	40	42	43	42	46	43	35	31	49	47	48	49	48	53	50	42	37	56
	2145	7722	95	55	57	58	57	61	59	51	46	65	62	64	64	64	68	65	57	52	71
550x350	385	1386	2	42	43	44	43	48	45	37	32	51	48	49	50	49	54	51	43	38	57
	2503	9009	72	58	60	60	60	64	61	53	48	67	64	66	66	66	70	67	59	54	73
550x400	440	1584	1	43	45	45	45	49	46	38	33	52	49	50	51	50	55	52	44	39	58
	2860	10296	40	60	62	63	62	66	63	56	51	70	66	68	68	68	72	69	61	56	75
550x450	495	1782	1	44	46	47	46	50	48	40	35	54	49	51	52	51	56	53	45	40	59
	3218	11583	34	62	64	65	64	68	66	58	53	72	67	69	70	69	74	71	63	58	77
550x500	550	1980	1	46	47	48	47	52	49	41	36	55	50	52	53	52	57	54	46	41	60
	3575	12870	34	64	66	67	66	70	68	60	55	74	69	71	72	71	75	72	65	60	78
550x550	605	2178	1	47	49	49	49	53	50	42	37	56	51	53	54	53	57	55	47	42	61
	3933	14157	34	66	68	69	68	72	69	62	57	76	71	73	73	73	77	74	66	61	80
600x100	120	432	3	35	37	37	37	41	38	30	25	44	45	46	47	46	51	48	40	35	54
	780	2808	108	43	45	46	45	49	46	38	34	52	53	55	55	55	59	56	48	43	62
600x150	180	648	3	36	38	39	38	42	39	31	27	45	45	46	47	46	51	48	40	35	54
	1170	4212	116	47	49	50	49	53	50	42	38	56	56	57	58	57	62	59	51	46	65
600x200	240	864	3	38	39	40	39	44	41	33	28	47	45	47	48	47	51	48	41	36	55
	1560	5616	115	51	53	53	53	57	54	46	41	60	58	60	61	60	64	61	54	49	68
600x250	300	1080	2	39	41	42	41	45	43	35	30	49	46	48	49	48	52	49	41	37	55
	1950	7020	104	54	56	56	56	60	57	49	44	63	61	63	63	63	67	64	56	51	70
600x300	360	1296	2	41	43	43	43	47	44	36	31	50	47	49	50	49	53	50	42	38	56
	2340	8424	83	57	59	59	59	63	60	52	47	66	63	65	65	65	69	66	58	53	72
600x350	420	1512	1	42	44	45	44	49	46	38	33	52	48	50	51	50	54	51	44	39	57
	2730	9828	53	59	61	62	61	66	63	55	50	69	65	67	68	67	71	68	60	56	74
600x400	480	1728	0	44	46	46	46	50	47	39	34	53	49	51	52	51	55	52	45	40	59
	3120	11232	34	62	64	64	64	68	65	57	52	71	67	69	70	69	73	70	62	58	76
600x450	540	1944	1	45	47	48	47	52	49	41	36	55	50	52	53	52	56	53	46	41	60
	3510	12636	43	64	66	67	66	70	67	59	55	73	69	71	71	71	75	72	64	59	78
600x500	600	2160	1	47	49	49	49	53	50	42	37	56	51	53	54	53	57	54	47	42	61
	3900	14040	53	66	68	69	68	72	69	61	57	75	71	72	73	72	77	74	66	61	80
600x550	660	2376	2	48	50	51	50	54	51	43	39	57	52	54	55	54	58	55	48	43	62
	4290	15444	64	68	70	71	70	74	71	63	59	77	72	74	75	74	78	75	68	63	82
600x600	720	2592	2	49	51	52	51	55	53	45	40	59	53	55	56	55	59	56	49	44	63
	4680	16848	76	70	72	72	72	76	73	65	60	79	74	76	76	76	80	77	69	64	83
650x150	195	702	3	36	38	39	38	43	40	32	27	46	45	46	47	46	51	48	40	35	54
	1268	4563	111	48	50	51	50	54	51	43	39	57	56	58	59	58	62	60	52	47	66
650x200	260	936	3	38	40	41	40	44	41	34	29	48	45	47	48	47	52	49	41	36	55
	1690	6084	111	52	54	54	54	58	55	47	42	61	59	61	62	61	65	62	54	50	68
650x250	325	1170	2	40	42	42	42	46	43	35	30	49	47	48	49	48	53	50	42	37	56
	2113	7605	97	55	57	58	57	61	58	50	46	64	62	63	64	63	68	65	57	52	71
650x300	390	1404	2	42	44	44	44	48	45	37	32	51	48	49	50	49	54	51	43	38	57
	2535	9126	69	58	60	61	60	64	61	53	49	67	64	66	67	66	70	67	59	55	73
650x350	455	1638	1	43	45	46	45	49	47	39	34	53	49	51	51	51	55	52	44	39	58
	2958	10647	30	61	63	63	63	67	64	56	51	70	66	68	69	68	72	69	62	57	76

OPTIMA-S Discharge Medium Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
550x100	110	396	2	55	57	57	57	61	58	50	45	64	61	63	63	63	67	64	56	51	70
	715	2574	106	63	65	65	65	69	66	58	53	72	69	70	71	70	75	72	64	59	78
550x150	165	594	3	53	55	56	55	59	56	49	44	63	58	60	61	60	65	62	54	49	68
	1073	3861	115	64	66	66	66	70	67	59	54	73	69	71	71	71	75	72	64	59	78
550x200	220	792	3	53	55	55	55	59	56	48	43	62	57	59	60	59	63	61	53	48	67
	1430	5148	117	65	67	68	67	71	68	61	56	75	70	72	72	72	76	73	65	60	79
550x250	275	990	3	53	55	55	55	59	56	48	43	62	57	59	59	59	63	60	52	47	66
	1788	6435	110	67	69	69	69	73	70	62	57	76	71	73	73	73	77	74	66	61	80
550x300	330	1188	2	53	55	56	55	59	56	48	44	62	57	59	59	59	63	60	52	47	66
	2145	7722	95	68	70	71	70	74	72	64	59	78	72	74	75	74	78	75	67	63	81
550x350	385	1386	2	54	55	56	55	60	57	49	44	63	57	59	60	59	63	60	52	48	66
	2503	9009	72	70	72	72	72	76	73	65	60	79	73	75	76	75	79	77	69	64	83
550x400	440	1584	1	54	56	57	56	60	57	49	45	63	57	59	60	59	63	61	53	48	67
	2860	10296	40	71	73	74	73	77	75	67	62	81	75	76	77	76	81	78	70	65	84
550x450	495	1782	1	55	56	57	56	61	58	50	45	64	58	59	60	59	64	61	53	48	67
	3218	11583	34	73	74	75	74	79	76	68	63	82	76	77	78	77	82	79	71	66	85
550x500	550	1980	1	55	57	58	57	61	58	51	46	65	58	60	61	60	64	61	53	49	67
	3575	12870	34	74	76	76	76	80	77	69	64	83	77	79	79	79	83	80	72	67	86
550x550	605	2178	1	56	58	58	58	62	59	51	46	65	58	60	61	60	65	62	54	49	68
	3933	14157	34	75	77	78	77	81	78	71	66	85	78	80	80	80	84	81	73	68	87
600x100	120	432	3	54	56	57	56	61	58	50	45	64	60	62	63	62	66	63	56	51	70
	780	2808	108	63	65	65	65	69	66	58	53	72	69	70	71	70	75	72	64	59	78
600x150	180	648	3	53	55	56	55	59	56	48	44	62	58	60	61	60	64	61	53	48	67
	1170	4212	116	64	66	67	66	70	67	59	55	73	69	71	72	71	75	72	64	60	78
600x200	240	864	3	53	55	55	55	59	56	48	43	62	57	59	60	59	63	60	52	48	66
	1560	5616	115	66	68	68	68	72	69	61	56	75	70	72	73	72	76	73	66	61	80
600x250	300	1080	2	53	55	55	55	59	56	48	43	62	57	59	59	59	63	60	52	47	66
	1950	7020	104	68	69	70	69	74	71	63	58	77	71	73	74	73	78	75	67	62	81
600x300	360	1296	2	53	55	56	55	59	57	49	44	63	57	59	59	59	63	60	52	47	66
	2340	8424	83	69	71	72	71	75	72	65	60	79	73	75	75	75	79	76	68	63	82
600x350	420	1512	1	54	56	56	56	60	57	49	44	63	57	59	60	59	63	60	53	48	67
	2730	9828	53	71	73	73	73	77	74	66	61	80	74	76	77	76	80	77	69	65	83
600x400	480	1728	0	54	56	57	56	61	58	50	45	64	58	59	60	59	64	61	53	48	67
	3120	11232	34	72	74	75	74	78	76	68	63	82	75	77	78	77	81	79	71	66	85
600x450	540	1944	1	55	57	58	57	61	58	50	46	64	58	60	60	60	64	61	53	48	67
	3510	12636	43	74	76	76	76	80	77	69	64	83	77	78	79	78	83	80	72	67	86
600x500	600	2160	1	56	58	58	58	62	59	51	46	65	58	60	61	60	65	62	54	49	68
	3900	14040	53	75	77	78	77	81	78	70	66	84	78	80	80	80	84	81	73	68	87
600x550	660	2376	2	56	58	59	58	63	60	52	47	66	59	61	61	61	65	62	54	49	68
	4290	15444	64	76	78	79	78	83	80	72	67	86	79	81	81	81	85	82	74	69	88
600x600	720	2592	2	57	59	60	59	63	60	52	48	66	59	61	62	61	66	63	55	50	69
	4680	16848	76	78	80	80	80	84	81	73	68	87	80	82	82	82	86	83	75	70	89
650x150	195	702	3	53	55	55	55	59	56	48	43	62	58	60	60	60	64	61	53	48	67
	1268	4563	111	65	66	67	66	71	68	60	55	74	69	71	72	71	75	73	65	60	79
650x200	260	936	3	53	55	55	55	59	56	48	43	62	57	59	60	59	63	60	52	48	66
	1690	6084	111	66	68	69	68	73	70	62	57	76	71	72	73	72	77	74	66	61	80
650x250	325	1170	2	53	55	56	55	59	56	48	44	62	57	59	59	59	63	60	52	47	66
	2113	7605	97	68	70	71	70	74	71	64	59	78	72	74	75	74	78	75	67	63	81
650x300	390	1404	2	54	55	56	55	60	57	49	44	63	57	59	60	59	63	60	52	48	66
	2535	9126	69	70	72	72	72	76	73	65	60	79	73	75	76	75	80	77	69	64	83
650x350	455	1638	1	54	56	57	56	60	57	50	45	64	57	59	60	59	64	61	53	48	67
	2958	10647	30	72	73	74	73	78	75	67	62	81	75	77	77	77	81	78	70	65	84

OPTIMA-S Discharge Medium Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
650x400	520	1872	0	45	47	47	47	51	48	40	35	54	50	52	52	52	56	53	45	40	59
	3380	12168	34	63	65	66	65	69	67	59	54	73	68	70	71	70	74	71	64	59	78
650x450	585	2106	1	46	48	49	48	53	50	42	37	56	51	53	54	53	57	54	46	42	60
	3803	13689	34	66	67	68	67	72	69	61	56	75	70	72	73	72	76	73	66	61	80
650x500	650	2340	1	48	50	50	50	54	51	43	38	57	52	54	55	54	58	55	47	43	61
	4225	15210	34	68	70	70	70	74	71	63	58	77	72	74	74	74	78	75	67	62	81
650x550	715	2574	1	49	51	52	51	55	52	45	40	59	53	55	56	55	59	56	48	44	62
	4648	16731	34	70	72	72	72	76	73	65	60	79	74	75	76	75	80	77	69	64	83
650x600	780	2808	1	50	52	53	52	57	54	46	41	60	54	56	57	56	60	57	49	45	63
	5070	18252	34	72	73	74	73	78	75	67	62	81	75	77	78	77	81	78	71	66	85
650x650	845	3042	1	52	54	54	54	58	55	47	42	61	55	57	58	57	61	58	50	46	64
	5493	19773	34	73	75	76	75	80	77	69	64	83	77	79	79	79	83	80	72	67	86
700x200	280	1008	3	39	41	41	41	45	42	34	29	48	46	48	48	48	52	49	41	36	55
	1820	6552	109	53	55	55	55	59	56	48	43	62	60	62	62	62	66	63	55	50	69
700x250	350	1260	2	41	42	43	42	47	44	36	31	50	47	49	49	49	53	50	42	37	56
	2275	8190	87	56	58	59	58	62	60	52	47	66	63	64	65	64	69	66	58	53	72
700x300	420	1512	1	42	44	45	44	49	46	38	33	52	48	50	51	50	54	51	44	39	57
	2730	9828	55	59	61	62	61	66	63	55	50	69	65	67	68	67	71	68	60	56	74
700x350	490	1764	0	44	46	47	46	50	47	40	35	54	49	51	52	51	56	53	45	40	59
	3185	11466	5	62	64	65	64	68	65	57	53	71	67	69	70	69	73	71	63	58	77
700x400	560	2016	1	46	48	48	48	52	49	41	36	55	51	52	53	52	57	54	46	41	60
	3640	13104	34	65	67	67	67	71	68	60	55	74	69	71	72	71	76	73	65	60	79
700x450	630	2268	1	47	49	50	49	54	51	43	38	57	52	54	54	54	58	55	47	42	61
	4095	14742	34	67	69	70	69	73	70	62	58	76	71	73	74	73	78	75	67	62	81
700x500	700	2520	1	49	51	51	51	55	52	44	39	58	53	55	55	55	59	56	48	43	62
	4550	16380	34	69	71	72	71	75	72	65	60	79	73	75	76	75	79	77	69	64	83
700x550	770	2772	1	50	52	53	52	56	54	46	41	60	54	56	56	56	60	57	49	44	63
	5005	18018	34	71	73	74	73	77	75	67	62	81	75	77	78	77	81	78	70	66	84
700x600	840	3024	1	52	53	54	53	58	55	47	42	61	55	57	58	57	61	58	50	46	64
	5460	19656	34	73	75	76	75	79	76	69	64	83	77	78	79	79	83	80	72	67	86
700x650	910	3276	1	53	55	55	55	59	56	48	43	62	56	58	59	58	62	59	51	47	65
	5915	21294	34	75	77	78	77	81	78	70	66	84	78	80	81	80	84	81	74	69	88
700x700	980	3528	1	54	56	57	56	60	57	49	45	63	57	59	60	59	63	60	52	48	66
	6370	22932	34	77	79	79	79	83	80	72	67	86	80	82	82	82	86	83	75	70	89
750x200	300	1080	2	39	41	42	41	45	43	35	30	49	46	48	49	48	52	49	41	37	55
	1950	7020	104	54	54	54	54	54	54	54	54	63	61	63	63	63	67	64	56	51	70
750x250	375	1350	2	41	43	44	43	47	45	37	32	51	47	49	50	49	54	51	43	38	57
	2438	8775	78	57	59	60	59	64	61	53	48	67	63	65	66	65	70	67	59	54	73
750x300	450	1620	1	43	45	46	45	49	46	39	34	53	49	51	51	51	55	52	44	39	58
	2925	10530	35	61	62	63	62	67	64	56	51	70	66	68	69	68	72	69	61	57	75
750x350	525	1890	1	45	47	48	47	51	48	40	36	54	50	52	53	52	56	53	45	40	59
	3413	12285	34	63	65	66	65	70	67	59	54	73	68	70	71	70	75	72	64	59	78
750x400	600	2160	1	47	49	49	49	53	50	42	37	56	51	53	54	53	57	54	47	42	61
	3900	14040	34	66	68	69	68	72	69	61	57	75	71	72	73	72	77	74	66	61	80
750x450	675	2430	1	48	50	51	50	54	52	44	39	58	52	54	55	54	59	56	48	43	62
	4388	15795	34	69	70	71	70	75	72	64	59	78	73	74	75	74	79	76	68	63	82
750x500	750	2700	1	50	52	52	52	56	53	45	40	59	54	55	56	56	60	57	49	44	63
	4875	17550	34	71	73	73	73	77	74	66	61	80	75	76	77	76	81	78	70	65	84
750x550	825	2970	1	51	53	54	53	57	55	47	42	61	55	57	57	57	61	58	50	45	64
	5363	19305	34	73	75	75	75	79	76	68	63	82	76	78	79	78	82	80	72	67	86
750x600	900	3240	1	53	55	55	55	59	56	48	43	62	56	58	58	58	62	59	51	46	65
	5850	21060	34	75	77	77	77	81	78	70	65	84	78	80	81	80	84	81	73	69	87
750x650	975	3510	1	54	56	57	56	60	57	49	45	63	57	59	59	59	63	60	52	47	66
	6338	22815	34	77	79	79	79	83	80	72	67	86	80	81	82	81	86	83	75	70	89
750x700	1050	3780	1	55	57	58	57	61	59	51	46	65	58	60	61	60	64	61	53	48	67
	6825	24570	34	78	80	81	80	85	82	74	69	88	81	83	84	83	87	84	76	72	90

OPTIMA-S Discharge Medium Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
650x400	520	1872	0	55	57	57	57	61	58	50	45	64	58	60	60	60	64	61	53	48	67
	3380	12168	34	73	75	76	75	79	76	69	64	83	76	78	79	78	82	79	72	67	86
650x450	585	2106	1	56	57	58	57	62	59	51	46	65	58	60	61	60	64	62	54	49	68
	3803	13689	34	75	77	77	77	81	78	70	65	84	77	79	80	79	84	81	73	68	87
650x500	650	2340	1	56	58	59	58	62	60	52	47	66	59	61	61	61	65	62	54	49	68
	4225	15210	34	76	78	79	78	82	79	72	67	86	79	81	81	81	85	82	74	69	88
650x550	715	2574	1	57	59	60	59	63	60	52	48	66	59	61	62	61	65	63	55	50	69
	4648	16731	34	78	79	80	79	84	81	73	68	87	80	82	82	82	86	83	75	70	89
650x600	780	2808	1	58	60	60	60	64	61	53	48	67	60	62	62	62	66	63	55	50	69
	5070	18252	34	79	81	81	81	85	82	74	69	88	81	83	84	83	87	84	76	72	90
650x650	845	3042	1	58	60	61	60	65	62	54	49	68	60	62	63	62	67	64	56	51	70
	5493	19773	34	80	82	83	82	86	83	76	71	90	82	84	85	84	88	85	77	73	91
700x200	280	1008	3	53	55	55	55	59	56	48	43	62	57	59	59	59	63	60	52	47	66
	1820	6552	109	67	69	69	69	73	70	62	57	76	71	73	74	73	77	74	66	62	80
700x250	350	1260	2	53	55	56	55	59	56	49	44	63	57	59	59	59	63	60	52	47	66
	2275	8190	87	69	71	71	71	75	72	64	59	78	73	74	75	74	79	76	68	63	82
700x300	420	1512	1	54	56	56	56	60	57	49	44	63	57	59	60	59	63	60	53	48	67
	2730	9828	55	71	73	73	73	77	74	66	61	80	74	76	77	76	80	77	69	65	83
700x350	490	1764	0	55	56	57	56	61	58	50	45	64	58	59	60	59	64	61	53	48	67
	3185	11466	5	73	74	75	74	79	76	68	63	82	76	77	78	77	82	79	71	66	85
700x400	560	2016	1	55	57	58	57	61	59	51	46	65	58	60	61	60	64	61	53	49	67
	3640	13104	34	74	76	77	76	80	77	70	65	84	77	79	79	79	83	80	72	67	86
700x450	630	2268	1	56	58	59	58	62	59	51	47	65	59	60	61	60	65	62	54	49	68
	4095	14742	34	76	78	78	78	82	79	71	66	85	78	80	81	80	84	82	74	69	88
700x500	700	2520	1	57	59	59	59	63	60	52	47	66	59	61	62	61	65	62	55	50	69
	4550	16380	34	77	79	80	79	83	81	73	68	87	80	81	82	81	86	83	75	70	89
700x550	770	2772	1	58	59	60	60	64	61	53	48	67	60	62	62	62	66	63	55	50	69
	5005	18018	34	79	81	81	81	85	82	74	69	88	81	83	83	83	87	84	76	71	90
700x600	840	3024	1	58	60	61	60	65	62	54	49	68	60	62	63	62	67	64	56	51	70
	5460	19656	34	80	82	83	82	86	83	75	71	89	82	84	85	84	88	85	77	73	91
700x650	910	3276	1	59	61	62	61	65	62	55	50	69	61	63	64	63	67	64	56	52	70
	5915	21294	34	81	83	84	83	88	85	77	72	91	83	85	86	85	89	86	79	74	93
700x700	980	3528	1	60	62	62	62	66	63	55	50	69	62	63	64	63	68	65	57	52	71
	6370	22932	34	83	84	85	84	89	86	78	73	92	84	86	87	86	90	88	80	75	94
750x200	300	1080	2	53	55	55	55	59	56	48	43	62	57	59	59	59	63	60	52	47	66
	1950	7020	104	68	69	70	69	74	71	63	58	77	71	73	74	73	78	75	67	62	81
750x250	375	1350	2	53	55	56	55	60	57	49	44	63	57	59	60	59	63	60	52	47	66
	2438	8775	78	70	71	72	71	76	73	65	60	79	73	75	76	75	79	76	68	64	82
750x300	450	1620	1	54	56	57	56	60	57	49	45	63	57	59	60	59	63	61	53	48	67
	2925	10530	35	72	73	74	73	78	75	67	62	81	75	77	77	77	81	78	70	65	84
750x350	525	1890	1	55	57	57	57	61	58	50	45	64	58	60	60	60	64	61	53	48	67
	3413	12285	34	73	75	76	75	80	77	69	64	83	76	78	79	78	82	80	72	67	86
750x400	600	2160	1	56	58	58	58	62	59	51	46	65	58	60	61	60	65	62	54	49	68
	3900	14040	34	75	77	78	77	81	78	70	66	84	78	80	80	80	84	81	73	68	87
750x450	675	2430	1	57	58	59	58	63	60	52	47	66	59	61	62	61	65	62	54	50	68
	4388	15795	34	77	79	79	79	83	80	72	67	86	79	81	82	81	85	82	75	70	89
750x500	750	2700	1	57	59	60	59	64	61	53	48	67	60	61	62	61	66	63	55	50	69
	4875	17550	34	78	80	81	80	84	82	74	69	88	81	82	83	82	87	84	76	71	90
750x550	825	2970	1	58	60	61	60	64	62	54	49	68	60	62	63	62	66	64	56	51	70
	5363	19305	34	80	82	82	82	86	83	75	70	89	82	84	84	84	88	85	77	72	91
750x600	900	3240	1	59	61	62	61	65	62	54	50	68	61	63	63	63	67	64	56	51	70
	5850	21060	34	81	83	84	83	87	84	77	72	91	83	85	86	85	89	86	78	74	92
750x650	975	3510	1	60	62	62	62	66	63	55	50	69	62	63	64	63	68	65	57	52	71
	6338	22815	34	83	84	85	84	89	86	78	73	92	84	86	87	86	90	87	80	75	94
750x700	1050	3780	1	61	62	63	62	67	64	56	51	70	62	64	65	64	68	65	58	53	72
	6825	24570	34	84	86	86	86	90	87	79	74	93	85	87	88	87	92	89	81	76	95

OPTIMA-S Discharge Medium Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 100 Pa									ΔPt = 200 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
750x750	1125	4050	1	57	58	59	58	63	60	52	47	66	59	61	61	61	65	62	54	49	68
	7313	26325	34	80	82	83	82	86	83	76	71	90	83	84	85	84	89	86	78	73	92
800x200	320	1152	2	40	42	42	42	46	43	35	30	49	46	48	49	48	53	50	42	37	56
	2080	7488	99	55	57	57	57	61	58	50	45	64	61	63	64	63	68	65	57	52	71
800x250	400	1440	2	42	44	44	44	48	45	37	32	51	48	50	50	50	54	51	43	38	57
	2600	9360	66	59	60	61	60	65	62	54	49	68	64	66	67	66	71	68	60	55	74
800x300	480	1728	1	44	46	46	46	50	47	39	34	53	49	51	52	51	55	52	45	40	59
	3120	11232	34	62	64	64	64	68	65	57	52	71	67	69	70	69	73	70	62	58	76
800x350	560	2016	1	46	48	48	48	52	49	41	36	55	51	52	53	52	57	54	46	41	60
	3640	13104	34	65	67	67	67	71	68	60	55	74	69	71	72	71	76	73	65	60	79
800x400	640	2304	1	48	49	50	49	54	51	43	38	57	52	54	54	54	58	55	47	42	61
	4160	14976	34	67	69	70	69	74	71	63	58	77	72	74	74	74	78	75	67	62	81
800x450	720	2592	1	49	51	52	51	55	53	45	40	59	53	55	56	55	59	56	49	44	63
	4680	16848	34	70	72	72	72	76	73	65	60	79	74	76	76	76	80	77	69	64	83
800x500	800	2880	1	51	53	53	53	57	54	46	41	60	54	56	57	56	61	58	50	45	64
	5200	18720	34	72	74	75	74	78	75	68	63	82	76	78	78	78	82	79	71	66	85
800x550	880	3168	1	52	54	55	54	59	56	48	43	62	56	57	58	57	62	59	51	46	65
	5720	20592	34	74	76	77	76	80	78	70	65	84	78	79	80	79	84	81	73	68	87
800x600	960	3456	1	54	56	56	56	60	57	49	44	63	57	58	59	58	63	60	52	47	66
	6240	22464	34	76	78	79	78	82	80	72	67	86	79	80	81	80	85	82	74	69	88
800x650	1040	3744	1	55	57	58	57	61	58	51	46	65	58	59	60	59	64	61	53	48	67
	6760	24336	34	78	80	81	80	84	81	74	69	88	80	81	82	81	86	83	75	70	89
800x700	1120	4032	1	56	58	59	58	63	60	52	47	66	58	60	61	60	65	62	54	49	68
	7280	26208	34	80	82	83	82	86	83	75	71	89	80	82	83	82	87	84	76	71	90
800x750	1200	4320	1	58	60	60	60	64	61	53	48	67	59	61	62	61	65	62	55	50	69
	7800	28080	34	82	84	84	84	88	85	77	72	91	81	83	84	83	87	84	77	72	91
800x800	1280	4608	1	59	61	61	61	65	62	54	49	68	61	63	63	63	67	64	56	51	70
	8320	29952	34	83	85	86	85	90	87	79	74	93	85	87	88	87	92	89	81	76	95
850x200	340	1224	2	40	42	43	42	47	44	36	31	50	47	49	49	49	53	50	42	37	56
	2210	7956	92	56	58	58	58	62	59	51	46	65	62	64	65	64	68	65	58	53	72
850x250	425	1530	1	43	44	45	44	49	46	38	33	52	48	50	51	50	54	51	44	39	58
	2763	9945	52	60	61	62	61	66	63	55	50	69	65	67	68	67	71	68	61	56	75
850x300	510	1836	1	45	47	47	47	51	48	40	35	54	50	52	52	52	56	53	45	40	59
	3315	11934	34	63	65	65	65	69	66	58	53	72	68	70	70	70	74	71	63	58	77
850x350	595	2142	1	47	48	49	48	53	50	42	37	56	51	53	54	53	57	54	47	42	61
	3868	13923	34	66	68	68	68	72	69	61	56	75	70	72	73	72	77	74	66	61	80
850x400	680	2448	1	48	50	51	50	55	52	44	39	58	53	54	55	54	59	56	48	43	62
	4420	15912	34	69	70	71	70	75	72	64	59	78	73	75	75	75	79	76	68	63	82
850x450	765	2754	1	50	52	53	52	56	53	46	41	60	54	56	56	56	60	57	49	44	63
	4973	17901	34	71	73	74	73	77	74	67	62	81	75	77	77	77	81	78	70	65	84
850x500	850	3060	1	52	54	54	54	58	55	47	42	61	55	57	58	57	61	58	50	46	64
	5525	19890	34	74	75	76	75	80	77	69	64	83	76	78	79	78	83	80	72	67	86
850x550	935	3366	1	53	55	56	55	59	57	49	44	63	56	58	59	58	63	60	52	47	66
	6078	21879	34	76	78	78	78	82	79	71	66	85	79	81	81	81	85	82	74	69	88
850x600	1020	3672	1	55	57	57	57	61	58	50	45	64	58	59	60	59	64	61	53	48	67
	6630	23868	34	78	80	80	80	84	81	73	68	87	81	82	83	82	87	84	76	71	90
850x650	1105	3978	1	56	58	59	58	62	59	52	47	66	59	61	61	61	65	62	54	49	68
	7183	25857	34	80	82	82	82	86	83	75	70	89	82	84	85	84	88	85	78	73	92
850x700	1190	4284	1	58	59	60	59	64	61	53	48	67	60	62	62	62	66	63	55	50	69
	7735	27846	34	82	83	84	83	88	85	77	72	91	84	86	86	86	90	87	79	74	93
850x750	1275	4590	1	59	61	61	61	65	62	54	49	68	61	63	63	63	67	64	56	51	70
	8288	29835	34	83	85	86	85	89	87	79	74	93	85	87	88	87	91	89	81	76	95
850x800	1360	4896	1	60	62	63	62	66	63	55	51	69	62	64	64	64	68	65	57	52	71
	8840	31824	34	85	87	88	87	91	88	80	75	94	87	89	89	89	93	90	82	77	96
850x850	1445	5202	1	61	63	64	63	67	64	57	52	71	63	65	65	65	69	66	58	53	72
	9393	33813	34	87	88	89	88	93	90	82	77	96	88	90	91	90	94	91	84	79	98

OPTIMA-S Discharge Medium Pressure System

OPTIMA-S	AIR-FLOW			ΔPt = 400 Pa									ΔPt = 600 Pa								
Size	Q [l/s]	Q [m³/h]	ΔP_{st} [Pa]	63	125	250	500	1000	2000	4000	8000	dB(A)	63	125	250	500	1000	2000	4000	8000	dB(A)
750x750	1125	4050	1	61	63	64	63	68	65	57	52	71	63	65	65	65	69	66	58	53	72
	7313	26325	34	85	87	88	87	91	88	80	76	94	86	88	89	88	93	90	82	77	96
800x200	320	1152	2	53	55	56	55	59	56	48	44	62	57	59	59	59	63	60	52	47	66
	2080	7488	99	68	70	71	70	74	71	63	59	77	72	74	74	74	78	75	67	62	81
800x250	400	1440	2	54	55	56	56	60	57	49	44	63	57	59	60	59	63	60	52	48	66
	2600	9360	66	70	72	73	72	76	73	66	61	80	74	75	76	75	80	77	69	64	83
800x300	480	1728	1	54	56	57	56	61	58	50	45	64	58	59	60	59	64	61	53	48	67
	3120	11232	34	72	74	75	74	78	76	68	63	82	75	77	78	77	81	79	71	66	85
800x350	560	2016	1	55	57	58	57	61	59	51	46	65	58	60	61	60	64	61	53	49	67
	3640	13104	34	74	76	77	76	80	77	70	65	84	77	79	79	79	83	80	72	67	86
800x400	640	2304	1	56	58	59	58	62	59	52	47	66	59	61	61	61	65	62	54	49	68
	4160	14976	34	76	78	79	78	82	79	71	67	85	79	80	81	80	85	82	74	69	88
800x450	720	2592	1	57	59	60	59	63	60	52	48	66	59	61	62	61	66	63	55	50	69
	4680	16848	34	78	80	80	80	84	81	73	68	87	80	82	82	82	86	83	75	70	89
800x500	800	2880	1	58	60	61	60	64	61	53	49	67	60	62	63	62	66	63	55	51	69
	5200	18720	34	79	81	82	81	85	83	75	70	89	81	83	84	83	88	85	77	72	91
800x550	880	3168	1	59	61	61	61	65	62	54	49	68	61	63	63	63	67	64	56	51	70
	5720	20592	34	81	83	83	83	87	84	76	71	90	83	85	85	85	89	86	78	73	92
800x600	960	3456	1	60	62	62	62	66	63	55	50	69	62	64	64	64	68	65	57	52	71
	6240	22464	34	82	84	84	84	88	85	77	72	91	84	86	86	86	90	87	79	74	93
800x650	1040	3744	1	61	63	63	63	67	64	56	51	70	63	65	65	65	69	66	58	53	72
	6760	24336	34	83	85	85	85	89	86	78	73	92	85	87	87	87	91	88	80	75	94
800x700	1120	4032	1	62	64	64	64	68	65	57	52	71	64	65	66	65	70	67	59	54	73
	7280	26208	34	84	85	86	85	90	87	79	74	93	86	87	88	87	92	89	81	76	95
800x750	1200	4320	1	63	64	65	64	69	66	58	53	72	64	66	67	66	71	68	60	55	74
	7800	28080	34	84	86	87	86	91	88	80	75	94	86	88	89	88	92	90	82	77	96
800x800	1280	4608	1	63	65	65	65	69	66	58	53	72	64	66	67	66	70	67	59	55	73
	8320	29952	34	87	89	90	89	94	91	83	78	97	89	90	91	90	95	92	84	79	98
850x200	340	1224	2	53	55	56	55	59	56	48	44	62	57	59	59	59	63	60	52	47	66
	2210	7956	92	69	70	71	70	75	72	64	59	78	72	74	75	74	78	76	68	63	82
850x250	425	1530	1	54	56	56	56	60	57	49	44	63	57	59	60	59	63	60	53	48	67
	2763	9945	52	71	73	73	73	77	74	66	61	80	74	76	77	76	80	77	70	65	84
850x300	510	1836	1	55	57	57	57	61	58	50	45	64	58	60	60	60	64	61	53	48	67
	3315	11934	34	73	75	76	75	79	76	68	64	82	76	78	78	78	82	79	71	66	85
850x350	595	2142	1	56	58	58	58	62	59	51	46	65	58	60	61	60	65	62	54	49	68
	3868	13923	34	75	77	78	77	81	78	70	66	84	78	79	80	79	84	81	73	68	87
850x400	680	2448	1	57	58	59	59	63	60	52	47	66	59	61	62	61	65	62	54	50	68
	4420	15912	34	77	79	79	79	83	80	72	67	86	79	81	82	81	85	82	75	70	89
850x450	765	2754	1	58	59	60	59	64	61	53	48	67	60	62	62	62	66	63	55	50	69
	4973	17901	34	79	80	81	80	85	82	74	69	88	81	83	83	83	87	84	76	71	90
850x500	850	3060	1	59	61	61	61	65	62	54	49	68	61	63	63	63	67	64	56	51	70
	5525	19890	34	80	82	83	82	86	83	75	70	89	82	84	85	84	88	85	77	73	91
850x550	935	3366	1	59	61	62	61	66	63	55	50	69	61	63	64	63	67	64	57	52	71
	6078	21879	34	82	84	84	84	88	85	77	72	91	84	85	86	85	90	87	79	74	93
850x600	1020	3672	1	60	62	63	62	66	64	56	51	70	62	64	64	64	68	65	57	52	71
	6630	23868	34	83	85	86	85	89	87	79	74	93	85	87	87	87	91	88	80	75	94
850x650	1105	3978	1	61	63	64	63	67	64	57	52	71	63	65	65	65	69	66	58	53	72
	7183	25857	34	85	87	87	87	91	88	80	75	94	86	88	89	88	92	89	82	77	96
850x700	1190	4284	1	62	64	65	64	68	65	57	53	71	63	65	66	65	70	67	59	54	73
	7735	27846	34	86	88	89	88	92	89	81	77	95	87	89	90	89	94	91	83	78	97
850x750	1275	4590	1	63	65	65	65	69	66	58	53	72	64	66	67	66	70	67	59	55	73
	8288	29835	34	87	89	90	89	94	91	83	78	97	89	90	91	90	95	92	84	79	98
850x800	1360	4896	1	64	66	66	66	70	67	59	54	73	65	67	67	67	71	68	60	55	74
	8840	31824	34	89	90	91	90	95	92	84	79	98	90	91	92	92	96	93	85	80	99
850x850	1445	5202	1	64	66	67	66	71	68	60	55	74	65	67	68	67	72	69	61	56	75
	9393	33813	34	90	92	92	92	96	93	85	80	99	91	93	93	93	97	94	86	81	100

Optima-S-I

Double skin rectangular VAV units with external insulation

Highlights:

- Damper tightness class 3 according to EN 1751
- Casing tightness class C according to EN 1751
- High measuring accuracy of:
  10-20% of nominal air flow rate has an accuracy error rate of ±25%
  20-40% av nominell: <±10%
  40-100% av nominell: <±4% 5%
- Air volume range of 144 to 56160 m³/h
- Operating range of up to 1000Pa

Function

Double skin rectangular or square VAV terminal units is commonly used for supply air applications or for return air applications at low to medium system pressures. Optima-SI VAV terminal units are ideal for multi-zone control with supply and return in Master and Slave setup such as offices, hotel rooms or meeting rooms where the required cooling and heating load will vary on demand.

