

RDTM-V

Rectangular variable air volume controller

Technical Documentation

Installation, Commissioning, Operation, Maintenance and Service Manual



These technical specifications define the range of manufactured sizes and versions of the Rectangular variable air volume controller RDTM-V (hereinafter referred to as the “controller”).
They apply to manufacturing, design, ordering, delivery, installation, operation, and maintenance.

CONTENT

I. GENERAL.....3

 Description.....3

 Basic characteristics of the controllers.....4

 Operating conditions.....4

 Definitions.....5

II. DESIGN.....7

 Basic list of designs.....8

 Air volume flow control / duct pressure control / room pressure control.....9

 Compact BELIMO controller - air volume flow control.....10

 BELIMO VRU controller – air volume flow, duct pressure or room pressure control.....13

 PROFI-LINE GRUNER controller – air volume flow control / pressure control.....15

 GRUNER universal controller – air volume flow control.....17

 GRUNER universal controller – pressure control.....17

 Compact SIEMENS controller – air volume flow control.....20

III. DIMENSIONS.....22

 Technical parameters.....25

IV. INSTALLATION.....35

 Placement and installation.....35

V. TECHNICAL DATA.....36

 Controller configuration.....36

 Control accuracy.....55

 Pressure loss.....56

 Noise data.....57

 Level of acoustic output INTO THE DUCT corrected with filter A for controllers with dimensions B≤445.....57

 Level of acoustic output INTO THE DUCT corrected with filter A for controllers with dimensions B≥450.....58

 Level of acoustic output OUTSIDE the duct corrected with filter A.....59

VI. MATERIAL, FINISHING.....60

VII. TRANSPORTATION, STORAGE AND WARRANTY.....61

 Logistic terms.....61

 Warranty.....61

VIII. ASSEMBLY, ATTENDANCE AND MAINTENANCE.....62

IX. ORDERING INFORMATION.....63

 Ordering key.....63

I. GENERAL

Airflow controllers are HVAC components that automatically adjust their effective flow area to achieve the required air volume flow rate in ductwork within a properly designed and operated system.

Variable air volume (VAV) controllers integrate, within a single casing, an air control damper, an electric damper actuator, an electronic flow sensing element, and an electronic control unit. The term “variable air volume controller” is also commonly used for structurally similar devices designed for direct control of duct or room pressure, where the air volume flow rate is regulated indirectly.

For all the above applications, VAV controllers are characterized by the ability to vary the airflow or pressure setpoint over time, either via analogue control signals (e.g. control voltage) or via digital communication (e.g. Modbus RTU), while simultaneously providing feedback signals representing the actual air volume flow rate or air pressure.

If an HVAC system with multiple controllers is designed and operated such that fan speed is controlled based on feedback from the controllers, significant energy savings can be achieved (see EPD example), together with reduced noise levels compared to systems using less costly mechanical constant air volume (CAV) controllers. It shall be taken into account during system design and operation that the controller, as a throttling device, can only reduce the airflow generated by the fan.

These technical specifications apply to the design, manufacture, supply, installation, commissioning, operation, maintenance, and disposal of VAV controllers type RDTM-V. Design intended for use in potentially explosive atmospheres in accordance with the ATEX Directive are not currently available.

Description

The Variable air volume (VAV) controller RDTM-V (hereinafter also referred to as the “controller”) is intended for HVAC systems for ventilation, heating and cooling in buildings. In addition to its autonomous functions—control of air volume flow, duct pressure or room pressure—it also allows, depending on the configuration and control strategy, the integrated damper to be tightly closed, fully opened, or used solely for air volume flow or pressure measurement upon user command, depending on the selected design.

The controller consists of a casing made of sheet steel, optionally with thermal and acoustic insulation and steel

outer cladding; an air control damper with steel blades and plastic blade end caps and blade bearings with reduced flammability rating V1 in accordance with UL 94; a steel linkage mechanism; a mechanism cover; an actuator; a pressure sensor; and an electronic controller. In the case of air volume flow control, an integrated system of aluminium measuring profiles and plastic tubing is also included, by means of which local pressure differences are generated, stabilised and averaged within the airflow inside the controller casing and transmitted to the pressure sensor.

RDTM-V controllers are characterized by

- control from as low as 0.8 m/s across the entire size range
- easy closing (low torque requirements) and smooth operation
- rigid blades with good aerodynamic properties, available in two sizes to minimize pressure loss
- silicone-free design
- simple and reliable construction
- modern, specially developed dual-channel measuring profiles with high efficiency and rigidity, while maintaining low pressure loss; for the highest hygienic class, the measuring profiles can be powder coated
- the possibility of installation directly downstream of a duct bend in the direction of airflow without loss of control accuracy
- enclosed mechanism allowing the controller to be additionally covered (even on site) with a layer of insulation material such as mineral wool or foam

Basic characteristics of the controllers

Nominal sizes AxB	200 x 100 to 1600 x 1400 or 200 x 2000 in 5 mm increments → see pages 25 to 34
Actuator torque	5 to 20 Nm (one actuator per controller)
Basic functions	air volume flow control / duct pressure control / room pressure control
Actuator integration	compact (sensor and control unit integrated with the actuator) / separate
Installation length	400 mm for air volume flow control 200 mm for duct pressure or room pressure control
Flange	width 30 mm
Leakage according to EN 1751	casing: class ATC 3 (formerly "C") blade: class 3 (from B = 200), otherwise class 2
Permissible duct pressure	max. ±1500 Pa for air volume flow or room pressure control / for duct pressure control, the range is limited by the pressure sensor range
Maximum differential pressure	1000 ... 1500 Pa depending on damper size → see page 56
Minimum pressure loss	from approx. 2 Pa at 0,8 m/s
Mean air velocity range	0,8 m/s to 7 m/s (standard), 0,8 m/s to 10 m/s (non-standard) or 0,8 m/s to 12 m/s (non-standard)
Air volume flow range	from 58 m³/h resp. 16 l/s to 54 432 m³/h resp. 15 120 l/s
Control accuracy	from ± 5 % at 7 m/s to ± 11 % at 0,8 m/s
Reaction to fire (casing, blades, mechanism)	class A1
Insulation	without insulation (can be insulated on site) or with thermal and acoustic insulation made of mineral wool, thickness 40 mm, with vibration- and thermally separated sheet metal cladding
Measuring profiles	1 to 4 parallel aluminium measuring profiles, internally divided by a partition with pressure tapping holes Ø 3 mm

Operating conditions

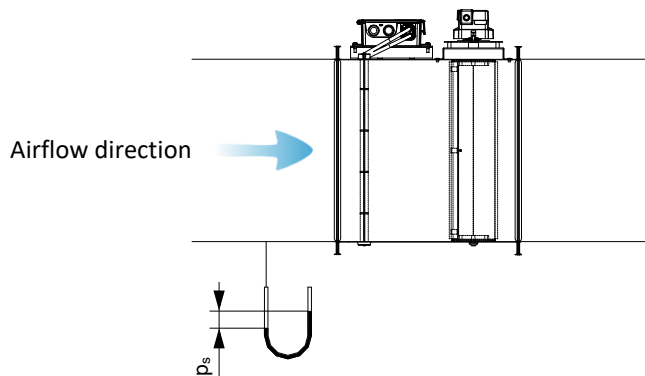
Basic parameters

- Proper function, declared control accuracy, and reliable operation and service life of the product are ensured under the following conditions:
 - Mean air velocity in the duct not exceeding 12 m/s
 - Maximum duct pressure not exceeding ±1500 Pa; in the case of duct pressure control, also such that the pressure sensor range is not exceeded
 - Pressure loss not exceeding 1000 to 1500 Pa depending on size → see page 56.
 - Air velocity profile in the duct corresponding to sufficiently long straight duct sections, except for installation directly downstream of a bend under specified conditions → see page 35.
 - Environment protected against weather effects, with climatic classification class 3K5 without condensation, frost, ice formation, and without water ingress from sources other than rain, in accordance with EN 60721-3-3, amendment A2.
 - Environment free of abrasive, chemically active, and adhesive contaminants.
 - Temperature of the flowing medium in the range from 0 °C to +50 °C.

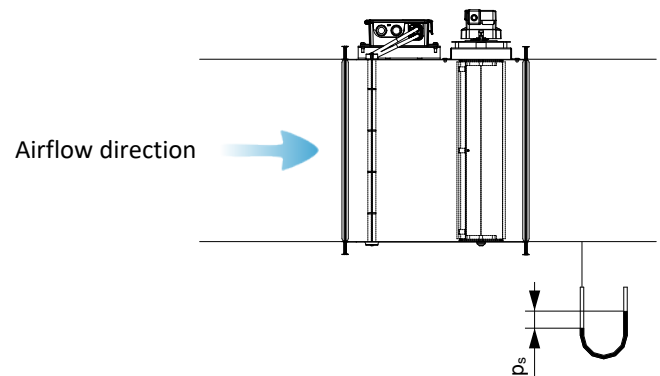
Definitions

Duct pressure

Static pressure in the duct measured relative to the ambient environment. It may be either positive (overpressure) or negative (underpressure). Measurement of duct pressure downstream of significant HVAC components such as a controller or a partially closed damper may be difficult due to non-uniform or pulsating airflow; therefore, a sufficient distance from such components is recommended when measurement is required.



Duct pressure is relevant in terms of the structural rigidity of the controller casing (and may also be associated with noise propagation) and the level of air leakage (tightness). It does not have a direct effect on the measurement of air volume flow in the duct, nor on the loading of the damper blade or the required actuator torque, except in specific cases, for example when the controller is installed at the end of the duct and the duct pressure equals the pressure loss.



Differential pressure

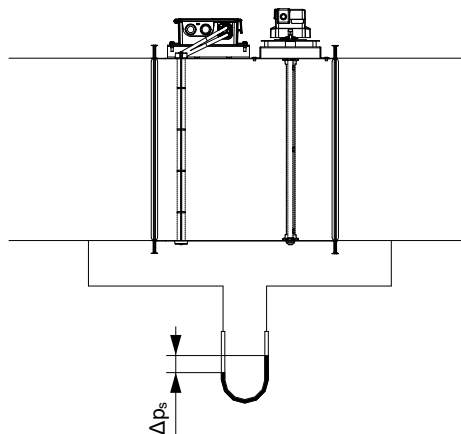
Difference between static pressures in the duct upstream and downstream of the controller. The differential pressure (pressure loss) of the controller is limited by the manufacturer to prevent mechanical overloading of the construction, in particular the damper blade, exceeding the maximum actuator torque, etc.

Two cases may occur:

- The damper is closed. In this case, the differential pressure often corresponds to the duct pressure, or it may be even higher (for example, if the controller in the supply duct is closed while the exhaust branch of the HVAC system is operating).
- The damper is at least partially open and air flows through it. In this case, the differential pressure corresponds to the **pressure loss**. The pressure loss

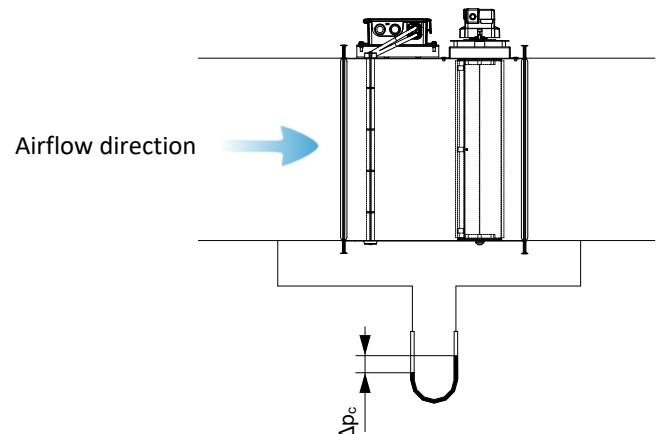
depends on the current air volume flow and on the damper blade position. By varying the damper blade position, the air volume flow is restricted (controlled); therefore, the term control pressure loss is sometimes used. When the damper is fully open, the Variable air volume (VAV) controller exhibits low pressure loss, typically in the order of pascals, with a quadratic dependence on the air volume flow, or respectively on the mean air velocity in the duct. In laboratory conditions, the pressure loss of an HVAC component is usually determined using a so-called substitute duct, as the airflow downstream of the control damper is typically highly non-uniform and pulsating. This also partly explains the difficulties associated with measuring pressure loss of HVAC components directly on site.

Case: a)



Δp_s [Pa] - differential pressure in the duct

Case: b)

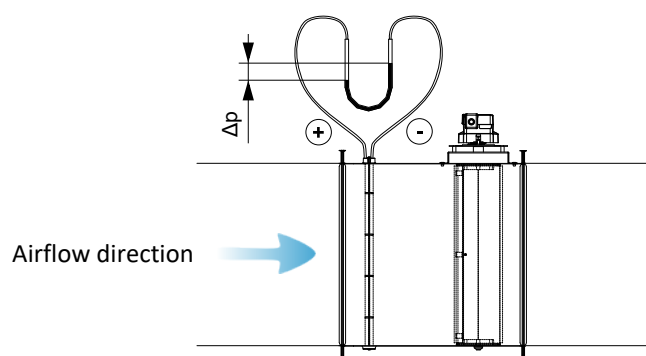


Δp_c [Pa] - controller pressure loss

Differential pressure

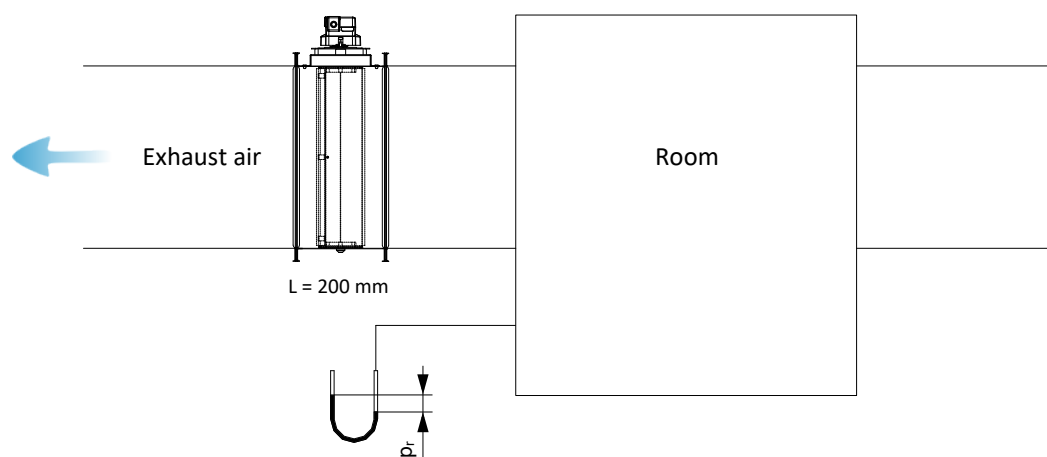
Pressure measured by the controller sensor during direct air volume flow control. In the vast majority of cases, this represents the difference between the total pressure (i.e. static + dynamic) at a point within the duct cross-section and either the static duct pressure (for less efficient measuring systems), or the static pressure in the wake of an artificially created flow obstruction, which is lower than the static pressure in the duct. In the case of the RDTM-V controller, this corresponds to the pressure difference between the

upstream and downstream sides of a circular aluminium profile. The pressure sensor integrated in the air volume flow controller shall have a measuring range corresponding to the range of the differential pressure being measured, which is not an issue for standard devices (e.g. BELIMO, GRUNER, SIEMENS) and for this type of controller. The value is always positive, and when connecting the tubing to the sensor, the „+“ and „-“ ports must be observed.



Room pressure

Air pressure in a given room relative to the outdoor air pressure or, more commonly, relative to the air pressure in another room; it may be either positive (overpressure) or negative (underpressure).