Design

Optima-S-I units are constructed from sheet steel frame and blades. The frame construction contains a robust mounting frame to assure the sturdiness of the unit and to facilitate the mounting to upstream and downstream ducts.

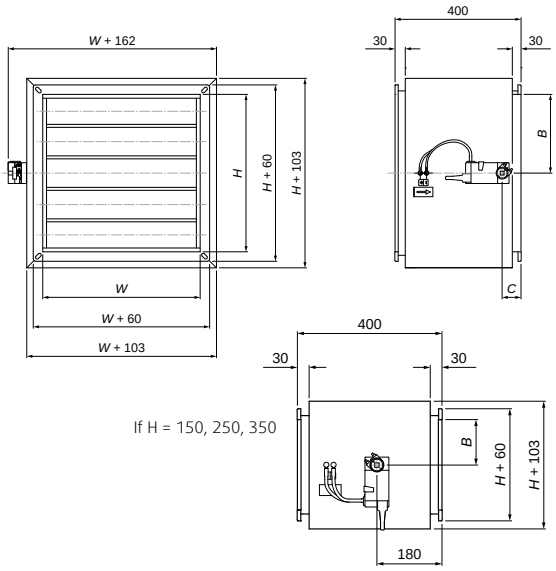
The aerofoil blades are opposed action and are constructed from extruded aluminium and enforce corrosion-free throughout the blade to add rigidity and reduce the pressure loss and sound levels which may be contributed to airflow stream passing over the blades. The blade axe are sitting in self lubricating bearings which are connected together by a gear wheel to assure a smooth ratio and transition from blade to blade.

Available Sizes

200 x 100mm to 1200 x 1000mm with steps of 50mm in height and length

Controls

The VAV terminal units are as standard equipped with BLC (Belimo compact) controllers (LMV-D3 or NMV-D3) without any MP or LON communication capability to be used as stand alone or in master and slave setting.



The compact controllers are equally available with MP-Bus, ModBus and LON communication capability. On demand as alternative, Gateway communication units can be provided and can be connected later in time to building management systems to create a zone control by creating bus-rings solutions (only possible if MP-Bus communication is installed).

VAV and Compact controllers are factory calibrated as standard to the air volume indicated in the table or upon request can be adjusted to site required settings prior to dispatch on Vmin and Vmax range. The air volumes can also be readjusted on site with ZTH-Gen hand held service tool. If specific air volumes for Vmin and Vmax would be required, this must be indicated prior to order of the units for adequate calibration in the factory.

BLC1= Belimo LMV-D3 compact controller WITH MP-Bus communication

BLC4 = Belimo LMV-D3 compact controller WITHOUT MP-Bus communication

BLC1-MOD = Belimo LMV-D3 compact controller WITH MODBUS communication

GO = Gruner compact controller type WTHOUT communication

GO-MPD = Gruner compact controller type with MODBUS communication

Mounting

On duct installations after elbow, reduction, T-branch etc. L to be min. 3 times duct equivalent effective diameter (D_{eff}).
If L can not be respected, then minimum of 2 × D_{eff} with perforated equalizing grid should be installed

$$D_{eff} = \frac{2 \times W \times H}{W + H}$$

$$L_{min} = 3 \times D_{eff}$$

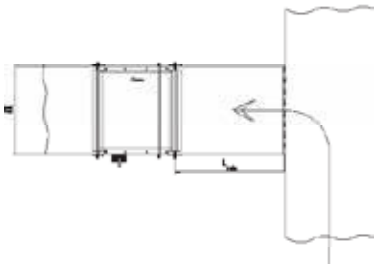


Fig. 4: Measuring track length after T-branch

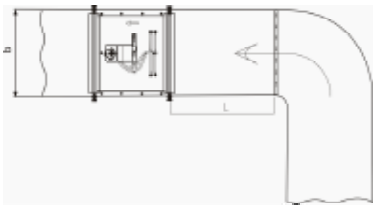


Fig. 5: Measuring track length after Elbow

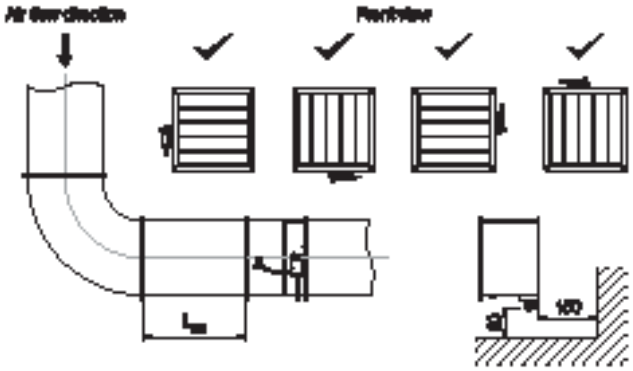


Fig. 6: Optima-S positioning and definition of measuring track length

NOTE:
A proper flange fixing method (e.g. flange clamps) and gasket shall be used by installer to maintain the corresponding tightness class.

Dimensions

H \ W	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
100	3	3	5	6	6	8	8	9	9												
150	6	8	8	9	9	9	11	11	12	14											
200	9	11	11	12	12	12	14	14	15	15	15	17	17	18	18						
250		11	11	14	14	14	14	14	15	15	17	18	18	20	21	21					
300		3C	12	14	15	14	14	15	15	17	18	20	21	23	29	29	32	32	33		
350			14	15	17	15	15	15	17	18	20	21	23	26	29	30	33	33	36	38	
400			Tightness		18	18	17	17	18	20	21	23	26	29	30	35	38	39	41	42	44
450		4C	class			18	20	20	20	21	24	26	29	32	32	36	39	41	42	44	45
500							23	21	23	24	27	29	32	33	35	38	42	44	45	47	48
550								24	26	27	30	32	33	36	36	39	44	45	47	48	51
600									29	30	32	33	36	38	38	41	45	48	50	51	54
650										33	35	36	38	41	41	44	48	50	53	54	57
700											38	39	41	44	44	47	51	53	56	57	60
750												41	44	45	47	50	54	56	57	60	63
800													45	47	48	51	56	57	60	63	65
850														48	51	53	57	59	62	65	68
900															53	56	60	62	65	68	71
950																59	62	65	68	71	74
1000																	65	68	71	74	75

Tab. 4: OPTIMA-S-I table of weight

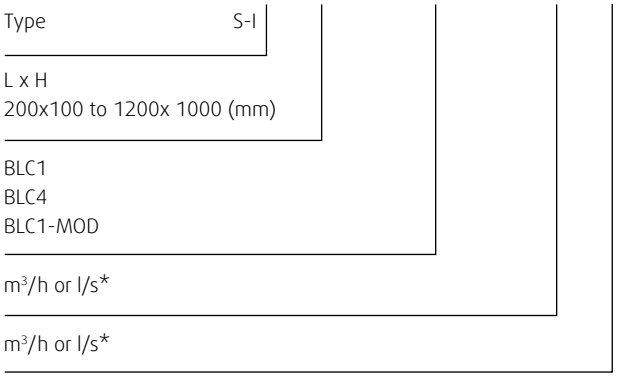
***m* (kg)**	5 Nm drive	✓	OPTIMA-S-I	✓	OPTIMA-S-I-GO
***m* (kg)**	10 Nm drive	✓	OPTIMA-S-I	✓	OPTIMA-S-I-GO
***m* (kg)**	20 Nm drive	✓	OPTIMA-S-I	✗	OPTIMA-S-I-GO

Accessories

Silencers are available to reduce the discharge sound power levels when required. Multi-outlet insulated terminal units are available when multi-zone application is required.

Ordering codes

Optima - Type - Size- Controller Type - V_{min} - V_{max}



*** Note:**

1. If the air volumes are not given during the ordering process, then standard Factory setting will be applied according to table

Ordering example:

OPTIMA-S-I-600x300-BLC1-1500(m³/h)-5000(m³/h)
The above order example is set for Vmin and Vmax air volume setting for size 600x300 with Belimo compact controller having MP Bus comminucation capability.

BLC1 controller is a compact controller with MP-Bus communication
BLC1-MOD is controller with builtin ModBus comminucation
BLC4 controller is a standalone controller without any communication

Optima-S-I Table of dimensions and weight

W	H	B	G
mm	mm	mm	kg
200	200	140	6
300			7
400			9
500			10
600			12
700			14
800			15
900			17
1000			18
1100			19
1200			21
200	300	51	7
300			8
400			10
500			12
600			14
700			16
800			17
900			19
1000			21
1100			22
1200			24
200	400	201	8
300			10
400			12
500			14
600			16
700			18
800			20
900			22
1000			25
1100			27
1200			29

W	H	B	G
mm	mm	mm	kg
200	500	290	8
300			11
400			13
500			15
600			18
700			20
800			22
900			25
1000			28
1100			30
1200			32
200	600	301	9
300			12
400			14
500			17
600			19
700			22
800			25
900			27
1000			30
1100			33
1200			36
200	700	390	10
300			13
400			16
500			19
600			22
700			25
800			28
900			30
1000			34
1100			37
1200			40

W	H	B	G
mm	mm	mm	kg
200	800	440	11
300			14
400			17
500			20
600			24
700			27
800			30
900			33
1000			37
1100			40
1200			43
200	900	451	12
300			15
400			19
500			22
600			25
700			29
800			32
900			35
1000			40
1100			43
1200			47
200	1000	540	13
300			16
400			20
500			23
600			27
700			31
800			34
900			38
1000			43
1100			47
1200			50

Optima-S-I Quick selection table

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
200	100	144	40	936	260
	150	216	60	1404	390
	200	288	80	1872	520
250	100	180	50	1170	325
	150	270	75	1755	488
	200	360	100	2340	650
	250	450	125	2925	813
300	100	216	60	1404	390
	150	324	90	2106	585
	200	432	120	2808	780
	250	540	150	3510	975
	300	648	180	4212	1170
	350	756	210	4914	1365
350	100	252	70	1638	455
	150	378	105	2457	683
	200	504	140	3276	910
	250	630	175	4095	1138
	300	756	210	4914	1365
	350	882	245	5733	1593
400	100	288	80	1872	520
	150	432	120	2808	780
	200	576	160	3744	1040
	250	720	200	4680	1300
	300	864	240	5616	1560
	350	1008	280	6552	1820
	400	1152	320	7488	2080
450	100	324	90	2106	585
	150	486	135	3159	878
	200	648	180	4212	1170
	250	810	225	5265	1463
	300	972	270	6318	1755
	350	1134	315	7371	2048
	400	1296	360	8424	2340
	450	1458	405	9477	2633
500	100	360	100	2340	650
	150	540	150	3510	975
	200	720	200	4680	1300
	250	900	250	5850	1625
	300	1080	300	7020	1950
	350	1260	350	8190	2275
	400	1440	400	9360	2600
	450	1620	450	10530	2925
	500	1800	500	11700	3250

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
550	100	396	110	2574	715
	150	594	165	3861	1073
	200	792	220	5148	1430
	250	990	275	6435	1788
	300	1188	330	7722	2145
	350	1386	385	9009	2503
	400	1584	440	10296	2860
	450	1782	495	11583	3218
	500	1980	550	12870	3575
	550	2178	605	14157	3933
600	100	432	120	2808	780
	150	648	180	4212	1170
	200	864	240	5616	1560
	250	1080	300	7020	1950
	300	1296	360	8424	2340
	350	1512	420	9828	2730
	400	1728	480	11232	3120
	450	1944	540	12636	3510
	500	2160	600	14040	3900
	550	2376	660	15444	4290
	600	2592	720	16848	4680
650	150	702	195	4563	1268
	200	936	260	6084	1690
	250	1170	325	7605	2113
	300	1404	390	9126	2535
	350	1638	455	10647	2958
	400	1872	520	12168	3380
	450	2106	585	13689	3803
	500	2340	650	15210	4225
	550	2574	715	16731	4648
	600	2808	780	18252	5070
	650	3042	845	19773	5493
700	200	1008	280	6552	1820
	250	1260	350	8190	2275
	300	1512	420	9828	2730
	350	1764	490	11466	3185
	400	2016	560	13104	3640
	450	2268	630	14742	4095
	500	2520	700	16380	4550
	550	2772	770	18018	5005
	600	3024	840	19656	5460
	650	3276	910	21294	5915
	700	3528	980	22932	6370

10 - 20% Of Vmax air flow rate has an accuracy error rate of: ±25%
20 - 40% Of Vmax air flow rate has an accuracy error rate of: <±10%
40 - 100% Of Vmax air flow rate has an accuracy error rate of: <±4%

Optima-S-I Quick selection table

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
750	200	1080	300	7020	1950
	250	1350	375	8775	2438
	300	1620	450	10530	2925
	350	1890	525	12285	3413
	400	2160	600	14040	3900
	450	2430	675	15795	4388
	500	2700	750	17550	4875
	550	2970	825	19305	5363
	600	3240	900	21060	5850
	650	3510	975	22815	6338
	700	3780	1050	24570	6825
	750	4050	1125	26325	7313
800	200	1152	320	7488	2080
	250	1440	400	9360	2600
	300	1728	480	11232	3120
	350	2016	560	13104	3640
	400	2304	640	14976	4160
	450	2592	720	16848	4680
	500	2880	800	18720	5200
	550	3168	880	20592	5720
	600	3456	960	22464	6240
	650	3744	1040	24336	6760
	700	4032	1120	26208	7280
	750	4320	1200	28080	7800
	800	4608	1280	29952	8320
850	200	1224	340	7956	2210
	250	1530	425	9945	2763
	300	1836	510	11934	3315
	350	2142	595	13923	3868
	400	2448	680	15912	4420
	450	2754	765	17901	4973
	500	3060	850	19890	5525
	550	3366	935	21879	6078
	600	3672	1020	23868	6630
	650	3978	1105	25857	7183
	700	4284	1190	27846	7735
	750	4590	1275	29835	8288
	800	4896	1360	31824	8840
	850	5202	1445	33813	9393
900	200	1296	360	8424	2340
	250	1620	450	10530	2925
	300	1944	540	12636	3510

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
900	350	2268	630	14742	4095
	400	2592	720	16848	4680
	450	2916	810	18954	5265
	500	3240	900	21060	5850
	550	3564	990	23166	6435
	600	3888	1080	25272	7020
	650	4212	1170	27378	7605
	700	4536	1260	29484	8190
	750	4860	1350	31590	8775
	800	5184	1440	33696	9360
	850	5508	1530	35802	9945
	900	5832	1620	37908	10530
950	250	1710	475	11115	3088
	300	2052	570	13338	3705
	350	2394	665	15561	4323
	400	2736	760	17784	4940
	450	3078	855	20007	5558
	500	3420	950	22230	6175
	550	3762	1045	24453	6793
	600	4104	1140	26676	7410
	650	4446	1235	28899	8028
	700	4788	1330	31122	8645
	750	5130	1425	33345	9263
	800	5472	1520	35568	9880
	850	5814	1615	37791	10498
	900	6156	1710	40014	11115
	950	6498	1805	42237	11733
1000	300	2160	600	14040	3900
	350	2520	700	16380	4550
	400	2880	800	18720	5200
	450	3240	900	21060	5850
	500	3600	1000	23400	6500
	550	3960	1100	25740	7150
	600	4320	1200	28080	7800
	650	4680	1300	30420	8450
	700	5040	1400	32760	9100
	750	5400	1500	35100	9750
	800	5760	1600	37440	10400
	850	6120	1700	39780	11050
	900	6480	1800	42120	11700
	950	6840	1900	44460	12350
	1000	7200	2000	46800	13000

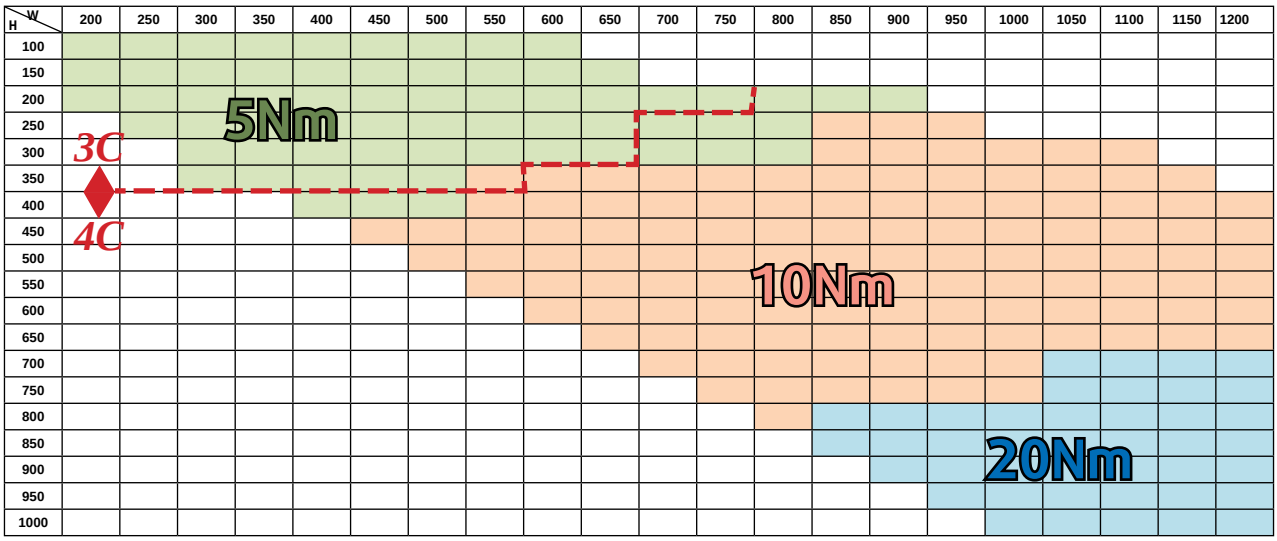
10 - 20% Of Vmax air flow rate has an accuracy error rate of: ±25%
20 - 40% Of Vmax air flow rate has an accuracy error rate of: <±10%
40 - 100% Of Vmax air flow rate has an accuracy error rate of: <±4%

Optima-S-I Quick selection table

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
1050	300	2268	630	14742	4095
	350	2646	735	17199	4778
	400	3024	840	19656	5460
	450	3402	945	22113	6143
	500	3780	1050	24570	6825
	550	4158	1155	27027	7508
	600	4536	1260	29484	8190
	650	4914	1365	31941	8873
	700	5292	1470	34398	9555
	750	5670	1575	36855	10238
	800	6048	1680	39312	10920
	850	6426	1785	41769	11603
	900	6804	1890	44226	12285
	950	7182	1995	46683	12968
	1000	7560	2100	49140	13650
1100	300	2376	660	15444	4290
	350	2772	770	18018	5005
	400	3168	880	20592	5720
	450	3564	990	23166	6435
	500	3960	1100	25740	7150
	550	4356	1210	28314	7865
	600	4752	1320	30888	8580
	650	5148	1430	33462	9295
	700	5544	1540	36036	10010
	750	5940	1650	38610	10725
	800	6336	1760	41184	11440
	850	6732	1870	43758	12155
	900	7128	1980	46332	12870
	950	7524	2090	48906	13585
	1000	7920	2200	51480	14300

mm		V_{min}		V_{max}	
W	H	m³/h	l/s	m³/h	l/s
1150	350	2898	805	18837	5233
	400	3312	920	21528	5980
	450	3726	1035	24219	6728
	500	4140	1150	26910	7475
	550	4554	1265	29601	8223
	600	4968	1380	32292	8970
	650	5382	1495	34983	9718
	700	5796	1610	37674	10465
	750	6210	1725	40365	11213
	800	6624	1840	43056	11960
	850	7038	1955	45747	12708
	900	7452	2070	48438	13455
	950	7866	2185	51129	14203
	1000	8280	2300	53820	14950
1200	400	3456	960	22464	6240
	450	3888	1080	25272	7020
	500	4320	1200	28080	7800
	550	4752	1320	30888	8580
	600	5184	1440	33696	9360
	650	5616	1560	36504	10140
	700	6048	1680	39312	10920
	750	6480	1800	42120	11700
	800	6912	1920	44928	12480
	850	7344	2040	47736	13260
	900	7776	2160	50544	14040
	950	8208	2280	53352	14820
	1000	8640	2400	56160	15600

Note :
value V_{min} = 0 can be always adjusted
value V_{max} can be adjusted also deside the standard range upon an agreement with the producer



Accessories

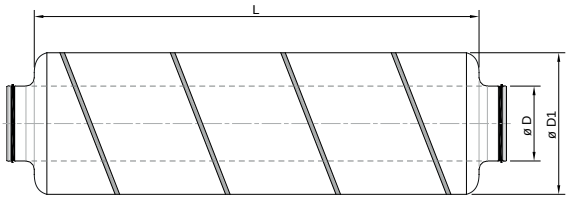
LDC

Circular Attenuator

Circular silencer LDC designed to fit directly to Optima-R and Optima-R-I VAV terminal units with the help of Fast clamp FK. The inlet and outlet connection complies with the spiral duct standard.

The LDC effectively reduces noise levels on the discharge of the VAV unit or in the duct work. Two silencers can be used in series together in installations where noise reduction is a particularly strong requirement, this can be very effective. For the most effective noise reduction, the silencer should be fitted immediately downstream of the VAV terminal unit and before the accessories such as Optima-R-MO (Round Multi-outlet units) or after the Accessories such as VBC (Water Batteries).

The silencer is delivered in various fixed lengths and is insulation thickness 100 mm. All LDC silencers are fitted with tightness rubber gasket to assure leak less connection. FK can be used to facilitate the connection and mounting of the system.

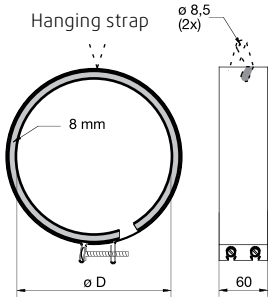


Size	Ø D (mm)	L_{nom} (mm)	Ø D_1 (mm)	L (mm)	m (kg)
100-300	97	300	200	360	2,28
100-600	97	600	200	660	4,09
100-900	97	900	200	960	5,18
100-1200	97	1200	200	1260	6,46
125-600	122	600	224	665	4,39
125-900	122	900	224	965	6,2
125-1200	122	1200	224	1265	7,47
150-600	147	600	250	600	5,37
160-600	157	600	260	670	5,37
160-900	157	900	260	970	7,48
200-600	197	600	300	685	6,9
200-900	197	900	300	985	9,74
250-600	247	600	355	600	8,55
250-900	247	900	355	900	11,7
315-600	312	600	415	600	11,8
315-900	312	900	415	900	16,3
355-900	352	900	560	900	25,2
400-900	397	900	600	900	24,3

FK

Fast clamps

Mounting clips which facilitate the installation and removal of fans for service and cleaning. Made from galvanised sheet steel and fitted with an 8 mm neoprene lining which suppresses vibrations and ensures a tight fit. The mounting clips are clamped together by two screws which allow for small differences in dimension.

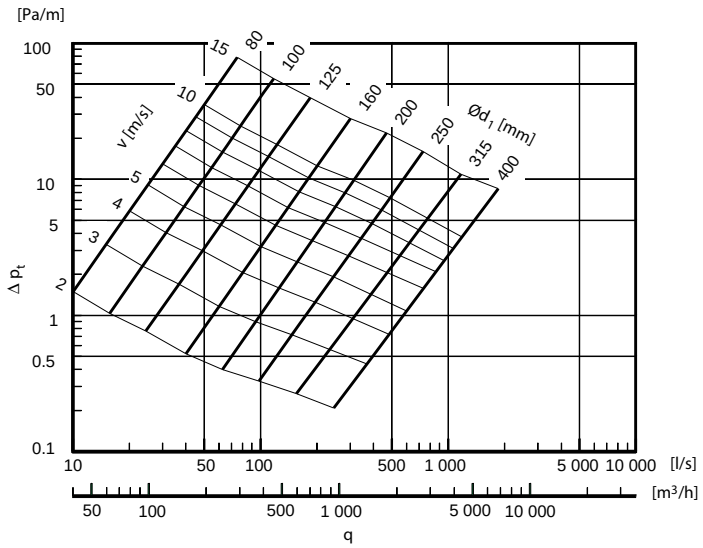


FK	øD mm
100	100
125	125
150	150
160	160
200	200
250	250
315	315
355	355
400*	400
450*	450
500*	500
* Note! Without hanging straps	

		Attenuation [dB] for centre frequency [Hz]										
ØD nom	Length nom	63	125	250	500	1k	2k	4k	8k	ØD1 mm	l mm	m mm
80	300	5	5	8	15	28	29	23	16	190	300	1,92
80	600	5	7	12	26	41	50	48	24	190	600	3,14
80	900	5	9	17	37	50	50	50	32	190	900	4,61
80	1200	6	11	21	49	50	50	50	40	190	1200	5,73
100	300	2	2	6	14	21	25	20	11	210	360	2,28
100	600	4	3	11	24	36	49	34	17	210	660	4,09
100	900	5	4	15	34	50	50	48	23	210	960	5,18
100	1200	6	5	19	45	50	50	50	29	210	1260	6,46
125	300	2	2	6	13	16	20	15	10	235	365	2,66
125	600	3	3	9	23	30	40	22	14	235	665	4,39
125	900	4	4	12	33	45	50	30	17	235	965	6,20
125	1200	5	5	15	43	50	50	38	21	235	1265	7,47
160	300	1	2	4	10	12	15	8	8	270	375	2,98
160	600	2	3	7	19	27	29	14	11	270	675	5,37
160	900	2	4	10	28	42	43	20	15	270	975	7,48
160	1200	2	5	13	37	50	50	26	19	270	1275	9,23
200	300	1	2	5	8	10	11	5	5	325	385	4,11
200	600	2	3	7	16	21	23	9	8	325	685	6,90
200	900	2	4	8	24	32	34	13	10	325	985	9,74
200	1200	3	5	10	31	43	45	18	13	325	1285	12,0
250	600	3	2	7	13	17	16	8	6	365	600	8,55
250	900	3	4	8	20	26	23	10	8	365	900	11,7
250	1200	4	5	9	26	35	30	12	10	365	1200	15,0
315	600	0	2	6	11	14	9	4	5	427	600	11,3
315	900	1	3	7	16	22	12	6	7	427	900	15,6
315	1200	1	3	8	22	30	16	7	9	427	1200	20,3
400*	600	0	3	4	6	8	4	4	4	508	600	20,5
400*	900	1	3	5	10	13	7	5	6	508	900	26,8
400*	1200	1	4	7	14	19	10	7	8	508	1200	30,0

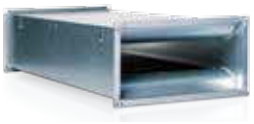
* Supplied with two loose couplings

Technical data



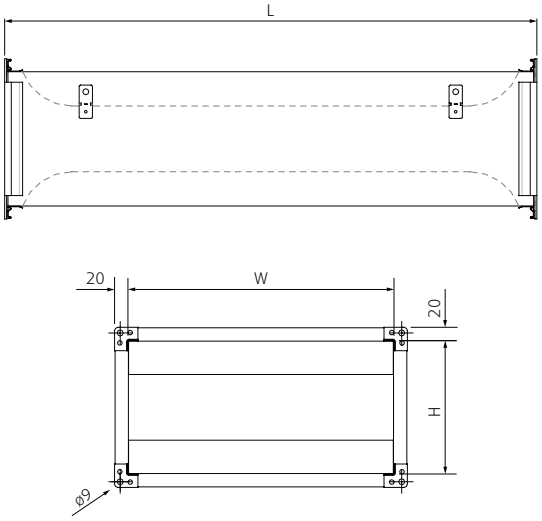
Optima-SA

Rectangular Sound Attenuator



Rectangular silencer Optima-SA designed to fit directly to Optima-RS VAV terminal units. The inlet and outlet connection is designed to effectively and easily be mounted to the Optima-RS units.

The Optima-SA effectively reduces noise levels on the discharge of the VAV unit. Two silencers can be used in series together in installations where noise reduction is a particularly strong requirement, this can be very effective. For the most effective noise reduction, the silencer should be fitted immediately downstream of the VAV terminal unit and before the accessories such as Optima-RS-MO (Rectangular to round Multi-outlet units) or after the Accessories such as VBR (Water Batteries). The silencer is delivered in fixed length of 1000mm and is insulated with thicknesses which vary to assure highest attenuation possible without compromising an increase in the pressure loss.



Size	W (mm)	H (mm)	L (mm)	m (kg)
200x200-1000	200	200	1000	9,1
250x200-1000	250	200	1000	10,2
400x200-1000	400	200	1000	13,4
500x250-1000	500	250	1000	19,1
600x350-1000	600	350	1000	22,7
700x400-1000	700	400	1000	26,4

THP

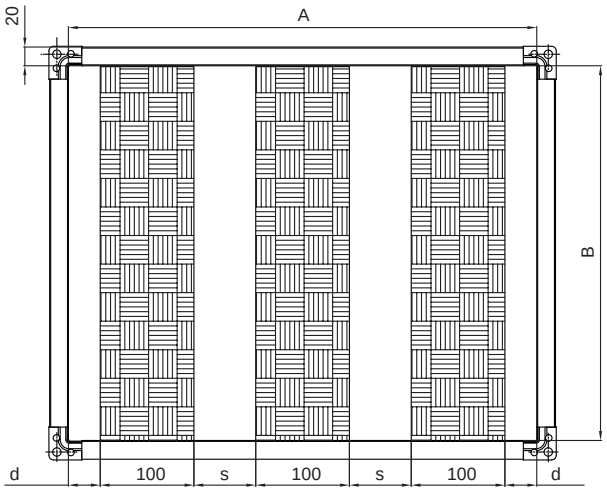
Rectangular Sound Attenuator

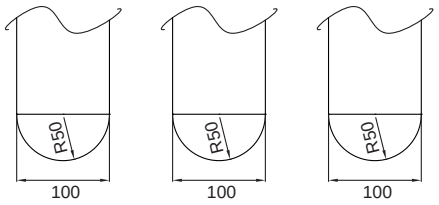
Rectangular silencer THP designed to fit directly to Optima-S VAV terminal units. The inlet and outlet connection is designed to effectively and easily be mounted to the Optima-S units.

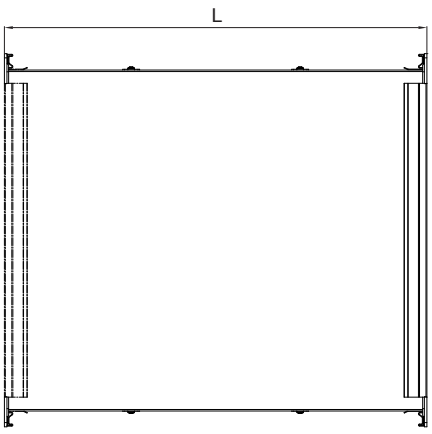
The THP effectively reduces noise levels on the discharge of the VAV unit. Two silencers can be used in series together in installations where noise reduction is a particularly strong requirement, this can be very effective. For the most effective noise reduction, the silencer should be fitted immediately downstream of the VAV terminal unit and before the accessories such as VBR (Water Batteries).

The silencer is delivered in fixed length of 1000mm and has beffel dimensions as noted and is insulated with thicknesses which vary to assure highest attenuation possible without compromising an increase in the pressure loss.

Table of dimensions on the next page give the standard basic configurations. For all other required configurations, please contact your local Systemair sales office.



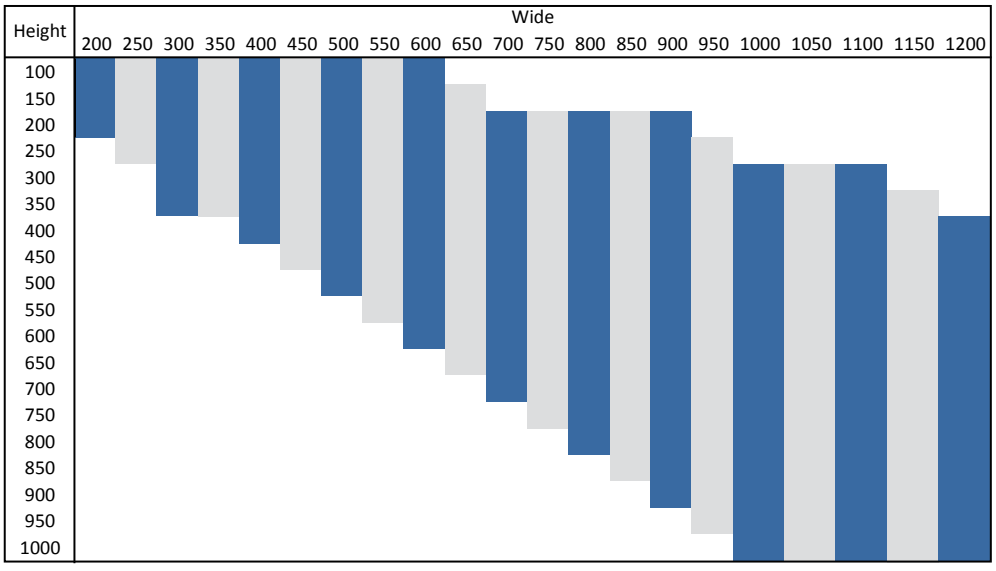




Weights in Kg	H mm	L mm	A [mm] - n																
			200-1			300-2			400-2			500-3			600-3			700-4		
			W	S	d	W	S	d	W	S	d	W	S	d	W	S	d	W	S	d
	200	1000	12	0	50	20	50	25	22	100	50	28	66	34	30	100	50	35	75	37.5
	300		15	0	50	22	50	25	24	100	50	30	66	34	32	100	50	39	75	37.5
	400		18	0	50	26	50	25	28	100	50	35	66	34	37	100	50	44	75	37.5
	500		21	0	50	30	50	25	32	100	50	41	66	34	43	100	50	50	75	37.5
	600		24	0	50	34	50	25	36	100	50	44	66	34	46	100	50	55	75	37.5
	700		28	0	50	38	50	25	40	100	50	49	66	34	51	100	50	62	75	37.5
	800		31	0	50	43	50	25	45	100	50	54	66	34	56	100	50	68	75	37.5
	900		33	0	50	45	50	25	47	100	50	58	66	34	60	100	50	71	75	37.5
	1000		35	0	50	48	50	25	50	100	50	60	66	34	62	100	50	74	75	37.5

Weights in Kg	H mm	L mm	A [mm] - n														
			800-4			900-5			1000/5/100			1100/6/83			1200/6/100		
			W	S	d	W	S	d	W	S	d	W	S	d	W	S	d
	200	1000	37	100	50	43	80	40	45	100	50	46	83	42.5	48	100	50
	300		41	100	50	47	80	40	49	100	50	50	83	42.5	52	100	50
	400		46	100	50	54	80	40	56	100	50	64	83	42.5	66	100	50
	500		52	100	50	61	80	40	63	100	50	70	83	42.5	72	100	50
	600		57	100	50	67	80	40	69	100	50	78	83	42.5	80	100	50
	700		64	100	50	74	80	40	76	100	50	86	83	42.5	88	100	50
	800		70	100	50	81	80	40	83	100	50	93	83	42.5	95	100	50
	900		73	100	50	83	80	40	85	100	50	95	83	42.5	97	100	50
	1000		76	100	50	88	80	40	90	100	50	100	83	42.5	102	100	50

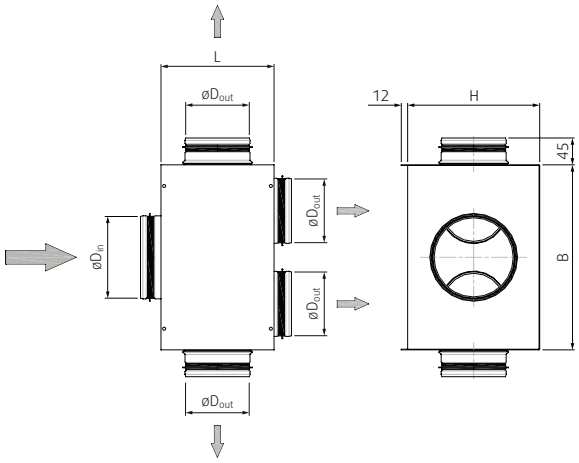
n = Number of Baffels
s = Distance between baffels
A= Width of Silencer
H = Height of the Silencer
W = Total weight of silencer
d = Distance from Inner silencer wall to baffel



Optima-R-MO & R-I-MO

Multioutlet box

Optima-R-MO are Multi-Outlet plenum boxes which are designed to be used with Round VAV units. Multi-Outlet plenum boxes are as standard without any insulation internally or externally. On request following boxes can be insulated as required on site.
Multi outlet plenum boxes are designed to facilitate installation of VAV units to multiple diffusers for supply or return air application.

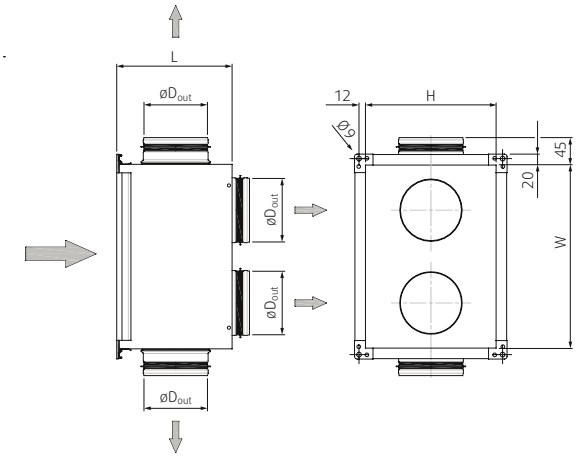


Size	ØD$_{in}$ (mm)	ØD$_{out}$ (mm)	B (mm)	H (mm)	L (mm)
100-80	97	78	250	190	150
100-100	97	97	300	190	170
125-100	122	97	300	210	170
125-125	122	122	350	210	190
140-100	137	97	300	230	170
140-140	137	137	380	230	210
160-125	157	122	350	250	190
160-160	157	157	420	250	230
180-140	177	137	380	270	210
180-180	177	177	460	270	250
200-160	197	157	420	290	230
200-200	197	197	500	290	270
225-180	222	177	460	320	250
225-225	222	222	560	320	300
250-200	247	197	500	340	270
250-250	247	247	610	340	330
280-225	277	222	560	370	300
280-280	277	277	670	370	370
315-250	312	247	610	410	330
315-315	312	312	740	410	390
355-280	352	277	670	450	370
355-355	352	352	820	450	430
400-315	397	312	740	480	390
400-400	397	397	910	480	470

Optima-RS-MO

Multioutlet box

Optima-RS-MO are Multi-Outlet plenum boxes which are designed to be used with Round to rectangular outlet VAV units. Multi-Outlet plenum boxes are as standard without any insulation internally or externally. On request following boxes can be insulated as required on site. Multi outlet plenum boxes are designed to facilitate installation of VAV units to multiple diffusers for supply or return air application.



Size	W (mm)	H (mm)	ØDout (mm)	L (mm)
200x200-80	200	200	78	190
200 x 200 - 100	200	200	98	190
250 x 200 - 100	250	200	98	190
250 x 200 - 125	250	200	122	190
400 x 200 - 125	400	200	122	190
400 x 200 - 140	400	200	137	210
400 x 200 - 160	400	200	157	210
400 x 200 - 180	400	200	177	250
500 x 250 -160	500	250	157	250
500 x 250 -180	500	250	177	330
500 x 250 -200	500	250	197	330
600 x 350 - 200	600	350	197	330
600 x 350 - 250	600	350	247	370
700 x 400 - 250	700	400	247	370
700 x 400 - 315	700	400	312	390

Reference

Project name: Sun & sand
Type of building: Hotel
City/country: Pune, India
Product/solution: Axial fans, high temperature fans.

Controllers

Argus-RC
Room controller without communication 10

Argus-Midi
Room controller with communication 10

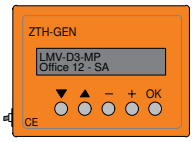
Argus-IR24-P
Wall mounted presence detector 10

Argus-IR24-PC
Ceiling mounted presence detector 10

BLC4 controllers
VAV-Compact Controller..... 10

BLC1 controllers
VAV-Compact Controller..... 10

ZTH-GEN
Hand held Service-Tool 10



BLC1-MOD controllers
VAV-Compact Controller 10

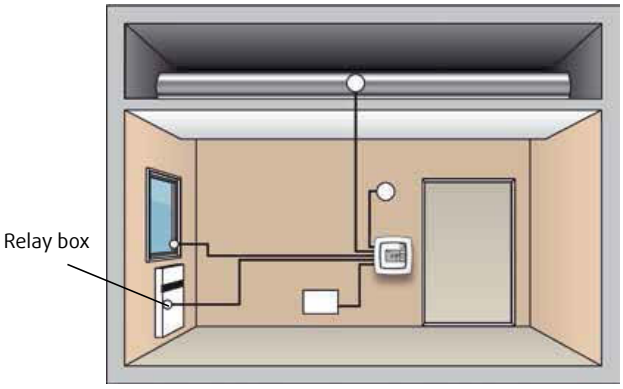
Fan Optimizer
Fan regulation for room ventilation 10

Argus-RC

Pre-programmed room controllers

The stand-alone version, Argus-RC, is designed for control of heating and cooling in a single zone or a room. A system consists of different control units and a relay box. The control units are pre-programmed, but can be configured for a specific application by using the display and switches. (However, the default setting is in most cases applicable.)

The control units have built-in temperature sensors. An external temperature sensor can also be connected.



Controllers Heating and Cooling

Argus-RC
Room Unit

Argus-RC-O
Room Unit
Occupancy

Argus-RC-H
Room Unit
Hidden Set-point

RC
Room controller

RC is a room controller from the Argus series intended to control heating and cooling in a zone control system.

- Awarded design
- Simple installation
- On/Off or 0...10 V control
- Input for occupancy detector, window contact, condensation detector and change-over function

RC is a room controller from the Argus series. It does not have a communication connection.

Argus
Argus is a wide series of controllers which handle heating and cooling. The controllers are divided into two different series, With and Without communication capability. The controller group with no communication capability, to which RC belongs, are pre-programmed, stand-alone controllers. The controllers with communication are pre-programmed and are ready to be installed into a controller network to suit the communication type

Applications
The Argus controllers are suitable in buildings where you want optimal comfort and low energy consumption, for example offices, schools, shopping centres, airports, hotels and hospitals etc.

Design
The controllers have a modern design. The design has been awarded the 2007 "iF product design award". The standard colour is white, but the frame and centre can be received in a number of different colours on inquiry. The units can be combined, offering many different effects.

Sensor
The controller has a built-in sensor. An external Pt1000-sensor can also be used.

Actuators
RC can control 0...10 V DC valve actuators and/or 24 V AC thermal actuators.

Easy to install
The modular design with a separate bottom plate for wiring makes the whole Argus series easy to install and commission. The bottom plate can be put into place before the electronics are installed. Mounting is directly on the wall or on an electrical connection box.

Control states

RC has control state:

- Heating and cooling in sequence

The change-over function can be activated, see below.

Operating modes

There are three different operating modes: Stand-by, Occupied and Bypass. Occupied is the preset operating mode. It can be changed to Stand-by with a dipswitch. The operating modes can be activated via an occupancy detector.

Stand-by : The room is in an energy save mode and is not used at the moment. This can for example be during nights, weekends, evenings etc. The controller is prepared to change operating mode to Occupied if someone enters the room. Both heating and cooling are disconnected within a temperature interval around the applicable setpoint (heating setpoint value=-3°C, cooling setpoint=+3°C).

Occupied : The room is in use and is therefore in a comfort mode. The controller regulates the temperature around a heating setpoint (22°C) and a cooling setpoint (24°C).

Bypass: The temperature in the room is controlled in the same way as in operating mode Occupied. The output for forced ventilation is also active. Bypass is useful for example in conference rooms, where many people are present at the same time for a certain period of time. After 10 minutes absence, the controller will automatically return to the preset operating mode (Occupied or Stand-by).

Occupancy detector

By connecting an occupancy detector, RC can switch between Bypass and the preset operating mode (Occupied or Stand-by). The temperature is then controlled according to requirement, which saves energy and keeps the temperature at a comfortable level.

Change-over function

RC has an input for change-over that automatically resets output UO1 to operate with heating or cooling function. The input can be connected to sensors of type PT1000 and have the sensor mounted so that it senses the temperature on the supply pipe to the coil.

When the temperature exceeds 22°C, the output function is set to heating and when the temperature drops below 18°C, the output is set to cooling.

As an alternative, a potential-free contact can be used. When the contact is open the controller works with the heating function and when it is closed, with the cooling function.

To ensure satisfactory functioning using sensor, the system must have continuous primary circuit circulation. When the change-over function is not used, the input must be left disconnected.

Setpoint

In Occupied mode, the controller operates from a heating setpoint (22°C) or a cooling setpoint (24°C) that can be changed locally using dipswitches. The setpoint can be adjusted up and down (±3°C) with the knob on the front of the controller.Switching between heating and cooling setpoints is done automatically in the controller depending on the heating and cooling requirement.

Built-in safety functions

RC has an input for a condensation detector which prevents condensation. The controller also has frost protection. It prevents frost damages by by ensuring that the room temperature does not drop below 8°C when the controller is in Off-mode (caused by open window).

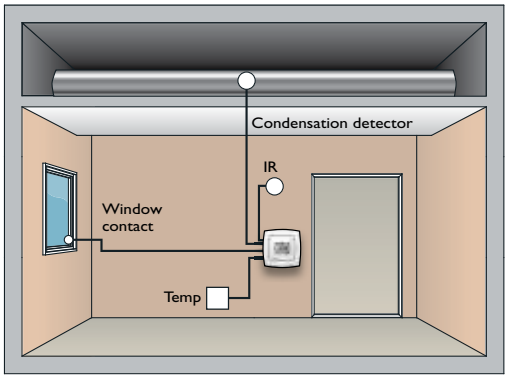
Indications

The controller has an LED shaped like a thermometer on the front. A red indication is shown when heating control is functional and a blue indication when cooling control is active. No LED indication shows that neither heating nor cooling control is active.

Actuator exercise

All actuators are exercised. The exercise takes place at a 23 hours interval. An opening signal is sent to the actuator for as long time as the run time has been configured. Then a closing signal is sent for as long time and the exercise is finished.

Application example



Technical data

Supply voltage	18...30 V AC, 50...60 Hz
Internal consumption	2.5 VA
Ambient temperature	0...50°C
Storage temperature	-20...+70°C
Ambient humidity	Max 90% RH
Protection class	IP20
Built-in temperature sensor	NTC type, measuring range 0...50°C, accuracy ±0.5°C at 15...30°C
Material, casing	Polycarbonate, PC
Weight	110 g
Colour	Cover: Polar white RAL9010 Bottom plate: Light gray *Is also available in other colours on inquiry, contact systemair for more Information.*
CE	This product conforms with the requirements of European EMC standards CENELEC EN 61000-6-1 and EN 61000-6-3, and the requirements of European LVD standard IEC 60 730-1. It carries the CE mark.

Inputs

External room sensor	PT1000-sensor, 0...50°C. Suitable sensors are Argus's TG-R5/PT1000,TG-UH/PT1000 and TG-A1/PT1000.
Change-over alt. potential-free contact	PT1000-sensor, 0...100°C. Suitable sensor is Argus's TG-A1/PT1000.
Occupancy detector	Closing potential-free contact. Suitable occupancy detector is Argus's IR24-P.
Condensation detector alt. window contact	Argus's condensation detector KG-A/1 resp. potential-free contact

Outputs

Forced ventilation	24 V AC actuator, max 0.5 A
Valve actuator alt. thermal actuator	2 outputs
Valve actuator	0...10 V DC, max 5 mA
Thermal actuator	24 V AC, max 2.0 A
Control	Heating or cooling
Actuator exercise	23 hours interval
	Terminal blocks Lift type for cable cross-section 2.1 mm^2

Basic setpoint heating, setting with dipswitches

The ON-position is marked on the dipswitch. The cooling setpoint is 2°C higher.

Basic setpoint, heating (°C)	SW1	SW2
20	OFF	OFF
22 (FS)	OFF	ON
24	ON	OFF
26	ON	ON

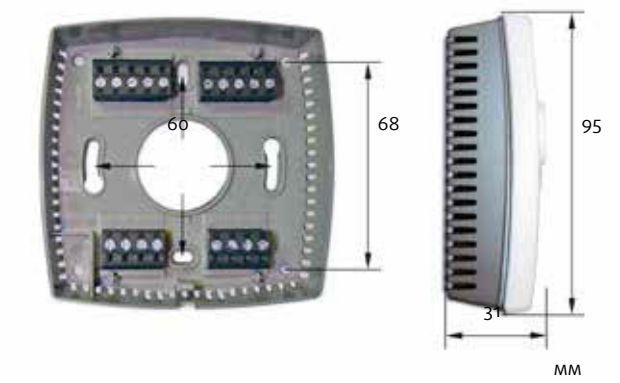
Other dipswitches

	ON	OFF	Comment
SW3	Stand-by	Occupied (FS)	Preset operating mode
SW4	DI, window contact. Closed contact indicates closed window.	CI, Argus's condensation detector, KG-A/1 (FS).	Function terminal 33, DI2/CI.
SW5	Digital output for 24 V AC thermal actuator.	Analogue output for 0...10 V DC valve actuator (FS).	Function terminal 23, UO1.
SW6	Digital output for 24 V AC thermal actuator.	Analogue output for 0...10 V DC valve actuator (FS).	Function terminal 24, UO2.
SW7	External, PT1000-sensor	Internal NTC-sensor (FS)	Temperature sensor

Wiring

Terminal	Designation	Operation
10	G	Supply voltage 24 V AC
11	G0	Supply voltage 0 V
12	DO1	Output for forced ventilation
13-14		No function
20	GDO	24 V AC out common for DO
21	G0	0 V common for UO (when 0...10 V actuator is used)
22		No function
23	UO1	Output for 0...10 V valve actuator alt. thermal actuator. Heating or cooling.
24	UO2	Output for 0...10 V valve actuator alt. thermal actuator. Heating or cooling.
30	AI1	Input for external sensor
31	UI1	Input for change-over sensor alt. potential-free contact
32	DI1	Input for occupancy detector
33	DI2/CI	Input for Argus's condensation detector KG-A/1 alt. window contact
40	+C	24 V DC out common for UI and DI
41	AGnd	Analogue ground
42-43		No function

Dimensions



Product documentation

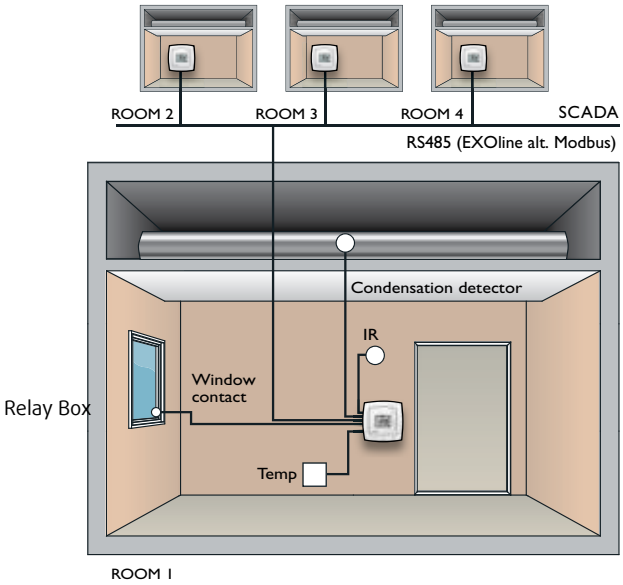
Document	Type
Instruction Argus RC	Instruction for RC
Product sheet TG-R4/PT1000, TG-R5/PT...	Information about room sensors, outdoor sensors and strap-on sensors suitable for RC
Product sheet TG-UH/PT...	
Product sheet TG-A1/PT...	
Product sheet IR24-P	Information about occupancy detector suitable for RC
Instruction IR24-P	Instruction for IR24-P
Product sheet CS-1	Information about condensation detector for the Argus controllers

Argus Midi

Pre-programmed room controllers with communication

Argus Midi has basically the same set-up as the stand-alone version. However, every individual zone system in every room can be connected to a bus line enabling communication with a central SCADA system via RS485 using EXOline or Modbus.

The room controllers are pre-programmed



Controllers Heating and Cooling

Argus-RC-CDO Room Unit Display, Occupancy

Argus- RC-CO Room Unit Occupancy

Argus- RC-C Room Unit

Argus- RC-CH Room Unit Hidden Set-point

RC-CDO

Pre-programmed room controller with display and communication

RC-CDO is a complete pre-programmed room controller from the Argus Midi series intended to control heating and cooling in a zone control system.

- Awarded design
- Communication via RS485 (Modbus or EXOline)
- Fast and safe configuration via Argus tool©
- Simple installation
- On/Off or 0...10 V control
- Backlit display
- Input for occupancy detector, window contact, condensation detector and change-over function

RC-CDO is a room controller from the Argus series. It has a display and communication via RS485 (Modbus or EXOline) for integration into systems.

Argus

Argus is a wide series of controllers which handle heating and cooling.
The controllers are divided into three different series, Mini, Midi and Maxi. Mini are pre-programmed, stand-alone controllers. Maxi consists of freely programmable controllers with communication. The Midi group, to which RC-CDO belongs, are pre-programmed controllers with communication.

Applications

The Argus controllers are suitable in buildings where you want optimal comfort and low energy consumption, for example offices, schools, shopping centres, airports, hotels and hospitals etc.

Design

The controllers have a modern design. The design has been awarded the 2007 "iF product design award".

Sensor

The controller has a built-in sensor. An external Pt1000-sensor can also be used.

Actuators

RC-CDO can control 0...10 V DC valve actuators and/or 24 V AC thermal actuators.

Easy to install

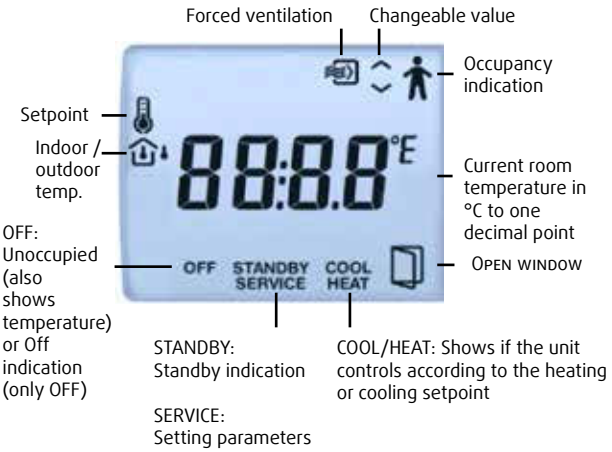
The modular design with a separate bottom plate for wiring makes the whole Argus series easy to install and commission. The bottom plate can be put into place before the electronics are installed. Mounting is directly on the wall or on an electrical connection box.

Flexibility with communication

RC-CDO can be connected to a central SCADA-system via RS485 (EXOline or Modbus) and configured for a particular application using the cost-free configuration tool Argus tool©.

Display handling

The display has the following indications:
It is possible to set different parameter values in a



parameter menu in the display, using the buttons on the controller. You change parameter values with the INCREASE and DECREASE buttons and confirm changes with the Occupancy button.

Control states

RC-CDO can be configured for different control states/ control sequences:

- Heating
- Heating or cooling via the change-over function
- Heating/Heating
- Heating/Cooling
- Heating/Cooling with VAV-control and forced supply air function
- Heating/Cooling with VAV-control
- Cooling
- Cooling/Cooling
-

Operating modes

There are five different operating modes: Off, Unoccupied, Stand-by, Occupied and Bypass. Occupied is the preset operating mode. It can be changed to Stand-by in the parameter menu in the display. The operating modes can be activated via a central command, an occupancy detector or the Occupancy button.

Off: Heating and cooling are disconnected. However, the temperature must not drop below the set minimum temperature (Factory setting (FS)=8°C). Operating mode Off is activated on open window.

Unoccupied: The room where the controller is placed is not used for an extended period, for example during holidays or long weekends. Both heating and cooling are disconnected within a temperature interval with configurable min/max temperatures (FS min=15°C, max=30°C).

Stand-by: The room is in an energy save mode and is not used at the moment. This can for example be during nights, weekends, evenings etc. The controller is prepared to change operating mode to Occupied if someone enters the room. Both heating and cooling are disconnected within a temperature interval around the applicable setpoint (FS heating setpoint value=-3°C, cooling setpoint=+3°C).

Occupied: The room is in use and is therefore in a comfort mode. The controller regulates the temperature around a heating setpoint (FS=22°C) and a cooling setpoint (FS=24°C).

Bypass: The temperature in the room is controlled in the same way as in operating mode Occupied. The output for forced ventilation is also active. Bypass is useful for example in conference rooms, where many people are present at the same time for a certain period of time. When Bypass has been activated by a press on the Occupancy button, the controller will automatically return to the preset operating mode (Occupied or Stand-by) after a configurable time (FS=2 hours). If an occupancy detector is used, the controller will automatically return to the preset operating mode after 10 minutes absence.

Occupancy detector

By connecting an occupancy detector, RC-CDO can switch between Bypass and the preset operating mode (Occupied or Stand-by). The temperature is then controlled according to requirement, which saves energy and keeps the temperature at a comfortable level.

The Occupancy button

If you press the Occupancy button for less than 5 seconds when the controller is in the preset operating mode, the controller changes to operating mode Bypass. If you press the button for less than 5 seconds when the controller is in Bypass, it changes operating mode to the preset operating mode.

When the Occupancy button is held depressed for more than 5 seconds, the controller changes operating mode to "Shutdown" (Off/Unoccupied), regardless of the current

operating mode. Via the display or Argus tool©, you can configure which operating mode, Off or Unoccupied, should be activated on "Shutdown" (FS=Unoccupied). If you press the Occupancy button for less than 5 seconds in Shutdown, the controller returns to Bypass.

Forced ventilation

Argus has a built-in function for forced ventilation. A short press on the Occupancy button activates output DO1 for example for a damper.

Change-over function

RC-CDO has an input for change-over that automatically resets output UO1 to operate with heating or cooling function. The input can be connected to sensors of type PT1000 and have the sensor mounted so that it senses the temperature on the supply pipe to the coil.
When the temperature exceeds 22°C, the output function is set to heating and when the temperature drops below 18°C, the output is set to cooling. As an alternative, a potential-free contact can be used. When the contact is open the controller works with the heating function and when it is closed, with the cooling function. To ensure satisfactory functioning using sensor, the system must have continuous primary circuit circulation. When the change-over function is not used, the input must be left disconnected.

Setpoint

In Occupied mode, the controller operates from a heating setpoint (FS = 22°C), or a cooling setpoint (FS = 24°C) that can be changed using the INCREASE and DECREASE buttons. Pressing on INCREASE increases the current setpoint by 0.5°C with each press up to the max. limit (FS = +3°C). Pressing on DECREASE decreases the current setpoint by 0.5°C with each press down to the min. limit (FS = -3°C).
Switching between heating and cooling setpoints is done automatically in the controller depending on the heating and cooling requirement.

Built-in safety functions

RC-CDO has an input for a condensation detector which prevents condensation. The controller also has frost protection. It prevents frost damages by ensuring that the room temperature does not drop below 8°C when the controller is in Off-mode.

Actuator exercise

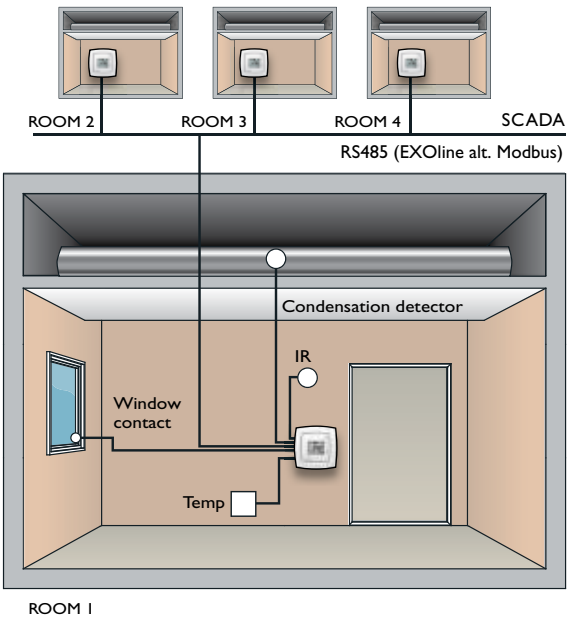
All actuators are exercised. The exercise takes place at set intervals in hours (FS=23 hours interval). An opening signal is sent to the actuator for as long time as the run time has been configured. Then a closing signal is sent for as long time and the exercise is finished.

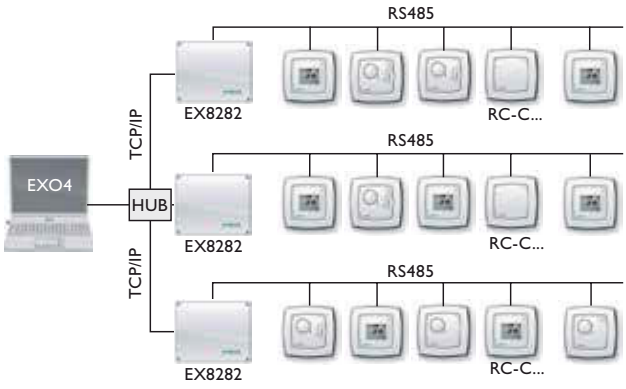
Configuration and supervision with Argus tool©

RC-CDO is pre-programmed on delivery, but can be configured using Argus tool©.

Argus tool© is a PC-based program that makes it possible to configure and supervise an installation, and change settings, via a clear and easy user interface.

Application examples





Technical data

Supply voltage	18...30 V AC, 50...60 Hz
Internal consumption	2.5 VA
Ambient temperature	0...50°C
Storage temperature	-20...+70°C
Ambient humidity	Max 90% RH
Protection class	IP20
Communication	RS485 (EXOline or Modbus) with automatic detection/change-over
Modbus	8 bits, 1 or 2 stop bits. Odd, even (FS) or no parity.
Communication speed	9600 bps (not changeable)
Display	LCD with background illumination
Built-in temperature sensor	NTC type, measuring range 0...50°C, accuracy ±0.5°C at 15...30°C
Material, casing	Polycarbonate, PC
Weight	110 g
Colour	Cover: Polar white RAL9010 Bottom plate: Light gray
CE standards	This product conforms with the requirements of European EMC CENELEC EN 61000-6-1 and EN 61000-6-3, and the requirements of European LVD standard IEC 60 730-1. It carries the CE mark.

Inputs

External room sensor	PT1000-sensor, 0...50°C. Suitable sensors are Argus's TG-R5/PT1000,TG-UH/PT1000 and TG-A1/PT1000.
Change-over alt. potential-free contact	PT1000-sensor, 0...100°C. Suitable sensor is Argus's TG-A1/PT1000.
Occupancy detector	Closing potential-free contact. Suitable occupancy detector is Argus's IR24-P.
Condensation detector alt. window contact	Argus's condensation detector KG-A/1 resp. potential-free contact

Outputs

Forced ventilation	24 V AC actuator, max 0.5 A
Valve actuator alt. thermal actuator	2 outputs
Valve actuator	0...10 V DC, max 5 mA
Thermal actuator	24 V AC, max 2.0 A
Control	Heating or cooling
Actuator exercise	FS = 23 hours interval
	Terminal blocks Lift type for cable cross-section 2.1 mm^2

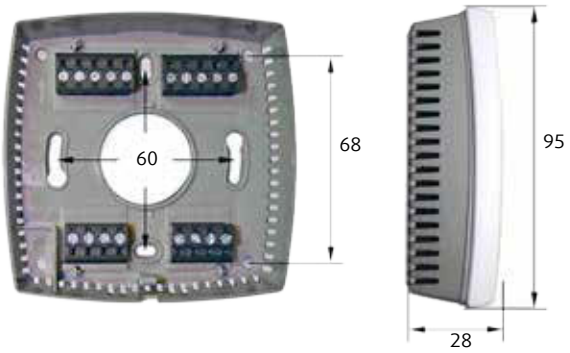
Setpoint settings via Argus tool© or in the display

Basic heating setpoint	5...40°C
Basic cooling setpoint	5...50°C
Setpoint displacement	±0...10°C (FS = ±3°C)

Wiring

Terminal	Designation	Operation
10	G	Supply voltage 24 V AC
11	G0	Supply voltage 0 V
12	DO1	Output for forced ventilation
13-14		No function
20	GDO	24 V AC out common for DO
21	G0	0 V common for UO (when 0...10 V actuator is used)
22		No function
23	UO1	Output for 0...10 V valve actuator alt. thermal actuator. Heating or cooling.
24	UO2	Output for 0...10 V valve actuator alt. thermal actuator. Heating or cooling.
30	AI1	Input for external sensor
31	UI1	Input for change-over sensor alt. potential-free contact
32	DI1	Input for occupancy detector
33	DI2/CI	Input for Argus's condensation detector KG-A/1 alt. window contact
40	+C	24 V DC out common for UI and DI
41	AGnd	Analogue ground
42	A	RU-Bus A
43	B	RU-Bus B

Dimensions



Product documentation

Document	Type
Argus Midi Manual	Manual for the controllers from the Argus Midi series
Installation instruction Argus RC-CDO	Installation instruction for RC-CDO
Product sheet TG-R4/PT1000, TG-R5/PT...	Information about room sensors, outdoor sensors and strap-on sensors suitable for RC-CDO
Product sheet TG-UH/PT...	
Product sheet TG-A1/PT...	
Product sheet IR24-P	Information about occupancy detector suitable for RC-CDO
Instruction IR24-P	Instruction for IR24-P
Product sheet KG-A/1	Information about condensation detector for the Argus controllers

Argus-IR24-P

Presence detector

IR24-P is a presence detector designed for automatic ventilation control of HVAC systems.

- Power supply 24 V AC or DC
- Intended for wall or ceiling mounting
- Unobtrusive design
- Potentialfree, changeover relay
- Both relay on-delay and/or relay off-delay, can
- be individually set

Function

The IR24-P is a presence detector designed for automatic ventilation control of HVAC systems. It saves money and gives higher comfort in premises which require forced ventilation for shorter periods of time, such as conference rooms, assembly-halls etc. The unit provides a changeover relay signal output for start/stop of fan or similar equipment. It can be wall or corner mounted with 110°, 15m detection range.

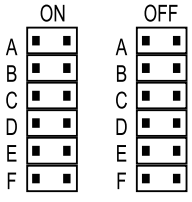
Range adjustments

In order to suit different rooms or areas, the detection range of IR24-P can be adjusted by changing the direction of the sensor. To change the sensor direction, release the screw on the mounting bracket and then carefully move the sensor to the direction desired.

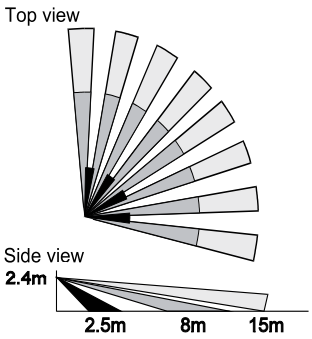
On / Off Delay

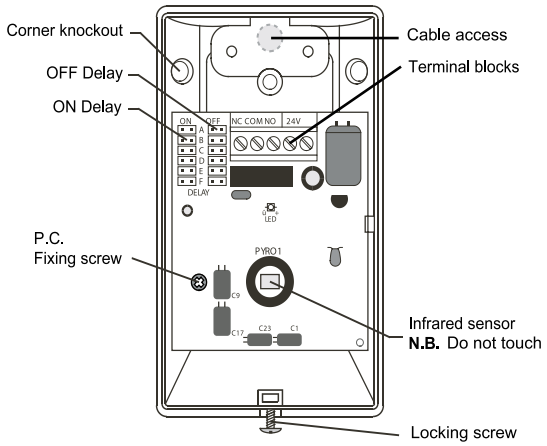
The ON and OFF delays are designed to provide smarter energy management of HVAC systems. ON delay is the time given to the sensor to certify the occupancy, before it activates the output relay. OFF delay is the time that the relay is activated after the last detection. Both ON and OFF delays can be easily set by placing the jumper head on the corresponding pins as following.

	A	B	C	E	E	F
ON	0 sec.	10 sec.	30 sec.	1 min.	5 min	10 min.
OFF	10 sec.	1 min.	5 min.	10 min.	20 min.	30 min.



Detection pattern





Technical data

- Infrared sensor Dual element
- Power supply 24 ± 2 V AC/DC
- Detection range 15 x 15 m at 25°C
- Output relay 24 V DC, 0.2 A max.
- Consumption 5 mA @24 V AC
- Mounting height 1.8...3.6 m
- Mounting bracket MB-99
- Detectable speed 0.1...3.0 m/sec.
- RFI immunity Av. 20 V/m (10...1,000 MHz)
- Ambient temperature -20°C...50°C
- Ambient humidity 95% RH max.
- Dimension 112 x 66 x 45 mm

Operation

A. Standby

After the warm up time expires, the sensor enters into standby mode. The detector will check whether both delays are properly set. If not, the green LED will blink to indicate.

B. Relay ON Delay

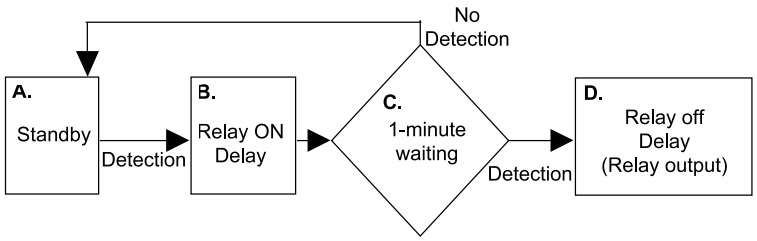
Relay ON delay is the time given to sensor to verify true occupancy before activating the relay output. Any further detection during ON delay will NOT reset the timer.

C. 1-minute Waiting

When Relay ON delay expires, the sensor enters into a 1-minute waiting time. If no detection occurs within 1 minute, the sensor will return to standby mode. If any detection occurs, then relay output will be activated and Relay OFF delay will be started.

D. Relay OFF Delay

Relay OFF delay is the time of relay activating. Every detection during this period will reset the timer

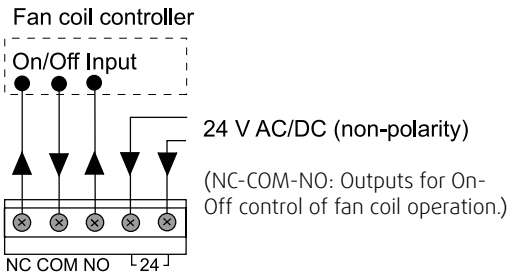


Installation and Wiring

N.B. Do not install where the detector is exposed to direct sunlight or directly above strong sources of heat. Make sure the detection area does not have any obstruction (plants, large pieces of furniture, curtains etc.) which may block the detection.

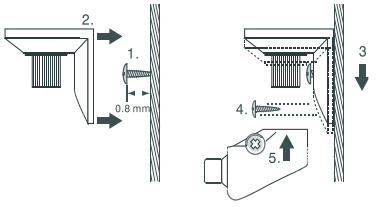
Installation (see also picture beside)

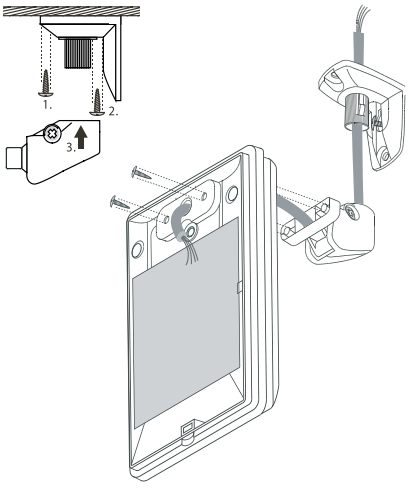
1. Mount the base of mounting bracket on the selected position. Lead the cable through the access tunnel of mounting bracket or through the knockout openings
2. Open the front cover by loosening the locking screw at the bottom. Lead the cable into the unit and assemble the mounting bracket with the unit.
3. Connect the cable to the corresponding terminals according to the instructions below.
4. Replace the front cover and then proceed with the walk test.



Walk Test

Apply power supply and allows 25 seconds for sensor to warm up. The green LED will blink during warm up period. Walk across the detection zones (invisible) at normal speed. The red LED will blink whenever the sensor detects the motion.





Argus-IR24-PC

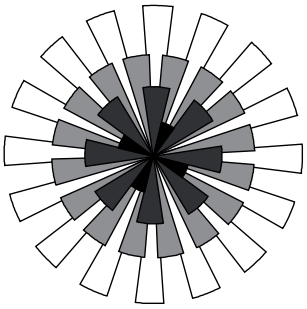
Presence detector

IR24-P is a presence detector designed for automatic ventilation control of HVAC systems.