II. DESIGN

Different controller designs are available depending on

- Main function:
 - air volume flow control (installation length 400 mm)
 - duct pressure control (installation length 200 mm)
 - room pressure control (installation length 200 mm)
- Type of pressure sensor:
 - so-called “dynamic” sensors based on thermal anemometry (most common)
 - so-called “static” sensors – diaphragm type (less affected by dust and fibres in the air)
- Type of actuator:
 - standard / spring return / fast-acting actuator, etc.
- Manufacturer of the controller electrical components (actuator, sensor, control unit):
 - BELIMO (most common) / GRUNER / SIEMENS
- Level of integration of electrical components into a single unit (single enclosure):
 - compact (sensor, control unit and actuator integrated into one assembly – not always available)
 - separate actuator with connected sensor and control unit
- Presence and type of digital control and communication, such as:
 - wireless data transmission (NFC)
 - communication via MP-Bus, Modbus RTU, KNX or BACnet

All offered designs are powered by 24 V AC/DC and provide analogue voltage input and output signals (0–10 V or 2–10 V). Current output is not available; however, if a current input of 4–20 mA or 0–20 mA is required, the user may connect the input terminals via a 500 Ω resistor and order the controller with input configured for 2–10 V or 0–10 V.

Basic list of designs

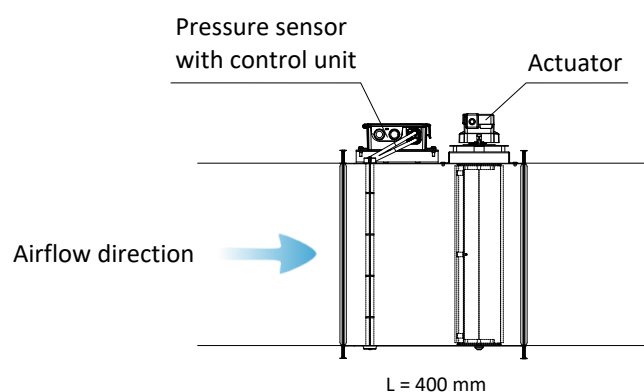
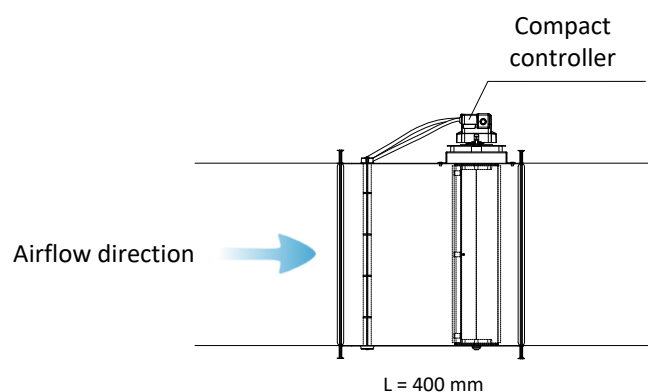
Ordering code for RDTM-V air volume flow controllers						Senzor range	Design
Air flow	BELIMO compact solution (sensor, controller and actuator in one box)	Without the spring	Dynamic	Analog MPBus	LMV-D3-MP (5 N.m, NMV-D3-MP 10 N.m, SMV-D3-MP 20 N.m)	0...500 Pa	B01
				Modbus RTU	LMV-D3-MOD (5 N.m, NMV-D3-MOD 10 N.m, SMV-D3-MOD 20 N.m)	0...500 Pa	B02
				BACnet MPBus			
				KNX	LMV-D3-KNX (5 N.m, NMV-D3-KNX 10 N.m)	0...500 Pa	B04
	GRUNER compact solution (sensor, controller and actuator in one box)	Without the spring	Dynamic	Analog PP-Bus	327VM-024-05 (5 N.m, 327VM-024-10 10 N.m, 327VM-024-15 15 N.m.)	0...500 Pa	G00
				Modbus RTU	327VM-024-05-MB (5 N.m, 327VM-024-10-MB 10 N.m, 327VM-024-15-MB 15 N.m.)	0...500 Pa	G02
	SIEMENS compact solution (sensor, controller and actuator in one box)	Without the spring	Dynamic	Analog PP-Bus	GDB181.1E/3 (5 N.m, GLB181.1E/3 10 N.m)	0...500 Pa	S00
				Modbus RTU	GDB181.1E/MO (5 N.m, GLB181.1E/MO 10 N.m)	0...500 Pa	S02
				KNX	GDB181.1E/KN (5 N.m, GLB181.1E/KN 10 N.m)	0...500 Pa	S04
				BACnet	GDB181.1E/BA (5 N.m, GLB181.1E/BA 10 N.m)	0...500 Pa	S05
Pressure control	BELIMO sensor, controller and actuator all in separate boxes	Without the spring	Static	Analog MP-Bus	Controller VRU-M1-BAC (STP) + LM24A-VST (5 N.m., NM24A-VST 10 N.m, SM24A-VST 20 N.m)	0...600 Pa	B75
				Modbus RTU	Controller VRU-M1-BAC (STP) + LM24A-VST (5 N.m., NM24A-VST 10 N.m, SM24A-VST 20 N.m)	0...600 Pa	B78
		With the spring	Static	Analog MP-Bus	Controller VRU-M1R-BAC (STP) + LF24-VST (4 N.m, NF24A-VST 10 N.m, SF24A-VST 20 N.m)	0...600 Pa	B75F
				Modbus RTU	Controller VRU-M1R-BAC (STP) + LF24-VST (4 N.m, NF24A-VST 10 N.m, SF24A-VST 20 N.m)	0...600 Pa	B78F
		Speed actuator	Static	Analog MP-Bus	Controller VRU-M1-BAC (STP) + LMQ24A-VST (4 N.m., NMQ24A-VST 8 N.m)	0...600 Pa	B75Q
				Modbus RTU	Controller VRU-M1-BAC (STP) + LMQ24A-VST (4 N.m., NMQ24A-VST 8 N.m)	0...600 Pa	B78Q
	GRUNER compact solution (sensor, controller and actuator in one box)	Without the spring	Dynamic	Analog PP-Bus	327VM-024-05/CCOL (5 N.m, 327VM-024-10/CCOL 10 N.m, 327VM-024-15/CCOL 15 N.m.)	0...500 Pa	G50
				Modbus RTU	327VM-024-05-MB (CCPC) (5 N.m, 327VM-024-10-MB (CCPC) 10 N.m, 327VM-024-15-MB (CCPC) 15 N.m.)	0...500 Pa	G52
	GRUNER sensor, controller and actuator all in separate boxes	Without the spring	Dynamic	Analog PP-Bus	Controller GUAC-PM-DD3 + 227C-024-05-V/ST06 (5 N.m, 227C-024-10-V/ST06 10 N.m, 227C-024-15-V/ST06 15 N.m, 363C-024-20-V/ST06 20N.m)	0...300 Pa	G62
				Modbus RTU	Controller GUAC-PM-DD3-MB + 227C-024-05-V/ST06 (5 N.m, 227C-024-10-V/ST06 10 N.m, 227C-024-15-V/ST06 15 N.m, 363C-024-20-V/ST06 20N.m)	0...300 Pa	G64
			Static	Analog PP-Bus	Controller GUAC-PM1 + 227C-024-05-V/ST06 (5 N.m, 227C-024-10-V/ST06 10 N.m, 227C-024-15-V/ST06 15 N.m, 363C-024-20-V/ST06 20N.m)	0...100 Pa	G70
				Analog PP-Bus	Controller GUAC-PM3 + 227C-024-05-V/ST06 (5 N.m, 227C-024-10-V/ST06 10 N.m, 227C-024-15-V/ST06 15 N.m, 363C-024-20-V/ST06 20N.m)	0...300 Pa	G71
			Static	Analog PP-Bus	Controller GUAC-PM6 + 227C-024-05-V/ST06 (5 N.m, 227C-024-10-V/ST06 10 N.m, 227C-024-15-V/ST06 15 N.m, 363C-024-20-V/ST06 20N.m)	0...600 Pa	G72
				Analog PP-Bus	Controller GUAC-PM1-MB + 227C-024-05-V/ST06 (5 N.m, 227C-024-10-V/ST06 10 N.m, 227C-024-15-V/ST06 15 N.m, 363C-024-20-V/ST06 20N.m)	0...100 Pa	G76
			Dynamic	Analog PP-Bus	Controller GUAC-PM3-MB + 227C-024-05-V/ST06 (5 N.m, 227C-024-10-V/ST06 10 N.m, 227C-024-15-V/ST06 15 N.m, 363C-024-20-V/ST06 20N.m)	0...300 Pa	G77
				Analog PP-Bus	Controller GUAC-PM6-MB + 227C-024-05-V/ST06 (5 N.m, 227C-024-10-V/ST06 10 N.m, 227C-024-15-V/ST06 15 N.m, 363C-024-20-V/ST06 20N.m)	0...600 Pa	G78
		With the spring	Dynamic	Analog PP-Bus	Controller GUAC-PM-DD3 + 341C-024-05-V/ST06 (5 N.m, 361C-024-10-V/ST06 10 N.m, 361C-024-20-V/ST06 20 N.m)	0...300 Pa	G62F
				Modbus RTU	Controller GUAC-PM-DD3-MB + 341C-024-05-V/ST06 (5 N.m, 361C-024-10-V/ST06 10 N.m, 361C-024-20-V/ST06 20 N.m)	0...300 Pa	G64F
			Static	Analog PP-Bus	Controller+pressure sensor GUAC-PM1 + 341C-024-05-V/ST06 (5 N.m, 361C-024-10-V/ST06 10 N.m, 361C-024-20-V/ST06 20 N.m)	0...100 Pa	G70F
				Analog PP-Bus	Controller+pressure sensor GUAC-PM3 + 341C-024-05-V/ST06 (5 N.m, 361C-024-10-V/ST06 10 N.m, 361C-024-20-V/ST06 20 N.m)	0...300 Pa	G71F
			Static	Analog PP-Bus	Controller+pressure sensor GUAC-PM6 + 341C-024-05-V/ST06 (5 N.m, 361C-024-10-V/ST06 10 N.m, 361C-024-20-V/ST06 20 N.m)	0...600 Pa	G72F
				Analog PP-Bus	Controller GUAC-PM1-MB + 341C-024-05-V/ST06 (5 N.m, 361C-024-10-V/ST06 10 N.m, 361C-024-20-V/ST06 20 N.m)	0...100 Pa	G76F
			Dynamic	Analog PP-Bus	Controller GUAC-PM3-MB + 341C-024-05-V/ST06 (5 N.m, 361C-024-10-V/ST06 10 N.m, 361C-024-20-V/ST06 20 N.m)	0...300 Pa	G77F
				Analog PP-Bus	Controller GUAC-PM6-MB + 341C-024-05-V/ST06 (5 N.m, 361C-024-10-V/ST06 10 N.m, 361C-024-20-V/ST06 20 N.m)	0...600 Pa	G78F
Room pressure control	BELIMO sensor, controller and actuator all in separate boxes	Without the spring	Static	Analog MP-Bus	Controller VRU-M1R-BAC (STP) + LM24A-VST (5 N.m., NM24A-VST 10 N.m, SM24A-VST 20 N.m)	-75...+75	B91
				Modbus RTU	Controller VRU-M1R-BAC (STP) + LM24A-VST (5 N.m., NM24A-VST 10 N.m, SM24A-VST 20 N.m)	-75...+75	B92
		With the spring	Static	Analog MP-Bus	Controller VRU-M1R-BAC (STP) + LF24-VST (4 N.m, NF24A-VST 10 N.m, SF24A-VST 20 N.m)	-75...+75	B91F
				Modbus RTU	Controller VRU-M1R-BAC (STP) + LF24-VST (4 N.m, NF24A-VST 10 N.m, SF24A-VST 20 N.m)	-75...+75	B92F
		Speed actuator	Static	Analog MP-Bus	Controller VRU-M1-BAC (STP) + LMQ24A-VST (4 N.m., NMQ24A-VST 8 N.m)	-75...+75	B91Q
				Modbus RTU	Controller VRU-M1-BAC (STP) + LMQ24A-VST (4 N.m., NMQ24A-VST 8 N.m)	-75...+75	B92Q
		Without the spring	Static	Analog MP-Bus	Controller VRU-M1R-BAC (STP) + LM24A-VST (5 N.m., NM24A-VST 10 N.m, SM24A-VST 20 N.m)	-75...+75	B91
				Modbus RTU	Controller VRU-M1R-BAC (STP) + LM24A-VST (5 N.m., NM24A-VST 10 N.m, SM24A-VST 20 N.m)	-75...+75	B92

Connection diagrams for the most common designs → see pages 9 to 10

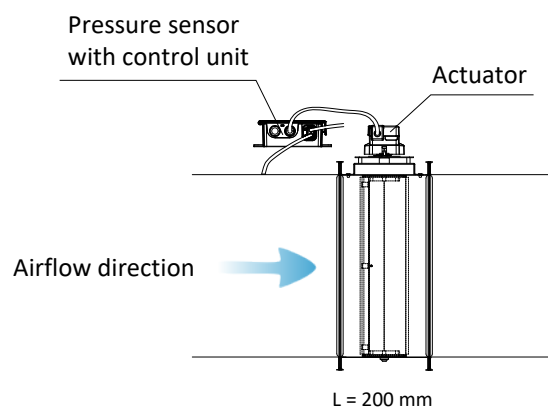
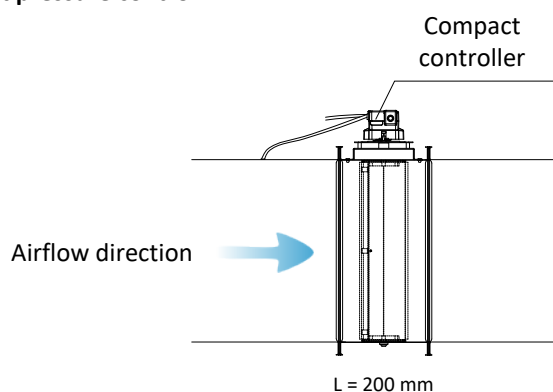
Extended list of designs available for download [HERE](#)

Air volume flow control / duct pressure control / room pressure control

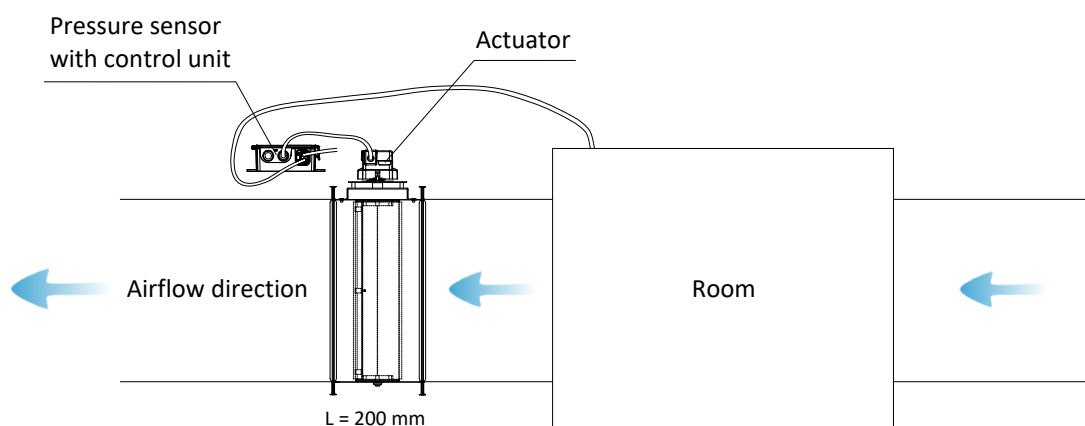
Air volume flow control



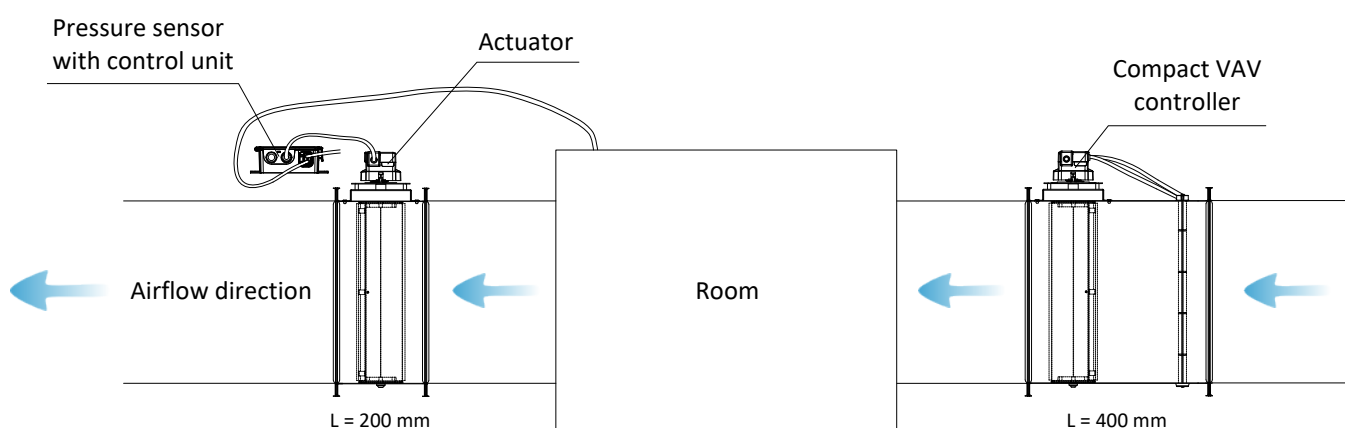
Duct pressure control



Room pressure control



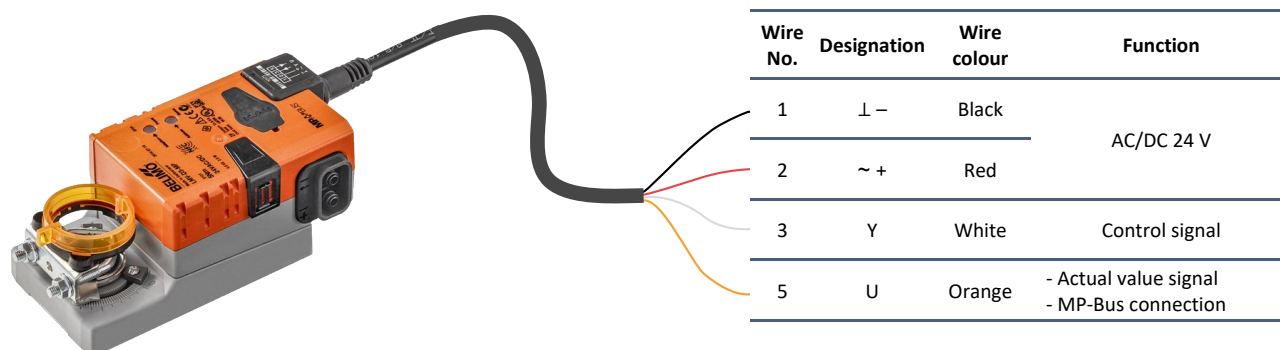
Combined room pressure and air volume flow control