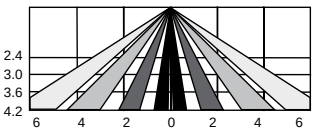
- Power supply 24 V AC/DC
- Intended for ceiling mounting
- 360° detection
- Individually settable On and Off delays
- Change-over output
- Unobtrusive design

IR24-PC is a 360° presence detector for automatic ventilation control of HVAC systems. It uses infrared light. The detector has a change-over output for activation/ deactivation of a fan coil controller.

Detection pattern



Top view 360°



Side view

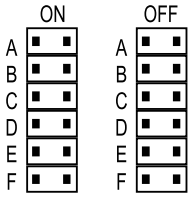
Mounting	height	(m)	2.4	3.0	3.6	4.2
Diameter	coverage	6.0	7.5	9.0	10.5	

On/Off delays

IR24-PC has individually settable On and Off delays. The delays are designed to provide better energy management of HVAC systems. The On delay is the time given to the sensor to certify the occupancy before it activates the fan coil controller. The Off delay is the operating time for the fan coil after the last detection. The On and Off delays are set by placing the jumper head on the corresponding pins according to the table and figure below.

	A	B	C	E	E	F
ON	0	10	30	60	300	600
OFF	10	60	300	600	1200	1800

(Values in seconds)



Installation

Loosen the screw and remove the cover. Carefully lift out the electronics cassette by bending the plastic clips outwards. Lead the cable into the bottom part. Mount the bottom part on the ceiling. Replace the electronics cassette and connect the cable to the corresponding terminals (see the section Wiring on the next page). Finally, replace the front cover.
Note: Do not touch the infrared sensor in the middle of the electronics cassette.

Testing the function

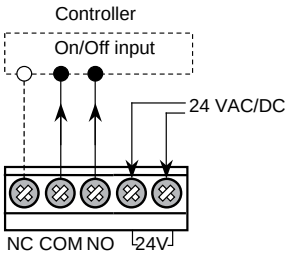
To test the function of the detector, apply power supply and wait for the detector to warm up (~25 sec.). The LED will blink (long and short) during the warm-up period. Ensure that the jumper head connectors of the On and Off delays are placed in the "A" position (the shortest time). Walk across the detection zones at normal speed. The LED will be lit when the sensor detects the motion.

Note: The LED will blink if a jumper head connector is not properly placed.

Technical data

Power supply	24 +/- 2 V AC/DC
Power consumption	15 mA
Output	200 mA, 24 V DC, change-over relay
Ambient humidity	Max. 95% RH
Temperature range	-20°C...+50°C
Protection class	IP20
Mounting	Ceiling mounting
Mounting height	2.4...4.2 m
Infrared sensor	Dual element
Detection range	Height x 2.5 at 25°C
On delay (selectable)	0, 10, 30, 60, 300 or 600 seconds
Off delay seconds (selectable)	10, 60, 300, 600, 1200 or 1800

Wiring



NC-COM-NO: Output for On-Off control.

Dimensions

mm

Product documentation

Document	Type
Instruction IR24-PC	Instruction for IR24-PC

Compact or universal air volume control with Belimo.

The cost-efficient way to controlled room climate.

Human health

well-being and work performance are crucially influenced by room climate. Belimo room and system solutions – a complete range of products for cost-efficient motorisation and control of zones and single rooms in the comfort zone, industry, trade and sensitive working areas – are proven in countless installations all over the world.

VAV-Compact – efficient room control with a single unit

Actuator, controller and sensor in one unit – VAV-Compact provides an economical solution for variable and constant air volume control systems in office buildings, hotels, hospitals, etc. Special rotary actuators with a torque of 5, 10 or 20 Nm and linear actuators with 150 Nm can be supplied for a wide range of VAV/CAV unit sizes and types. VAV-Compact controllers can be controlled conventionally or via the Belimo MP-Bus®. The MP types can be integrated in a higher-level system – together with one sensor per device – either via a DDC controller with an MP interface or by means of a gateway. The fans are incorporated in an MP-Bus® based Fan Optimiser to facilitate cost-optimised control according to demand.

VAV-Universal – flexibility in problematic environments

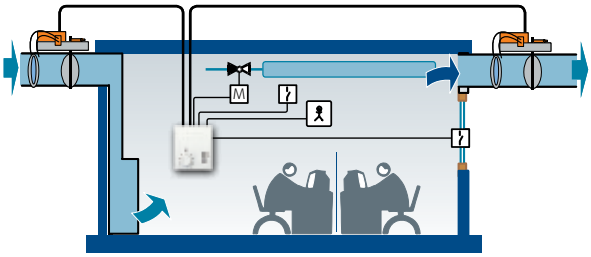
The ready-to-connect VAV-Universal range encompasses rotary and safety actuators as well as controllers with dynamic and static pressure sensors. These devices can be finely tuned to exacting requirements in industry, trade and public buildings. Digital, self-adaptive VRP-M controllers interact with fast-running actuators in laboratories or production areas with a severely polluted room atmosphere to assure an instant supply of fresh air. Depending on what is chosen, the control systems can be integrated in a higher-level fieldbus and equipped – directly or over the MP-Bus® – with the Belimo Fan Optimiser to cut fan energy consumption by up to 50%.

Increased convenience
a better working atmosphere, optimum energy efficiency.

VAV-Compact for convenient solutions

Individual room comfort

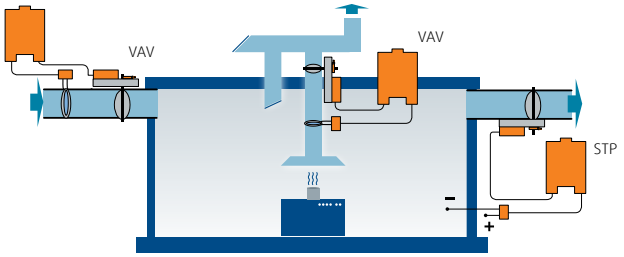
- Wide range of potential applications
- Adjustable to each application
- Demand-based single-room application
- Operation with Fan Optimiser



VAV-Universal with VRP-M controller and fast-running actuators for sensitive working areas

Instant pure air

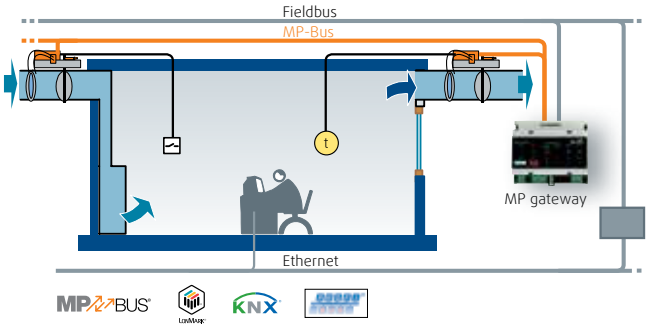
- Extraction of polluted air
- Ready-to-connect control system for maximum safety
- Integration in MP-Bus® network
- Volumetric flow or pressure control



VAV-Compact with bus connection

Intelligent simplicity

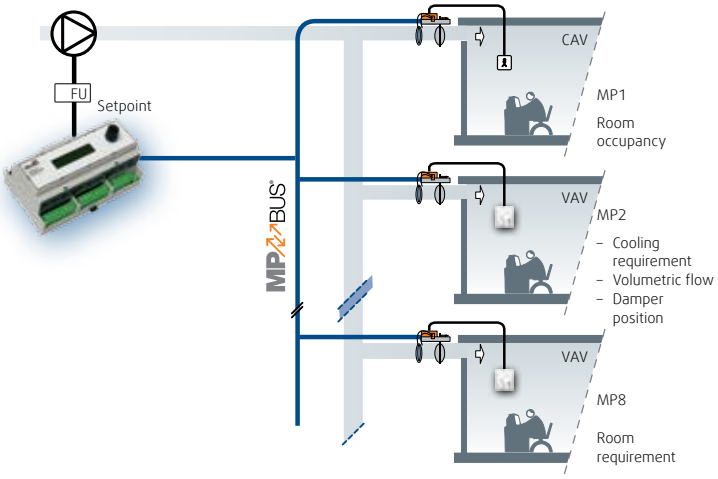
- System connection to DDC controller with MP interface via MP-Bus®
- Integration in higher-level systems such as LonWorks®, Konnex, Ethernet TCP/IP, Profibus DP, etc. via MP gateway
- Convenient, cost-efficient wiring
- Maximum flexibility in new, retrofitted, converted or renovated buildings



VAV-Compact with Belimo Fan Optimiser for reduced energy consumption

Up to 50% fan energy saving

- Optimised consumption and operating costs
- Reduced flow noise thanks to lower supply pressure in the air duct system
- Reduced wiring expenses thanks to MP-Bus® network

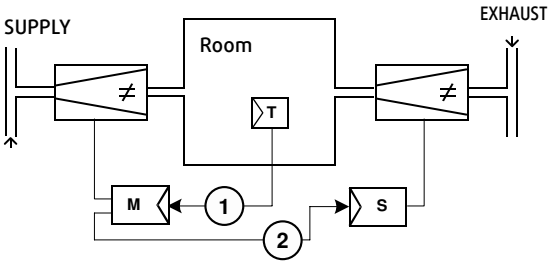


Function	VAV-Compact			VAV-Universal	
	MODBUS types	LON types	MP types	VRP-M system solutions	Universal program
Sensors			MP-BUS	VFP.. VFD3	VRD3 VFP.. VFD3
Controller			LMV-D3-MP NMV-D3-MP	MP-BUS VRP-M	VRD3 VRP VRP-STP
Actuators	LMV-D3 MOD NMV-D3 MOD	LMV-D3LON NMV-D3LON	LHV-D3-MP	LMQ24A-SRV-ST NMQ24A-SRV-ST NM24A-V-ST SF24A-V-ST with emergency control function	LM24A-V NM24A-V SM24A-V **LF24-V with emergency control function** **SF24A-V with emergency control function**
Bus integration			MP-BUS Into field bus systems via MP-Gateway LonWorks®: Gateway UK24LON Konnex: Gateway UK24EIB Modbus RTU: Gateway UK24MOD BACnet MS/TP: Gateway UK24BAC		
Ventilator optimisation via MP bus			MP-BUS Fan Optimiser COU24-A-MP		
Service tool	ZTH-GEN				
Parameterisation and Service software	PC-Tool MFT-P				
Room controller			CR24.. CRA24..		
Positioner			CRP24.. SG..		

Information: Documents to VAV-Compact LON version, VRP-M system solution, VAV-Universal, single room controllers CR24, CRA24, CRP24, Fan Optimiser COU24-A-MP and Tools and Interfaces are available as separate documents

VAV-Compact
Functions

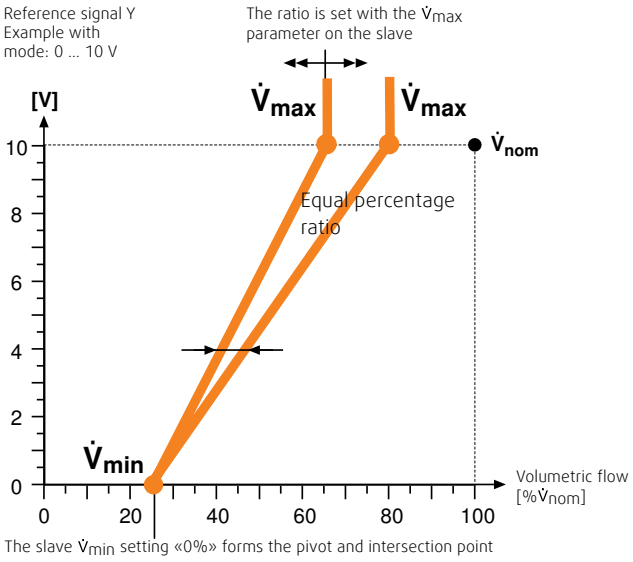
Master / slave connection



Principle:

1. A reference signal, e.g. from a room temperature controller, is connected to the master input. $\dot{V}_{min}$ and $\dot{V}_{max}$ are set on the master controller.
2. The volumetric flow actual value signal from the master acts as a reference signal for the slave controller. The master is installed on the supply or exhaust air side, depending on the application. See "Determination of the master controller".

For connection diagram, see page 39-42



Determination of the master controller
If both units have:

- Non-identical $\dot{V}_{nom}$ settings, the controller with the lower $_{nom}$.
- Identical $\dot{V}_{nom}$ settings, the controller with the higher air olume setting acts as master
- Positive pressure in the room

Master: Supply air unit Slave: Exhaust air unit

- **Negative pressure in the room**

Master: Exhaust air unit Slave: Supply air unit

Room pressure ratio
In a master / slave connection, any changes in the air system of the master (supply pressure too low, e.g. due to a pressure control fault) are detected and reported to the slave. This guarantees an equal percentage ratio of supply air to exhaust air.
In a master / slave configuration, only one controller can act as master. However, one master controller can control several parallel slave controllers.

When are master / slave connections used?

- In systems with air volume controllers in the supply and exhaust air that are required to work sequentially
- When an equal percentage ratio of supply air to exhaust air is specified.

Operating volumetric flow settings
The $\dot{V}_{max}$- and $\dot{V}_{min}$ values used for the required volumetric flow are set on the master and transferred to the slave by means of a reference signal.

CAV application
In constant air volume applications, operating mode control (CLOSED / $\dot{V}_{min}$ etc.) is only set on the master controller.
Slave setting if the room pressure ratio is balanced
The $\dot{V}_{min}$ setting on the slave is always 0%. If the room pressure ratio is 1:1 and all controllers are the same size, the slave controller is set to $\dot{V}_{max}$ 100% / $\dot{V}_{min}$ 0%.
Slave setting if the room pressure ratio is unbalanced
The $\dot{V}_{min}$ setting on the slave is always 0%.
Setting with % scale on the ZTH-GEN hand-operated device
The ratio of slave volume to master volume is set as follows with the $\dot{V}_{max}$ value on the slave controller:

$$\dot{V}_{max\ S\%} = \frac{\dot{V}_{max\ S} \cdot \dot{V}_{nom\ M}}{\dot{V}_{max\ M} \cdot \dot{V}_{nom\ S}} \cdot 100$$

$\dot{V}_{max\ S\%}$ = $\dot{V}_{max}$ value that must be set on the controller in %
$\dot{V}_{nom\ M}$ = Nominal volume of the master unit in m^3/h
$\dot{V}_{max\ M}$ = Maximum volume of the master unit in m^3/h
$\dot{V}_{nom\ S}$ = Nominal volume of the slave unit in m^3/h
$\dot{V}_{max\ S}$ = Maximum volume of the slave unit in m^3/h

Setting with PC-Tool / ZTH-GEN

These two setting tools can be used to enter the volumetric flow ratio directly in m^3/h, l/s or cfm, i.e. there is no need to calculate the setting ratio.

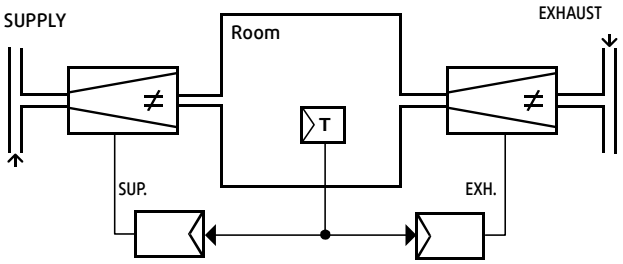
Example
Required: Positive pressure in the room with 20% excess air
–Supply air unit: $\dot{V}_{nom}$ 1600 m^3/h / $\dot{V}_{max}$ 1500 m^3/h
–Exhaust air unit: $\dot{V}_{nom}$ 2400 m^3/h / $\dot{V}_{max}$ 1200 m^3/h

Find: $\dot{V}_{max}$ setting of the slave controller

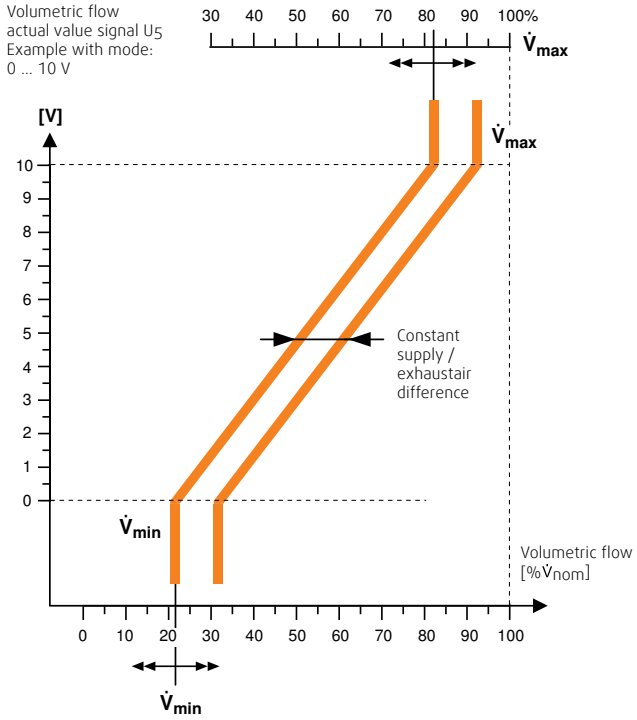
$$53\% = \frac{1200 \cdot 1600}{1500 \cdot 2400} \cdot 100$$

VAV-Compact
Functions

Parallel connection



Principle:
The reference signal of the temperature controller is connected in a parallel circuit with the reference value inputs of the supply and exhaust air controllers. The operating volumetric flows $\dot{V}_{max}$ and $\dot{V}_{min}$ are set on both controllers.
For connection diagram, see page 39-42



Room pressure ratio

In a parallel connection, the two VAV units are operated independently of one another with a common reference signal. The operating volumetric flows of the supply and exhaust air units must be set according to the required room pressure ratio.

The supply and exhaust air controllers work independently of one another, i.e. if a fault occurs in the supply or exhaust air system, the room pressure ratio is impaired for technical reasons. In the worst case, the unit tolerances may be accumulated. This circumstance must be taken into account by the project planning engineer.

When are parallel connections used?

- If air volume controllers operate with parallel supply and exhaust air (controlled by a common reference variable)
- If the supply and exhaust air devices have different sizes and different minimum and maximum volumetric flow settings
- If constant differential control is active between the supply and exhaust air
- In systems with several supply and exhaust air devices
- In circulating air systems for airtight rooms.

Operating volumetric flow settings

The $\dot{V}_{max}$ and $\dot{V}_{min}$ values used for the required volumetric flow must be set on each VAV controller.

CAV application

In constant air volume applications, operating mode control (CLOSED / $\dot{V}_{min}$ etc.) is set on both controllers.

Setting if the room pressure ratio is balanced

Owing to the proportional assignment of the reference signal to the value ranges for $\dot{V}_{max}$ and $\dot{V}_{min}$, it is possible to operate VAV units with different nominal widths and differentiated ranges parallel to one another.

Setting if the room pressure ratio is unbalanced

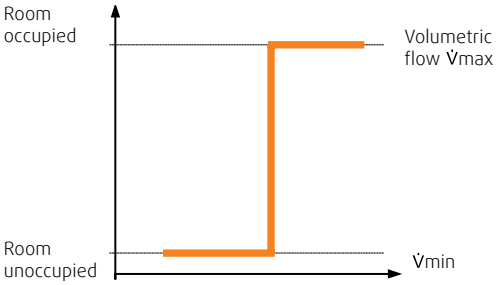
The operating volumetric flows of the supply and exhaust air units must be set according to the difference:

- Positive pressure ratio in the room Supply air volume > exhaust air volume
- Negative pressure ratio in the room Exhaust air volume > supply air volume

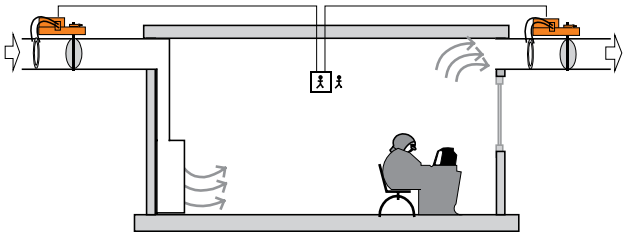
VAV-Compact
Conventional application

Single-duct systems

Function diagram



IRC-VAV **CAV room solution with motion detector**



CAV single-duct system, occupancy-controlled

Brief Description
Control solution for CAV single-room application
CAV single-duct system, occupancy-controlled Stand-alone operation or integrated in a building automation system (I/O integration)

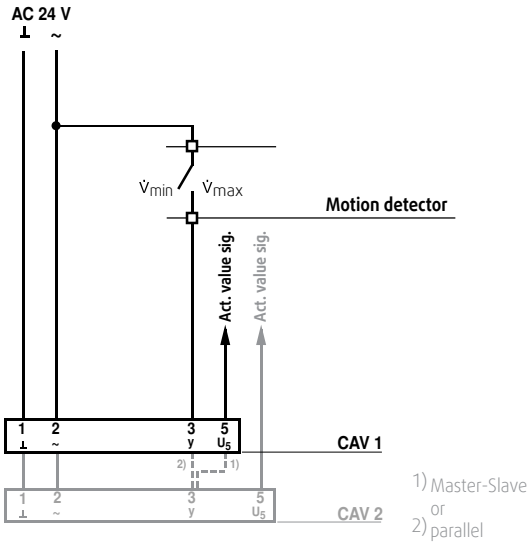
Functions
The CAV controller is controlled by means of the motion detector in two modes on the basis of room occupancy $\dot{V}_{min}$ ... $\dot{V}_{max}$:
- Room unoccupied: constant air volume $\dot{V}_{min}$
- Room occupied: constant air volume $\dot{V}_{max}$

Motion detector
With switching output for low switching capacity (load 0.24 mA)

VAV-Compact control device
..MV-D3-MP
VAV-Compact control device for supply air, exhaust air or mixing units, comprising a sensor, VAV controller and actuator for pressure-independent air volume controls.

- Damper position feedback controlled via the MP-Bus for demand based fan optimisation.

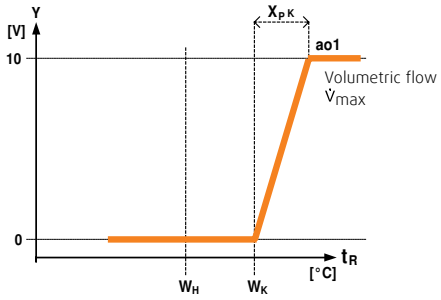
Wiring diagram



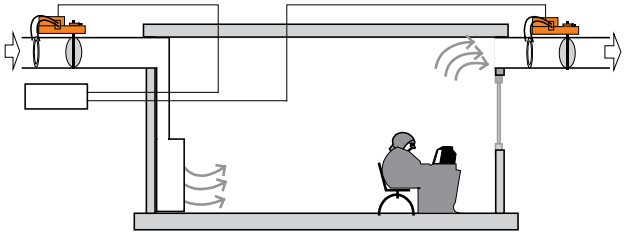
Notes
- Connection and terminal designations of the motion detector in accordance with the manufacturer's specification
- Mode setting on the CAV controller: 0 ... 10 V oder 2 ... 10 V

VAV-Compact
Conventional application

Single-duct systems



IRC-VAV CAV room solution with 0....10V control



Brief Description
Control solution for VAV single-room application
Stand-alone operation or integrated in a building automation system (I/O integration)

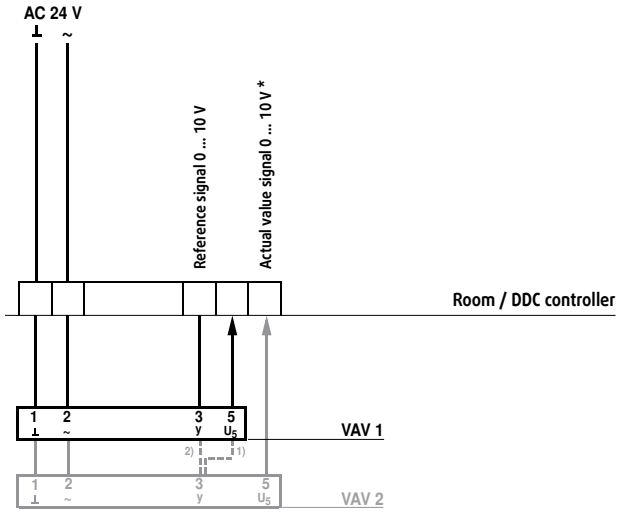
Functions
The 0 ... 10 V V single-room or DDC controller controls the VAV controller with vaiable air volume in the range from $\dot{V}_{min}$ ... $\dot{V}_{max}$, depending on the room cooling needs.

Single-room or DDC controller
With The 0 ... 10 V output single (cooling sequence).
Controller functions in accordance with the manufacturer's specification.

VAV-Compact control device
..MV-D3-MP
VAV-Compact control device for supply air, exhaust air or mixing units, comprising a sensor, VAV controller and actuator for pressure-independent air volume controls.

- Damper position controlled via the MP-Bus for demand based fan optimisation.

Anschlussschema

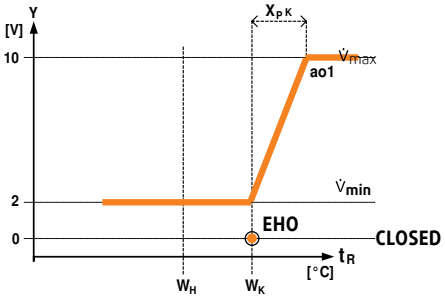


Notes
- Connection and terminal designations in accordance with the controller manufacturer's specification
- Mode setting on the VAV controller: 0 ... 10 V

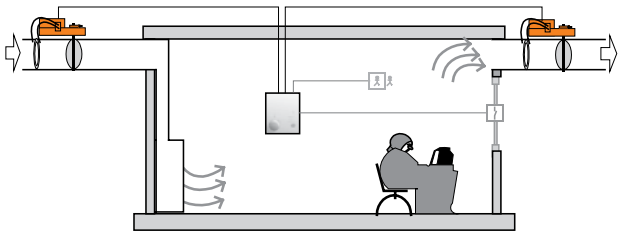
VAV-Compact
Conventional application

Single-duct systems

Function diagram



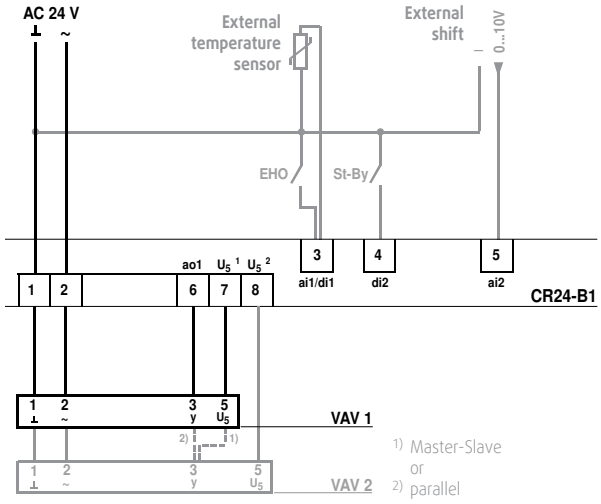
IRC-VAV **VAV room solution with CR 24 room controller**



VAV singleduct system, room tempreture-controlled

Note
For technical data and a detailed description of functions, see CR24 product information.

Wiring diagram



Notes
- Further VAV applications such as boost (fast heat up), night cool down (air heated with water or electrically), night cooling, combination available with chilled ceiling.
- Mode setting for VAV controller for this application: 2 ... 10 V

Brief description

Control solution for VAV single-room application, VAV single-duct system, room temperature-controlled, Stand-alone operation or integrated in a building automation system (I/O integration)

Functions

The CR24-B1 single-room controller controls the connected VAV controllers with a variable air volume in the range from $\dot{V}_{min}$ ... $\dot{V}_{max}$, depending on the room cooling needs. Other functions can be optionally connected (e.g. with a motion detector): energy hold off, standby, etc.

Room temperature controller

CR24-B1 (automatic) CR24-A1
Room temperature controller (15 ... 36°C) with an integrated or external temperature sensor

- Mode selection with a pushbutton and three LEDs: AUTO, ECO (reduced room temperature for standby or night operation) and MAX (flushing operation with 15' timer)
- Room protection function (frost / excess temperature)
- Inputs for energy hold off, standby operation, external temperature sensor, summer / winter compensation
- VAV system output
- Self-resetting start-up and service function
- Tool connection for diagnostics, settings and trend recordings

VAV-Compact control device ..MV-D3-MP, VAV-Compact control device for supply air, exhaust air or mixing units, comprising a sensor, VAV controller and actuator for pressure-independent air volume controls.

- Damper position controlled via the MP-Bus for demand based fan optimisation.

Input and output assignment

Functions	Description	Assignment
VAV	VAV system output (0) 2 ... 10 V	Output ao1
Optional functions	Description	Assignment
EHO	Energy hold off (window)	Input di1
Sensor	External temperature sensor NTC 5K	Input ai1
Shift	External shift 0 ... 10 V (Summer / Winter compensation)	Input ai2

Note
Terminal designations in accordance with the Belimo final controlling element.

Configuration, settings

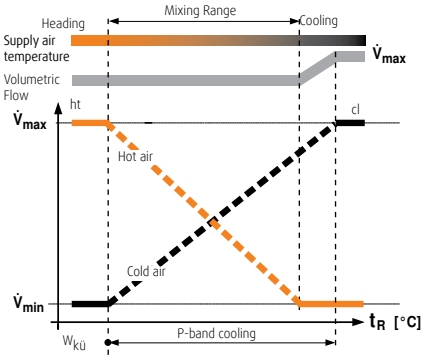
DIP switches

1	P-Band	normal	wide
2	di2	Stand by	Change over

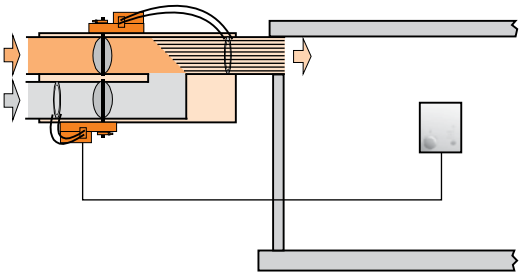
Setpoint WH range: 15 ... 36 °C

VAV-Compact
Conventional application

Dual-duct systems



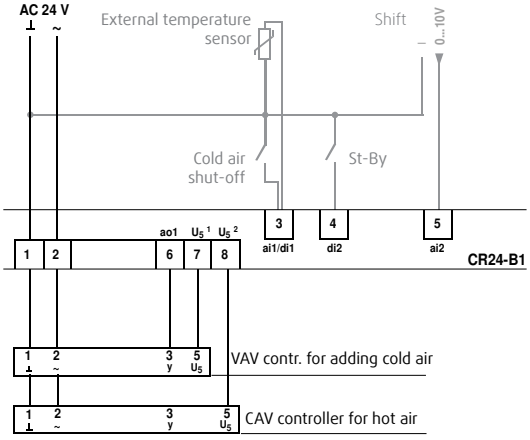
IRC-VAV **VAV dual-duct solution with CR 24 room controller**



VAV dual-duct system, room temperature-controlled

Note
For technical data and a detailed description of functions, see CR24 product information.

Wiring diagram



Note
- Terminal descriptions correspond to the Belimo actuator connection.
- Mode setting for VAV controller for this application: 2 ... 10 V

Control solution for VAV single-room application

VAV dual-duct system, room temperature-controlled
Stand-alone operation or integrated in a building automation system (I/O integration)

Functions

The two air volume controllers mix the hot and cold air supplied by the dual-duct air conditioning system to obtain the condition requested by the CR24-B1 room temperature controller. The constant air volume (CAV) controller for the hot air adjusts to the set $\dot{V}$max volume for heating. The variable air volume (VAV) controller for the cold air adds the variable amount of cold air requested by the room temperature controller. If cooling needs exceed the hot air volume, the hot-air part is shut off and only cold air is supplied.
Optional: The cold-air part can be shut off by means of a switching contact at input d1.

Room temperature controller

CR24-B1(automatic) CR24-A1
Room temperature controller (15 ... 36°C) with an integrated or external temperature sensor

- Mode selection with a pushbutton and three LEDs: AUTO, ECO (reduced room temperature for standby or night operation) and MAX (flushing operation with 15' timer)
- Room protection function (frost / excess temperature)
- Inputs for cold air shut-off, external temperature sensor, summer / winter compensation
- VAV system output
- Self-resetting start-up and service function
- Tool connection for diagnostics, settings and trend recordings

VAV-Compact control device ..MV-D3-MP

VAV-Compact control device for supply air, exhaust air or mixing units, comprising a sensor, VAV controller and actuator for pressure-independent air volume controls.

Input and output assignment

Functions	Description	Assignment
VAV	VAV system output (0) 2 ... 10 V	Output ao1
Optional functions	Description	Assignment
Shut-off CA	Cold air shit-off	Input di1
Sensor	External temperature sensor NTC 5K	Input ai1
Shift	External shift 0 ... 10 V (Summer / Winter compensation)	Input ai2

Configuration, settings

DIP switches

1	P-Band	normal	wide
2	di2	Stand by	Change over

Setpoint WH range: 15 ... 36 °C

LMV-D3-MF

NMV-D3-MF

BLC4, VAV-Compact Controller

VAV-Compact controller with integrated pressure sensor, VAV controller and damper actuator for pressure-independent VAV and CAV applications in the comfort zone

- Control: DC 0/2 ... 10 V
- Diagnostic socket for Service and PC-Tool

Brief description

Application	The digital VAV-Compact has PI control characteristics and is used for pressure-independent control of VAV units in the comfort zone.
Pressure measurement	The integrated maintenance-free Belimo D3 differential pressure sensor is also suitable for very small volumetric flows. It is for this reason that it covers versatile applications in the comfort zone, e.g. in residential construction, offices, hospitals, hotels, cruise ships, etc.
Actuator	Two versions available, depending on the size of the VAV unit: 5 / 10 Nm. – Rotary actuator, depending on the size
Control function	VAV-CAV or Open-Loop operation for integration in an external VAV control loop.
Feedback	Current volumetric flow, damper position or differential pressure value.
VAV – variable volumetric flow	For variable volumetric flow applications with a modulating reference variable, e.g. room temperature controller or direct digital control, it enables demand-related, energy-saving ventilation of individual rooms or zones. The operating range $\hat{M}_{min}$ ...$\hat{M}_{max}$ can be connected via selectable mode. The following are available: DC 2 ... 10 V / 0 ... 10 V / adjustable range.
CAV – constant volumetric flow	For constant volumetric flow applications, e.g. in step mode, controlled by means of a switch. The following operating modes can be selected from: CLOSED / $\hat{M}_{min}$ / ($\hat{M}_{mid}$) / $\hat{M}_{max}$ / OPEN
Operating and service devices	Belimo PC-Tool or service tool ZTH-GEN, can be plugged into the VAV-Compact (PP connection) or connection U5.
Assembly and connection	The VAV-Compact, which is assembled on the unit by the OEM, is connected using the prefabricated connecting cable.
Test function / test display	The VAV-Compact features two LEDs with a functional readiness display for commissioning and functional checking. Extended information with ZTH-GEN.
OEM factory settings	The VAV-Compact is mounted on the VAV unit by the unit manufacturer, who adjusts and tests it according to the application. The VAV-Compact is sold exclusively via the OEM channel for this reason.