Compact BELIMO controller - air volume flow control

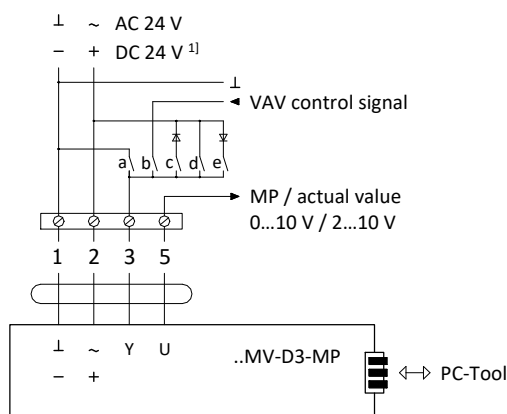
- Pressure sensor, digital VAV controller and actuator integrated into one unit, providing a compact solution with various communication options.
- The controller is designed for air volume flow control and operates on the principle of dynamic measurement.
- It compares the measured differential pressure with the setpoint and, in case of deviation, adjusts the damper blade position until the required value is achieved.
- Controllers are divided according to the control type:
 - LMV-D3-MP, NMV-D3-MP and SMV-D3-MP for control via 0(2)...10 V signal or MP-Bus protocol
 - LMV-D3-MF.1 MDK* and NMV-D3-MF.1 MDK* for control via 0(2)...10 V signal
 - LMV-D3-MOD and NMV-D3-MOD for control via 0(2)...10 V signal or via Modbus RTU, BACnet, MP-Bus protocols
 - LMV-D3-KNX and NMV-D3-KNX for control via 0(2)...10 V signal or KNX protocol

Controllers LMV-D3-MP, NMV-D3-MP, SMV-D3-MP, LMV-D3-MF.1 MDK* and NMV-D3-MF.1 MDK*



Air volume flow control – wiring options:

LMV-D3-MP, NMV-D3-MP, SMV-D3-MP,
LMV-D3-MF.1 MDK* and NMV-D3-MF.1 MDK*



CAV-Function: Standard

Operating mode	-	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					
Damper CLOSED	a) CLOSED		c) CLOSED ¹⁾		
V _{min} ...V _{max}		b) VAV			
CAV - V _{min}	fully open - V _{min} active ²⁾				
Damper OPEN					a) OPEN ¹⁾
CAV - V _{max}				d) V _{max}	

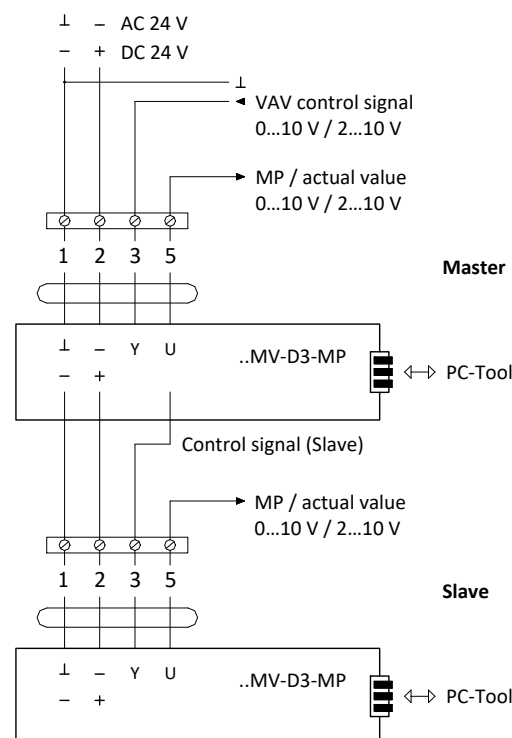
- Contact closed, function active
- Contact closed – function active only in 2...10 V mode
- Contact open

¹⁾ Not available with DC 24 V supply

²⁾ Damper is closed when the voltage reaches 0.5 V

Air volume flow control – MASTER-SLAVE actuator config.:

LMV-D3-MP, NMV-D3-MP, SMV-D3-MP,
LMV-D3-MF.1 MDK* and NMV-D3-MF.1 MDK*



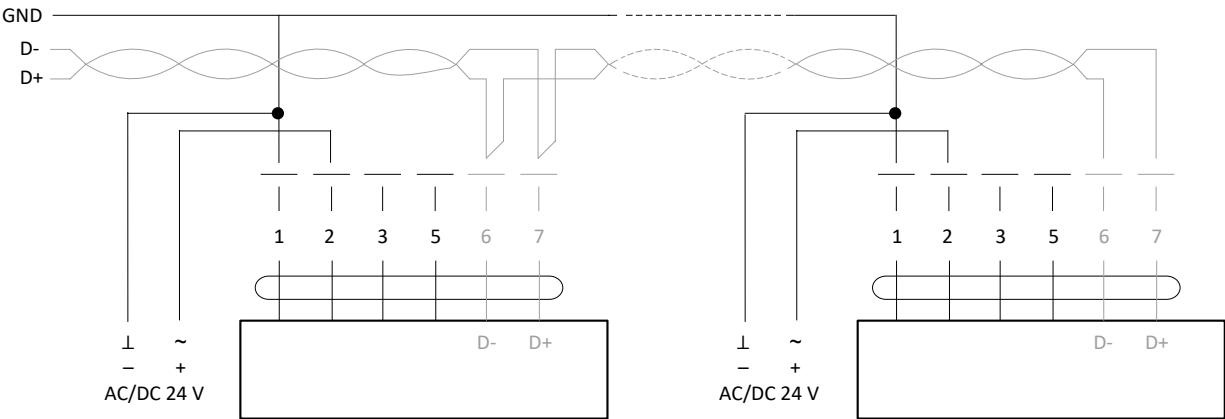
* MP-Bus protocol and service connector not available

Controllers LMV-D3-MOD, NMV-D3-MOD and SMV-D3-MOD



Wire No.	Designation	Wire colour	Function
1	⊥ -	Black	AC/DC 24 V
2	~ +	Red	
3			
5	► MFT	Orange	MP connection
6	D-	Pink	BACnet / Modbus RTU connection (RS-485)
7	D+	Grey	

Wiring of LMV-D3-MOD, NMV-D3-MOD and SMV-D3-MOD controllers on an RS-485 serial bus

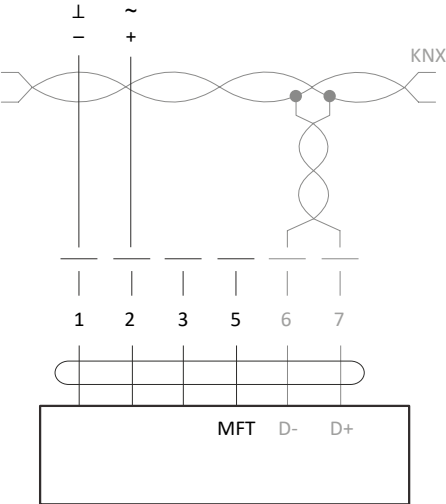


Controllers LMV-D3-KNX and NMV-D3-KNX



Wire No.	Designation	Wire colour	Function
1	⊥ -	Black	AC/DC 24 V
2	~ +	Red	
3			
5	► MFT	Orange	PP connection

Wiring of LMV-D3-KNX and NMV-D3-KNX controllers



Technical parameters of the controllers: LMV-D3-MF.1 MDK/MP/MOD/KNX, NMV-D3-MF.1 MDK/MP/MOD/KNX and SMV-D3-MP/MOD

VAV controller	LMV-D3-...				NMV-D3-...				SMV-D3-...	
Communication	MF	MP	MOD	KNX	MF	MP	MOD	KNX	MP	MOD
Supply voltage	AC/DC 24 V, 50/60 Hz									
Operating range	AC 19,2...28,8 V / DC 21,6...28,8 V									
Power rating	3,5 VA		4 VA		5 VA				5,5 VA	
	(max. 8 A @ 5 ms)									
Power consumption	2 W				3 W				3 W	
Torque	5 Nm				10 Nm				20 Nm	
Setting ranges										
V _{nom}	OEM-specific preset air volume flow value, applicable for VAV controllers									
V _{max}	20...100 % from V _{nom}									
V _{min}	0...100 % from V _{nom}									
Standard control										
VAV mode for control signal Y (connection 3)	- DC 2...10 V / (4...20 mA with resistor 500 Ω) - DC 0...10 V / (0...20 mA with resistor 500 Ω) - adjustable DC 0...10 V } (input resistance min. 100 kΩ)									
Mode for setpoint value U5 (connection 5)	- DC 2...10 V - DC 0...10 V - selectable: air volume flow / damper position / differential pressure } (max. 0,5 mA)									
CAV operating mode (constant air volume flow)	CLOSED / V _{min} / V _{max} / OPEN* (* only with AC 24 V supply)									
Connection	cable 6 x 0,75 mm ² (for MP communication: cable 4 x 0,75 mm ²)									
Protection class	III (SELV – safety extra-low voltage)									
Ambient humidity	95% rH, non-condensing (according to EN 60730-1)									
Storage temperature	-40 °C ... +80 °C									
Weight	0,5 kg				0,7 kg				0,83 kg	

BELIMO VRU controller – air volume flow, duct pressure or room pressure control

- Universal VAV VRU controller with integrated pressure sensor in a single casing (controlled via 0/2–10 V signal, MP-Bus, Modbus RTU, BACnet MS/TP) and actuator.
- Depending on the selected type, the controller operates on the principle of dynamic or static measurement.
- It compares the measured differential pressure with the setpoint and, in case of deviation, adjusts the damper blade position until the required value is achieved.
- Controllers are classified according to the type of pressure sensor used:
 - VRU-D3-BAC for control via 0/2...10 V signal (optionally MP-Bus, Modbus RTU, BACnet MS/TP), for dynamic pressure measurement in the range 0...500 Pa
 - VRU-M1-BAC for control via 0/2...10 V signal (optionally MP-Bus, Modbus RTU, BACnet MS/TP), for static pressure measurement in the range 0...600 Pa
 - VRU-M1R-BAC for control via 0/2...10 V signal (optionally MP-Bus, Modbus RTU, BACnet MS/TP), for room static pressure measurement in the range –75...+75 Pa
- Controllers are further classified according to the actuator type:
 - LM24A-VST (5 Nm), NM24A-VST (10 Nm), SM24A-VST (20 Nm) without spring return
 - LF24-VST (4 Nm), NF24A-VST (10 Nm), SF24A-VST (20 Nm) with spring return
 - LMQ24A-VST (4 Nm), NMQ24A-VST (8 Nm) fast-acting actuators
 - NKQ24A-VST (10 Nm) fast-acting actuators with spring return

Controllers VRU-D3-BAC, VRU-M1-BAC, VRU-M1R-BAC



Wire No.	Designation	Function
1	$\perp$ –	AC/DC 24 V
2	~ +	
3	Y	VAV reference signal
5	U / MP	PP / MP Communication
6	$\perp$	GND
7	D+	BACnet MS/TP / Modbus RTU communication bus
8	D-	

Technical parameters of the controllers: VRU-D3-BAC, VRU-M1-BAC, VRU-M1R-BAC

Controller	VRU-D3-BAC	VRU-M1-BAC	VRU-M1R-BAC
Supply voltage	AC/DC 24 V, 50/60 Hz		
Operating range	AC 19.2...28.8 V / DC 21.6...28.8 V		
Power rating	2 VA (without VST actuator)		
Power consumption	1.5 W		
Control signal w1	DC 0/2...10 V @ input resistance 100 kΩ		
Operating range	DC 2...10 V		
Actual value signal U5	0 (2)...10 V		
Actuator connection	AC/DC 24V, PP-Link for VST actuator		
Communication types	PP Bus, MP Bus, ModBus RTU, BACnet		

Pressure sensor

	BELIMO D3 flow-through sensor (dynamic measurement)	BELIMO M1 diaphragm sensor	BELIMO M1R diaphragm sensor
Measuring principle			
Mounting position	independent of position, no zero adjustment required		
Sensor range	0...500 Pa	0...600 Pa	–75...75 Pa
Maximum pressure	1500 Pa	1500 Pa	+7kpa
Differential pressure accuracy	±1 Pa @ 0...20 Pa ±5% @ 20...500 Pa	–	–
Measured air properties	0...50 °C / 5...95 % r.H., non-condensing		
Pressure connection	hose connectors for tubing with inner diameter 4...6 mm		

Setting ranges

Connection	screw terminals for 2 x 1,5 mm ²
Protection class	III (SELV – safety extra-low voltage)
Degree of protection	IP 42
Ambient temperature	0 °C...+50 °C
Storage temperature	–20 °C...+80 °C
Parameterisation	BELIMO Assistant App (NFC) / PC-Tool / ZTH EU
Weight	0,34 kg (without VST actuator)

Actuators for VRU controller with VST connector:

LM24A-VST, LMQ24A-VST, NM24A-VST, NMQ24A-VST, SM24A-VST


Actuators for VRU controller with VST connector:

NKQ24A-VST


Actuators for VRU controller with VST connector:

NF24A-VST, SF24A-VST


Technical parameters of the actuators: LM24A-VST, NM24A-VST, SM24A-VST, LMQ24A-VST, NMQ24A-VST, NF24A-VST, SF24A-VST, NKQ24A-VST

Actuator	LM24A-VST	NM24A-VST	SM24A-VST	LMQ24A-VST	NMQ24A-VST	NF24A-VST	SF24A-VST	NKQ24A-VST
Supply voltage	AC/DC 24 V, 50/60 Hz (from VRU)							
Power consumption / Power rating	1W / 2VA	2W / 4VA	2W / 4VA	13W / 23VA	13W / 23VA	5W / 8VA	8,5W / 11VA	11W / 22VA
Torque at rated voltage	5 Nm	10 Nm	20 Nm	4 Nm	8 Nm	10 Nm	20 Nm	6 Nm
Direction of rotation	L / R (selectable by switch)					L / R		L / R (selectable by switch)
Running time for >90 (resp. 95°)	120s	120s	120s	2,5s	4s	120s spring return <20s	120s spring return <20s	4s spring return <4s
Degree of protection	IP 54							
Protection class	III (SELV – safety extra-low voltage)							
Ambient temperature	-30 °C...+50 °C							
Storage temperature	-40 °C...+80 °C							
Sound power level	35 dB(A)	35 dB(A)	45 dB(A)	54 dB(A)	56 dB(A)	40 dB(A)	40 dB(A)	60 dB(A)
Weight	0,56 kg	0,78 kg	0,98 kg	0,56 kg	0,78 kg	2,3 kg	2,3 kg	1,4 kg

PROFI-LINE GRUNER controller – air volume flow control / pressure control

- Pressure sensor, digital controller and actuator integrated into one unit, providing a compact solution with various communication options.
- The controller is designed for air volume flow control or pressure control (CCPC) and operates on the principle of dynamic or static measurement.
- It compares the measured differential pressure with the setpoint and, in case of deviation, adjusts the damper blade position until the required value is achieved.
- Controllers based on dynamic measurement are classified according to the control type:
 - 327VM-024-05(-MB*), 327VM-024-10(-MB*) or 327VM-024-15(-MB*) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), with a range of 0...500 Pa
- Controllers based on static measurement are classified according to the control type and sensor range:
 - 327VM-024-05-DS4(-MB*), 327VM-024-10-DS4(-MB*) or 327VM-024-15-DS4(-MB*) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), with a range of 0...400 Pa
 - 327VM-024-05-DS6(-MB*), 327VM-024-10-DS6(-MB*) or 327VM-024-15-DS6(-MB*) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), with a range of 0...600 Pa
 - 327VM-024-05-DS10(-MB*), 327VM-024-10-DS10(-MB*) or 327VM-024-15-DS10(-MB*) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), with a range of 0...1500 Pa

Controllers 327VM-024-...