Type overview

Type	Torque	Power consumption	Dimensioning	Weight
LMV-D3-MF	5 Nm	2 W	4 VA (max. 8 A @ 5 ms)	Approx. 500 g
NMV-D3-MF	10 Nm	3 W	5 VA (max. 8 A @ 5 ms)	Approx. 700 g

Technical data

Supply	
Nominal voltage	AC 24 V, 50/60 Hz DC 24 V
Operating range	AC 19.2 ... 28.8 V DC 21.6 ... 28.8 V
Differential pressure sensor	
Type, principle of operation	Belimo D3 sensor, dynamic response
Operating range	0 ... 600 Pa
Overload capability	±3000 Pa
Installation position	Any, no reset necessary
Materials in contact with medium	Glass, epoxy resin, PA, TPE
Control function	– VAV-CAV – Open-loop operation
Adjustment values	
$\dot{V}_{nom}$	OEM-specific nominal volumetric flow setting, suitable for the VAV unit
Δp @ $\dot{V}_{nom}$	38 ... 450 Pa
$\dot{V}_{max}$	20 ... 100% of $\dot{V}_{nom}$
$\dot{V}_{min}$	0 ... 100% of $\dot{V}_{nom}$
$\dot{V}_{mid}$	50% of $\dot{V}_{min}$ to $\dot{V}_{max}$
Classic control	
VAV mode for reference value input Y (Connection 3)	– DC 2 ... 10 V / (4 ... 20 mA with 500 Ω resistance) – DC 0 ... 10 V / (0 ... 20 mA with 500 Ω resistance) – Adjustable DC 0 ... 10 V } Input impedance min. 100 kOhm
Mode for actual value signal U_5 (Connection 5)	– DC 2 ... 10 V – DC 0 ... 10 V – Adjustable: volumetric flow, damper position or differential pressure } max. 0.5 mA
CAV operating modes (constant volumetric flow)	CLOSED / $\dot{V}_{min}$ / ($\dot{V}_{mid}$ *) / $\dot{V}_{max}$ / OPEN * (* only with AC 24 V supply)
Operating and service	Pluggable / PC-Tool (V3.6 or higher) / service tool ZTH-GEN
Push-button	Adaption
LED display	– 24 V supply – Status
Actuator	Brushless, non-blocking actuator with power-save mode
Direction of rotation	ccw / cw
Adaption	Capture of setting range and resolution to control range
Gear disengagement	Push-button self-resetting without functional impairment
Sound power level	Max. 35 dB (A)
Angle of rotation	95°∢, adjustable mechanical or electronic limiting
Spindle driver	– Clamp, spindle round 10 ... 20 mm / spindle square 8 ... 16 mm – Form fit in various versions, e.g. 8 x 8 mm
Connection	Cable, 4 x 0.75 mm^2
Safety	
Protection class	III Safety extra-low voltage
Degree of protection	IP54
Electromagnetic compatibility	CE according to 89/336/EEC
Mode of operation	Type 1 (in accordance with EN 60730-1)
Rated impulse voltage	0.5 kV (in accordance with EN 60730-1)
Control pollution degree	2 (in accordance with EN 60730-1)
Ambient temperature	0 ... +50°C
Non-operating temperature	–20 ... +80°C
Ambient humidity	5 ... 95% r.h., non-condensing (in accordance with EN 60730-1)
Maintenance	Maintenance-free

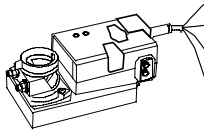
Restrictions

Bus function MP	no MP Bus communication possible
Fan Optimiser (Fan control)	no communication to BELIMO Fan Optimiser COU24-A-MP
Sensor integration	no Sensor integration possible

Connection

Connecting cable The connection is made using the connecting cable mounted to the VAV-Compact device.

Hinweise
- Supply via safety isolating transformer!
- Connections 1 and 2 (AC/DC 24 V) and 5 must be routed to accessible terminals (room temperature controller, floor distributor, control cabinet, etc.) in order to enable access with the tool for diagnostic and service work.

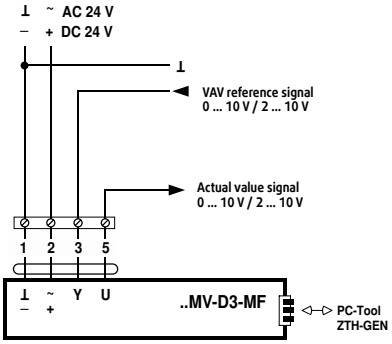


No.	Designation	Wire colour	Function
1	⊥ –	black	⊥ – } AC/DC 24 V supply
2	~ +	red	~ + } AC/DC 24 V supply
3	Y	white	Reference signal VAV/CAV
5	U	orange	– Actual value signal – Tool communication

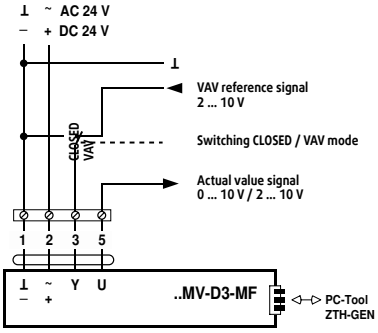
VAV – Variable operation $\hat{M}_{min}$ ... $\hat{M}_{max}$

Wiring diagrams

Example 1:
VAV with analogue reference signal



Example 2:
VAV with shut-off (CLOSE), 2 ... 10 V mode



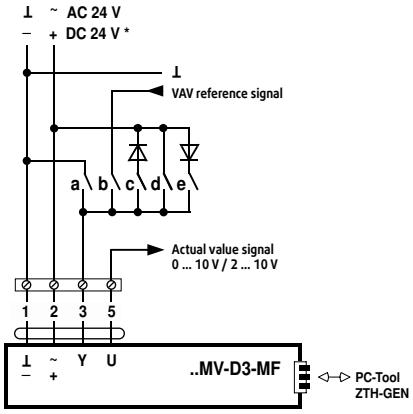
CAV – Step mode CLOSED / $\hat{M}_{min}$ / $\hat{M}_{mid}$ / $\hat{M}_{max}$ / OPEN

CAV control

Three options are available for the CAV control:
- Standard 0.1 V shut-off: CLOSED – $\hat{M}_{min}$ – $\hat{M}_{max}$ – OPEN (default setting)
- Standard 0.5 V shut-off: CLOSED – $\hat{M}_{min}$ – $\hat{M}_{max}$ – OPEN
- Old Generation (NMV-D2M): CLOSED – $\hat{M}_{min}$ – $\hat{M}_{mid}$ – $\hat{M}_{max}$ – OPEN

Note
«Standard 0.5 V shut-off» not use at:
- Mode 2 ... 10 V and MP bus operation
- Mode 2 ... 10 V and CAV control

Wiring diagrams



Note
The contacts are mutually interlocking!

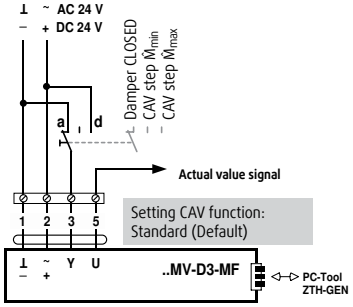
CAV function: Standard

Mode setting	– / 2 ... 10 V	0 ... 10 V / 2 ... 10 V	0 ... 10 V / 2 ... 10 V	0 ... 10 V / 2 ... 10 V	0 ... 10 V / 2 ... 10 V
Signal	⊥ –	0 ... 10 V 2 ... 10 V	~	~ +	~
Function	3	3	3	3	3
Damper CLOSED	a) CLOSED		c) CLOSED *		
$\hat{M}_{min}$ ... $\hat{M}_{max}$		b) VAV			
CAV – $\hat{M}_{min}$	All open – $\hat{M}_{min}$ active **				
Damper OPEN					e) OPEN *
CAV – $\hat{M}_{max}$				d) $\hat{M}_{max}$	

Legend
- Contact closed, function active
- Contact closed, function active, only in 2 ... 10 V mode
- Contact open

* Not available with DC 24 V supply
** the damper is closed when the 0.5 V shut-off level is used

Example:
CAV application CLOSED – $\hat{M}_{min}$ – $\hat{M}_{max}$ (mode 2 ... 10 V)



Setting CAV function:
Standard (Default)

Dimensioning of supply and connecting cable

General

In addition to the actual wire sizing, attention must also be paid to the surrounding area and the cable routing.Signal cables must not be laid in the vicinity of load cables, objects liable to cause EMC interference etc. if possible. Paired or layer stranded cables improve immunity to interference.

24 V supply, dimensioning and cabling

The dimensioning and installation of the AC 24 V supply, the fuse protection and the cables are dependent on the total operated load and local regulations. Account must be taken of the following performance data, including the starting currents of the actuators:

- Dimensioning values VAV-Compact controller, see Technical data
- Dimensioning values of further controlling elements etc. can be found in the current data sheets and product information
- Other devices which are intended to be connected to the same 24 V supply
- Reserve capacity for subsequent expansion, if planned.

Tool connection

Settings and diagnostics

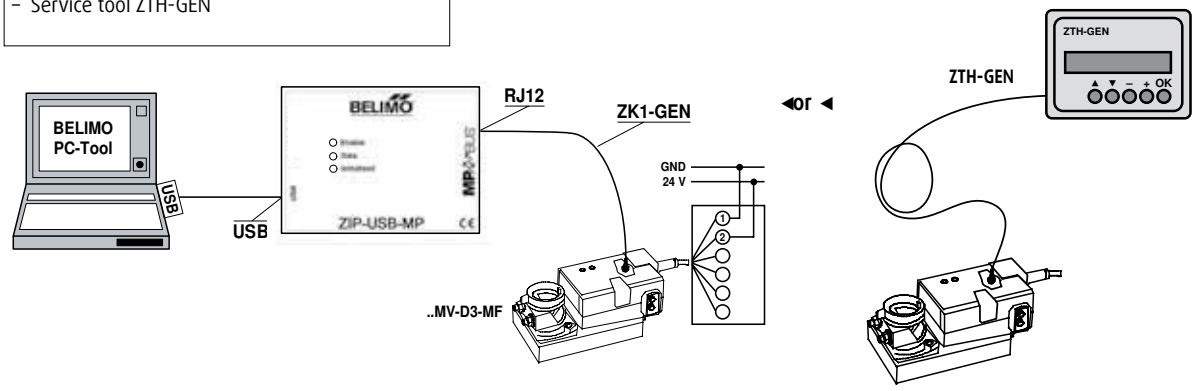
The settings and diagnostics of the connected VAV-Compact controller can be checked and adjusted easily and rapidly with the Belimo PC-Tool or with the ZTH-GEN service tool.

On-board service connection

The service connection integrated in the VAV-Compact enables a rapid connection of the operating device used.

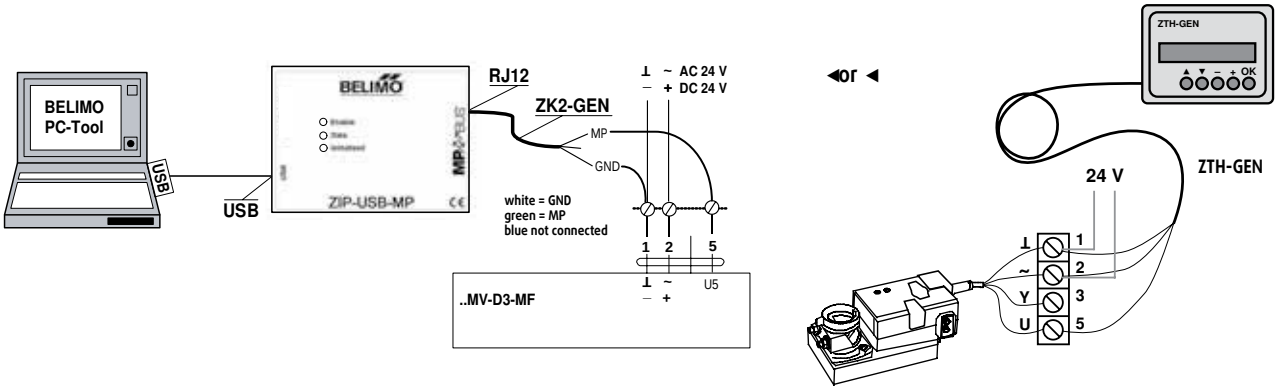
Belimo VAV operating and service devices

- Belimo PC-Tool with level converter ZIP-USB-MP
- Service tool ZTH-GEN



Tool connection (5)

The VAV-Compacts can also communicate with the Service tools via the Tool connection (connection wire 5). The connection be set up during operations on-site, i.e. in the connection socket, on the tool socket of the Belimo room temperature controller CR24 or at the floor or control cabinet terminals.



LMV-D3-MP

NMV-D3-MP

BLC1, VAV-Compact Controller

VAV-Compact controller with integrated pressure sensor, VAV controller and damper actuator for pressure-independent VAV and CAV applications in the comfort zone

- Control: DC 0/2 ... 10V / MP-Bus
- Integration in bus systems
  - DDC controller with MP interface
  - LonWorks® systems
  - Fan optimiser systems
- With additional switch-on option for sensors and switches
- Diagnostic socket for Service and PC-Tool

Brief description

Application
The digital VAV-Compact has PI control characteristics and is used for pressure-independent control of VAV units in the comfort zone.

Pressure measurement
The integrated maintenance-free Belimo D3 differential pressure sensor is also suitable for very small volumetric flows. It is for this reason that it covers versatile applications in the comfort zone, e.g. in residential construction, offices, hospitals, hotels, cruise ships, etc.

Actuator
Three versions available, depending on the size of the VAV unit: 5 / 10 / 20 Nm.
- Rotary actuator, depending on the size
- Linear actuator 150 N with 100, 200 or 300 mm linear movement

Control function
VAV-CAV or Open-Loop operation for integration in an external VAV control loop.

Feedback
Damper position for fan optimiser systems, current volumetric flow or pressure value.

VAV – variable volumetric flow
For variable volumetric flow applications with a modulating reference variable, e.g. room temperature controller, direct digital control or bus system, it enables demand-related, energy-saving ventilation of individual rooms or zones. The operating range $\hat{M}_{min}$ ...$\hat{M}_{max}$ can be connected via selectable mode.
The following are available: DC 2 ... 10V / 0 ... 10V / adjustable range / bus operation

CAV – constant volumetric flow
For constant volumetric flow applications, e.g. in step mode, controlled by means of a switch. The following operating modes can be selected from: CLOSED / $\hat{M}_{min}$ / ($\hat{M}_{mid}$) / $\hat{M}_{max}$ / OPEN

Bus function
Up to eight Belimo MP devices (VAV / damper actuator / valve actuator) can be connected together over the MP-Bus and integrated into the following systems:
- LONWORKS® applications with Belimo UK24LON interface
- EIB Konnex applications with Belimo UK24EIB interface
- MODBUS RTU applications with Belimo UK24MOD interface
- BACnet applications with Belimo UK24BAC interface
- DDC controller with integrated MP-Bus protocol
- Fan optimiser applications with optimiser COU24-A-MP

A sensor (0...10V or passive), e.g. a temperature sensor or a switch, can optionally be integrated into the higher-level DDC or bus system via the MP-Bus.

Operating and service devices
Belimo PC-Tool or service tool ZTH-GEN, can be plugged into the VAV-Compact (PP connection) or via MP-Bus.

Assembly and connection
The VAV-Compact, which is assembled on the unit by the OEM, is connected using the prefabricated connecting cable.

Test function / test display
The VAV-Compact features two LEDs with a functional readiness display for commissioning and functional checking. Extended information with ZTH-GEN.

OEM factory settings
The VAV-Compact is mounted on the VAV unit by the unit manufacturer, who adjusts and tests it according to the application. The VAV-Compact is sold exclusively via the OEM channel for this reason.

Type overview

Type	Torque	Power consumption	Dimensioning	Weight
LMV-D3-MP	5 Nm	2 W	4 VA (max. 8 A @ 5 ms)	Approx. 500 g
NMV-D3-MP	10 Nm	3 W	5 VA (max. 8 A @ 5 ms)	Approx. 700 g
SMV-D3-MP	20 Nm	3 W	5.5 VA (max. 8 A @ 5 ms)	Approx. 830 g
LHV-D3-MP	150 N	2.5 W	4.5 VA (max. 8 A @ 5 ms)	Approx. 550 g

Technical data	
Supply	
Nominal voltage	AC 24V, 50/60 Hz, DC 24 V
Operating range	AC 19.2 ... 28.8V, DC 21.6 ... 28.8V
Differential pressure sensor	
Type, principle of operation	Belimo D3 sensor, dynamic response
Operating range	0 ... 600 Pa
Overload capability	±3000 Pa
Installation position	Any, no reset necessary
Materials in contact with medium	Glass, epoxy resin, PA, TPE
Control function	– VAV-CAV – Open-loop operation
Adjustment values	
$\dot{M}_{nom}$	OEM-specific nominal volumetric flow setting, suitable for the VAV unit
Δp @ $\dot{M}_{nom}$	50 ... 450 Pa
$\dot{M}_{max}$	20 ... 100% of $\dot{M}_{nom}$
$\dot{M}_{min}$	0 ... 100% of $\dot{M}_{nom}$
$\dot{M}_{mid}$	50% of $\dot{M}_{min}$ to $\dot{M}_{max}$
Classic control	
VAV mode for reference value input Y (Connection 3)	– DC 2 ... 10V / (4 ... 20 mA with 500 Ω resistance) – DC 0 ... 10V / (0 ... 20 mA with 500 Ω resistance) – Adjustable DC 0 ... 10V } Input impedance min. 100 kOhm
Mode for actual value signal U5 (Connection 5)	– DC 2 ... 10V – DC 0 ... 10V – Adjustable: volumetric flow, damper position or differential pressure } max. 0.5 mA
CAV operating modes (constant volumetric flow)	CLOSED / $\dot{M}_{min}$ / ($\dot{M}_{mid}$ *) / $\dot{M}_{max}$ / OPEN * (* only with AC 24V supply)
MP-Bus function	
Address in bus operation	MP1 ... 8 (classic operation: PP)
LONWORKS® / EIB-Konnex / Modbus RTU / BACnet	With BELIMO Interface UK24LON / UK24EIB / UK24MOD / UK24BAC 1 ... 8 BELIMO MP devices (VAV / damper actuator / valve)
DDC controller	DDC controllers/programmable controller with an integrated MP interface from various manufacturers
Fan optimiser (fan control)	With BELIMO Fan Optimiser COU24-A-MP
Sensor integration	Passive (Pt1000, Ni1000, etc.) and active sensors (0...10V), e.g. temperature, humidity 2-point signal (switching capacity 16 mA @ 24V), e.g. switches, occupancy switches
Operating and service	Pluggable / PC-Tool (V3.6 or higher) / service tool ZTH-GEN
Communication	PP/MP-Bus, max. DC 15V, 1200 baud
Push-button	Adaption / addressing
LED display	– 24V supply – Status / bus function
Actuator	Brushless, non-blocking actuator with power-save mode
Direction of rotation	ccw / cw or ↑ / ↓
Adaption	Capture of setting range and resolution to control range
Gear disengagement	Push-button self-resetting without functional impairment
Sound power level	Max. 35 dB (A), SMV-D3-MP max. 45 dB (A)
Actuator - rotating	
Angle of rotation	95°◁, adjustable mechanical or electronic limiting
Position indication	Mechanical with pointer
Spindle driver	– Clamp, spindle round 10 ... 20 mm / spindle square 8 ... 16 mm – Form fit in various versions, e.g. 8 x 8 mm
Actuator – linear	
Stroke	100, 200 or 300 mm, adjustable mechanical or electronic limiting
Connection	Cable, 4 x 0.75 mm^2
Safety	
Protection class	III Safety extra-low voltage
Degree of protection	IP54
Electromagnetic compatibility	CE according to 89/336/EEC

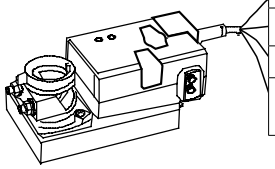
Technical data	*(continued)*
Safety	
Mode of operation	Type 1 (in acc. with EN 60730-1)
Rated impulse voltage	0.5 kV (in accordance with EN 60730-1)
Control pollution degree	2 (in accordance with EN 60730-1)
Ambient temperature	0 ... +50°C
Non-operating temperature	–20 ... +80°C
Ambient humidity	5 ... 95% r.h., non-condensing (in accordance with EN 60730-1)
Maintenance	Maintenance-free

Connection

Connecting cable

The connection is made using the connecting cable mounted to the VAV-Compact device.

Note
- Supply via safety isolating transformer!
- Connections 1 and 2 (AC/DC 24V) and 5 (MP signal) must be routed to accessible terminals (room temperature controller, floor distributor, control cabinet, etc.) in order to enable access with the tool for diagnostic and service work.

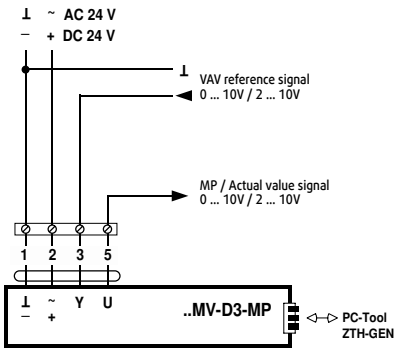


No.	Designation	Wire colour	Function
1	– ⊥	black	⊥ – AC/DC 24V supply
2	+ ~	red	~ + AC/DC 24V supply
3	Y	white	Reference signal VAV/CAV
5	U	orange	– Actual value signal – MP-Bus connection

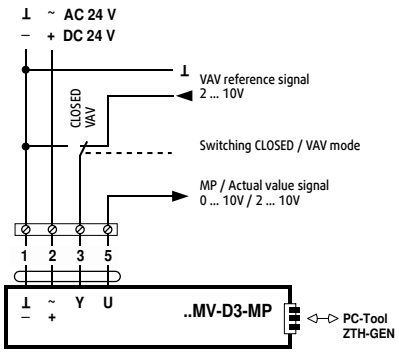
VAV – Variable operation $\dot{M}_{min}$...$\dot{M}_{max}$

Wiring diagrams

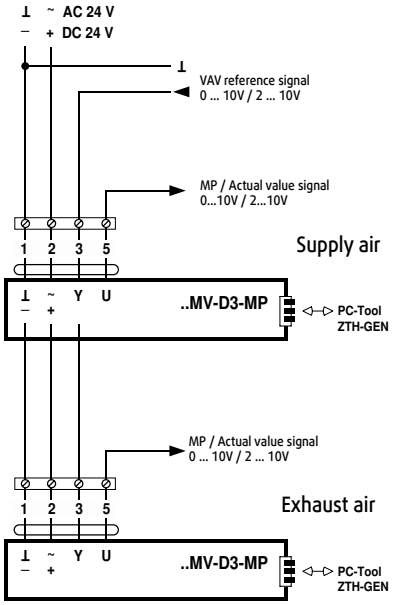
Example 1:
VAV with analogue reference signal



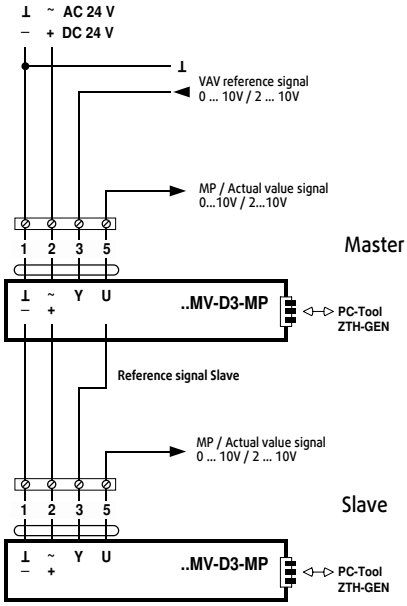
Example 2:
VAV with shut-off (CLOSE), 2 ... 10V mode



Example 3:
VAV with analogue reference signal
supply/exhaust air in parallel operation



Example 4:
VAV with analogue reference signal,
in Master/Slave operation

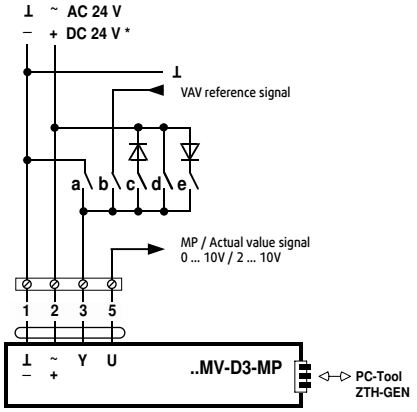


CAV – Step mode CLOSED / $\dot{M}_{min}$ / $\dot{M}_{mid}$ / $\dot{M}_{max}$ / OPEN

CAV control

Three options are available for the CAV control:
- Standard 0.1 V shut-off: CLOSED –$\dot{M}_{min}$ – $\dot{M}_{max}$ – OPEN (default setting)
- Standard 0.5 V shut-off: CLOSED – $\dot{M}_{min}$ – $\dot{M}_{max}$ – OPEN
- Old Generation (NMV-D2M): CLOSED – $\dot{M}_{min}$ – $\dot{M}_{mid}$ – $\dot{M}_{max}$ – OPEN

Wiring diagrams



* Not available with DC 24 V supply.

CAV function: Standard

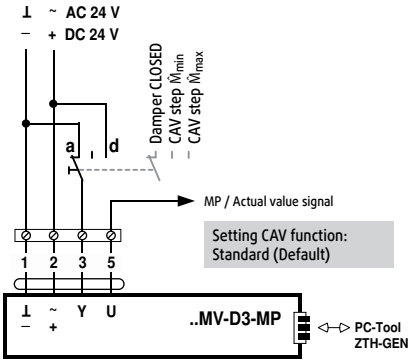
Mode setting	–	0 ... 10 V	0 ... 10 V	0 ... 10 V	0 ... 10 V
	2 ... 10 V	2 ... 10 V	2 ... 10 V	2 ... 10 V	2 ... 10 V
Signal	⊥ –	0 ... 10 V 2 ... 10 V	~	~ +	~
Function	3	3	3	3	3
Damper CLOSED	a) CLOSED		c) CLOSED *		
$\dot{M}_{min}$ ... $\dot{M}_{max}$		b) VAV			
CAV – $\dot{M}_{min}$	All open – $\dot{M}_{min}$ active **				
Damper OPEN					e) OPEN *
CAV – $\dot{M}_{max}$				d) $\dot{M}_{max}$	

Legend

Contact closed, function active
Contact closed, function active, only in 2 ... 10 V mode
Contact open

* Not available with DC 24 V supply
** The damper is closed when the 0.5 V shut-off level is used.

Example:
CAV application CLOSED – $\dot{M}_{min}$ – $\dot{M}_{max}$ (mode 2 ... 10 V)



Note

In order to use the CAV step $\dot{M}_{mid}$, the Old Generation (NMV-D2M) CAV function must be selected.

CAV function: Old Generation (NMV-D2M)

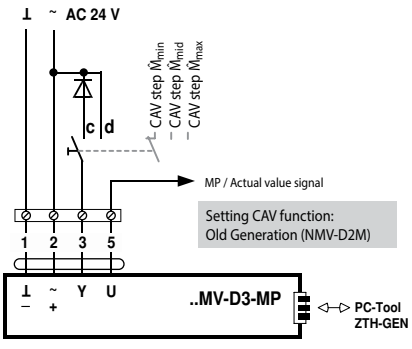
Mode setting	–	0 ... 10 V	0 ... 10 V	0 ... 10 V	0 ... 10 V
	2 ... 10 V	2 ... 10 V	2 ... 10 V	2 ... 10 V	2 ... 10 V
Signal	⊥ –	0 ... 10 V 2 ... 10 V	~	~ +	~
Function	3	3	3	3	3
Damper CLOSED	a) CLOSED				
$\dot{M}_{min}$ ... $\dot{M}_{max}$		b) VAV			
CAV – $\dot{M}_{min}$	All open – $\dot{M}_{min}$ active				
Damper OPEN					e) OPEN *
CAV – $\dot{M}_{max}$				d) $\dot{M}_{max}$	
CAV – $\dot{M}_{mid}$			c) $\dot{M}_{mid}$ *		

Legend

Contact closed, function active
Contact closed, function active, only in 2 ... 10 V mode
Contact open

* Not available with DC 24 V supply

Example:
CAV application $\dot{M}_{min}$ – $\dot{M}_{mid}$ – $\dot{M}_{max}$ (Mode 0 ... 10 or 2 ... 10 V)

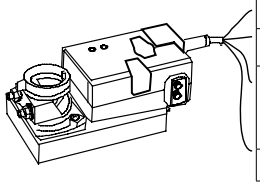


MP-Bus operation – VAV / CAV operation

Connecting cable

The connection to the MP-Bus is made using the connecting cable mounted to the VAC-Compact device.

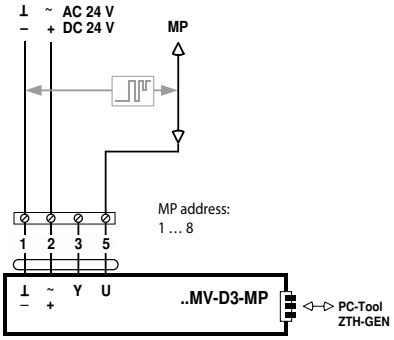
Note
- Supply via safety isolating transformer!
- Connections 1 and 2 (AC/DC 24V) and 5 (MP signal) must be routed to accessible terminals (room temperature controller, floor distributor, control cabinet, etc.) in order to enable access with the tools for diagnostic and service work.



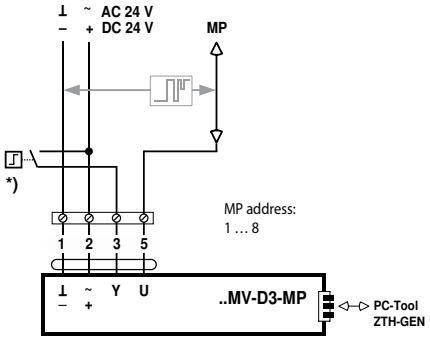
No.	Designation	Wire colour	Function
1	– ⊥	black	⊥ – } AC/DC 24V supply
2	+ ~	red	~ + } AC/DC 24V supply
3	Y	white	Input for – Sensor interface – Override control
5	U	orange	MP-Bus connection

Wiring diagrams

Control via MP-Bus
For detailed information, see section «MP-Bus integration»



MP-Bus control with integrated switch
For detailed information on sensor integration, see section «MP-Bus integration»



*) e.g. window contact

Note
- For further information about the connection, override controls, MP-Bus cables, etc., see section «MP-Bus integration»
- This is a connection description. Depending on the application, the terminal allocation may vary. The connection and commissioning must be carried out by trained personnel.

Dimensioning of supply and connecting cable

General

In addition to the actual wire sizing, attention must also be paid to the surrounding area and the cable routing.Signal cables must not be laid in the vicinity of load cables, objects liable to cause EMC interference etc. if possible. Paired or layer stranded cables improve immunity to interference.

24 V supply, dimensioning and cabling

The dimensioning and installation of the AC 24V supply, the fuse protection and the cables are dependent on the total operated load and local regulations. Account must be taken of the following performance data, including the starting currents of the actuators:
- Dimensioning values VAV-Compact controller, see Technical data
- Dimensioning values of further controlling elements etc. can be found in the current data sheets and product information
- Other devices which are intended to be connected to the same 24 V supply
- Reserve capacity for subsequent expansion, if planned.

MP-Bus integration – supply, dimensioning and cabling

See S4-VAV-Compact D3, MP-Bus integration

BLC1-MOD, VAV-Compact Controller

A pressure sensor, digital VAV controller and damper actuator all in one, providing a VAV-Compact solution with a communications capability for pressure-independent VAV systems in the comfort zone

- Control function: VAV
- Communication via Modbus RTU (RS-485)
- Conversion of sensor signals
- Diagnostic socket for operating devices

NMV-D3-MOD

LMV-D3-MOD

Brief description

Application
The digital VAV-Compact has PI control characteristics and is used for pressure-independent control of VAV units in the comfort zone.

Mode of operation
The actuator is fitted with an integrated interface for Modbus RTU, receives its digital positioning signal from the superordinate Modbus-Master and returns the current status.

Converter for sensors
Connection option for a sensor (passive or active sensor or switching contact). In this way, the analogue sensor signal can be easily digitised and passed along to Modbus.

Parameterisable actuators
The factory settings cover the most common applications. As desired, individual parameters can be adapted for specific systems or servicing with a service tool (e.g. ZTH-GEN).
The Modbus communication parameters (address, baud rate, ...) are set with the ZTH-GEN.
Pressing push-button 3 while connecting the supply voltage resets the communication parameters to the factory setting.
Quick addressing: The Modbus address can alternatively be set using push-buttons from 1 to 16. The value selected is added to the «Basic address» parameter and results in the effective Modbus address. For example, with a basic address of 140, Modbus addresses between 141 and 156 can be parameterised using quick addressing.

Pressure measurement
Maintenance-free, dynamic, differential pressure sensor, proven in a wide range of applications, suitable for use in offices, hospital wards, alpine hotels or cruise liners.

Actuator
Two versions are available, depending on the size of the VAV unit: 5 or 10 Nm.

VAV – variable volumetric flow
The VAV-Compact is supplied with its modulating setpoint by a room temperature controller via Modbus. This facilitates demand-related, power-saving ventilation in individual rooms or zones of air conditioning systems. The operating range ($\dot{V}_{min}$ and $\dot{V}_{max}$) can be set either locally with PC-Tool or ZTH-GEN or via Modbus.

Operating and service devices
Belimo PC-Tool or Service-Tool ZTH-GEN, pluggable on the VAV-Compact.

Assembly and connection
The VAV-Compact device, which is assembled on the unit by the OEM, is connected using the prefabricated connecting cable.

OEM factory settings
The VAV-Compact is mounted on the VAV unit by the unit manufacturer, who adjusts and tests it according to the application. The VAV-Compact is sold exclusively via the OEM channel for this reason.

Type listing

Type	Torque	Power consumption	For wire sizing	Weight
LMV-D3-MOD	5 Nm	2 W	4 VA (max. 5 A @ 5 ms)	Approx. 500 g
NMV-D3-MOD	10 Nm	3 W	5 VA (max. 5 A @ 5 ms)	Approx. 700 g

Safety notes

- The actuator must not be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- It may only be installed by suitably trained personnel. Any legal regulations or regulations issued by authorities must be observed during installation.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- The cable must not be removed from the device.
- When calculating the required torque, the specifications supplied by the damper manufacturers (cross-section, design, installation site), and the air flow conditions must be observed.
- The device contains electrical and electronic components and is not permitted to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Modbus overview

Register

	No.	Adr	Register
In operation	1	0	**Setpoint [%]**
	2	1	**Override control**
	3	2	**Command**
	4	3	Actuator type
	5	4	Relative position [%]
	6	5	Absolute position [°] [mm]
	7	6	Relative volumetric flow [%] (only for VAV/EPIV)
	8	7	Absolute volumetric flow (pressure) [m^3/h] [l/min] [Pa] (only for VAV/EPIV)
	9	8	Sensor value [mv] [Ω] [-]
Service	101	100	Series number 1st part
	102	101	Series number 2nd part
	103	102	Series number 4th part
	104	103	Firmware version (Modbus module)
	105	104	Malfunction and service information
	106	105	**Min [%]**
	107	106	**Max [%]**
	108	107	**Sensor type**
	109	108	**Bus fail position**

- Registers in Bold can be written
- Registers <100 (In operation) which can be written are volatile and should therefore be updated periodically
- Registers >100 which can be written are non-volatile

Commands

All data is arranged in a table and addressed by 1..n (register) or 0..n-1 (address). No distinction is made between data types (Discrete Inputs, Coils, Input Registers, Holding Registers). As a consequence, all data can be accessed with the two commands for Holding Register. The commands for Discrete Inputs and Input Registers can be used as an alternative.

Standard commands:
Read Holding Registers [3]
Write Single Register [6]

Optional commands:
Read Discrete Inputs [2]
Read Input Registers [4]
Write Multiple Registers [16]

Note regarding Read Discrete Inputs
The command reads one or more bits and can alternatively be used for register 105 (Malfunction and service information). The start address to be used is 1664.

Modbus register description

Register 1: Setpoint

Setpoint for actuator setting or volumetric flow in hundredths of one percent,
i.e. 0...10 000 corresponds to 0...100%

Register 2: Override control

Overriding the setpoint with defined values

Override control	
0	None
1	Open
2	Close
3	Min
5	Max

Register 3: Command

Initiation of actuator functions for service and test; the register is reset automatically.

Command	
0	None
1	Adaption
2	Test run
3	Synchronisation
4	Reset actuator malfunctions

Register 4: Actuator type

Actuator type; the allocation may deviate from the basic category with some actuators.

Actuator type	
0	Actuator not connected / not known
1	Air/water actuators with/without safety function
2	Volumetric flow controller VAV / EPIV
3	Fire damper actuator

Register 5: Relative position

Relative position in hundredths of one percent,
i.e. 0 ... 10 000 correspond to 0 ... 100%

Register 6: Absolute position

Absolute position
0 ... 10 000 (65535 if not supported by the actuator)
The unit depends on the device:
[°] for actuators with rotary movement
[mm] for actuators with linear movement

Register 7: Relative volumetric flow

Relative volumetric flow in hundredths of one percent of Vnom,
i.e. 0 ... 10 000 correspond to 0 ... 100%
This value is available only for VAV controllers and EPIV devices (actuator type: 2).
For all other types, 65535 will be entered.

Register 8: Absolute volumetric flow

Absolute volumetric flow
This value is available only for VAV controllers and EPIV devices (actuator type: 2).
For all other types, 65535 will be entered.
The unit depends on the device:
[m^3/h] for VAV controllers (or [Pa] for pressure applications)
[l/min] for EPIV devices

Register 9: Sensor value

Current sensor value; dependent on the setting in Register 108
The unit depends on the sensor type: [mv] [Ω] [-]

Register 101, 103: Series number

Each MP node has an unambiguous series number which is either impressed on or glued to the node. The series number consists of 4 segments, although only parts 1, 2 and 4 are displayed on Modbus.
Example: 00839-31324-064-008

Register 9	Register 10	Register 11
1st part	2nd part	4th part
00839	31234	008

Register 104: Firmware Version

Firmware version of Modbus module (VX.XX)
e.g. 101 ⍰ V1.01

Modbus register description	(continued)

Register 105: Malfunction and service information

The status information is split into messages about the actuator (malfunctions) and other service information.