Wire No.	Designation	Wire colour	Function
1	⊥ –	Black	AC/DC 24 V
2	~ +	Red	
3	Y	White	Control signal 0(2)...10 V
4	U	Orange	Output signal value

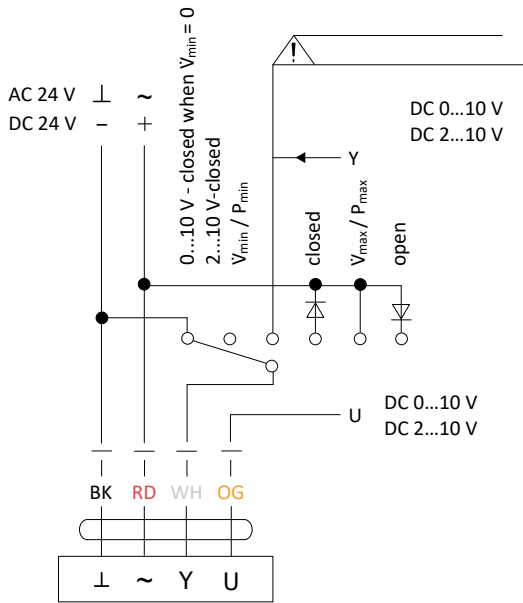
Controllers 327VM-024-... -MB



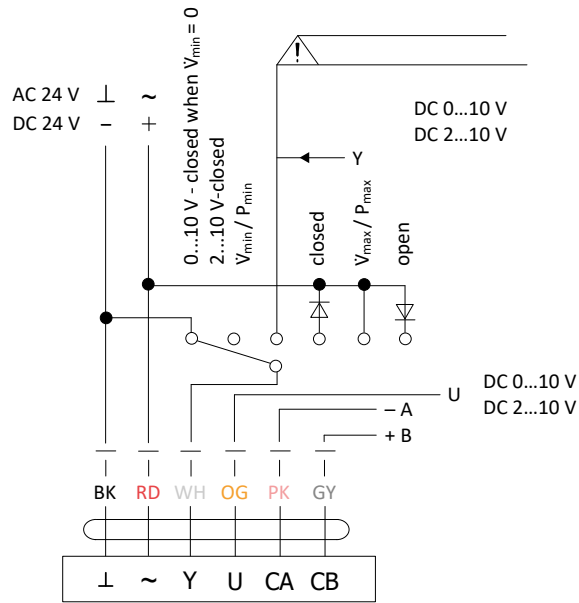
Wire No.	Designation	Wire colour	Function
1	⊥ –	Black	AC/DC 24 V
2	~ +	Red	
3	Y	White	Control signal 0(2)...10 V
4	U	Orange	Output signal value
A	CA -	Pink	Modbus RTU connection (RS-485)
B	CB +	Grey	

* Controllers with the suffix -MB additionally support communication via the Modbus RTU protocol.

Wiring of controllers 327VM-024-...



Wiring of controllers 327VM-024-...-MB



Technical parameters of the actuators: 327VM-024-...(-MB)

applies to controllers operating on both dynamic and static measurement principles and for air volume flow control

Supply voltage	AC/DC 24 V, 50/60 Hz
Rated voltage	19...29 VAC/DC
Power consumption	< 3,0 W
Idle power consumption	< 2,0 W
Torque	5 Nm 10 Nm 15 Nm
V _{nom}	OEM-specific preset air volume flow value, applicable for VAV controllers
V _{max}	30...100 % from V _{nom}
V _{min}	0...100 % from V _{nom}
Input signal Y	DC 0(2)...10 V DC 0(4)...20 mA
Output signal U	DC 0(2)...10 V, max. 0,5 mA
Connection	cable 1m, 4 x 0,75 mm ² (for controllers with Modbus RTU 6 x 0,75 mm ²)
Protection class	III (SELV – safety extra-low voltage)
Ambient humidity	5...95 % rH, non-condensing (according to EN 60730-1)
Ambient temperature	0 °C...+50 °C
Storage temperature	-20 °C...+80 °C
Sound power level	< 35 dB

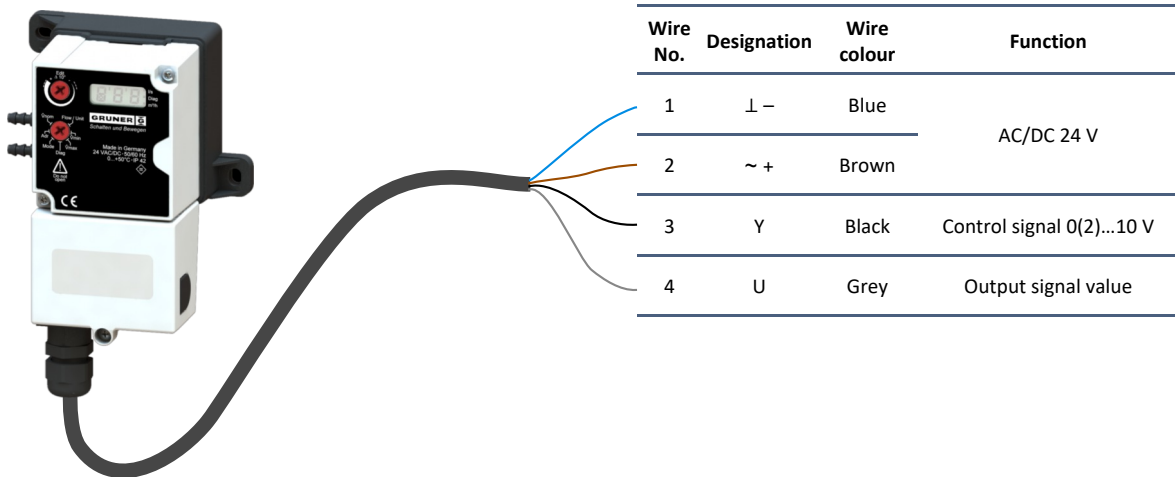
GRUNER universal controller – air volume flow control

- GUAC controller with integrated pressure sensor in a single casing, with a separate actuator.
- The controller is designed for air volume flow control and operates, depending on the connected sensor, on the principle of dynamic or static measurement.
- It compares the measured differential pressure with the setpoint and, in case of deviation, adjusts the damper blade position until the required value is achieved.
- Controllers are classified according to the type of pressure sensor used and communication type:
 - GUAC-DM3(-MB) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), for dynamic pressure measurement in the range 0...300 Pa
 - GUAC-SM3(-MB) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), for static pressure measurement in the range 0...300 Pa
- Controllers are further classified according to the actuator type:
 - 227C-024-05-V/ST06, 227C-024-10-V/ST06 and 227C-024-15-V/ST06 without spring return
 - 341C-024-05-V/ST06, 361C-024-10-V/ST06 and 361C-024-15-V/ST06 with spring return

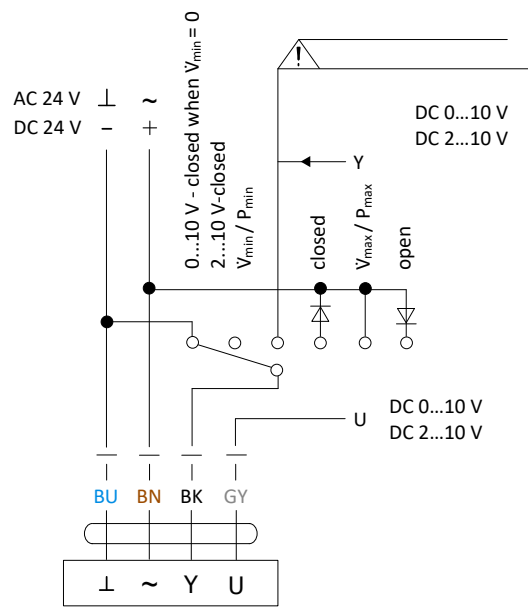
GRUNER universal controller – pressure control

- GUAC controller with integrated pressure sensor in a single casing, with a separate actuator.
- The controller is designed for pressure control and operates, depending on the connected sensor, on the principle of dynamic or static measurement.
- It compares the measured differential pressure with the setpoint and, in case of deviation, adjusts the damper blade position until the required value is achieved.
- Controllers are classified according to the type of pressure sensor used and communication type:
 - GUAC-PM1(-MB) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), for static pressure measurement in the range 0...100 Pa
 - GUAC-PM3(-MB) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), for static pressure measurement in the range 0...300 Pa
 - GUAC-PM6(-MB) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), for static pressure measurement in the range 0...600 Pa
 - GUAC-PM-DD3(-MB) for control via 0(2)...10 V signal or 0(4)...20 mA (optionally Modbus RTU), for dynamic pressure measurement in the range 0...300 Pa
- Controllers are further classified according to the actuator type:
 - 227C-024-05-V/ST06, 227C-024-10-V/ST06 and 227C-024-15-V/ST06 without spring return
 - 341C-024-05-V/ST06, 361C-024-10-V/ST06 and 361C-024-15-V/ST06 with spring return

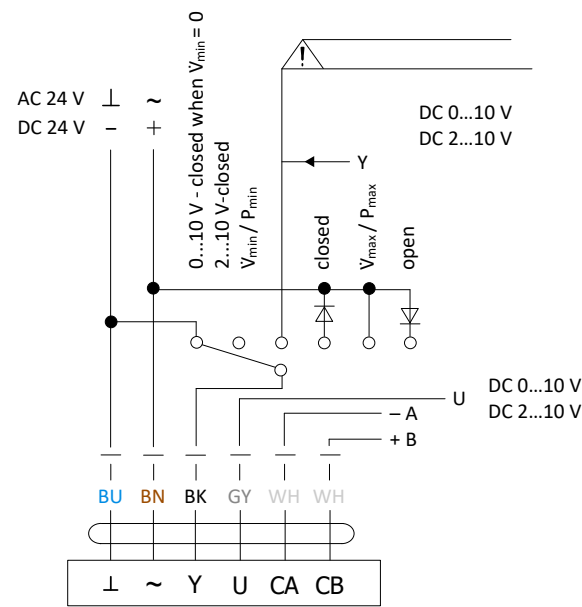
Controllers GUAC-...



Wiring of controllers GUAC-...



Wiring of controllers GUAC-...-MB



Technical parameters of the controllers: GUAC-...	
Supply voltage	AC/DC 24 V, 50/60 Hz
Power rating	1,3 VA
Power consumption	0,6 W
V _{nom}	OEM-specific preset air volume flow value, applicable for VAV controllers
V _{max}	0...100 % from V _{nom}
V _{min}	0...100 % from V _{nom}
Input signal Y	DC 0(2)...10 V DC 0(4)...20 mA
Output signal U	DC 0(2)...10 V, max. 0,5 mA
Connection	Cable 1 m with Lumberg connector
Protection class	III (SELV – safety extra-low voltage)
Ambient humidity	95% rH, non-condensing (according to EN 60730-1)
Ambient temperature	0 °C...+50 °C
Storage temperature	-20 °C...+80 °C
Weight	0,38 kg

Actuators for GUAC controller: 227C-024-...

Actuators for GUAC controller: 341C-024-05-V/ST06
361C-024-...

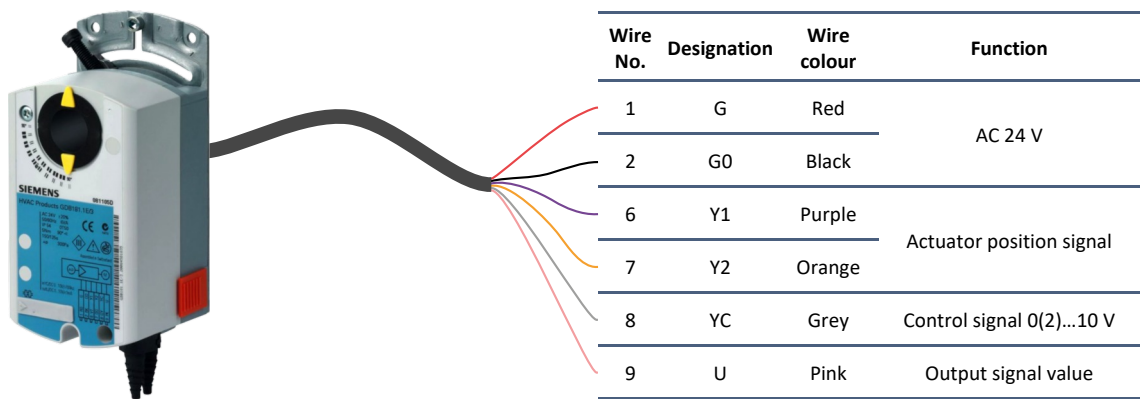
Technical parameters of the actuators: 227C-024-... , 341C-024-05-V/ST06 and 361C-024-...

Actuator	227C-024-05-V/ST06	227C-024-10-V/ST06	227C-024-15-V/ST06	341C-024-05-V/ST06	361C-024-10-V/ST06	361C-024-20-V/ST06
Supply voltage	AC/DC 24 V, 50/60 Hz					
Power rating	3,5 VA			6,5 VA	8 VA	11,5 VA
Power consumption	2 W			5 W		8 W
Idle power consumption	1 W			2 W		2 W
Torque	5 Nm	10 Nm	20 Nm	5 Nm	10 Nm	20 Nm
Connection	Cable 1 m with Lumberg connector					
Running time for > 90°	< 100 s	< 150 s	< 150 s	< 100 s, spring return 20 s	< 150 s, spring return 20 s	< 150 s, spring return 20 s
Protection class	III (SELV – safety extra-low voltage)					
Ambient humidity	95 % rH, non-condensing (according to EN 60730-1)					
Ambient temperature	-30 °C...+50 °C					
Storage temperature	-30 °C...+80 °C					
Sound power level	< 35 dB					
Sound power level of spring return	0 dB			< 65 dB		
Weight	0,53 kg			1,4 kg	1,7 kg	

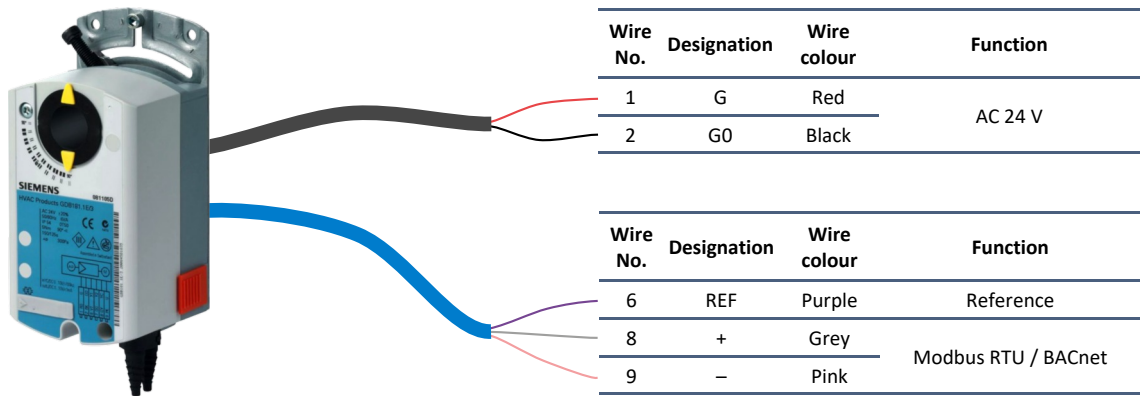
Compact SIEMENS controller – air volume flow control

- Pressure sensor, digital VAV controller and actuator integrated into one unit, providing a compact solution with various communication options.
- The controller is designed for air volume flow control and operates on the principle of dynamic measurement.
- It compares the measured differential pressure with the setpoint and, in case of deviation, adjusts the damper blade position until the required value is achieved.
- Controllers are divided according to the control type:
 - GDB181.1E/3 and GLB181.1E/3 for control via 0(2)...10 V signal
 - GDB181.1E/BA and GLB181.1E/BA via protocol BACnet
 - GDB181.1E/KN and GLB181.1E/KN via protocol KNX
 - GDB181.1E/MO and GLB181.1E/MO via protocol Modbus RTU

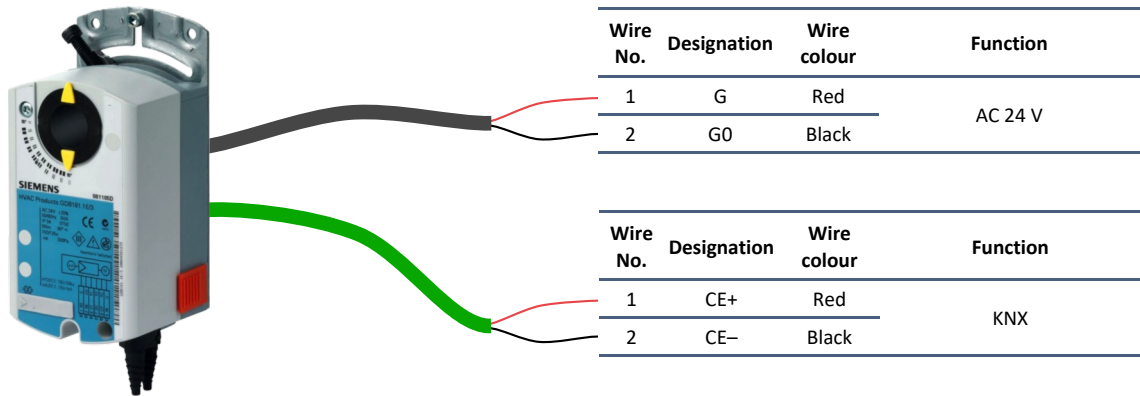
Controllers GDB181.1E/3 and GLB181.1E/3



Controllers GDB181.1E/BA, GLB181.1E/BA, GDB181.1E/MO and GLB181.1E/MO



Controllers GDB181.1E/KN and GLB181.1E/KN

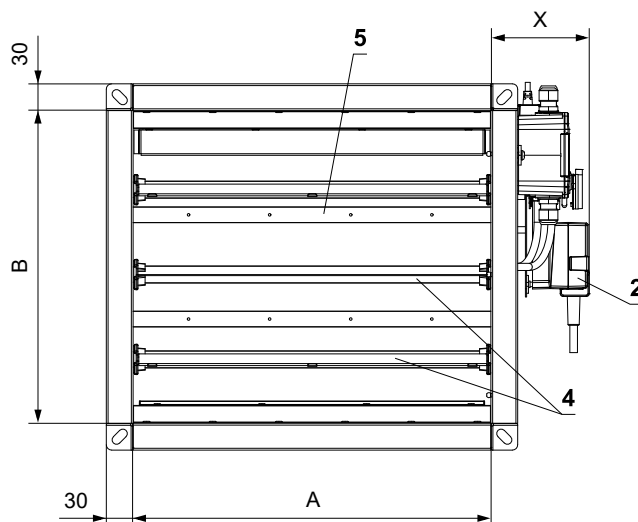
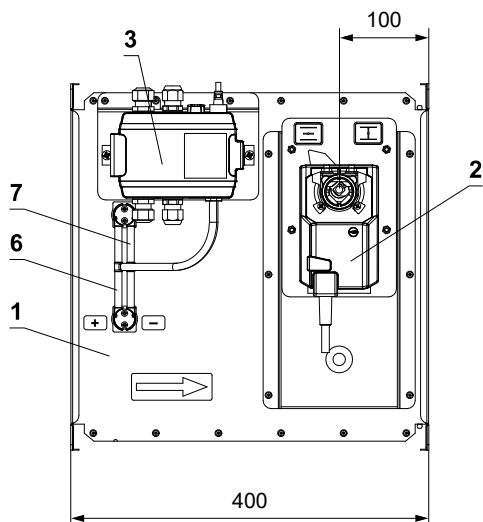


Technical parameters of the controllers: GDB181.1E/... and GLB181.1E/...

Controller	GDB181.1E/...				GLB181.1E/...			
Communication	3 (without)	MO	KN	BA	3 (without)	MO	KN	BA
Supply voltage	AC 24 V, 50/60 Hz							
Operating range	+– 20 %							
Power rating	3 VA							
Power consumption	2,5 W							
Torque	5 Nm				10 Nm			
Setting ranges								
V _{nom}	OEM-specific preset air volume flow value, applicable for VAV controllers							
V _{max}	20...120 % from V _{nom}							
V _{min}	–20...100 % from V _{nom}							
Connection	cable 6 x 0,75 mm ²							
Protection class	III (SELV – safety extra-low voltage)							
Ambient humidity	95% rH, non-condensing (according to EN 60730-1)							
Storage temperature	–25 °C...+70 °C							
Weight	0,6 kg							

III. DIMENSIONS

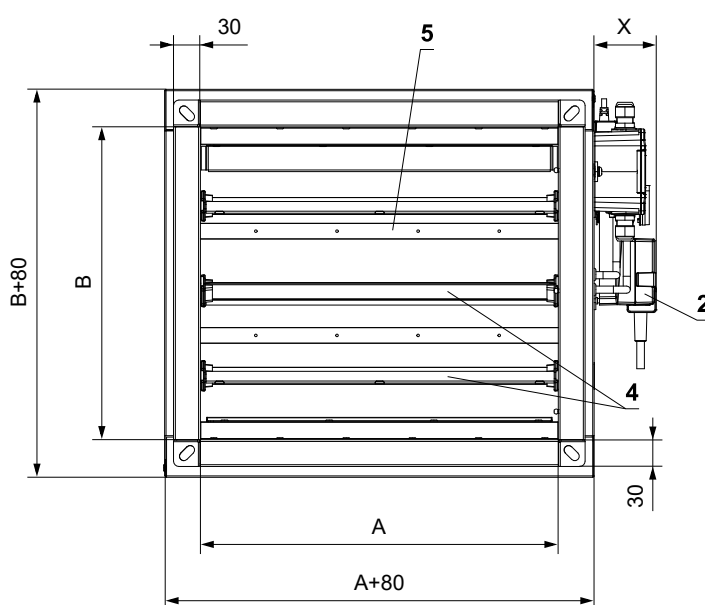
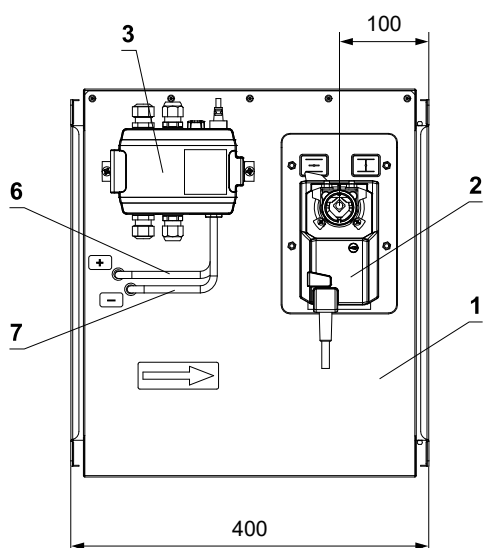
RDTM-V - without insulation - L = 400 mm



- 1 Controller casing
- 2 Actuator BELIMO
- 3 BELIMO VRU controller
- 4 Damper blades
- 5 Pressure sensor
- 6 Pressure tapping - p_1 (+)
- 7 Pressure tapping - p_2 (-)

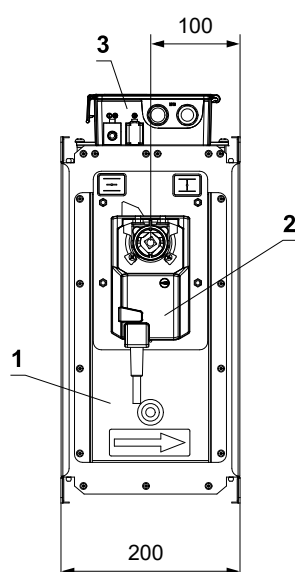
X = max. 140 mm for BELIMO electrical components
 X = max. 115 mm for GRUNER electrical components
 X = max. 105 mm for SIEMENS electrical components

RDTM-V - with insulation - L = 400 mm

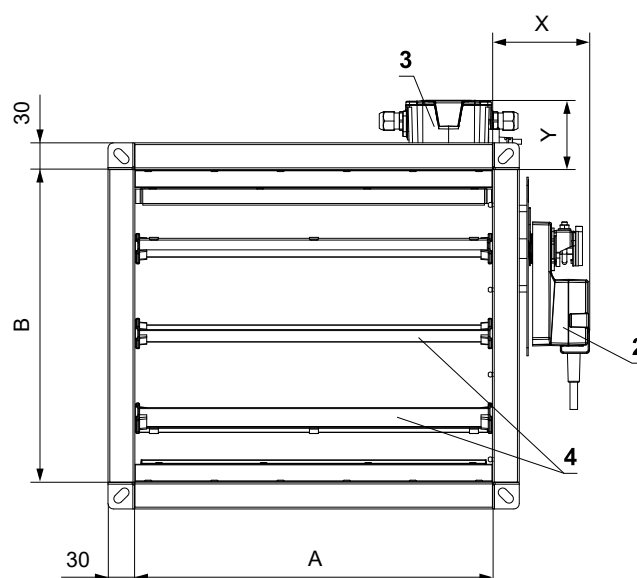


- 1 Controller casing with insulation
- 2 Actuator BELIMO
- 3 BELIMO VRU controller
- 4 Damper blades
- 5 Pressure sensor
- 6 Pressure tapping - p_1 (+)
- 7 Pressure tapping - p_2 (-)

X = max. 93 mm for BELIMO electrical components
 X = max. 70 mm for GRUNER electrical components
 X = max. 61 mm for SIEMENS electrical components

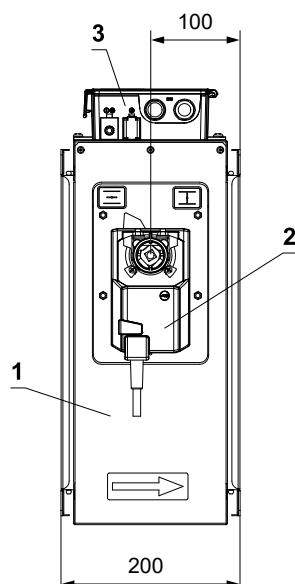
RDTM-V - without insulation - L = 200 mm

- 1 Controller casing
- 2 Actuator BELIMO
- 3 BELIMO VRU controller
- 4 Damper blades

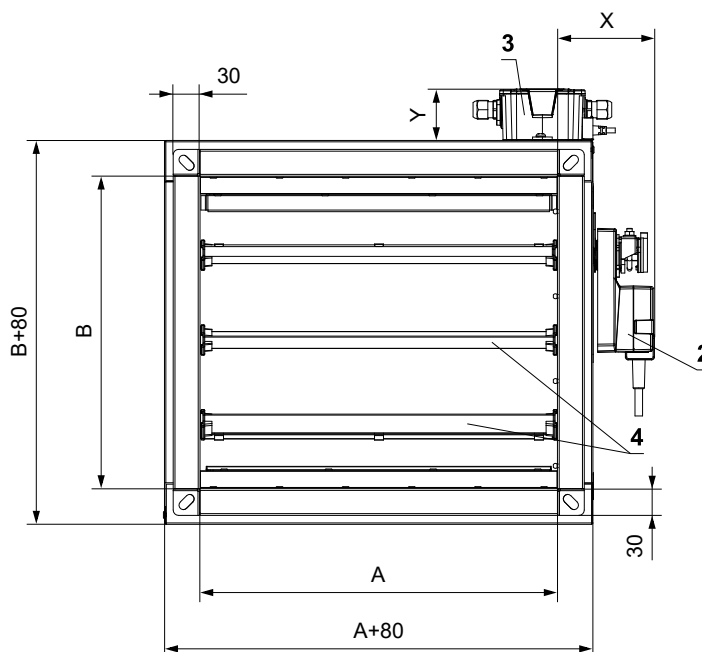


X = max. 140 mm for BELIMO actuators
 X = max. 115 mm for GRUNER actuators
 X = max. 105 mm for SIEMENS actuators

Y = 77 mm for BELIMO controllers
 Y = 87 mm for GRUNER controllers
 Y = 66 mm for SIEMENS controllers

RDTM-V - with insulation - L = 200 mm

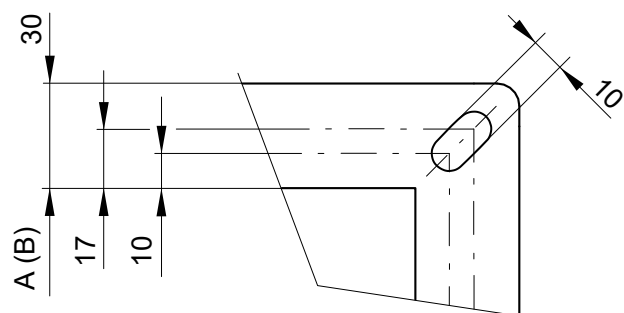
- 1 Controller casing with insulation
- 2 Actuator BELIMO
- 3 BELIMO VRU controller
- 4 Damper blades



X = max. 93 mm for BELIMO actuators
 X = max. 70 mm for GRUNER actuators
 X = max. 61 mm for SIEMENS actuators

Y = 57 mm for BELIMO controllers
 Y = 67 mm for GRUNER controllers
 Y = 46 mm for SIEMENS controllers

Controller flange



Controller flanges with a width of 30 mm are provided with oval holes in the corners.