	Bit	Description
Malfunctions (low byte)	0	Excessive utilisation
	1	Mechanical travel increased
	2	Mechanical overload
	3	–
	4	Safety-relevant faults (fire protection only)
	5	Damper test error (fire protection only)
	6	Duct temperature too high (fire protection only)
	7	Smoke detector tripped (fire protection only)
Service (high byte)	8	Internal activity (test run, adaption, …)
	9	Gear disengagement active
	10	Bus watchdog triggered
	11	–
	12	–
	13	–
	14	–
	15	–

The malfunction bits can be reset with Register 3 (command 4) or with the Belimo PC-Tool. Malfunctions 0 and 4 cannot be reset.

Register 106: Min / Vmin setting

Minimum limit (position or volumetric flow) in hundredths of one percent,
i.e. 0...10 000 correspond to 0...100%
Caution: Changing the setting may result in malfunctions.

Register 107: Max / Vmax setting

Minimum limit (position or volumetric flow) in hundredths of one percent,
i.e. 2000...10 000 correspond to 20...100%
Caution: Changing the setting may result in malfunctions.

Register 108: Sensor type

Sensor type connected to the actuator; in the absence of sensor specification, the switching at the Y input will have the effect of a local compulsion.

Sensor type	
0	None
1	Active sensor (mV)
2	Passive sensor 1 k (Ω)
3	Passive sensor 1 … 20 k (Ω)
4	Switching contact (0 / 1)

Note
After changing the sensor type, the actuator must always be restarted in order for correct sensor values to be read out.

Register 109: Bus fail position

Modbus communication is not monitored as standard. In the event of a breakdown in communication, the actuator retains the current setpoint.
The bus monitoring controls the Modbus communication. If neither the setpoint (Register 1) nor the override control (Register 2) is renewed within 120 seconds, the actuator controls to the bus fail position (closed / open).
Triggered bus monitoring is indicated in Register 105.

Bus fail position	
0	Last setpoint (no bus monitoring)
1	Fast close if time is exceeded
2	Fast open if time is exceeded

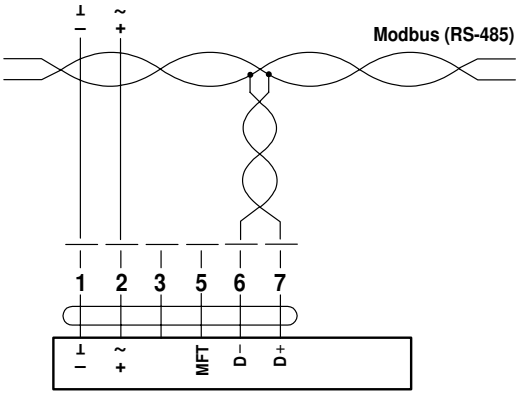
Electrical installation

Connection diagram for cable layout

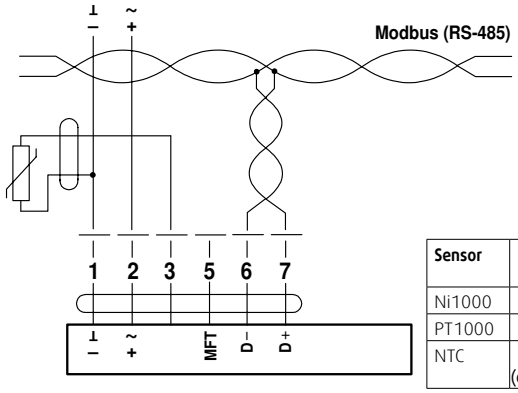
Note
Connection via safety isolating transformer.

Note
Modbus signal assignment:
C1 = D– = A
C2 = D+ = B
Power supply and communication are not galvanically isolated.
Interconnect ground signal of the devices.

Connection without sensor

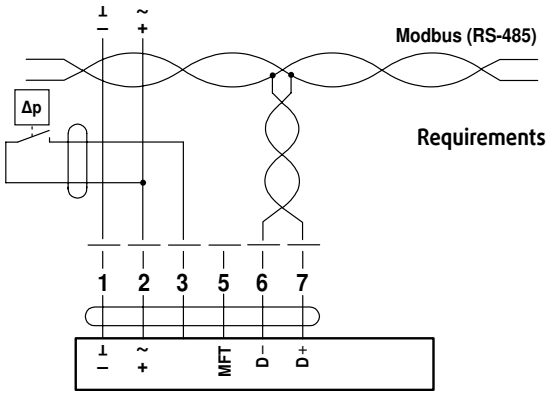


Connection with passive sensor, e.g. Pt1000, Ni1000, NTC



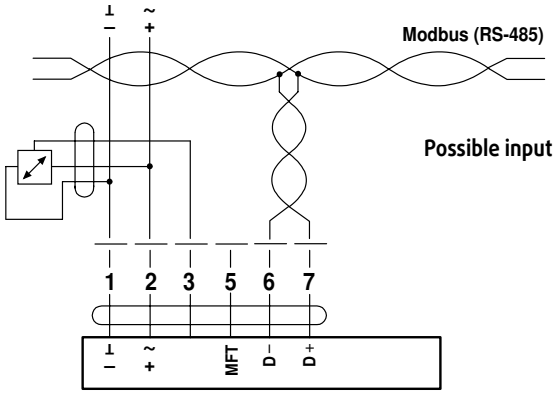
Sensor	Temperature range	Resistance range	Resolution
Ni1000	–28 ... +98°C	850 ... 1600 Ω	1 Ω
PT1000	–35 ... +155°C	850 ... 1600 Ω	1 Ω
NTC	–10 ... +160°C (depending on type)	200 ... 50 kΩ	1 Ω

Connection with switching contact, e.g. Δp-monitor



Requirements for switching contact:

Connection with active sensor, e.g. 0 ... 10 V @ 0 ... 50°C



Possible input voltage range:

Tool connection

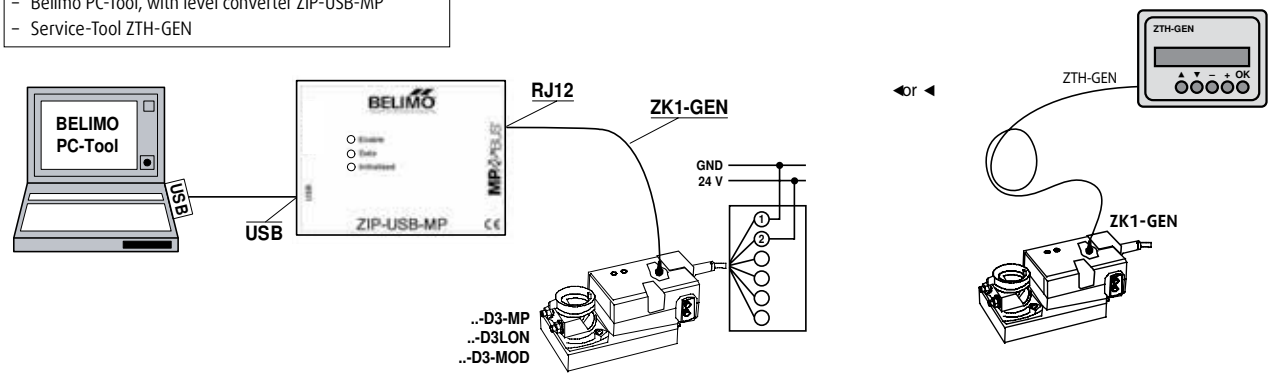
Setting and diagnostics

Setting and the diagnostics of the connected VAV-Compact controller can be checked and set quickly and easily with the Belimo PC-Tool or the Service-Tool ZTH-GEN.

On-board service connection

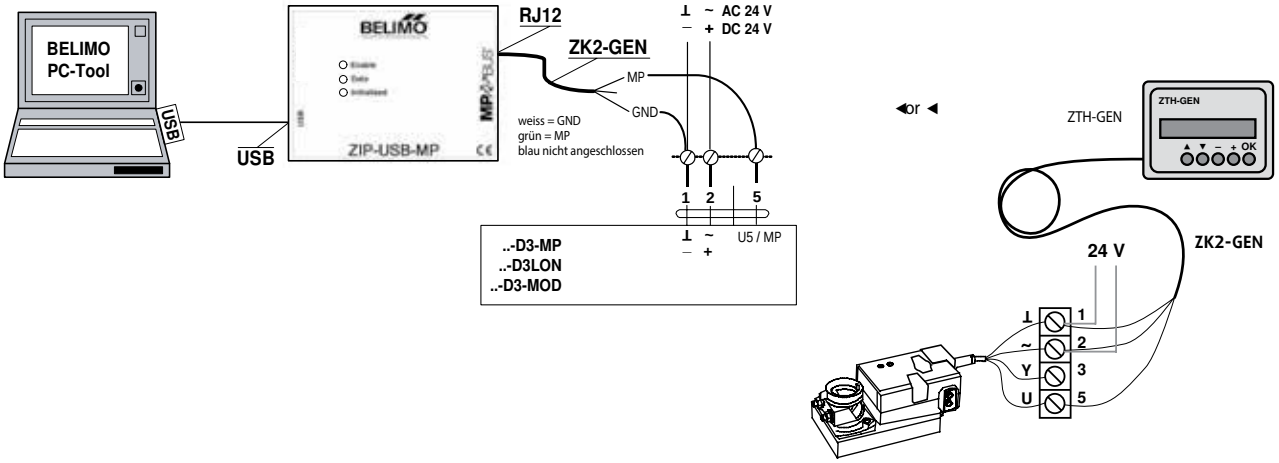
The service connection integrated in the VAV-Compact allows the console used to be connected quickly.

Belimo VAV operating and service devices
- Belimo PC-Tool, with level converter ZIP-USB-MP
- Service-Tool ZTH-GEN



MP connection (5)

The VAV-Compact can also communicate (connection wire 5) with the Service-Tools via the MP connection. The connection can be established during operation on site, i.e. in the connection socket, at the tool socket of the Belimo room temperature controller CR24 or on the floor or control cabinet terminals.



Operating controls and indicators

① **Push-button and LED display green**

Off:	No power supply or fault
Illuminated:	In operation
Flashing:	Address mode: pulses according to set address (1 ... 16) when starting: reset to factory setting (communication)
Press button:	in standard mode: switches on angle of rotation adaptation in address mode: confirmation of set address (1 ... 16)

② **Push-button and LED display yellow**

Off:	The actuator is ready
Illuminated:	Adaption or synchronising process active or actuator in address mode (green LED indicator flashing)
Flickering:	Modbus communication active
Press button:	in operation (>3 s): switch address mode on and off in address mode: address setting by pressing several times when starting (>5 s): reset to factory setting (communication)

③ **Gear disengagement button**

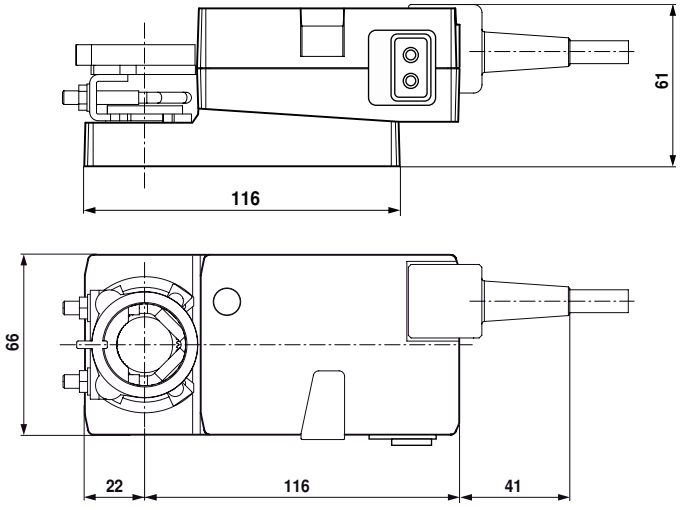
Press button:	Gear disengaged, motor stops, manual override possible
Release button:	Gear engaged, synchronisation starts, followed by standard operation

④ **Service plug**

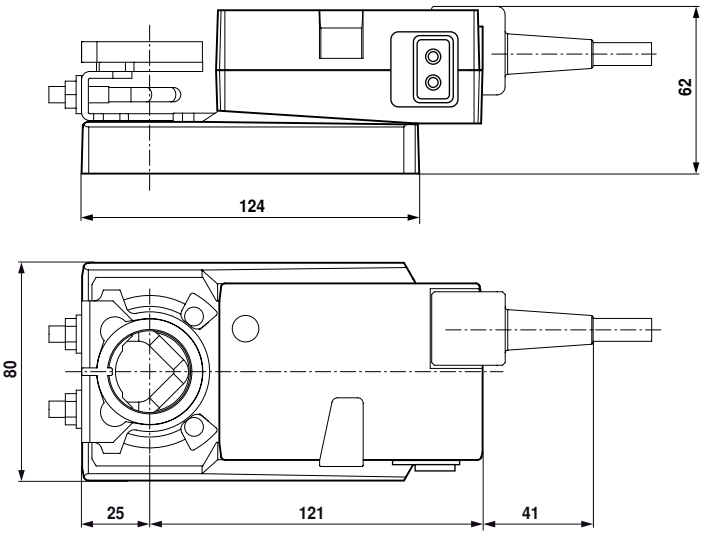
For connecting parameterising and service tools

Dimensions [mm]

Dimensional drawings LMV-D3-MOD



Dimensional drawings NMV-D3-MOD



ZTH-GEN

Service-Tool for parameterisable and communicative Belimo actuators and VAV controllers. Connection via service socket on the device or MP/PP connection.

Information

Belimo Automation AG reserves the right to implement supplements, changes and improvements at any time, i.e. without prior notification.

- version overview,
- release information,
- most up-to-date operating instruction, etc.

Technical data

Electrical data	Power supply		AC 24V, 50/60 Hz, DC 24V (from actuator)
	Operating range		AC 19.2 ... 28.8V/DC 21.6 ... 28.8V
	Power consumption	Operation Dimensioning	1 W 2 VA
	Connection		Socket for Belimo PP connection, RJ12
	Connecting cable		see «Connection»
Interface	Communication		Point to Point (PP), no bus mode (MP)
Supported devices	Belimo actuator/VAV controller		with PP/MP connection, see «Supported devices», Scope of function dependent on type of device
Operating	LCD display		2 x 16 characters, with background illumination
	Keys		⇩ / ⇧ / – / + / OK
	Quick start guide		enclosed stickers, de/en
Safety	Protection class		**III** Safety extra-low voltage
	Electromagnetic compatibility		CE in accordance with 2004/108/EC
	Operating temperature		0 ... 50°C, non-condensing
	Non-operating temperature		–20 ... 50°C, non-condensing
Dimensions / Weight	Dimensions		L x W x D: 85 x 65 x 23 mm
	Weight		Approx. 260 g

Supported devices

Damper product range	..-MF / ..-MP / ..-MFT(2) / ..LON	
Valve product range	..-MF / ..-MP / ..-MFT(2) / ..LON	
EPIV – pressure-independent characterised control valve	P6..W..-C24E	available starting 2011
Fire damper actuator	BF-TopLine with BKN230-24MP	
VAV product range	VRD2 / VRD2-L	available 1992-2007
	VRD3	available starting 2008
	VRP-M (VAV and STP applications)	available starting 2005
	NMV-D2..	available 1992 to 2000
	LMV-D2M / NMV-D2M..	available 2000 to 2006
	LMV-D2-MP / NMV-D2-MP / SMV-D2-MP.., LHV-D2-MP..	available 2006 to 2011
	LMV-D2LON / NMV-D2LON	available 2006 to 2011
	LMV-D3-MP / NMV-D3-MP / SMV-D3-MP.., LHV-D3-MP..	available starting 2011
	LMV-D3LON / NMV-D3LON	available starting 2011

Safety notes

⚠

- **The device must not be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.**
- **Connection permitted only to Belimo devices with 24V safety extra-low voltage and PP/MP interface.**
- **Changes of parameters, etc. may not be performed except after consultation/specification of the OEM, device or mechanical/electrical contractor. Operating and adjustment regulations must be observed.**

Versions, compatibilities

This document describes the function and handling of the new ZTH-GEN V4.xx.

Current information regarding
- Upgrade ZTH-VAV → ZTH-GEN
- Firmware upgrade to V4.xx
- Version overview, documentation

The ZTH-GEN V4.xx contains the functionality of all previous versions of ZTH-GEN and ZTH-VAV, in addition to those of the new VAV-Compact D3.

Previous ZTH versions can be upgraded to a ZTH-GEN V4.xx by means of a simple firmware download.

ZEV The adjustment tool ZEV (1992 to 2007) is replaced by the ZTH-GEN V4.xx

ZTH-VAV Will be replaced by the new ZTH-GEN V4.xx

ZTH-GEN V2.xx / V3.xx Will be replaced by the new ZTH-GEN V4.xx

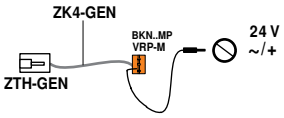
Connection

Connection and supply

The ZTH-GEN is supplied via the actuator/VAV controller. The connection is set up
- directly at the Service socket of the actuator/VAV controller or
- via the PP/MP connection (U5) e.g. connection socket, in the control cabinet, room controller CR24

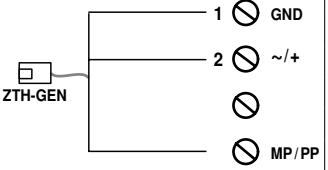
Local connection to service socket

Recommendation
Wire the PP connection (U5) to the floor distributor/control cabinet.
This means there is no need for direct access to the device.

Connection to	Cable type	Connection
VAV: ..-D2-MP / LON	ZK1-GEN (enclosed)	Direction connection to Service socket - plug in the plug - set up contact with clockwise rotation
VAV: ..-D3-MP / LON		
..-MF / MP / LON		
EPIV: P6..W..-C24E		
VAV: VRP-M [1]	ZK4-GEN (Accessories)	
F/S: BKN230-24MP (BF-Top)		
VAV: VRD3	ZK6-GEN (Accessories)	
VAV: ..MV-D2M [1]	ZK1-VAV (Accessories)	
VAV via CR24-..		

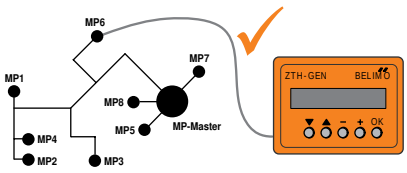
[1] ZTH-GEN connection in MP bus system: The MP connection should be separated from the MP bus while the ZTH-GEN is operating.

Direction connection to terminals

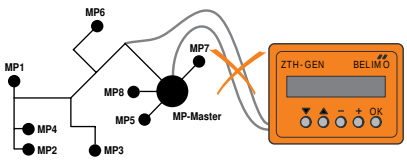
Connection to	Cable type	Connection
VAV: ..-D2-MP / LON	ZK2-GEN (Accessories)	
VAV: ..-D3-MP / LON		
VAV: ..MV-D2M		
VAV via CR24-..		
..-MF / MP / LON		
EPIV: P6..W..-C24E		
VAV: VRP-M		
VAV: VRD3		
F/S: BKN230-24MP (BF-Top)		

Connection in the MP bus system

Correct



Wrong



Direct connection to the MP bus or MP master is not possible with the ZTH-GEN.

Solution: Use the service socket on the actuator/VAV controller or temporarily disconnect the MP connection of the MP device from the MP bus and connect the ZTH-GEN to the MP connection.

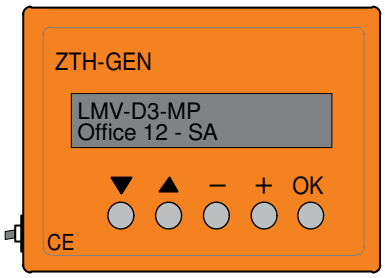
Operating

The operating device is started and the data of the connected device is read out when the ZTH-GEN is connected to the Belimo actuator/VAV controller.
The available adjustment and operating options are displayed in accordance with the device type. The available setting parameters are listed in the respective product documentation for the actuators/VAV controller.

Operating elements

LCD display

- Background illumination
- Display 2 x 16 characters



Key function

◂and ◂ Forward/backward, abort entry
– and **+** Change value/status
OK Confirm entry

RJ12 tool socket

Supply 24V / PP communication

Operating instruction

A quick start guide and a sticker with the basic functions for the the rear of the unit are enclosed with the ZTH-GEN.

Language setting, unit depiction

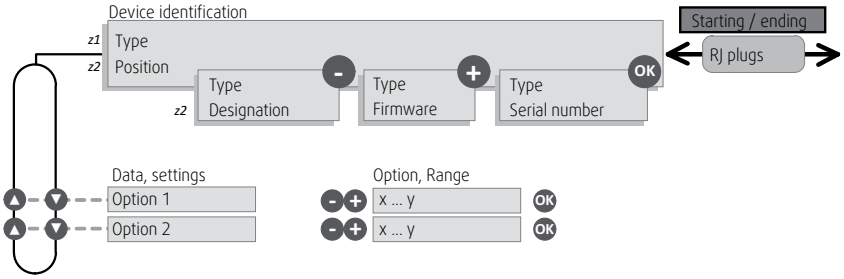
Language and units can be set in the Configuration menu.

Operating

Operating is context-related, i.e. the user sees only the options available for the connected device.
The corresponding Configuration table is read from the actuator for this purpose. In addition to the parameter type, this table also contains the corresponding divisions, e.g.: minimally adjustable running time/type. Non-relevant options are not displayed.

Menu structure, handling

The operating menu can be run through from both sides ⇩⇧.



Starting / ending

The connection to the actuator/VAV controller is started by plugging in the RJ plug and terminated by unplugging it.

Device specifications/Technical data

For a more detailed description, including setting parameters, we draw your attention to the respective separate product information.

Configuration

Start Configuration

1. Press the key (OK) while simultaneously plugging in the connecting cable
2. Configuration menu display appears

Configuration Menu

Option / Display	Setting	Product range	Explanation
HW Version Vx.x FW Version Vx.x			Display of the current hardware and firmware version of the ZTH-GEN
Text	German / **English**	-	
VAV unit	**m³/h** / l/s / cfm	VAV	
EPIV unit	m³/h / **l/min** / gpm	Valves	
Supply. ... AC ... V VHW: ... %			Display of the current AC 24V supply voltage, with direct connection to terminals (ZK2-GEN)
Start MP tester	OK	-	MP bus diagnostics tool for system integrators. The MP tester is not part of this documentation.
PICCV function	**0** / 1	Valves	Belimo US Enable PICCV Wizard function
Expert Mode [1)]	**0** / 1	VAV	Enable VAV settings: – Switching mode, – set V̇min / V̇max to original values (call up OEM setting)
Advanced Mode [2)]	**0** / 1	VAV Fire protection	Enable settings: – VAV: Direction of rotation, – BF-Top: Adaption
Exit Configuration	OK		

Activate options [1)] and [2)] only as needed and with the respective know-how; the adjustment of the respective parameters requires special expertise.

Basic functions

Device-specific identification

Key	**Display examples** (Read only)	**Explanation**
	LMV-D3-MP Office 2.12 Supply air	Type designation of the actuator/VAV controller Position (16 characters) optional
–	LMV-D3-MP DN160 / xxx	Type designation of the actuator/VAV controller Designation (16 characters) optional
+	LMV-D3-MP FW: Vxx.xx.00	Type designation of the actuator/VAV controller Firmware version of the actuator/VAV controller
OK	Address: xx 0073040033146142	MP address MP1 ... 8 / PP (PP: no bus operation) Serial number of the actuator/VAV controller

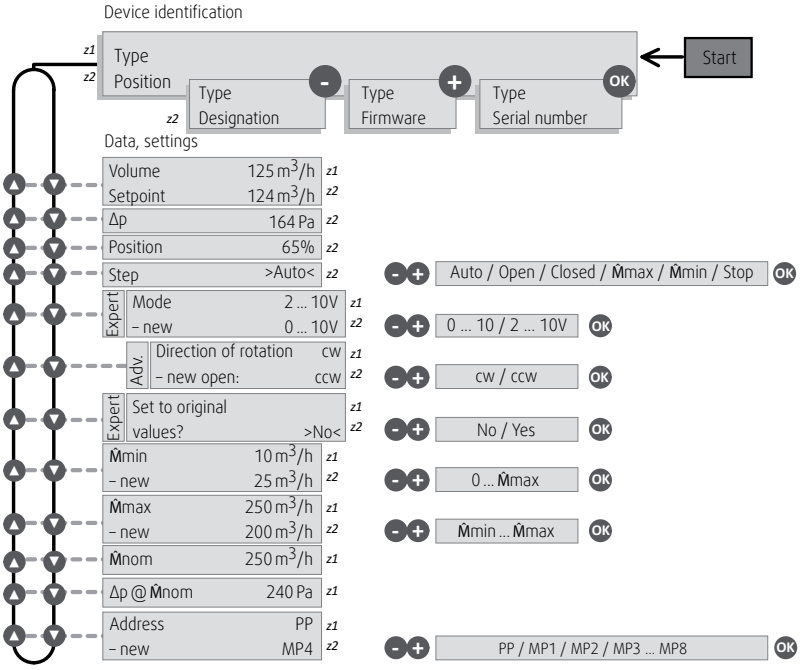
Position and Designation (16 characters) optional.
These display options can be described with the PC-Tool if required.

Set the MP bus address

Key	**Display examples** (Read/ write)	**Explanation**
◄	MP address: PP -new: MP1	Active setting (PP: no bus operation) Set the desired address MP1...8 (OK)

Functions for VAV product range

Menu tree The following menu tree corresponds to that of the new VAV-Compact D3 generation: L/N/SMV-D3-MP, LHV-D3-MP, L/ NMV-D3LON



Deviations

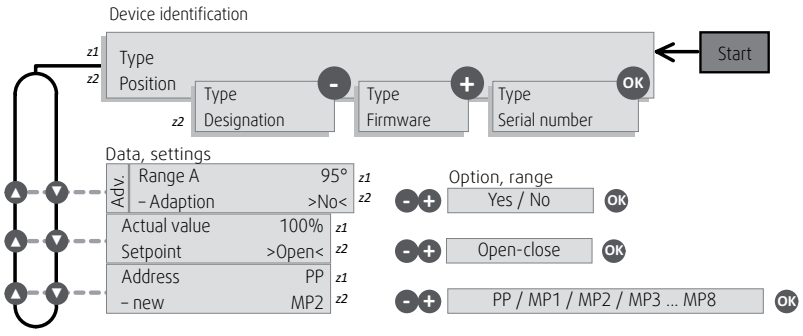
VRD2 (1992-2007)	Display actual value/setpoint in [% M̂nom], M̂min in [% M̂max], M̂max in [% M̂nom]	Read only	PP
VRD3 (starting 2008)	Display actual value/setpoint in [% M̂nom], M̂min in [% M̂nom], M̂max in [% M̂nom]	HW potentiometer setting «Tool» → Read/write, otherwise → Read only	PP
VRP-M VAV **VRP-M VAV / STP**	up to V2.16 M̂min in [% M̂max], M̂max in [% M̂nom] starting with V3.0 M̂min in [% M̂nom], M̂max in [% M̂nom]		PP / MP1...8
NMV-D2 (1992 – 2000) **NMV-D2M** (2000 – 2006)	Display actual value/setpoint in [% M̂nom], M̂min in [% M̂max], M̂max in [% M̂nom]		PP PP / MP1...8

Information: VAV-Universal actuators

The V-actuators L/N/SM24A-V, L/NMQ24A-SRV-ST, which fit the VAV universal controllers VRD3 / VRP-M (STP) / VRP / VRP-STP, have a tool connection but are nevertheless not tool-capable!

Functions for BF-TopLine fire protection actuators

Menu tree The following menu tree shows the adjustment/display possibilities of a BF-TopLine.



Checking the power supply

Checking the power supply

The ZTH-GEN offers the possibility of checking the AC 24V power supply (III safety extra-low voltage) of the Belimo devices. Voltages >30V are not permitted!
Application e.g. Commissioning, troubleshooting in the event of a malfunction.

Measurement procedure

Equipment: ZTH-GEN, ZK2-GEN
Connection: – connect free wires of the ZK2-GEN to AC 24V.
- white on GND (connection 1 actuator/VAV controller)
- blue on ~ (connection 2 actuator/VAV controller)
- third wire (turquoise) do not connect

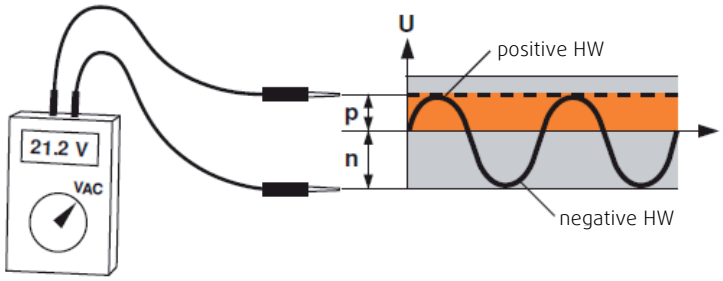
– Do not connect RJ11 plug to ZTH-GEN yet!
Start: – Press the ZTH-GEN key (OK) while at the same time connecting the RJ12 plug
– Select Supply function with arrow key (◄)
End: Disconnect ZTH-GEN RJ12 plug or end Configuration function (OK)

Display **Display**

Supply		okay
AC 24V	VHW:	88%

Quality: okay: AC supply in the division 19.2 ... 28.8V
AC value: measured AC voltage (accuracy ±1.0V insofar as VHW >95%)
VHW: Relationship of positive to negative half-wave
The deviation of the positive half-wave value to the value of the negative half-wave may not be too large. As a rule: positive HW / negative HW x 100 should be >80%.

Explanation VHW



Possible problems

The following items influence the half-wave load:
- Transformer too small in its dimensions
- long signal cable length from transformer to VAV controller

Fan Optimizer

VAV / CAV system solution for energy- optimised fan regulation for room ventilation.

Interfaces
- Room controller input DDC: 0 ... 10 / 2 ... 10 V / MP-Bus
- VAV controller input / output: MP-Bus
- Frequency converter output: 0 ... 10 V
- LC display for settings and diagnostics

Technical data

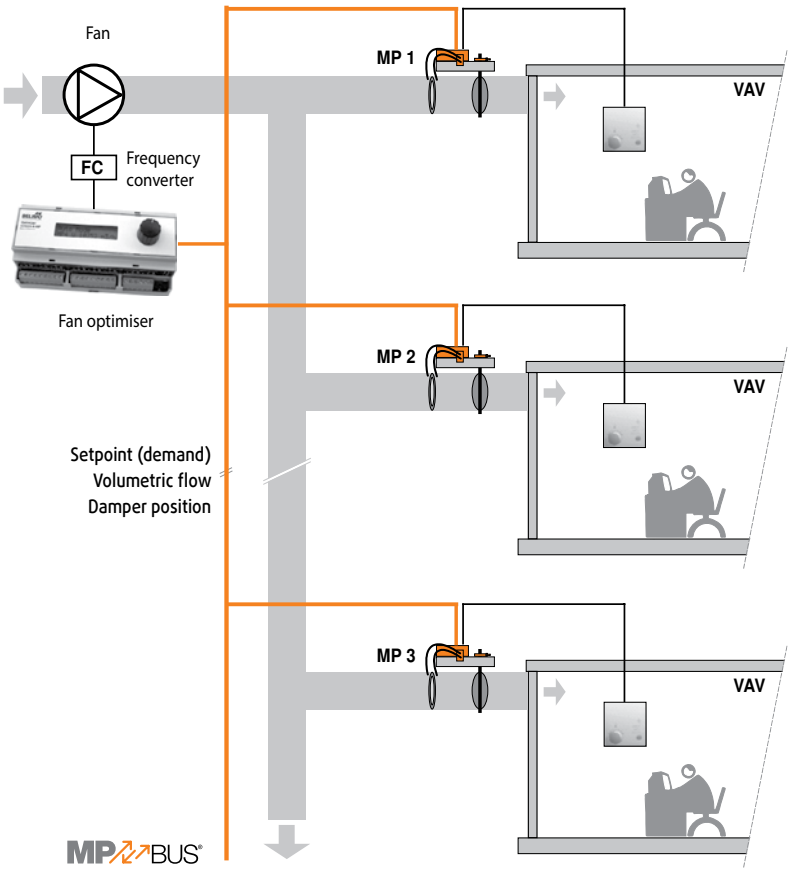
Electrical data	Nominal voltage	AC 24 V, 50/60 Hz / DC 24 V
	Power supply range	AC ±20% / DC +20% / –10%
	Power consumption	15 VA / 7.5 W (without connected VAV controller)
	Switch-on current (actuators)	max. 8.3 A at 5 ms
Connection	Inputs and outputs 1 ... 32	Screw terminals, 2.5 mm²
	MP-Bus / supply 33 ... 38	Screw terminals, 2.5 mm²
	MP-Bus operating devices	RJ12
	Wire sizing	See «Connections – topology and wire sizing»
Inputs / outputs	Inputs IN A - CASC	Cascade input, 0 ... 10 V, internal resistance 200 kΩ
	IN B - IN	Override control input, 0 ... 10 V, internal resistance 100 kΩ
	Outputs OUT A - FC	Frequency converter control output (protection class III), 0 ... 10 V, max. 10 mA
	OUT B - OUT	Reserve
	Controller analogue IN 1 ... 8	Analogue setpoint input for VAV controllers 1 ... 8, 0 ... 10 / 2 ... 10 V (switchable), internal resistance 200 kΩ
	OUT 1 ... 8	Analogue actual volumetric flow output for VAV controllers 1 ... 8, 0 ... 10 V / 2 ... 10 V (switchable), max. 10 mA
	Controller MP MP	DDC MP interface, MP-Bus connection, 24 V AC/DC supply
	RJ12	MP-Bus service socket (PC-Tool)
	Actuators MP	VAV controllers 1 ... 8, MP-Bus, 24 V AC/DC, max. 5 A
Operation	Optimiser Data input	Menu-guided encoder operation Acknowledge button
	Data display	LC display, 2 x 16 characters with LED back-lighting
	VAV controllers Settings and display	Via MP-Bus Tool connection with Belimo PC-Tool
Housing	Colour	Grey RAL 7035
	Installation	Control cabinet installation, snaps onto standard rail DIN EN 50 022
	Flame Test	UL94 V0
Safety	Protection class	III Safety extra-low voltage
	Degree of protection	IP10 (IP20 with plugs connected)
	EMC	CE according to 2004/108/EC
	Mode of operation	Type 1 (EN 60730-1)
	Rated impulse voltage	0.8 kV (EN 60730-1)
	Control pollution degree	2 (to EN 60730-1)
	Software class	A (EN 60730-1)
	Ambient temperature range	0 ... 50°C
	Storage conditions	–20 ... +80°C non-condensating (EN 60730-1)
	Ambient humidity range	+5 ... 95% r.H., non-condensating (EN 60730-1)
	Maintenance	Maintenance-free
Dimensions / weight	Dimensions	See «Dimensions» on page 8
	Weight	Approx. 300 g

Operating principle

The volumetric flow and its transport are determining factors for the **energy consumption of the fans.**

With **conventional, pressure-controlled systems**, the supply pressure is selected to provide enough air to the most unfavourably placed VAV unit during full load operation.
The remaining oversupplied units have to eliminate the excess energy, i.e. the overpressure, by closing the dampers.
These units are often operated in the most unfavourable range – for control characteristics, noise and pressure loss.
The **greatest energy loss** occurs at **partial load**, which often accounts for the largest share of the operating time of a VAV system.

Fan optimisation: The nominal volume (space requirement), actual volume and damper position are recorded via the MP-Bus, analysed by the optimiser and specified as a setpoint for the frequency converter.
Result: The system is operated in the optimum range – for control characteristics, noise and energy consumption.
The **greatest potential energy saving** occurs at partial load, which accounts for a considerable share of the time of a VAV system.



Fields of application

Variable and constant air volume systems for room ventilation applications with fans controlled by a frequency converter.

Principle of operation

The system is operated by the fan optimiser with optimum damper positions based on current demand signals. The objective is to keep the pressure loss across the VAV units as low as possible and thus permanently reduce operating costs by decreasing the fanoutput. The damper position of each VAV unit is recorded and transferred to the fan optimiser via the MP-Bus. These values are used there as a control variable for regulating the fan controlled by the frequency converter. As a result of this technology – which is based on the Belimo MP-Bus – an **energy saving of up to fifty percent** can be achieved compared to conventional systems in which fans are controlled by air duct pressure.