Technical parameters

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]		A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]					Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
200	3	4,4	4,2	7,1	0,0132	4...5		200	4,7	5,8	6,7	9	0,0284	4...5
250	3,3	4,9	4,7	8	0,0165			250	5,1	6,3	7,3	9,9	0,0355	
280	3,4	4,4	5	6,9	0,0185			280	5,3	6,6	7,7	10,3	0,0398	
300	3,5	5,4	5,1	8,8	0,0198			300	5,5	6,8	8	10,7	0,0426	
315	2,3	3,4	5,2	7,3	0,0208			315	4,4	6,9	8,1	13,2	0,0447	5
350	3,8	5,8	5,6	9,7	0,0231			350	5,9	7,3	8,6	11,5	0,0497	
355	2,4	3,5	5,6	7,8	0,0234			355	4,6	6	8,6	11,5	0,0504	
400	2,5	4,7	6	10,5	0,0264			400	4,8	6,3	9,2	12,3	0,0568	
200	3	3,9	5,1	8,3	0,0132			450	5	6,6	9,8	13,1	0,0639	8...10
250	3,4	4,4	5,6	9,3	0,0165			500 x 280	5,4	7,1	10,6	14,1	0,0710	
280	3,6	4,7	6	8,1	0,0185			550	2,5	7,5	11,2	14,9	0,0781	
300	3,8	4,9	6,2	10,3	0,0198			560	7,8	9,7	11,4	15,1	0,0795	
315	2,6	3,7	6,4	8,6	0,0208			600	5,9	7,8	11,9	15,7	0,0852	
350	4,1	5,3	6,8	11,2	0,0231			630	8,4	10,4	12,2	16,2	0,0895	
355	2,8	4	6,8	9,2	0,0234			650	8,6	10,6	12,5	16,5	0,0923	
400	2,9	4,2	7,3	12,2	0,0264			700	9	11,1	13,1	17,3	0,0994	
200	3	4,8	5,6	9,2	0,0284			710	6,4	8,5	13,2	17,5	0,1008	
250	3,4	5,3	6,2	10,2	0,0355			750	9,4	11,6	13,7	18,1	0,1065	
280	3,5	4,7	6,5	8,8	0,0398			800	9,8	12,1	14,4	19	0,1136	4...5
300	3,7	5,9	6,7	11,1	0,0426			200	4,9	7	7	11,3	0,0436	
315	2,5	3,7	6,8	9,3	0,0447			250	5,3	7,6	7,6	12,3	0,0545	
350	4	6,4	7,2	12	0,0497			280	5,5	6,9	8	10,7	0,0610	
355	2,6	3,9	7,2	9,8	0,0504	5		300	5,7	8,2	8,2	13,3	0,0654	5
400	2,7	5,3	7,7	12,9	0,0568			315	4,5	5,9	8,4	11,2	0,0687	
450	2,8	5,6	8,2	13,8	0,0639			350	6	8,8	8,8	14,3	0,0763	
500 x 200	3	6	8,7	14,8	0,0710			355	4,7	6,2	8,8	11,8	0,0774	
550	3,1	6,3	9,2	15,7	0,0781			400	4,9	7,8	9,4	15,3	0,0872	8...10
560	5,3	6,9	9,3	12,7	0,0795			450	5,2	8,4	10,1	16,5	0,0981	
600	3,4	6,8	9,9	16,8	0,0852			500	5,4	8,8	10,7	17,5	0,1090	
630	5,8	7,7	10,2	13,9	0,0895			550	5,6	9,2	11,3	18,5	0,1199	
650	6	9,6	10,4	17,7	0,0923			560 x 300	7,8	9,7	11,4	15,2	0,1221	
700	6,3	10,1	10,9	18,6	0,0994			600	5,8	9,6	11,9	19,5	0,1308	
710	3,6	5,6	11	15	0,1008			630	8,3	10,3	12,2	16,2	0,1373	
750	6,6	10,6	11,4	19,5	0,1065			650	8,5	12,5	12,4	20,5	0,1417	
800	6,9	11,1	11,9	20,5	0,1136			700	8,9	13	13	21,5	0,1526	
200	4,5	5,6	6,5	10,4	0,0284	4...5		710	6,2	8,4	13,1	17,5	0,1548	8...10
250	4,9	6,1	7,1	11,4	0,0355			750	9,2	13,6	13,6	22,4	0,1635	
280	5,2	6,4	7,4	10	0,0398			800	9,6	14,2	14,2	23,4	0,1744	
300	5,3	6,6	7,7	12,5	0,0426			850	10	14,8	14,8	24,4	0,1853	
315	4,2	5,5	7,9	10,5	0,0447	5		900	7	12	15,3	25,4	0,1962	
350	5,8	7,1	8,3	13,5	0,0497			950	7,2	12,4	15,9	26,4	0,2071	
355	4,4	5,8	8,4	11,2	0,0504			1000	7,4	12,8	16,5	27,4	0,2180	
400	4,6	6,1	8,9	14,5	0,0568			200	3,7	4,9	7,2	9,6	0,0436	5
450	4,8	6,4	9,5	15,6	0,0639			250	4,1	5,4	7,8	10,4	0,0545	
500 x 250	4,9	6,6	10	16,4	0,0710			280	4,3	5,7	8,1	10,9	0,0610	
550	5,3	7	11	17,8	0,0781			300	4,5	5,9	8,3	11,2	0,0654	
560	7,6	9,4	11,1	14,7	0,0795			315	3,4	4,8	8,5	11,4	0,0687	
600	5,7	7,5	11,6	18,8	0,0852			350	4,9	6,4	8,9	12	0,0763	
630	8,2	10,1	11,9	15,8	0,0895			355 x 315	3,5	5	9	12	0,0774	
650	8,4	10,3	12,2	19,9	0,0923			400	3,8	5,4	9,7	12,9	0,0872	
700	8,8	10,8	12,8	20,9	0,0994			450	4	5,7	10,3	13,7	0,0981	8...10
710	6,2	8,2	12,9	17,1	0,1008	8...10		500	4,2	6	10,9	14,5	0,1090	
750	9,2	11,4	13,4	21,9	0,1065			550	4,4	6,3	11,4	15,2	0,1199	
800	9,6	11,9	14	22,9	0,1136			560	6,6	8,5	11,6	15,4	0,1221	

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]		A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]					Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
600	4,6	6,6	12	16	0,1308	8...10		200	4,2	6,7	8,3	13,3	0,0588	5
630	7,2	9,2	12,4	16,5	0,1373			250	4,7	7,4	8,9	14,4	0,0735	
650	7,3	9,4	12,6	16,8	0,1417			280	5,1	6,6	9,5	12,6	0,0823	
700	7,7	9,9	13,2	17,6	0,1526			300	5,2	8,1	9,7	15,6	0,0882	
710	5,1	7,3	13,3	17,7	0,1548			315	4,1	5,7	9,9	13,2	0,0926	
750 x 315	8,1	10,3	13,8	18,3	0,1635			350	5,7	8,8	10,4	16,6	0,1029	8...10
800	8,5	10,8	14,4	19,1	0,1744			355	4,3	6	10,4	13,8	0,1044	
850	8,9	11,3	15	19,9	0,1853			400	4,5	7,8	11	17,7	0,1176	
900	5,8	8,4	15,6	20,7	0,1962			450	4,8	8,3	11,6	18,7	0,1323	
950	6	8,7	16,1	21,4	0,2071			500	5	8,7	12,3	19,8	0,1470	
1000	6,2	9	16,7	22,2	0,2180	10		550	5,3	9,2	12,9	20,8	0,1617	
200	5,5	6,8	7,8	12,5	0,0436	5		560	7,5	9,5	13	17,2	0,1646	8...10
250	6	7,3	8,5	13,5	0,0545			600	5,5	9,6	13,5	21,9	0,1764	
280	6,2	7,7	8,9	11,8	0,0610			630	8,1	10,2	13,9	18,3	0,1852	
300	6,4	7,9	9,1	14,6	0,0654			650 x 400	8,2	12,6	14,2	22,9	0,1911	
315	5,3	6,8	9,3	12,4	0,0687			700	8,7	13,2	14,8	23,9	0,2058	
350	7	8,6	10	15,9	0,0763			710	6	8,4	14,9	19,6	0,2087	
355	5,7	7,2	10	13,2	0,0774			750	9,1	13,8	15,4	25	0,2205	
400	5,9	7,6	10,7	17	0,0872			800	9,5	14,5	16,1	26	0,2352	
450	6,2	8	11,3	18	0,0981			850	9,9	15,1	16,7	27,1	0,2499	
500	6,5	8,3	12	19,1	0,1090			900	7	12,3	17,3	28,1	0,2646	
550	6,8	8,7	12,7	20,2	0,1199	8...10		950	7,2	12,8	17,9	29,1	0,2793	10
560 x 350	9	11	12,8	16,8	0,1221			1000	7,5	13,2	18,6	30,2	0,2940	
600	7,1	9,1	13,3	21,3	0,1308			1050	7,7	13,8	19,2	31,3	0,3087	
630	9,7	11,7	13,7	18	0,1373			1100	7,9	14,2	19,8	32,4	0,3234	
650	9,8	12	14	22,4	0,1417			1120	8	11,3	20,1	26,5	0,3293	
700	10,3	12,5	14,7	23,5	0,1526			1150	12,5	19,1	20,5	33,5	0,3381	
710	7,7	9,9	14,8	19,3	0,1548			1200	12,9	19,7	21,1	34,6	0,3528	
750	10,8	13,1	15,3	24,5	0,1635			1250	13,4	20,3	21,7	35,6	0,3675	
800	11,2	13,7	16	25,6	0,1744			200	4,6	6,1	10,9	16,2	0,0682	8...10
850	11,7	14,2	16,7	26,7	0,1853	10		250	5,2	6,7	11,7	17,5	0,0853	
900	8,8	11,4	17,4	27,8	0,1962			280	3,9	5,5	12,1	15,4	0,0955	
950	9,1	11,8	18	28,9	0,2071			300	4	5,7	12,5	18,7	0,1023	
1000	9,4	12,1	18,7	30	0,2180			315	5,8	7,5	12,7	16,1	0,1074	
200	4,1	5,4	7,8	10,4	0,0436			350	4,3	6	13,2	19,9	0,1194	
250	4,6	5,9	8,5	11,3	0,0545			355	6,2	8	13,3	16,9	0,1211	
280	4,8	6,3	8,9	11,8	0,0610			400	4,5	6,4	14	21,1	0,1364	
300	5	6,5	9,2	12,2	0,0654			450	4,8	6,7	14,8	22,3	0,1535	
315	3,9	5,4	9,4	12,4	0,0687			500	5	7,1	15,6	23,5	0,1705	
350	5,6	7,2	10	13,2	0,0763			550	5,3	7,4	16,4	24,7	0,1876	
355	4,3	5,9	10,1	13,3	0,0774	8...10		560	5,4	7,5	16,6	20,9	0,1910	10
400	4,5	6,2	10,7	14,1	0,0872			600	5,6	7,8	17,2	25,9	0,2046	
450	4,8	6,6	11,4	14,9	0,0981			630	5,7	8	17,7	22,3	0,2148	
500	5,1	7	12	15,8	0,1090			650 x 450	5,8	8,1	18	27,1	0,2217	
550	5,4	7,3	12,7	16,6	0,1199			700	9,8	12,2	18,8	28,3	0,2387	
560 x 355	7,6	9,6	12,8	16,8	0,1221			710	9,9	12,3	19	23,9	0,2421	
600	5,7	7,7	13,4	17,5	0,1308			750	10,3	12,8	19,6	29,5	0,2558	
630	8,3	10,4	13,8	18	0,1373			800	10,8	13,5	20,4	30,7	0,2728	
650	8,4	10,6	14	18,4	0,1417			850	11,4	14,1	21,2	31,9	0,2899	
700	8,9	11,1	14,7	19,2	0,1526			900	11,9	14,7	22	33,1	0,3069	
710	6,3	8,6	14,8	19,4	0,1548	10		950	12,4	15,3	22,8	34,3	0,3240	10
750	9,4	11,7	15,4	20,1	0,1635			1000	12,9	15,9	23,6	35,5	0,3410	
800	9,9	12,3	16,1	20,9	0,1744			1050	13,4	16,6	24,3	36,8	0,3581	
850	10,3	12,8	16,7	21,8	0,1853			1100	8,1	11,5	25,1	38,1	0,3751	
900	7,4	10	17,4	22,7	0,1962			1120	8,3	11,6	25,5	32,1	0,3819	
950	7,7	10,4	18,1	23,5	0,2071			1150	8,4	11,8	25,9	39,3	0,3922	
1000	8	10,8	18,7	24,4	0,2180			1200	8,2	11,8	26,7	40,5	0,4092	15

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _r [m ²]	Actuator [N.m]	A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _r [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]				Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
1250	8,5	12,1	27,5	41,7	0,4263	15	850	13,2	16,1	24,1	35,5	0,2899	10
1300	11,1	14,8	30,6	45,3	0,4433		900	13,8	16,8	25	36,8	0,3069	
1400 x 450	11,8	15,7	32,4	47,9	0,4774		950	14,5	17,5	25,9	38,2	0,3240	
1500	20,3	24,4	34,2	50,5	0,5115		1000	15,1	18,3	26,8	39,6	0,3410	
1600	21,5	25,8	35,9	53	0,5456		1050	15,3	18,7	27,7	41	0,3581	
200	5	7,9	11,8	17,5	0,0682	8...10	1100	10,1	13,6	28,6	42,3	0,3751	15
250	5,6	8,7	12,7	18,8	0,0853		1120 x 550	10,3	13,8	28,9	36	0,3819	
280	4,4	6,1	13,2	16,7	0,0955		1150	10,5	14,1	29,5	43,6	0,3922	
300	4,6	7,8	13,5	20,1	0,1023		1200	10,8	14,6	30,4	44,9	0,4092	
315	6,4	8,2	13,8	17,4	0,1074		1250	11,2	15	31,3	46,2	0,4263	
350	4,9	8,4	14,4	21,4	0,1194		1300	13,9	17,8	34,5	49,8	0,4433	8...10
355	6,9	8,8	14,5	18,3	0,1211		1400	14,8	18,9	36,5	52,7	0,4774	
400	5,3	8,9	15,3	22,7	0,1364		1500	23,6	27,8	38,4	55,5	0,5115	
450	5,6	9,5	16,2	24	0,1535		1600	25	29,5	40,4	58,3	0,5456	
500	6	10	17,1	25,3	0,1705		200	5,1	6,8	12,5	15,9	0,0682	
550	6,3	10,6	17,9	26,6	0,1876		250	5,7	7,5	13,4	16,9	0,0853	8...10
560	6,4	8,6	18,1	22,7	0,1910		280	4,5	7,9	13,9	20,7	0,0955	
600	6,7	11,2	18,8	27,9	0,2046		300	4,6	6,5	14,3	18	0,1023	
630	6,9	9,2	19,4	24,2	0,2148		315	6,5	8,4	14,5	18,3	0,1074	
650	7	11,7	19,7	29,2	0,2217		350	5	7	15,1	19,1	0,1194	
700	11,1	16	20,6	30,5	0,2387	10	355	7	10,7	15,2	22,7	0,1211	10
710 x 500	11,2	13,7	20,8	25,9	0,2421		400	5,4	7,4	16	20,2	0,1364	
750	11,7	16,8	21,5	31,7	0,2558		450	5,7	7,9	16,9	21,3	0,1535	
800	12,3	17,6	22,4	33,1	0,2728		500	6,1	8,3	17,8	22,4	0,1705	
850	12,9	18,4	23,2	34,3	0,2899		550	6,4	8,8	18,7	23,4	0,1876	
900	13,5	19,2	24,1	35,6	0,3069	15	560	6,5	8,9	18,9	23,7	0,1910	10
950	14,1	20	25	36,9	0,3240		600	6,8	9,3	19,6	24,5	0,2046	
1000	14,7	20,9	25,9	38,2	0,3410		630	7	11,9	20,2	29,9	0,2148	
1050	15,3	21,8	26,8	39,7	0,3581		650	7,2	9,7	20,5	25,6	0,2217	
1100	10	16,7	27,5	40,9	0,3751		700	11,3	13,9	21,4	26,7	0,2387	
1120	9,8	13,3	28	34,8	0,3819	15	710 x 560	11,4	14	21,6	26,9	0,2421	10
1150	10,1	17	28,5	42,3	0,3922		750	11,9	14,6	22,3	27,8	0,2558	
1200	10,4	17,5	29,4	43,6	0,4092		800	12,5	15,3	23,2	28,9	0,2728	
1250	10,8	18,1	30,3	44,9	0,4263		850	13,1	16	24,1	30	0,2899	
1300	13,4	21	33,5	48,5	0,4433		900	13,7	16,7	25	31	0,3069	15
1400	14,3	22,3	35,4	51,3	0,4774	8...10	950	14,4	17,5	25,9	32,2	0,3240	
1500	23	31,4	37,4	54	0,5115		1000	15	18,2	26,8	33,3	0,3410	
1600	24,4	33,2	39,3	56,8	0,5456		1050	15,2	18,6	27,7	34,5	0,3581	
200	5,1	6,8	12,4	18,5	0,0682		1100	10	13,5	28,6	35,6	0,3751	
250	5,7	7,5	13,3	19,8	0,0853	8...10	1120	10,1	13,7	28,9	36	0,3819	15
280	4,5	6,3	13,8	17,5	0,0955		1150	10,4	14	29,5	36,6	0,3922	
300	4,7	6,5	14,2	21,1	0,1023		1200	10,7	14,5	30,4	37,7	0,4092	
315	6,5	8,4	14,4	18,2	0,1074		1250	11,1	14,9	31,2	38,8	0,4263	
350	5	7	15,1	22,4	0,1194		1300	13,8	17,7	34,5	42,2	0,4433	8...10
355	7	9	15,2	19,1	0,1211		1400	14,7	18,8	36,4	44,6	0,4774	
400	5,4	7,4	16	23,7	0,1364		1500	23,4	27,7	38,4	46,9	0,5115	
450	5,8	7,9	16,9	25	0,1535		1600	24,8	29,3	40,4	49,3	0,5456	
500 x 550	6,1	8,4	17,8	26,3	0,1705		200	5,4	8,6	13,5	19,9	0,0916	
550	6,5	8,8	18,7	27,7	0,1876		250	5,9	9,4	14,3	21,2	0,1145	8...10
560	6,6	8,9	18,9	23,6	0,1910		280	4,7	6,6	14,9	18,7	0,1282	
600	6,9	9,3	19,6	29	0,2046		300	4,9	8,5	15,2	22,5	0,1374	
630	7,1	9,6	20,1	25,1	0,2148		315 x 600	6,7	8,7	15,5	19,5	0,1443	
650	7,2	9,8	20,5	30,3	0,2217		350	5,2	9	16,1	23,8	0,1603	
700	11,3	13,9	21,4	31,6	0,2387	10	355	7,2	9,2	16,2	20,3	0,1626	
710	11,5	14,1	21,6	26,8	0,2421		400	5,5	9,5	17	25,1	0,1832	
750	12	14,7	22,3	32,9	0,2558		450	5,8	10,1	17,9	26,4	0,2061	
800	12,6	15,4	23,2	34,2	0,2728		500	6,2	10,6	18,8	27,7	0,2290	

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _r [m ²]	Actuator [N.m]	A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _r [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]				Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
550	6,5	11,2	19,7	29	0,2519	10	250	6,4	8,4	15,3	22,6	0,1145	8...10
560	6,6	9	19,8	24,7	0,2565		280	5,2	7,2	15,9	20	0,1282	
600	6,8	11,7	20,5	30,3	0,2748		300	5,4	7,4	16,3	23,9	0,1374	
630	7	9,6	21,1	26,3	0,2885		315	7,3	9,4	16,6	20,8	0,1443	
650	7,2	12,2	21,4	31,6	0,2977		350	5,8	8	17,3	25,3	0,1603	
700	11,2	16,5	22,3	32,9	0,3206		355	7,8	10	17,4	21,7	0,1626	
710	11,3	14,1	22,5	28	0,3252		400	6,3	8,5	18,3	26,7	0,1832	
750	11,8	17,3	23,2	34,2	0,3435		450	6,7	9	19,2	28,1	0,2061	
800	12,4	18,1	24,1	35,5	0,3664		500	7,1	9,5	20,2	29,5	0,2290	
850	13	18,9	25	36,8	0,3893		550	7,5	10	21,2	30,9	0,2519	
900	13,6	19,7	25,9	38,1	0,4122	15	560	7,6	10,1	21,4	26,5	0,2565	10
950 x 600	13,7	20,1	26,7	39,5	0,4351		600	7,9	10,5	22,2	32,3	0,2748	
1000	14,3	20,9	27,6	40,8	0,4580		630	8,2	10,8	22,8	28,1	0,2885	
1050	14,9	21,8	28,5	42,2	0,4809		650	8,4	11	23,1	33,7	0,2977	
1100	9,7	16,8	29,4	43,5	0,5038		700	12,5	15,3	24,1	35	0,3206	
1120	9,8	13,5	29,8	37	0,5130		710	12,6	15,4	24,3	30	0,3252	
1150	10	17,3	30,3	44,8	0,5267		750 x 650	13,2	16,1	25,1	36,4	0,3435	
1200	10,4	17,9	31,2	46,1	0,5496		800	13,9	16,8	26,1	37,8	0,3664	
1250	10,7	18,4	32,1	47,4	0,5725		850	14,5	17,6	27	39,2	0,3893	
1300	14,1	22	36	51,8	0,5954		900	14,8	18	28	40,7	0,4122	
1400	15	23,3	38	54,6	0,6412	8...10	950	15,4	18,8	29	42,1	0,4351	15
1500	23,8	32,5	40,1	57,4	0,6870		1000	16,1	19,6	30	43,5	0,4580	
1600	25,2	34,3	42,1	60,3	0,7328		1050	16,8	20,4	30,9	45	0,4809	
200	5,4	7,2	13,8	17,5	0,0916		1100	11,7	15,4	31,9	46,3	0,5038	
250	6	7,9	14,7	18,5	0,1145		1120	11,9	15,6	32,3	39,7	0,5130	
280	4,8	6,7	15,2	19,2	0,1282		1150	12,1	15,9	32,9	47,7	0,5267	
300	4,9	6,9	15,6	19,6	0,1374		1200	12,5	16,4	33,9	49,1	0,5496	
315	6,7	8,8	15,8	23,5	0,1443		1250	12,9	16,9	34,8	50,5	0,5725	
350	5,2	7,3	16,5	20,7	0,1603		1300	16,5	20,5	38,9	55	0,5954	
355	7,2	9,3	16,6	20,8	0,1626		1400	17,5	21,8	41,1	58	0,6412	
400	5,6	7,8	17,4	21,8	0,1832	10	1500	26,5	30,9	43,3	61	0,6870	8...10
450	5,9	8,2	18,3	22,9	0,2061		1600	28	32,7	45,5	64	0,7328	
500	6,2	8,6	19,1	23,9	0,2290		200	5,8	9,4	15	22,1	0,0916	
550	6,6	9	20	25	0,2519		250	6,5	10,3	16	23,5	0,1145	
560	6,6	9,1	20,2	25,2	0,2565		280	5,4	7,4	16,6	20,8	0,1282	
600	6,9	9,5	20,9	26,1	0,2748		300	5,5	9,5	16,9	24,9	0,1374	
630	7,1	9,7	21,5	26,8	0,2885		315	7,4	9,6	17,2	21,6	0,1443	
650	7,2	9,9	21,8	27,2	0,2977		350	6	10,1	17,9	26,3	0,1603	
700	11,3	14,1	22,7	28,3	0,3206		355	8	10,2	18	22,5	0,1626	
710 x 630	11,4	14,2	22,9	28,5	0,3252		400	6,4	10,8	18,9	27,8	0,1832	
750	11,9	14,7	23,6	29,3	0,3435	15	450	6,8	11,4	19,9	29,2	0,2061	10
800	12,5	15,4	24,5	30,4	0,3664		500	7,3	12,1	20,9	30,6	0,2290	
850	13,1	16,1	25,4	31,5	0,3893		550	7,7	12,7	21,9	32	0,2519	
900	13,2	16,5	26,3	32,7	0,4122		560	7,8	10,4	22,1	27,4	0,2565	
950	13,8	17,1	27,2	33,8	0,4351		600 x 700	8,2	13,4	22,9	33,4	0,2748	
1000	14,4	17,8	28,1	34,8	0,4580		630	8,4	11,2	23,5	29,1	0,2885	
1050	15	18,6	28,9	36	0,4809		650	8,6	14	23,9	34,8	0,2977	
1100	9,8	13,5	29,8	37,1	0,5038		700	12,8	18,4	24,9	36,2	0,3206	
1120	10	13,7	30,2	37,5	0,5130		710	12,9	15,8	25,1	30,9	0,3252	
1150	10,2	13,9	30,7	38,2	0,5267		750	13,4	19,3	25,9	37,6	0,3435	
1200	10,5	14,4	31,6	39,3	0,5496	8...10	800	13,7	19,8	26,9	39	0,3664	15
1250	10,8	14,8	32,5	40,3	0,5725		850	14,4	20,7	27,9	40,5	0,3893	
1300	14,3	18,3	36,5	44,5	0,5954		900	15,1	21,6	28,9	41,9	0,4122	
1400	15,2	19,4	38,5	46,9	0,6412		950	15,8	22,5	29,9	43,3	0,4351	
1500	23,9	28,4	40,5	49,3	0,6870		1000	16,5	23,4	30,9	44,7	0,4580	
1600	25,3	30	42,6	51,7	0,7328		1050	17,2	24,4	31,8	46,2	0,4809	
200 x 650	5,7	7,6	14,4	21,2	0,0916		1100	12,1	19,5	32,8	47,6	0,5038	

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]	A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]				Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
1120	12,3	16,1	33,2	40,8	0,5130	15	710	12,4	15,4	25,6	31,6	0,4083	15
1150	12,5	20,2	33,8	49	0,5267		750	12,9	16	26,3	38,4	0,4313	
1200	13	20,8	34,8	50,4	0,5496		800	13,6	16,8	27,3	39,9	0,4600	
1250	13,4	21,5	35,8	51,8	0,5725		850	14,3	17,6	28,3	41,2	0,4888	
1300	16,9	25,2	39,9	56,3	0,5954		900	14,9	18,4	29,2	42,6	0,5175	
1400	18	26,7	42,1	59,4	0,6412		950	15,6	19,1	30,2	44	0,5463	
1500	27	36,1	44,4	62,4	0,6870		1000	16,3	19,9	31,1	45,3	0,5750	
1600	28,6	38,1	46,6	65,5	0,7328		1050	16,9	20,7	32,1	46,8	0,6038	
200	5,8	7,8	15,1	19	0,0916	8...10	1100	11,8	15,7	33	48,2	0,6325	15
250	6,5	8,5	16	20,2	0,1145		1120	11,9	15,9	33,4	41,2	0,6440	
280	5,3	7,4	16,6	24,5	0,1282		1150	12,2	16,2	34	49,6	0,6613	
300	5,5	7,6	17	21,4	0,1374		1200	12,6	16,7	35	50,9	0,6900	
315	7,4	9,6	17,3	21,7	0,1443		1250	13	17,2	35,9	52,3	0,7188	
350	5,9	8,2	18	22,5	0,1603		1300	17,3	21,6	40,8	57,5	0,7475	
355	7,9	10,2	18,1	26,6	0,1626		1400	18,4	22,9	43	60,6	0,8050	
400	6,4	8,7	19	23,7	0,1832		1500	27,3	32	45,2	63,6	0,8625	
450	6,8	9,2	20	24,9	0,2061	10	1600	29	33,8	47,4	66,7	0,9200	8...10
500	7,2	9,8	21	26,1	0,2290		200	10,8	14,7	16,7	24,5	0,1150	
550	7,7	10,3	22	27,3	0,2519		250	11,5	15,6	17,7	26	0,1438	
560	7,7	10,4	22,2	27,5	0,2565		280	10,4	12,7	18,3	23	0,1610	
600	8,1	10,8	23	28,4	0,2748		300	10,6	14,9	18,8	27,5	0,1725	
630	8,4	11,1	23,5	34,3	0,2885		315	12,5	14,8	19,1	23,8	0,1811	
650	8,5	11,3	23,9	29,6	0,2977		350	11,1	15,6	19,8	28,9	0,2013	
700	12,7	15,6	24,9	30,8	0,3206		355	13,1	15,5	19,9	24,8	0,2041	
710	12,8	15,7	25,1	31	0,3252	15	400	11,6	16,3	20,9	30,4	0,2300	10
750	13,4	16,4	25,9	32	0,3435		450	12,1	17	21,9	31,9	0,2588	
800	13,6	16,8	26,9	33,2	0,3664		500	12,6	17,7	23	33,3	0,2875	
850	14,3	17,6	27,9	34,4	0,3893		550	13,1	18,4	24	34,8	0,3163	
900	15	18,4	28,9	35,6	0,4122		560	13,2	16	24,2	29,9	0,3220	
950	15,7	19,1	29,9	36,8	0,4351		600	13,6	19,1	25,1	36,3	0,3450	
1000	16,4	19,9	30,9	37,9	0,4580		630	13,4	16,4	25,7	31,6	0,3623	
1050	17,1	20,8	31,8	39,2	0,4809		650	13,6	19,4	26,1	37,7	0,3738	
1100	12	15,8	32,8	40,4	0,5038	15	700	17,9	23,8	27,2	39,2	0,4025	15
1120	12,1	16	33,2	40,9	0,5130		710	18	21,2	27,4	33,7	0,4083	
1150	12,4	16,3	33,8	41,6	0,5267		750	18,6	24,9	28,2	40,7	0,4313	
1200	12,8	16,9	34,8	42,8	0,5496		800	19,4	25,8	29,3	42,2	0,4600	
1250	13,3	17,4	35,8	43,9	0,5725		850	20,1	26,8	30,3	43,7	0,4888	
1300	16,8	21	39,9	48,2	0,5954		900	20,9	27,7	31,4	45,1	0,5175	
1400	17,9	22,3	42,1	50,8	0,6412		950	21,6	28,7	32,4	46,6	0,5463	
1500	26,8	31,4	44,3	53,4	0,6870		1000	22,4	29,7	33,5	48	0,5750	
1600	28,5	33,2	46,5	56	0,7328	8...10	1050	23,1	30,7	34,5	49,6	0,6038	15
200	6,1	8,1	15,8	23,3	0,1150		1100	18,1	25,9	35,6	51,1	0,6325	
250	6,8	8,9	16,7	24,6	0,1438		1120	18,3	22,3	36	44	0,6440	
280	5,6	7,8	17,3	21,7	0,1610		1150	18,6	26,6	36,6	52,5	0,6613	
300	5,7	8	17,7	26	0,1725		1200	19,1	27,3	37,7	54	0,6900	
315	7,6	9,9	18	22,5	0,1811		1250	19,6	28	38,7	55,5	0,7188	
350	6,1	8,5	18,6	27,4	0,2013		1300	23,9	32,5	43,6	60,8	0,7475	
355	8,1	10,5	18,7	23,4	0,2041		1400	25,2	34,3	46	64	0,8050	
400	6,6	9	19,6	28,8	0,2300	10	1500	34,4	43,8	48,4	67,2	0,8625	10
450	7	9,5	20,6	30,1	0,2588		1600	36,2	46	50,8	70,5	0,9200	
500	7,4	10	21,5	31,5	0,2875		200	11,1	13,3	17,2	25,5	0,1150	
550	7,8	10,5	22,5	32,9	0,3163		250	11,8	14,1	18,3	26,9	0,1438	
560	7,8	10,6	22,7	28,2	0,3220		280	10,7	13,1	18,9	23,7	0,1610	
600	8,2	11	23,4	34,3	0,3450		300	10,9	13,3	19,3	28,4	0,1725	
630	8,4	11,3	24	29,8	0,3623		315	12,8	15,3	19,7	24,6	0,1811	
650	8,6	11,5	24,4	35,6	0,3738		350	11,4	13,9	20,4	29,9	0,2013	
700	12,6	15,6	25,2	36,9	0,4025		355	13,4	15,9	20,5	25,6	0,2041	