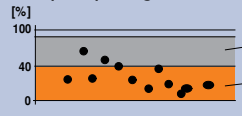
Proportionality laws

The proportionality laws form the basis of the volumetric flow transport.

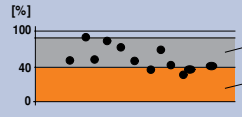
- The volumetric flow is proportional to the speed $\left(\frac{\dot{V}_1}{\dot{V}_2}\right) = \left(\frac{n_1}{n_2}\right)$
- Pressure increases change to the second power with the volumetric flow ratio $\left(\frac{\Delta p_1}{\Delta p_2}\right) = \left(\frac{\dot{V}_1}{\dot{V}_2}\right)^2 = \left(\frac{n_1}{n_2}\right)^2$
- The power consumption changes to the third power with the volumetric flow ratio $\left(\frac{P_1}{P_2}\right) = \left(\frac{\dot{V}_1}{\dot{V}_2}\right)^3 = \left(\frac{n_1}{n_2}\right)^3$

Damper diagrams

- Pressure-controlled system

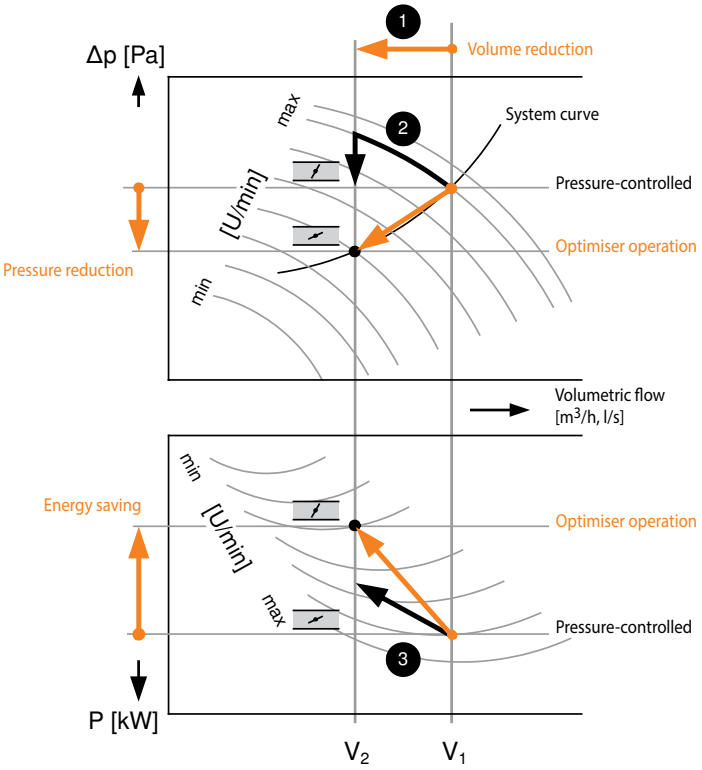


- Fan-optimised system



Operating principle *(continued)*

Duct pressure diagram with system curve



		Pressure-controlled	Optimiser operation
Volume reduction	1	VAV units: Dampers close until set volume reached	VAV units: Dampers close until volume setpoint is reached
Response of air duct pressure	2	– Air duct pressure rises – Pressure control corrected to set constant pressure, i.e. pressure at full load – VAV dampers close in order to compensate (eliminate) the excess air duct pressure – Increased flow noise	The optimiser determines the new situation from the change in the damper diagram and reduces the fan speed until the dampers of the downstream VAV units are operated in the optimum range
Energy saving	3	The fan is operated at a lower speed owing to the reduced volumetric flow. The downstream VAV units are not taken into account and are operated in an unfavourable range as a result of the excess pressure. The result: – Unnecessary pressure loss in the air duct system – Unnecessarily high power consumption	– Fan operated with lower speed -volumetric flow ratio – Significantly lower air duct pressure than with the air duct type due to the smaller pressure drop in the air duct network (optimum damper position)

Customer benefits

- Energy saving – up to fifty percent lower fan energy consumption due to the reduced dropin pressure across the downstream VAV units.
- Lower costs – supply and exhaust air pressure controls are eliminated.
- Quicker installation – standard cable for the 3-pole MP-Bus.
- Easier commissioning – owing to the elimination of pressure controls.
- Greater system convenience thanks to the lower flow noise – the flow noise through the units and in the air duct system is reduced by the lower supply pressure.
- Increased operational reliability – pressure losses due to filter contamination are automatically compensated. Complaints such as «the system does not supply enough air» are a thing of the past.
- Optimum cost-benefit ratio – the investment pays even with small and medium-sized buildings.
- Flexible system designs – for example as:
  - CAV system: volume changeover OFF / $\hat{M}_{min}$ / $\hat{M}_{max}$ via motion detector, etc.
  - VAV system: demand-controlled via CR24-B1 room temperature controller
  - VAV system: demand-controlled via room or DDC system controller or UK24LON/EIB
  - Mixed VAV / CAV system
- Can be used for new systems, retrofitting for system optimisations and renovation of existing systems – all VAV-Compacts (LMV-D2M / NMV-D2M from 2001 and later) support the optimiser function!
- Simple engineering and efficient commissioning – thanks to pre-configuration, LC display and self-adaptive control function.

Fan optimisation

- Is an effective measure to fulfil EU Directive 2002/91/EC on the overall efficiency of buildings and derived implementation measures, e.g. DE: DIN V 18599.
- Is an effective measure for permanentlyreducing operating costs.

Short payoff period

- The massive potential energy savings meanthat the initial costs of the fan optimisation solution are quickly recovered

Interfaces

Control

The energy requirements of the single-room or DDC controller are transferred to the COU24-A-MP fan optimiser via analogue signals or the MP-Bus.

VAV controllers

As a result of the MP-Bus technology, the VAV controllers provide access to all relevant data such as the current actual volumetric flow, damper position, etc. Setting and control functions are possible at any time with the Belimo PC-Tool.

Frequency converter

The frequency converter is controlled via a 0 ... 10 V analogue output. In the case of mixed systems with VAV and mechanical CAV units, a minimum fan speed can be set.

System size

The system size is unlimited; more fan optimisers can be operated in a sequential circuit via the optimiser's cascade output.
Number of VAV / CAV units per fan optimiser: 1 to 8

Operation and display

All relevant information (overall / individual actual volumes, damper positions, frequency converter setpoint, etc.) are shown on the LC display. There is a user-guided setting and display menu for easy operation with an encoder button.

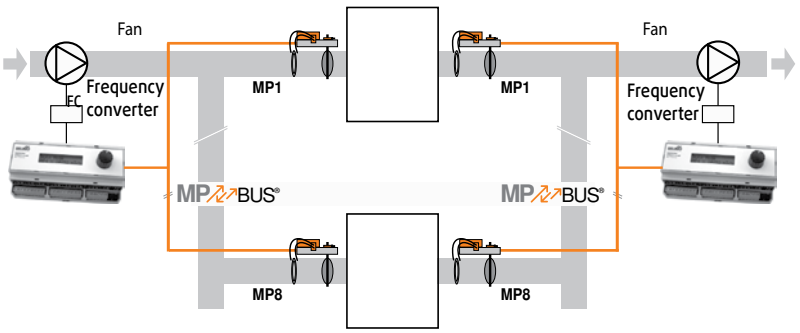
VAV controllers

The VAV controllers can be addressed and checked via the fan optimiser. In addition to the actual volumetric flow and damper position information, the operating volumetric flow settings $\hat{M}_{min}$ and $\hat{M}_{max}$ can be displayed and adjusted if necessary.
The PC-Tool can be used for service work, for example.
It is plugged into the central RJ12 connection.

Optimiser for supply and exhaust air systems

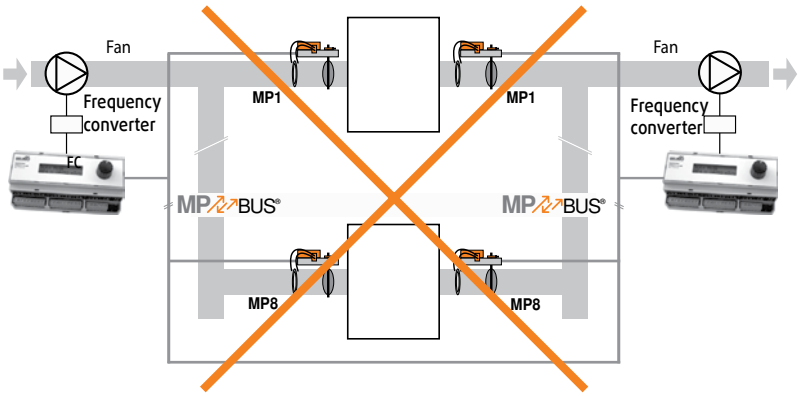
Independent operation

The supply and exhaust air system must be operated by two separately functioning optimisers.



Optimiser system with supply and exhaust air units on the same MP bus

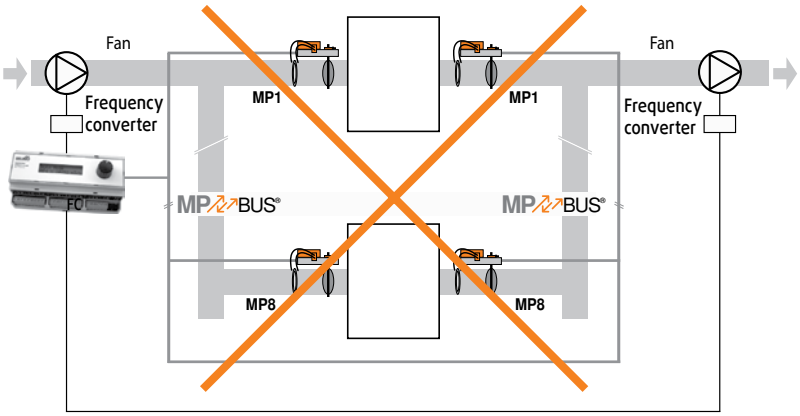
The MP bus must be separately managed for the supply and exhaust air system. The two lines **cannot** be connected.



Note
Merging the VAV controllers for the supply and exhaust air lines into one common MP line is not permitted!

Optimiser system with one optimiser for the supply and exhaust air fan

Controlling the supply and exhaust air fan using a common optimiser signal is **not permitted**.



Note
Parallel control of the supply and exhaust air fan with an optimiser is not permitted!

Interconnecting VAV controllers

Parallel or master slave connection

The setpoint signals for the SUPPLY and EXHAUST AIR VAV controller can be implemented in a VAV system as parallel or master-slave connections – also known as a sequential circuit.

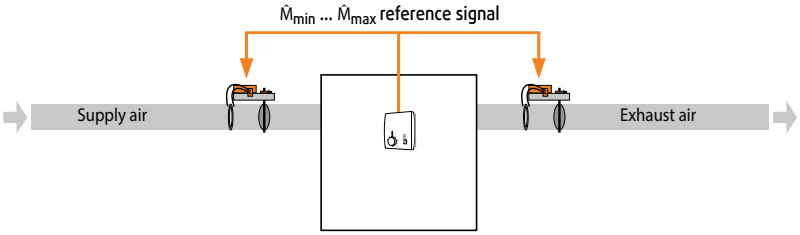
Note
Parallel connections have proven to be easier to handle (ordering, parameter setting and wiring) than a master-slave connection.
To simplify the system concept of an optimiser system, we would therefore recommend connecting the reference signal of e.g. a room temperature sensor to the supply and exhaust air VAV controller in parallel.

Parallel connection

In the parallel connection, the reference signal $\hat{M}_{min}$ .... $\hat{M}_{max}$, for example from a room temperature controller 0 ... 10 V output signal, is connected in parallel to the supply and exhaust air controller.

VAV controller setting	
Supply air unit	
$\hat{M}_{min}$	e.g. 250 m³/h
$\hat{M}_{max}$	e.g. 500 m³/h

Exhaust air unit	
$\hat{M}_{min}$	e.g. 250 m³/h
$\hat{M}_{max}$	e.g. 500 m³/h

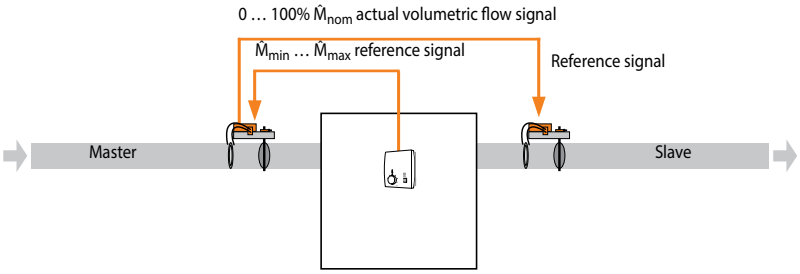


Master-slave (M/S) connection

With a master-slave connection, the reference signal $\hat{M}_{min}$ .... $\hat{M}_{max}$, for example from a room temperature controller 0 ... 10 V output signal, is connected to the master controller. The resultant actual volumetric flow signal of the master controller is the reference signal of the slave controller.

Master unit	
$\hat{M}_{min}$	e.g. 250 m³/h
$\hat{M}_{max}$	e.g. 500 m³/h

Slave unit	
$\hat{M}_{min}$	0 m³/h
$\hat{M}_{max}$	$\hat{M}_{nom}$ of master unit!



Setpoint connection for an optimiser system

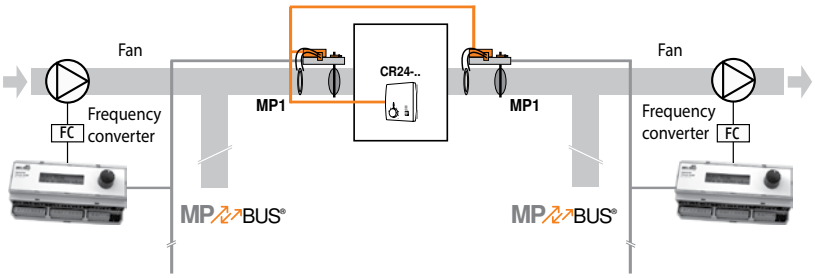
Principle

In principle, the setpoint connection for an optimiser system functions as previously described. Depending on the application, the reference signal is
– connected directly to the VAV controller or
– connected directly to the optimiser and transferred to the VAV controller.
To simplify the system concept of an optimiser system, we would therefore recommend connecting e.g. the reference signal of a room temperature sensor to the supply and exhaust air VAV controller in parallel.
Master-slave connections are always possible but more complex.
The actual volumetric flow signal is available at the OUT terminal (terminals for analogue controller) as a 0 ... 10 / 2 ... 10 V analogue signal.

Setpoint connection to VAV controller – parallel connection of supply and exhaust air unit

When connecting the supply and exhaust air VAV unit in parallel, the reference signal is wired in parallel to the setpoint input of the two VAV control circuits.

Parallel connection: AiMP system solution with CR24-B..

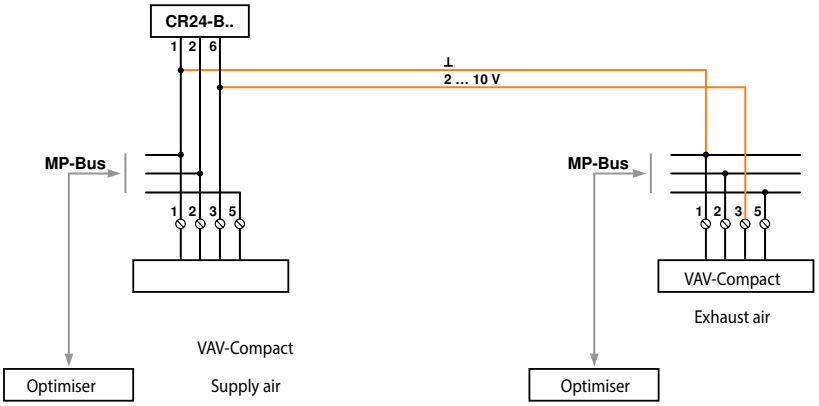


Setting for both optimisers	
COU24-A-MP	
Setpoint input	AiMP 2 ... 10 V

VAV controller setting	
Supply and exhaust air unit	
$\hat{V}_{min}$	according to room layout
$\hat{V}_{max}$	

Note
The actual volumetric flow signal (OUT terminal – analogue controller) is available at the optimiser as an analogue signal, irrespective of the optimiser operating setting (setpoint input), incl. Controller MP operation.

Connection



Setpoint connection for an optimiser system *(continued)*

Setpoint connection to VAV controllers – master-slave connection of supply and exhaust air unit

When the supply and exhaust air VAV unit has a master-slave connection (M/S), the reference signal is wired to the master's setpoint input only (supply air or exhaust air unit). The resultant actual volumetric flow signal of the master controller is the reference signal for the slave controller.

Note
To simplify the system concept of an optimiser system, we would recommend connecting the reference signal of e.g. a room temperature sensor to the supply and exhaust air VAV controller in parallel.

Note
The actual volumetric flow signal of the VAV control is available at the optimiser (OUT terminal – analogue controller).

Actual volumetric flow signal OUT

The actual volumetric flow signals of every connected VAV controller are available at the OUT terminals of the «Analogue controller» optimiser connections. This signal corresponds to the U5 signal e.g. of a Belimo VAV-Compact controller: 0 ... 10 and/or 2 ... 10 V correspond to 0 ... 100% nominal volumetric flow.

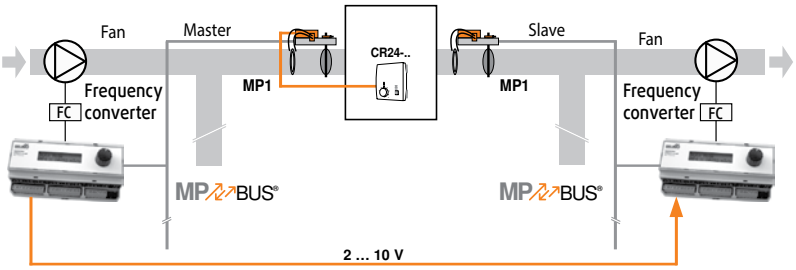
Examples with 0 … 10 V mode:

- $\hat{M}_{nom}$: 500 m³/h
- Terminal 3 (MP1): 3.4 V
- the resultant volumetric flow is (500 / 10) * 3.4 = 170 m³/hw

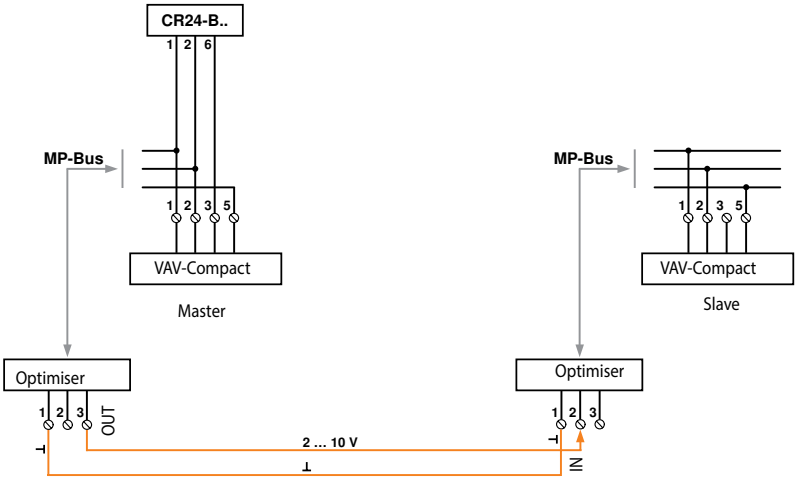
Setting for «master» optimiser	
COU24-A-MP	
Setpoint input	AiMP 2 ... 10 V
Master unit	
Mode	2 ... 10 V
$\hat{M}_{min}$	according to room layout
$\hat{M}_{max}$	

Setting for «slave» optimiser	
COU24-A-MP	
Setpoint input	Ain 2 ... 10 V
Slave unit	
Mode	2 ... 10 V
$\hat{M}_{min}$	0 m³/s and/or l/s!
$\hat{M}_{max}$	$\hat{M}_{nom}$ value of master unit!

Master-slave circuit: AiMP system solution with CR24-B..



Connection

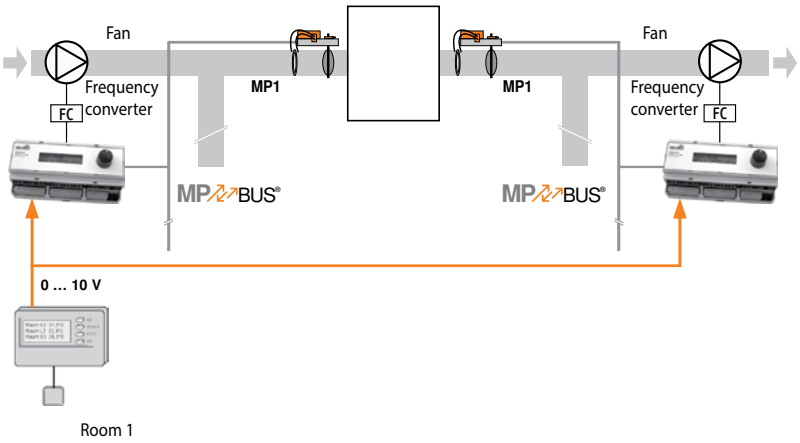


Setpoint connection for an optimiser system *(continued)*

Setpoint connection to optimiser – parallel connection of supply and exhaust air unit

When connecting the supply and exhaust air VAV unit in parallel, the reference signal is wired in parallel to the two setpoint inputs of the supply and exhaust air optimiser. The setpoint is converted into an MP command by the optimiser and sent to the corresponding VAV controller.

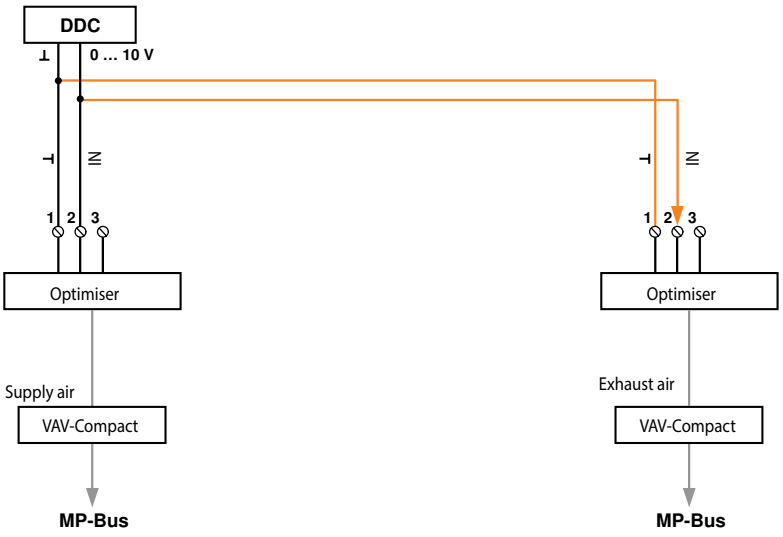
Parallel connection: Ain – 0 … 10 V connection via optimiser input



Setting for both optimisers	
COU24-A-MP	
Setpoint input	Ain 0 ... 10 V

VAV controller setting	
Supply and exhaust air unit	
Mode	0 ... 10 V
$\dot{M}_{min}$	according to room layout
$\dot{M}_{max}$	

Connection



Setpoint connection for an optimiser system *(continued)*

Setpoint connection to optimiser – master-slave connection of supply and exhaust air unit

When the supply and exhaust air VAV unit has a master-slave connection (M/S), the reference signal is connected only to the optimiser's setpoint input to which the master is connected (supply air or exhaust air unit). The resultant actual volumetric flow signal of the master controller, tapped at the OUT terminal of the «master optimiser», is the reference signal for the slave controller.

Note
To simplify the system concept of an optimiser system, we would recommend connecting the reference signal in parallel.

Note
The actual volumetric flow signal of the VAV control is available at the optimiser (OUT terminal – analogue controller).

Actual volumetric flow signal OUT

The actual volumetric flow signals of every connected VAV controller are available at the OUT terminals of the «Analogue controller» optimiser connections. This signal corresponds to the U5 signal e.g. of a Belimo VAV-Compact controller: 0 ... 10 and/or 2 ... 10 V correspond to 0 ... 100% nominal volumetric flow.

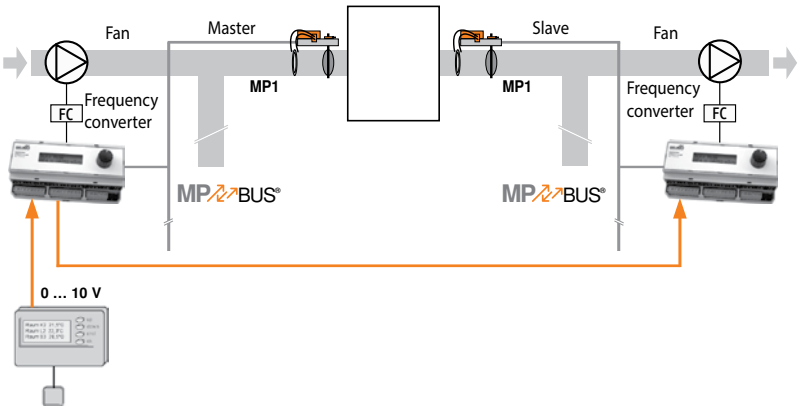
Examples with 0 … 10 V mode:

- $\hat{M}_{nom}$: 700 m³/h
- Terminal 3 (MP1): 5.0 V
- the resultant volumetric flow is (700 / 10) * 5.0 = 350 m³/h

Setting for «master» optimiser	
COU24-A-MP	
Setpoint input	Ain 0 ... 10 V
VAV-Compact	
Mode	0 ... 10 V
$\hat{M}_{min}$	according to room layout
$\hat{M}_{max}$	

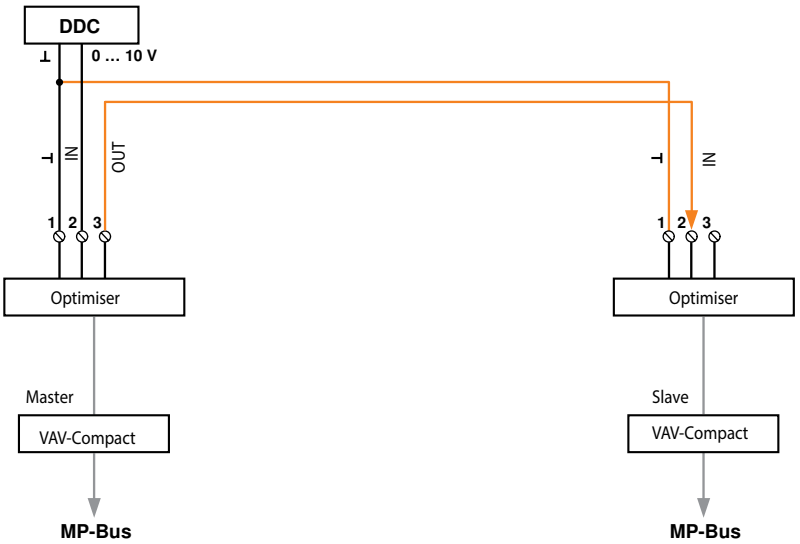
Setting for «slave» optimiser	
COU24-A-MP	
Setpoint input	Ain 0 ... 10 V
VAV-Compact	
Mode	0 ... 10 V
$\hat{M}_{min}$	0 m³/s and/or l/s!
$\hat{M}_{max}$	$\hat{M}_{nom}$ value of master unit!

Master-slave circuit: Ain – 0 … 10 V connection via optimiser input



Room 1

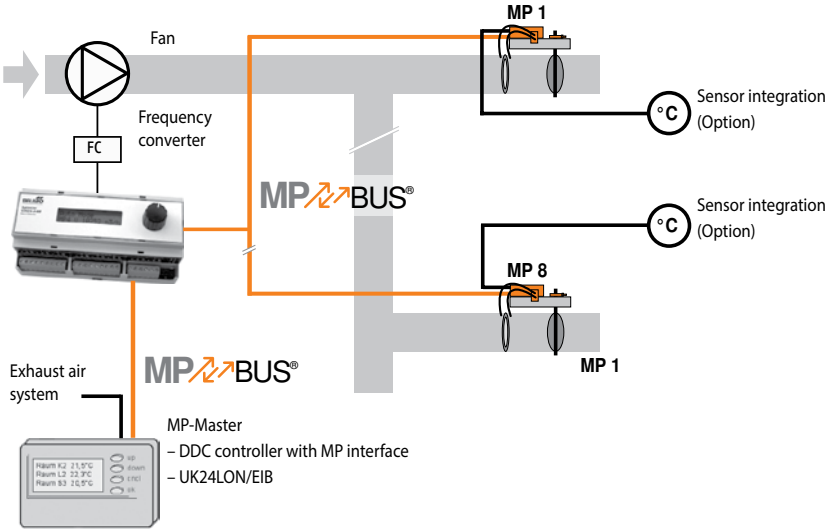
Connection



Setpoint connection for an optimiser system *(continued)*

Setpoint connection of an MP master (DDC with MP interface or UK24LON/EIB)

With an MP master system, the setpoints for the VAV controllers and the link between the supply and exhaust air systems is generated by the corresponding MP master (DDC or UK24LON/EIB).



Setting	
COU24-A-MP	
Setpoint input	MP
VAV-Compact	
Mode	2 ... 10 V / 0 ... 10 V
$\hat{M}_{min}$	according to room layout
$\hat{M}_{max}$	

MP master – sensor integration
The «sensor integration» function available with an MP bus system is also available to an optimiser with a connected MP master.

The optimiser has two MP interfaces:
- Controller MP
- Actuator MP

The MP master communicates with the MP slave (VAV controllers) via the optimiser. All data points of the VAV controller integrated in the MP master are available.
The optimiser makes a copy of the relevant data of the connected VAV controllers. If data that are not managed in the copy are requested, the optimiser forwards the corresponding commands to the addressed VAV controller.

In this operating mode, the frequency converter is controlled by the optimiser. If additional control or safety functions are planned, these must be given appropriate consideration (see planning, protective equipment on page 9+10).

Accessories

CB
Electrical duct heater 10

CBM
Duct heater 10

VBC
Water heating coil for circular ducts 10

CWK
Water-cooling battery for circular ducts 10

VBR
Water-heating coil for rectangular ducts 10

RB
Duct heater for rectangular ducts 10

PGK
Cold water coil for rectangular ducts 10

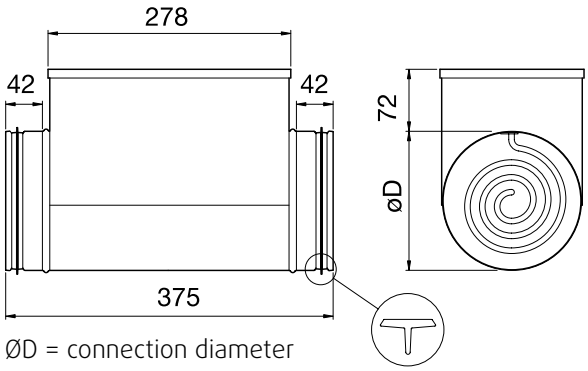
DXRE
Rectangular duct cooling coil (DX) 10

CB

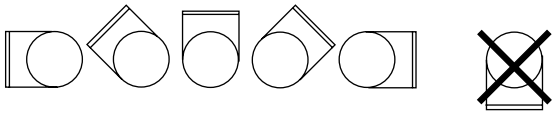
Electrical duct heater

Duct heater with spigot connection for standard spiral ducts. Manufactured from Aluzinc-coated sheet steel with a heating element in stainless steel. The heater has integral overheating protection with a manual reset function. The CB heater has rubber seals on the connecting spigots. Suitable for control by room thermostat or Pulser.

The minimum air volume is based on a minimum air velocity of 1.5 m/s. These duct heaters are designed for a maximum output air temperature of 50°C. The CB can be installed in a horizontal or vertical duct. In a horizontal duct, the connection box should be installed facing upwards, or rotated 90° to one side. Installation with the connection box facing downwards is not allowed.

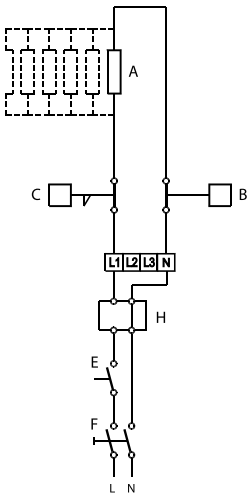


ØD = connection diameter

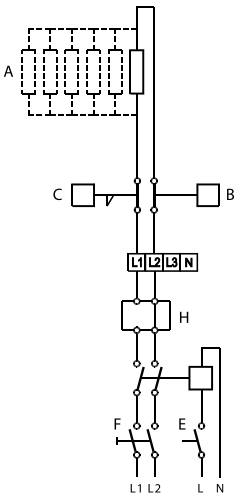


Recommended installation positions

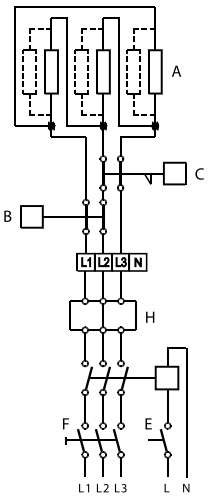
CB-1 230V~



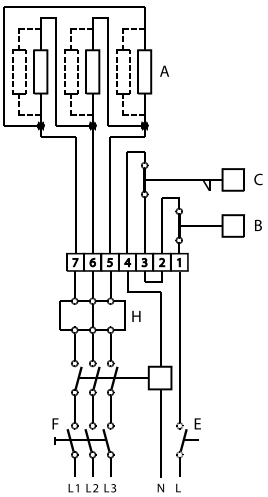
CB-2 400V 2~



CB-3 230V 3~ 400V 3~



CB-4 12kW, 400V 3~



A = Heating elements
B = Over heat protection with automatic reset

C = Over heat protection with manual reset
E = Interlocking

F = All phase breaker
H = Thyristor type Pulser or TTC

CBM

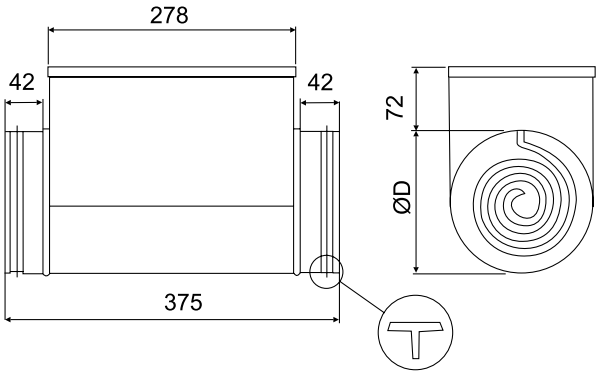
Duct heater

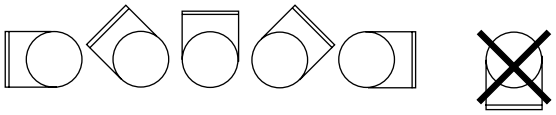
Description

Duct heater with integral control equipment

Duct heater with spigot connection for standard spiral circular ducts. Manufactured from Aluzinc-coated sheet steel with a heating element in stainless steel. The heater has integral overheating protection with a manual reset function. The CBM have rubber seals on the connecting spigots. The temperature is set on the cover of the duct heater. The unit is controlled by an integral electronic temperature regulator, using so-called timeproportional Pulse/Pause technology. This provides extremely precise temperature control. As a thyristor is used for adjusting the temperature, the unit has no moving parts. This means that it is silent and not susceptible to wear and tear. Terminals for interlocking the heater, via a pressure- and airflow guard are available in the terminal box. The minimum air volume is based on a minimum air velocity of 1.5 m/s. These duct heaters are designed for a maximum output air temperature of 50°C.

All CBMs are delivered with duct sensor TG-K330 (0-30°C) as standard.

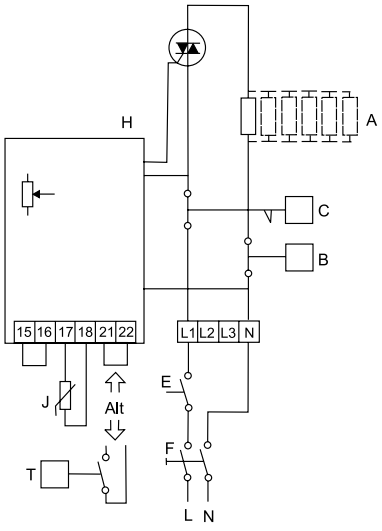




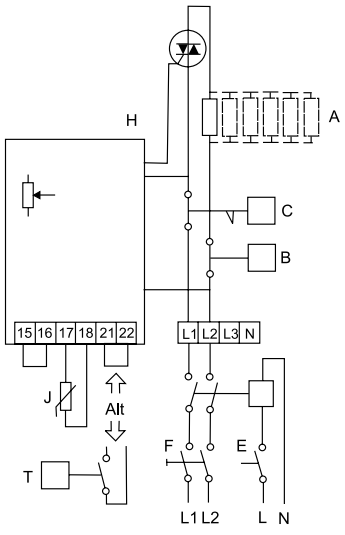
Recommended installation positions

A = Heating elements
B = Over heat protection with automatic reset
C = Over heat protection with manual reset
E = Interlocking
F = All phase breaker
H = Thyristor type Pulse or TTC
J = Sensor
T = Air flow switch/Pressure switch

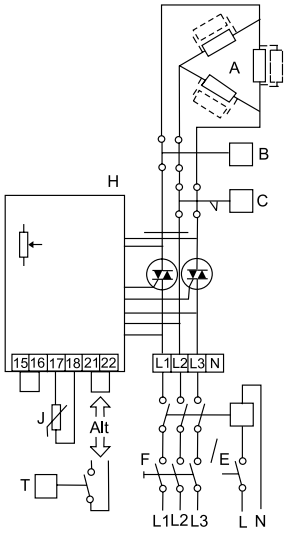
CBM-1 (230V~)



CBM-2 (400V 2~)

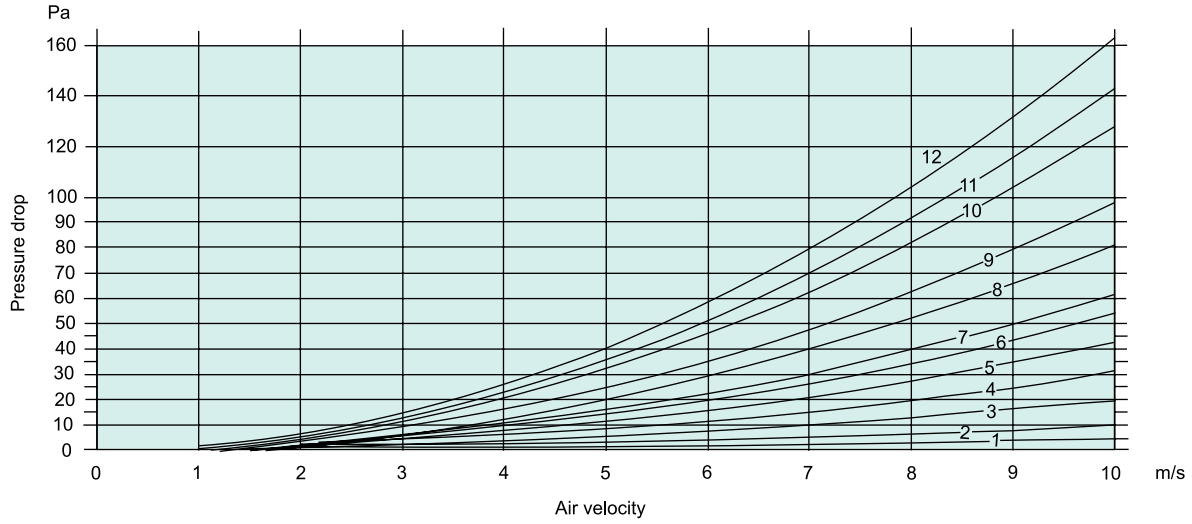


CBM-3 (400V 3~)



CB & CBM	ØD (mm)	P (kw)	U (v)	I (A)	Q_{min} (m^3/h)	m (Kg)	Controlled by	Wiring diagram
100-0.4	100	0.4	230~	1.7	45	2	Pulser	CB-1
100-0.6	100	0.6	230~	2.6	45	2	Pulser	CB-1
125-0.6	125	0.6	230~	2.6	70	2.5	Pulser	CB-1
125-1.2	125	1.2	230~	5.2	70	2.5	Pulser	CB-1
125-1.8	125	1.8	230~	7.8	65	2.5	Pulser	CB-1
150-1.2	150	1.2	230~	5.2	100	2.5	Pulser	CB-1
150-2.1	150	2.1	230~	9.1	100	3.2	Pulser	CB-1
150-2.7	150	2.7	230~	11.7	100	3.0	Pulser	CB-1
150-5.0	150	5.0	400 2~	12.5	100	3.8	Pulser	CB-2
160-1.2	160	1.2	230~	5.2	115	3	Pulser	CB-1
160-2.1	160	2.1	230~	9.1	115	3.2	Pulser	CB-1
160-2.7	160	2.7	230~	11.7	115	3.5	Pulser	CB-1
160-5.0	160	5.0	400 2~	12.5	115	4	Pulser	CB-2
200-2.1	200	2.1	230~	9.1	180	3.9	Pulser	CB-1
200-3.0	200	3.0	230~	13	180	4	Pulser	CB-1
200-5.0	200	5.0	400 2~	12.5	180	4.5	Pulser	CB-2
250-3.0	250	3.0	230~	13	280	4.8	Pulser	CB-1
250-6.0	250	6.0	400 2~	16	280	5.2	Pulser	CB-2
250-9.0	250	9.0	400 3~	13	280	6.2	TTC	CB-3
315-3.0	315	3.0	230	13	430	6	Pulser	CB-1
315-6.0	315	6.0	400 2~	15	430	6.3	Pulser	CB-2
315-9.0	315	9.0	400 3~	13	430	7.3	TTC	CB-3
315-12.0	315	12.0	400 3~	17.3	430	7.6	TTC	CB-4
355-6.0	355	6.0	400 2~	15	550	7	Pulser	CB-2
355-9.0	355	9	400 3~	13	550	8.2	TTC	CB-3
355-12.0	355	12	400 3~	17.3	550	8.5	TTC	CB-4
400-6.0	400	6	400 2~	15	700	8	Pulser	CB-2
400-9-0	400	9	400 3~	13	700	8.5	TTC	CB-3
400-12.0	400	12	400 3~	17.3	700	9.2	TTC	CB-4

Pressure drop graph

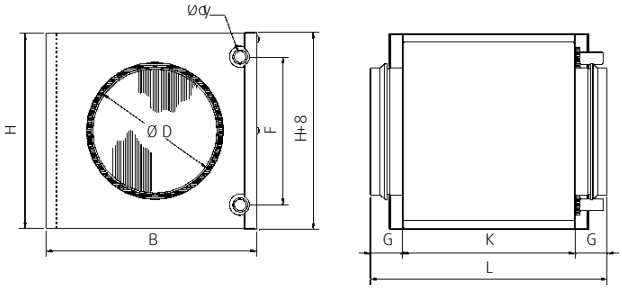


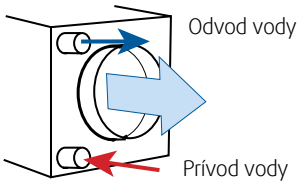
VBC

Water heating coil for circular ducts

Water-heating coil for heating air in ventilation systems with circular ducts. Aluzinc-coated casing, heat transmission element with copper tubes and aluminium fins. Removable cover for cleaning the unit.

The water-heating coil can be installed in a horizontal duct. Max operating temperature 150°C. Max operating pressure 1.6 MPa (16 Bar) 2- and 3-rows batteries.





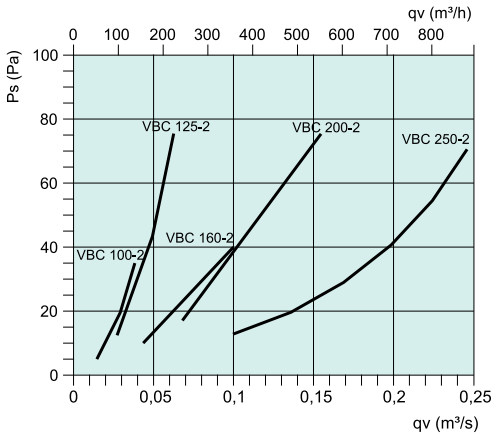
VBC	ØD	B	H	Ødy	F	G	K	L	kg
100-2	100	179	225	10	137	40	300	380	3.8
100-3	100	180	238	10	100	40	276	356	3.9
125-2	125	179	225	10	137	40	300	380	3.8
125-3	125	255	313	10	175	40	276	356	5.8
160-2	160	253	300	10	212	40	300	380	5.7
160-3	160	255	313	10	175	40	276	356	5.8
200-2	200	253	300	10	212	40	300	380	5.7
200-3	200	330	398	22	250	40	276	356	8.6
250-2	250	328	385	22	250	40	300	380	8.2
250-3	250	405	473	22	325	40	276	356	11.5
315-2	315	403	460	22	325	40	300	380	10.6
315-3	315	504	557	22	400	40	276	356	14.6
400-2	400	479	534	22	400	65	300	430	13.5
400-3	400	539	707	22	425	65	330	460	20.0
500-2	500	529	707	22	425	65	330	460	17.2

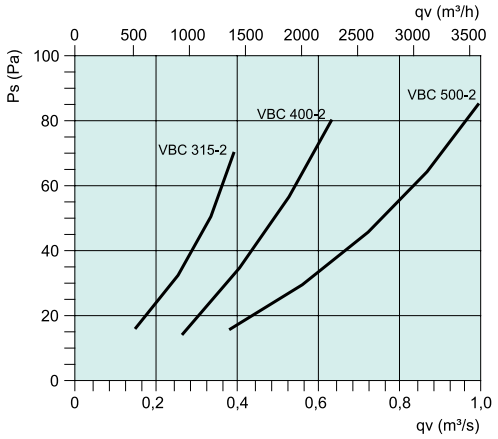
VBC	Air flow	Pressure drop	ΔT air at T water 60/40°C	Water flow rate	Water speed	Pressure drop	Power	ΔT ait at T water 90/70°C	Water flow rate	Water speed	Pressure drop	Power
	(m^3/h)	(Pa)	(K)	(l/s)	(m/s)	(kPa)	(kW)	(K)	(l/s)	(m/s)	(kPa)	(kW)
100-2	0.04	35	16	0.01	0.15	0.1	0.85	32.5	0.02	0.3	1	1.7
125-2	0.06	72	13	0.01	0.2	0.1	1	28.3	0.03	0.4	1	2.2
160-2	0.1	40	19.9	0.03	0.4	3	2.6	35.8	0.06	0.8	8	4.6
200-2	0.15	73	17.3	0.04	0.6	5	3.5	30.4	0.07	1.1	13	6.1
250-2	0.25	68	17.5	0.07	0.5	3	5.7	31.7	0.13	0.9	7	10.3
315-2	0.39	69	18.1	0.11	0.5	3	9.2	32	0.2	1	8	16.3
400-2	0.63	77	17.7	0.18	0.6	4	14.6	31	0.31	1.1	10	25.5
500-2	0.9	45	19.4	0.28	0.7	6.6	22.7	31	0.31	1.1	10	25.5

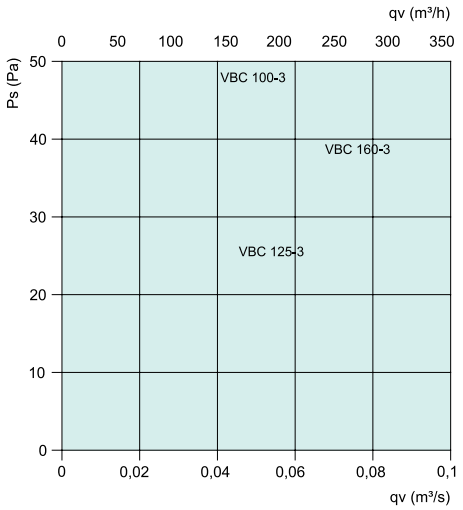
Coil calculation

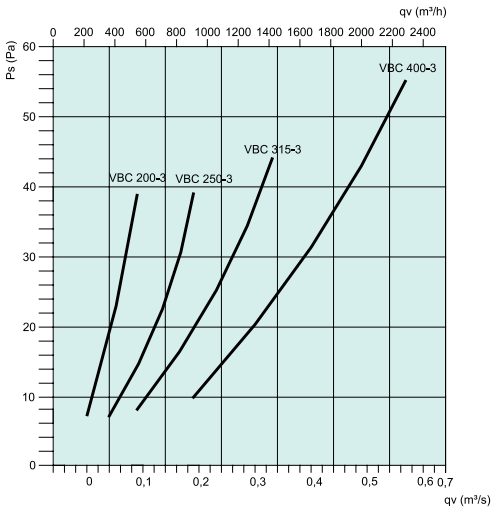
VBC	Air flow	Pressure drop	ΔT air at T water 60/40°C	Water flow rate	Water speed	Pressure drop	Power	ΔT ait at T water 90/70°C	Water flow rate	Water speed	Pressure drop	Power
	(m³/h)	(Pa)	(K)	(l/s)	(m/s)	(kPa)	(kW)	(K)	(l/s)	(m/s)	(kPa)	(kW)
100-3	0.04	39	25.9	0.02	0.24	0.85	1.35	47.4	0.03	0.45	2.65	2.46
125-3	0.06	17.2	33.4	0.03	0.47	5.33	2.6	56.2	0.05	0.8	14	4.38
160-3	0.1	41	29.3	0.05	0.68	11	3.8	49.7	0.08	1.17	29.5	6.46
200-3	0.15	29	30.7	0.07	0.54	5.36	6	52.1	0.13	0.92	14.1	10.17
250-3	0.25	31.2	30.5	0.12	0.59	6.23	9.93	51.6	0.21	1.02	16.2	16.8
315-3	0.39	35	30.2	0.19	0.69	8.28	15.3	51	0.32	1.17	21.4	25.87
400-3	0.63	36.3	30.3	0.03	0.74	10.10	24.74	50.8	0.51	1.26	26.1	41.6

Coil calculation 3 rows









CWK

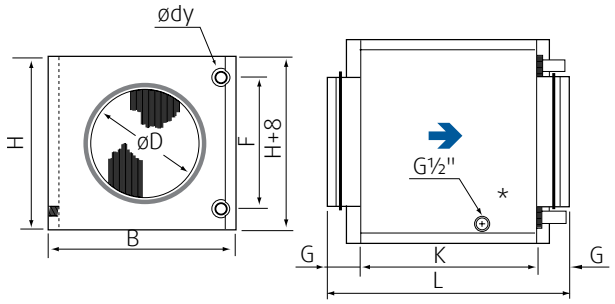
Water-cooling battery for circular ducts

Casing of galvanised sheet steel with copper tubes and aluminium fins. Inspection covers for easy cleaning and maintenance.

Connection sleeves with rubber seal.

Max operating temperature 150 °C

Max operating pressure 1,6 MPa (16Bar)



* Condensate drain

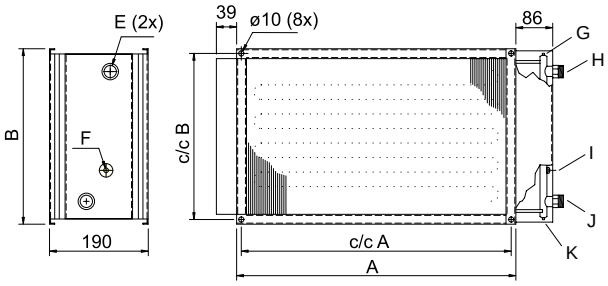
CWK	øD	B	H	ødy	F	G	K	L	kg
100-3-2.5	100	251	180	10	100	40	276	356	4.4
125-3-2.5	125	326	255	10	175	40	276	356	6.5
160-3-2,5	160	326	255	10	175	40	276	356	6.7
200-3-2.5	200	411	330	22	250	40	276	356	9.4
250-3-2.5	250	486	405	22	325	40	276	356	11
315-3-2.5	315	560	504	22	400	40	276	356	14.3
400-3-2.5	400	710	529	22	425	65	330	460	19.5

CWK	Air flow	Air speed	Pressure drop	Air before	Air before	Air after	Capacity	Water Flow	Water Pressure drop
	(m³/h)	m/s	(Pa)	(˚C)	(% RH)	(˚C)	(kW)	(l/s)	(kPa)
100-3-2.5	54	2	7	25	50	14.3	0.2	0.01	< 0.5
	54	2	7	30	45	15.8	0.4	0.01	1
	100	3.5	22	25	50	16.4	0.3	0.01	1
	100	3.5	22	30	45	18.5	0.5	0.02	2
	145	5	58	25	50	17.5	0.4	0.02	1
	145	5	58	30	45	20.0	0.6	0.02	3
125-3-2.5	85	2	3	25	50	12.6	0.5	0.02	3
	85	2	3	30	45	13.5	0.7	0.03	5
	150	3	9	25	50	14.5	0.7	0.03	5
	150	3	9	30	45	15.7	1.1	0.04	10
	215	4.5	18	25	50	15.6	0.8	0.03	7
	215	4.5	18	30	45	17.0	1.4	0.05	16
160-3-2.5	145	2	9	25	50	14.4	0.7	0.03	4
	145	2	9	30	45	15.6	1.0	0.04	10
	250	3.5	24	25	50	16.1	0.9	0.04	8
	250	3.5	24	30	45	17.4	1.5	0.06	20
	355	5	45	25	50	17.0	1.1	0.04	11
	355	5	45	30	45	18.4	1.3	0.08	32
200-3-2.5	225	2	6	25	50	14.1	1.0	0.05	2
	225	2	6	30	45	15.3	1.6	0.06	5
	390	3.5	17	25	50	15.9	1.4	0.06	4
	390	3.5	17	30	45	17.3	2.3	0.09	9
	555	5	33	25	50	16.9	1.7	0.07	5
	555	5	33	30	45	18.4	3.1	0.12	15
250-3-2.5	360	2	6	25	50	14.2	1.6	0.06	2
	360	2	6	30	45	15.4	2.5	0.10	5
	630	3.5	18	25	50	16.0	2.2	0.09	4
	630	3.5	18	30	45	17.3	3.8	0.15	10
	900	5	34	25	50	17.0	2.7	0.11	6
	900	5	34	30	45	18.2	5.1	0.20	17
315-3-2.5	560	2	7	25	50	14.5	2.4	0.10	3
	560	2	7	30	45	15.4	3.9	0.16	7
	985	3.5	20	25	50	16.1	3.4	0.13	5
	985	3.5	20	30	45	17.2	6.1	0.24	14
	1410	5	39	25	50	17.0	4.3	0.17	8
	1410	5	39	30	45	18.1	8.3	0.33	25
400-3-2.5	900	2	9	25	50	15.2	3.4	0.14	2
	900	2	9	30	45	16.3	5.8	0.23	5
	1590	3.5	25	25	50	16.8	4.8	0.19	4
	1590	3.5	25	30	45	17.8	9.3	0.37	12
	2280	5	49	25	50	17.6	6.1	0.24	6
	2280	5	49	30	45	18.6	12.8	0.51	22

VBR

Water-heating coil for rectangular ducts

Water-heating coil for heating air in ventilation systems with rectangular ducts. Hot dip galvanized casing, heat transmission element with copper tubes and aluminium fins. In cold conditions, a frost protection device with sensor should be fitted to reduce the risk of damage from freezing. The water-heating coil can be installed in a horizontal duct.



F Thread G 1/4
G Airing
H Water out
I Connection for immersion sensor
J Water in
K Draining

VBR	A	c/c A	B	c/c B	E	kg
40-20-2	438	420	238	220	R¾"	5.5
50-25-2	538	520	288	270	R¾"	7
50-30-2	538	520	338	320	R¾"	8
	A	c/c A	B	c/c B	E	kg
40-20-4	438	420	238	220	R¾"	7
50-25-4	538	520	288	270	R¾"	9
60-35-4	638	620	388	370	R 1"	13
	A	c/c A	B	c/c B	E	kg
70-40-3	738	720	438	420	R 1"	15.5

Max. operating temperature
Max. operating pressure, at water temp. 100°C 16 bar
Max. operating pressure, at water temp. 150°C 10 bar

VBR XX-XX-2 = Two pipe rows
VBR XX-XX-4 = Four pipe rows
VBR XX-XX-3 = Three pipe rows

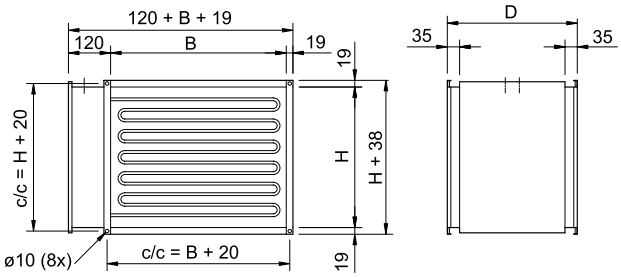
VBR	Water temp. (in/out)	Air Flow	Air Pressure drop	ΔT	Capacity	Water Flow	Water Pressure drop
	(°C)	(m³/h)	(Pa)	(K)	(kW)	(l/s)	(kPa)
40-20-2	60/40	400	9	18.5	2.7	0.03	0.5
40-20-2	60/40	1000	48	12.7	4.6	0.06	1
40-20-4	60/40	400	18	29.5	4.3	0.05	0.5
40-20-4	60/40	1000	96	19.5	7.1	0.09	0.5
40-20-2	80/60	400	9	32.8	4.7	0.06	1
40-20-2	80/60	1000	48	24.5	8.9	0.11	2
40-20-4	80/60	400	18	46.3	6.7	0.08	0.5
40-20-4	80/60	1000	96	38.9	14.0	0.17	1
50-25-2	60/40	600	8	21.7	4.7	0.06	1
50-25-2	60/40	1200	29	18.2	7.9	0.10	2
50-25-4	60/40	600	16	33.1	7.2	0.09	0.5
50-25-4	60/40	1200	59	28.4	12.3	0.15	1
50-25-2	80/60	600	8	36.5	7.9	0.10	2
50-25-2	80/60	1200	29	28.6	12.4	0.15	4
50-25-4	80/60	600	16	54.5	11.8	0.14	1
50-25-4	80/60	1200	59	45.9	19.9	0.24	3
60-35-2	60/40	1200	11	18.7	8.1	0.10	0.5
60-35-2	60/40	3000	61	15.0	16.3	0.20	2
60-35-4	60/40	1200	23	34.2	14.8	0.18	1
60-35-4	60/40	3000	123	28.1	30.4	0.37	4
60-35-2	80/60	1200	11	33.9	14.7	0.18	1
60-35-2	80/60	3000	61	24.1	26.1	0.32	3
60-35-4	80/60	1200	23	53.6	23.2	0.28	3
60-35-4	80/60	3000	123	41.5	45.0	0.55	8
70-40-2	60/40	2000	31	20.1	14.5	0.18	1
70-40-2	60/40	4000	94	16.0	23.2	0.28	1
70-40-3	60/40	2000	46	24.7	17.8	0.22	0.5
70-40-3	60/40	4000	139	21.1	30.5	0.37	1
70-40-2	80/60	2000	31	34.7	25.1	0.31	1
70-40-2	80/60	4000	94	25.1	36.3	0.44	3
70-40-3	80/60	2000	46	45.4	32.8	0.40	1
70-40-3	80/60	4000	139	34.4	49.7	0.61	2

Coil calculation
Data based on supply air temperature of 0°C.

RB

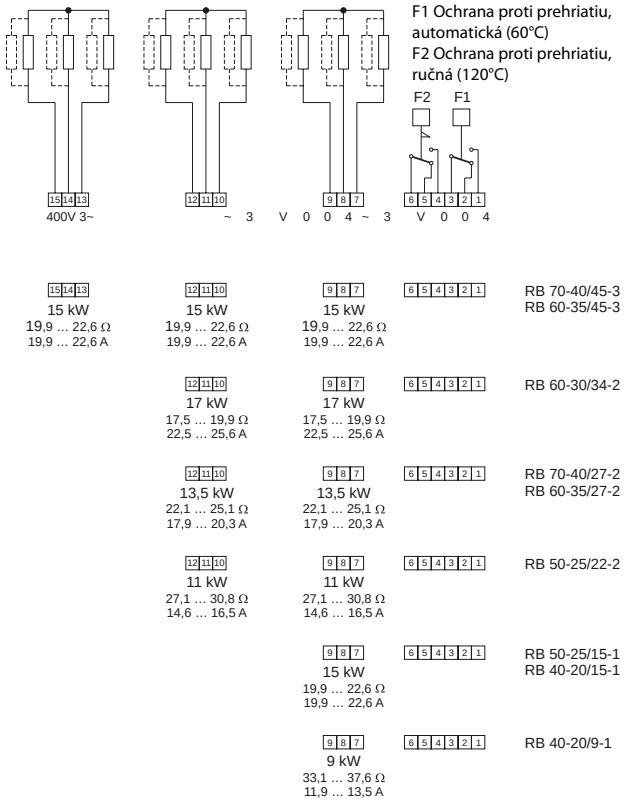
Duct heater for rectangular ducts

Manufactured from aluzinc coated sheet steel with a heating element in stainless steel. The heater has integral overheating protection with a manual reset function. Suitable for control by room thermostat or TTC. The minimum air volume is based on a minimum air velocity of 1.5 m/s. These duct heaters are designed for a maximum output air temperature of 40°C.



RB	Power	Voltage	Current	Min.	air flow	Weight
	(mm)	(kW)	(V)	(A)	(m³/h)	(kg)
40-20/9	9	400	3~	13	450	9.2
40-20/15	15	400	3~	22	450	16
50-25/15	15	400	3~	22	700	12.7
50-25/22	22	400	3~	31.8	700	19.9
60-35/27	27	400	3~	39	1000	23.1
60-35/45	45	400	3~	65	1000	30.6
70-40/27	27	400	3~	39	1600	23.1
70-40/45	45	400	3~	65	1600	30.3

RB	B	H	D
40-20/9-1	400	200	370
40-20/15-1	400	200	500
50-25/15-1	500	250	370
50-25/22-2	500	250	500
60-35/27-2	600	350	370
60-35/45-3	600	350	500
70-40/27-2	700	400	370
70-40/45-3	700	400	370

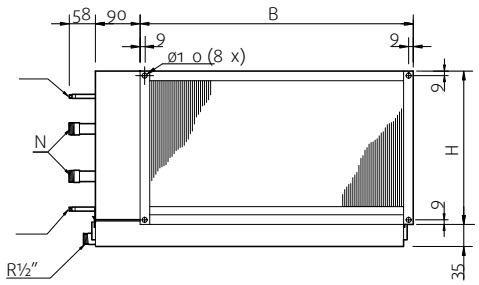


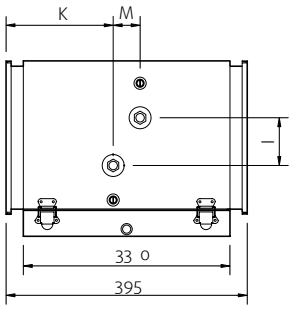
systemair

PGK

Cold water coil for rectangular ducts

Casing from galvanised sheet steel. Water-battery from copper tubes and aluminium fins. Air vent and drain valve included. Drip pan from stainless steel and condensate connection (R½"). Max working pressure 1.6 MPa (16 bar). For water connection left or right, Two inspection covers for cleaning and maintenance. Droplet separator DE as an accessory regardless of air direction. Recommended for air velocities from 3m/s





PGK	B	H	I	K	M	N
400x200-3-2.0	438	238	70	176	43	R 3/4
500x250-3-2.0	538	288	120	176	43	R 3/4
600x350-3-2	638	388	220	176	43	R 3/4
700x400-3-2.0	738	438	250	170	55	R1

PGK	Air flow	Air velocity	Air Pressure drop	Air before	Air before	Air after	Capacity	Water Flow	Water Pressure drop
	(m3/h)	m/s	(Pa)	(˚C)	(% RH)	(˚C)	(kW)	(l/s)	(kPa)
400x200-3-2.0	576	2	31	25	50	17.0	1.53	0.06	1
	576	2	36	30	45	19.0	2.50	0.10	3
	864	3	66	25	50	18.4	1.89	0.08	2
	864	3	72	30	45	20.2	3.26	0.13	5
	1152	4	113	25	50	19.2	2.20	0.09	2
	1152	4	119	30	45	20.8	4.15	0.17	7
500x250-3-2.0	900	2	31	25	50	17.0	2.38	0.09	2
	900	2	36	30	45	18.6	4.27	0.17	5
	1350	3	66	25	50	18.2	3.02	0.12	3
	1350	3	72	30	45	19.4	6.16	0.25	9
	1800	4	113	25	50	18.9	3.61	0.14	4
	1800	4	119	30	45	19.8	8.34	0.33	15
600x350-3-2	1512	2	31	25	50	17.3	3.86	0.15	1
	1512	2	36	30	45	19.0	6.64	0.26	3
	2268	3	66	25	50	18.6	4.82	0.19	2
	2268	3	72	30	45	19.8	9.48	0.38	6
	3024	4	113	25	50	19.3	5.72	0.23	3
	3024	4	119	30	45	20.1	13.05	0.52	11
700x400-3-2.0	1920	2	47	25	50	17.1	5.02	0.20	1
	1920	2	55	30	45	18.1	8.66	0.35	3
	2880	3	91	25	50	18.5	6.20	0.25	1
	2880	3	100	30	45	18.8	12.94	0.52	4
	3840	4	142	25	50	19.3	7.26	0.29	2
	3840	4	151	30	45	19.0	18.41	0.73	8

Coil calculation, water temp 6/12°C

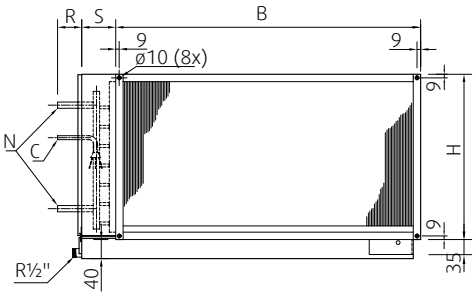
DXRE

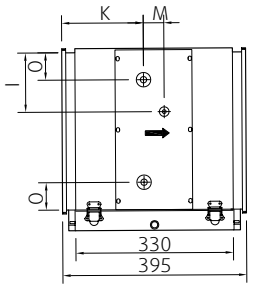
Rectangular duct cooling coil (DX)

- Same model for left-hand or right-hand installation (reversible coil)
- Stainless steel condensate drip tray. A droplet eliminator can be fitted regardless of the direction of air flow
- Easily removable drip tray to simplify cleaning and inspection.

DXRE is recommended for central or decentral (zones) cooling of individual rooms. The DXRE is intended for installation in a horizontal duct, with the air flow in either direction (reversible coil).

We recommend that a DE droplet eliminator (accessory) should be installed on theoutlet side of the coil if the air velocity is in excess of 2.5 m/s. This prevents water droplets being entrained by the air flow out into the duct system. Maximum operating pressure 2.4 MPa (24 Bar).





DE - Droplet separator

Droplet separator for duct cooling coils
Droplet separator DE must be ordered extra.
Recommended for air velocities from 2.5 m/s

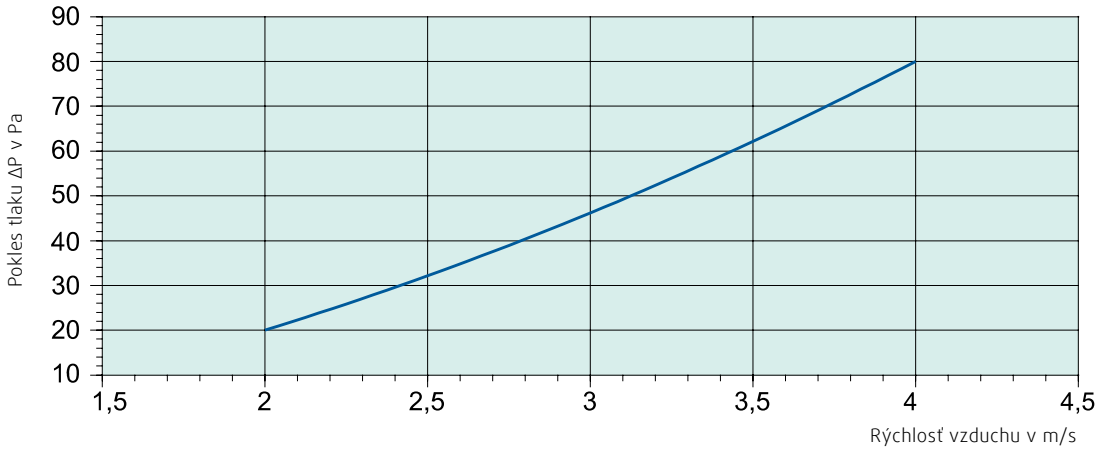
DXRE	B	H	I	O	K
400x200-3-2.5	438	238	70	100	165
500x250-3-2.5	558	288	120	30	165
600x350-3-2.5	638	388	220	30	165
700x400-3-2.5	738	438	250	30	160
DXRE	**M**	**N**	**S**	**R**	**C**
400x200-3-2.5	60	19	90	105	1/2"
500x250-3-2.5	60	22	90	105	1/2"
600x350-3-2.5	60	22	90	105	5/8"
700x400-3-2.5	75	35	100	115	5/8"

DXRE	Air flow	Air pressure drop	Air in	Air in	Air out	Output	Refrigerant flow	Refrigerant Pressure drop
	(m3/h)	(Pa)	(˚C)	(% RH)	(˚C)	(kW)	(kg/h)	(kPa)
400x200-3-2.5	575	32	25	50	15,8	2,2	51	3
	575	36	30	50	18,8	3,2	75	6,1
	865	60	25	50	16,9	2,7	63	4,3
	865	68	30	50	20,4	3,9	90	8,7
	1150	91	25	50	17,5	2,8	65	4,9
	1150	107	30	50	21,2	4,4	104	11,3
500x250-3-2.5	900	32	25	50	15,8	3,4	80	3,2
	900	36	30	50	18,7	5	118	6,6
	1350	60	25	50	16,9	4,2	99	5
	1350	69	30	50	20,1	6,3	147	9,8
	1800	92	25	50	18	4,4	103	5,2
	1800	108	30	50	21,2	7,1	165	12,1
600x350-3-2.5	1510	32	25	50	15,5	6	131	7,5
	1510	36	30	50	18,4	8,7	192	12,8
	2270	62	25	50	16,7	7,5	164	10,1
	2270	70	30	50	19,8	11	242	18,6
	3025	97	25	50	17,4	8,6	189	12,5
	3025	110	30	50	21	12,4	272	22,6
700x400-3-2.5	2015	40	25	50	14,7	8,6	188	7,6
	2015	44	30	50	17,4	12,5	274	13,3
	3020	72	25	50	16,3	9,6	211	9
	3020	83	30	50	19,3	14,7	323	17,4
	4030	112	25	50	16,5	11,2	246	11,3
	4030	130	30	50	20,2	16,9	370	20

Coil calculation
Refrigerant R407C, 5 °C

Refrigerant	R 410A	R 134A	R 404A	R 507A
Factor	1,01	0,93	1,00	0,97

Recalculation of the basic value with different refrigerants

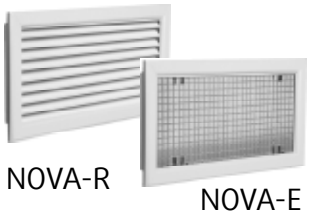


Pressure drop DE, droplet eliminator

Return air

Balance-E EFF

Optima-R



NOVA-R NOVA-E

Optima R-I

TSF & TS Series

Optima-S

PKI Series

TUNE-R Damper

IGC IGK PZ

External louvers for Exhaust air

Supply air

Optima-R

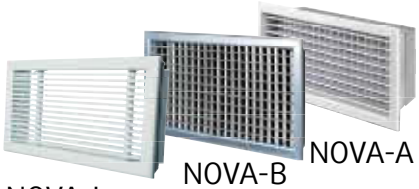
Optima R-I

Optima-RS

Optima-S

PKI Series

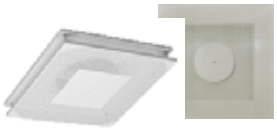
EFD Damper



NOVA-L NOVA-B NOVA-A

Sinus-C Series

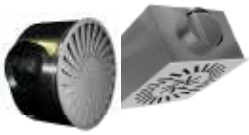
CRS, CRS-T & CRSP Series



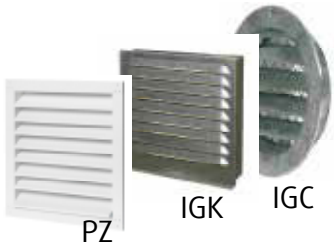
TSO, TSOI Series

Konika, Konika-A & Konika-AT Series

Kvadra & ADQ Series



VVKN & VVKR Series



PZ IGK IGC

External louvers for Intake air

systemair

Systemair GmbH • Jan 2013 • E2284