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]	A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]				Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
400	11,9	14,5	21,5	31,3	0,2300	10	1500	35,6	45,4	50,2	69,7	1,0380	20
450	12,4	15,1	22,5	32,8	0,2588		1600 x 900	37,4	47,6	52,6	73	1,1072	
500	12,9	15,7	23,6	34,3	0,2875		200	12,3	14,7	18,9	27,9	0,1384	
550	13	15,9	24,6	35,7	0,3163		250	13,1	15,6	20,1	29,4	0,1730	
560	13,1	16	24,8	30,7	0,3220	15	280	12	14,6	20,7	25,9	0,1938	10
600	13,5	16,5	25,7	37,2	0,3450		300	12,2	14,8	21,2	30,9	0,2076	
630	13,8	16,8	26,3	32,4	0,3623		315	14,2	16,8	21,5	26,8	0,2180	
650	14	17,1	26,7	38,7	0,3738		350	12,8	15,5	22,3	32,5	0,2422	
700	18,2	21,5	27,8	40,3	0,4025		355	14,8	17,5	22,4	27,9	0,2457	
710	18,4	21,6	28	34,5	0,4083		400	12,9	15,7	23,4	34	0,2768	
750	19	22,3	28,9	41,7	0,4313		450	13,5	16,4	24,5	35,6	0,3114	
800	19,8	23,2	29,9	43,2	0,4600		500	14,1	17	25,7	37,1	0,3460	
850 x 850	20,5	24	31	44,7	0,4888		550	14,6	17,7	26,8	38,6	0,3806	
900	21,3	24,9	32	46,1	0,5175		560	14,7	17,9	27	33,3	0,3875	15
950	22	25,7	33,1	47,6	0,5463		600	15,2	18,5	27,9	40,3	0,4152	
1000	22,8	26,6	34,2	49,1	0,5750		630	15,5	18,8	28,6	35,2	0,4360	
1050	23,5	27,5	35,2	50,6	0,6038		650	15,8	19,1	29	41,8	0,4498	
1100	18,5	22,6	36,3	52,1	0,6325		700	20,1	23,5	30,1	43,3	0,4844	
1120	18,7	22,8	36,7	44,9	0,6440		710 x 950	20,2	23,7	30,4	37,3	0,4913	
1150	19	23,2	37,3	53,6	0,6613		750	20,9	24,4	31,3	44,8	0,5190	
1200	19,5	23,8	38,4	55,1	0,6900		800	21,7	25,3	32,4	46,4	0,5536	
1250	20	24,4	39,4	56,5	0,7188		850	22,5	26,2	33,5	47,9	0,5882	
1300	24,4	28,9	44,4	61,9	0,7475		900	23,3	27,2	34,6	49,4	0,6228	
1400	25,7	30,4	46,8	65,1	0,8050		950	24,2	28,1	35,7	51	0,6574	
1500	34,8	39,7	49,2	68,3	0,8625	20	1000	25	29	36,9	52,5	0,6920	20
1600	36,7	41,7	51,6	71,6	0,9200		1050	25,8	30	38	54,1	0,7266	
200	11,6	15,9	18	26,6	0,1384		1100	20,8	25,1	39,1	55,7	0,7612	
250	12,4	16,8	19,1	28,1	0,1730		1120	21,1	25,4	39,6	48,1	0,7750	
280	11,2	13,7	19,7	24,7	0,1938	10	1150	21,4	25,8	40,2	57,2	0,7958	20
300	11,4	16,1	20,1	29,5	0,2076		1200	22	26,5	41,4	58,8	0,8304	
315	13,3	15,8	20,4	25,5	0,2180		1250	22,5	27,1	42,5	60,3	0,8650	
350	11,9	16,8	21,1	30,9	0,2422		1300	27,7	32,4	48,2	66,4	0,8996	
355	13,9	16,5	21,2	26,5	0,2457		1400	29,2	34,1	50,8	69,9	0,9688	
400	12,4	17,5	22,2	32,4	0,2768		1500	38,6	43,6	53,4	73,3	1,0380	
450	12,8	18,1	23,2	33,8	0,3114		1600	40,6	45,8	56	76,7	1,1072	
500	12,9	18,4	24,2	35,3	0,3460	15	200	12,6	17,2	19,5	28,8	0,1384	10
550	13,4	19,1	25,2	36,7	0,3806		250	13,4	18,2	20,6	30,3	0,1730	
560	13,5	16,5	25,5	31,5	0,3875		280	12,3	15	21,3	26,7	0,1938	
600	13,8	19,8	26,3	38,2	0,4152		300	12,4	17,4	21,6	31,7	0,2076	
630	14,1	17,3	26,9	33,3	0,4360		315	14	16,8	22,1	27,6	0,2180	15
650	14,3	20,5	27,3	39,7	0,4498		350	12,7	17,9	22,9	33,4	0,2422	
700 x 900	18,5	24,9	28,3	41,2	0,4844		355	14,7	17,5	23	28,6	0,2457	
710	18,7	22	28,5	35,3	0,4913		400	13,3	18,7	24	35	0,2768	
750	19,2	25,9	29,4	42,6	0,5190		450	13,8	19,5	25,1	36,5	0,3114	
800	20	26,8	30,4	44	0,5536		500	14,4	20,3	26,3	38	0,3460	
850	20,7	27,7	31,4	45,5	0,5882		550 x 1000	15	21,1	27,4	39,7	0,3806	
900	21,4	28,7	32,5	46,9	0,6228		560	15,1	18,4	27,6	34,1	0,3875	
950	22,2	29,6	33,5	48,4	0,6574		600	15,6	21,9	28,5	41,2	0,4152	
1000	22,9	30,6	34,5	49,8	0,6920		630	15,9	19,3	29,2	36	0,4360	
1050	23,6	31,6	35,6	51,4	0,7266		650	16,1	22,7	29,7	42,8	0,4498	
1100	18,6	26,7	36,6	52,8	0,7612		700	20,4	27,2	30,8	44,3	0,4844	
1120	18,8	23	37	45,4	0,7750		710	20,6	24,1	31	38,1	0,4913	
1150	19,1	27,4	37,6	54,2	0,7958		750	21,3	28,2	31,9	45,8	0,5190	
1200	19,5	28,1	38,7	55,7	0,8304		800	22,1	29,3	33	47,4	0,5536	
1250	20	28,8	39,7	57,1	0,8650		850	22,9	30,3	34,2	48,9	0,5882	
1300	25,1	34,1	45,4	63,2	0,8996		900	23,7	31,3	35,3	50,5	0,6228	
1400	26,4	35,8	47,8	66,5	0,9688		950	24,6	32,4	36,4	52	0,6574	

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]	A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]				Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
1000	25,4	33,4	37,5	53,5	0,6920	15	630	17,8	21,3	31,4	38,7	0,5097	15
1050	26,2	34,5	38,7	55,2	0,7266		650	17,8	24,8	31,9	45,8	0,5259	
1100	21,3	29,8	39,8	56,7	0,7612		700	22,2	29,4	33,1	47,4	0,5663	
1120	21,5	25,9	40,3	49	0,7750		710	22,4	26,2	33,3	40,9	0,5744	
1150	21,8	30,6	40,9	58,3	0,7958		750	23,1	30,5	34,2	49	0,6068	
1200 x 1000	22,4	31,3	42,1	59,8	0,8304		800	23,8	31,6	35,4	50,6	0,6472	
1250	23	32,1	43,2	61,3	0,8650		850	24,8	32,7	36,6	52,2	0,6877	
1300	28,2	37,5	48,9	67,5	0,8996		900	25,7	33,8	37,8	53,8	0,7281	
1400	29,7	39,4	51,6	71	0,9688		950	26,6	34,9	39	55,4	0,7686	
1500	39	49,2	54,2	74,4	1,0380		1000	27,5	36	40,2	57	0,8090	
1600	41,1	51,6	56,8	77,9	1,1072	20	1050 x 1100	28,4	37,1	41,4	58,7	0,8495	20
200	13,1	15,8	20,3	30,1	0,1618		1100	23,5	32,4	42,5	60,3	0,8899	
250	13,5	16,3	21,4	31,6	0,2023		1120	23,7	28,4	43	52,2	0,9061	
280	12,4	15,3	22,1	27,8	0,2265		1150	24,1	33,3	43,7	61,9	0,9304	
300	12,6	15,5	22,5	33,1	0,2427		1200	24,5	34,1	44,9	63,5	0,9708	
315	14,6	17,5	22,9	28,7	0,2548		1250	25,4	35	46,1	65,1	1,0113	
350	13,2	16,2	23,6	34,6	0,2832		1300	31,4	41,2	52,7	72,1	1,0517	
355	15,2	18,2	23,8	29,7	0,2872		1400	33,1	43,3	55,5	75,7	1,1326	
400	13,8	16,8	24,8	36,2	0,3236		1500	34,8	53,2	58,3	79,3	1,2135	
450	14,3	17,5	25,9	37,7	0,3641		1600	44,8	55,8	61,1	82,9	1,2944	
500	14,9	18,2	27	39,3	0,4045	15	200	13,5	16,3	21,5	27,1	0,1618	15
550	15,4	18,8	28,1	40,8	0,4450		250	14,4	17,3	22,7	28,5	0,2023	
560	15,5	19	28,3	35,1	0,4530		280	13,3	16,3	23,4	29,3	0,2265	
600	16	19,5	29,2	42,4	0,4854		300	13,6	16,6	23,8	29,8	0,2427	
630	16,3	19,9	29,9	36,9	0,5097		315	15,5	18,6	24,2	30,3	0,2548	
650	16,5	20,1	30,3	43,9	0,5259		350	14,2	17,3	25	31,2	0,2832	
700	20,8	24,5	31,4	45,4	0,5663		355	15,1	19,4	25,2	31,4	0,2872	
710 x 1050	21	24,7	31,6	39	0,5744		400	14,9	18,2	26,3	32,7	0,3236	
750	21,6	25,4	32,5	46,9	0,6068		450	15,5	18,9	27,4	34,1	0,3641	
800	22,4	26,3	33,6	48,4	0,6472		500	16,2	19,6	28,6	35,5	0,4045	
850	23,2	27,2	34,7	49,9	0,6877	20	550	16,8	20,4	29,8	36,9	0,4450	15
900	24	28,1	35,8	51,5	0,7281		560	17,1	23,6	30,1	43,4	0,4530	
950	24,8	29	36,9	53	0,7686		600	17,4	21,1	31	38,3	0,4854	
1000	25,6	29,9	38	54,5	0,8090		630	17,8	21,6	31,8	39,1	0,5097	
1050	26,4	30,9	39,1	56,1	0,8495		650	18,1	21,8	32,2	39,7	0,5259	
1100	21,5	26	40,3	57,6	0,8899		700	22,5	26,3	33,4	41,1	0,5663	
1120	21,7	26,3	40,7	49,7	0,9061		710 x 1120	22,8	30	33,7	48,2	0,5744	
1150	22	26,7	41,4	59,2	0,9304		750	23,3	27,3	34,6	42,4	0,6068	
1200	22,3	27,3	42,5	60,7	0,9708		800	24,6	28,3	35,8	43,8	0,6472	
1250	23,1	28	43,6	62,2	1,0113	20	850	25,2	29,3	37	45,2	0,6877	20
1300	29,1	34	50,1	69,1	1,0517		900	26,2	30,3	38,2	46,6	0,7281	
1400	30,6	35,7	52,7	72,6	1,1326		950	26,9	31,3	39,4	48	0,7686	
1500	40	45,3	55,4	76	1,2135		1000	27,9	32,3	40,6	49,4	0,8090	
1600	44,1	47,5	58	79,5	1,2944		1050	28,7	33,4	41,8	50,9	0,8495	
200	13,3	18,4	21,2	31,3	0,1618		1100	23,9	28,6	43	52,2	0,8899	
250	14,2	19,5	22,4	32,9	0,2023		1120	24,1	28,9	43,5	52,8	0,9061	
280	13,2	16,1	23,1	28,9	0,2265		1150	24,5	29,3	44,2	53,6	0,9304	
300	13,4	18,9	23,6	34,5	0,2427		1200	25,1	30	45,4	55	0,9708	
315	15,3	18,3	23,9	29,9	0,2548		1250	25,8	30,8	46,6	56,4	1,0113	
350	14	19,7	24,8	36,1	0,2832	15	1300	31,8	36,9	53,2	63,2	1,0517	15
355 x 1100	16,1	19,1	24,9	31	0,2872		1400	34,3	38,8	56	66,4	1,1326	
400	14,7	20,6	25,9	37,7	0,3236		1500	43,1	48,5	58,9	69,6	1,2135	
450	15,3	21,5	27,1	39,4	0,3641		1600	45,3	51	61,7	72,8	1,2944	
500	15,9	22,3	28,3	41	0,4045		200	13,6	16,5	21,8	32,3	0,1618	
550	16,6	23,2	29,5	42,6	0,4450		250 x 1150	14,5	17,5	23	33,9	0,2023	
560	16,7	20,2	29,7	36,7	0,4530		280	13,5	16,5	23,7	29,7	0,2265	
600	17,3	24	30,7	44,2	0,4854		300	13,8	16,8	24,2	35,5	0,2427	

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _r [m ²]	Actuator [N.m]	A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _r [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]				Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
315	15,7	18,8	24,5	30,7	0,2548	15	1250	19,7	29,6	47,3	67	1,1575	20
350	14,4	17,6	25,4	37,1	0,2832		1300	26,5	36,6	54,7	74,8	1,2038	
355	16,4	19,7	25,5	31,9	0,2872		1400 x 1200	28,2	38,8	57,5	78,4	1,2964	
400	15,1	18,4	26,6	38,8	0,3236		1500	37,8	48,7	60,4	82,1	1,3890	
450	15,7	19,1	27,8	40,4	0,3641		1600	40	51,4	63,2	85,8	1,4816	
500	16,3	19,9	29	42,1	0,4045		200	8,2	11,2	23,5	34,7	0,1852	15
550	17	20,6	30,2	43,7	0,4450		250	9,1	12,3	24,7	36,3	0,2315	
560	17,1	20,8	30,4	37,6	0,4530		280	8,1	11,4	25,5	32	0,2593	
600	17,6	21,4	31,4	45,3	0,4854		300	8,4	11,7	26	38,1	0,2778	
630	18	21,8	32,1	39,6	0,5097		315	10,3	13,7	26,4	33	0,2917	
650	18,3	22,1	32,6	46,9	0,5259		350	9,1	12,5	27,2	39,8	0,3241	
700	22,7	26,6	33,8	48,5	0,5663		355	11,1	14,6	27,4	34,2	0,3287	
710	22,8	26,8	34	41,8	0,5744		400	9,8	13,3	28,5	41,5	0,3704	
750	23,6	27,6	35	50,1	0,6068		450	10,5	14,1	29,8	43,1	0,4167	
800 x 1150	24,5	28,6	36,2	51,7	0,6472	20	500	11,2	14,9	31	44,8	0,4630	
850	25,4	29,6	37,4	53,3	0,6877		550	11,9	15,7	32,3	46,5	0,5093	
900	26,3	30,6	38,6	55	0,7281		560	12	15,9	32,5	40,1	0,5186	
950	27,2	31,6	39,8	56,6	0,7686		600	12,6	16,5	33,5	48,1	0,5556	
1000	28,1	32,6	41	58,2	0,8090		630	13	17	34,3	42,1	0,5834	
1050	29	33,6	42,2	59,9	0,8495		650	13,3	17,3	34,8	49,8	0,6019	
1100	24,1	28,8	43,4	61,5	0,8899		700	17,7	21,8	36	51,5	0,6482	
1120	24,4	29,1	43,9	53,3	0,9061		710 x 1250	17,9	22	36,3	44,4	0,6575	
1150	24,7	29,6	44,6	63,1	0,9304		750	18,7	22,9	37,3	53,1	0,6945	
1200	25,4	30,3	45,8	64,7	0,9708		800	19,6	23,9	38,5	54,8	0,7408	
1250	26	31,1	47	66,4	1,0113		850	20,6	25	39,8	56,5	0,7871	
1300	32,1	37,2	53,6	73,4	1,0517		900	21,5	26	41,1	58,1	0,8334	
1400	33,8	39,1	56,5	77	1,1326	15	950	22,5	27,1	42,3	59,8	0,8797	20
1500	43,4	48,9	59,3	80,7	1,2135		1000	23,5	28,1	43,6	61,5	0,9260	
1600	45,6	51,3	62,1	84,3	1,2944		1050	24,4	29,3	44,8	63,2	0,9723	
200	7,8	13,2	22,6	33,4	0,1852		1100	19,6	24,5	46,1	64,9	1,0186	
250	8,7	14,3	23,8	35	0,2315		1120	19,9	24,8	46,6	56,4	1,0371	
280	7,6	10,8	24,5	30,7	0,2593		1150	20,3	25,3	47,3	66,6	1,0649	
300	7,9	13,7	25	36,6	0,2778		1200	21	26,1	48,6	68,2	1,1112	
315	9,8	13,1	25,3	31,8	0,2917		1250	21,7	26,9	49,8	69,9	1,1575	
350	8,5	14,6	26,1	38,3	0,3241		1300	28,6	33,9	57,3	77,7	1,2038	
355	10,5	13,9	26,2	32,9	0,3287		1400	30,4	36	60,3	81,6	1,2964	
400	9,1	15,5	27,3	39,9	0,3704		1500	40,2	45,9	63,3	85,4	1,3890	
450	9,8	16,3	28,5	41,5	0,4167		1600	42,6	48,5	66,3	89,2	1,4816	
500	10,4	17,1	29,7	43,1	0,4630		200	8,2	14	24,1	35,6	0,1852	15
550	11	18	30,8	44,7	0,5093		250	9,2	15,3	25,3	37,4	0,2315	
560	11,1	14,9	31,1	38,5	0,5186		280	8,2	11,6	26,1	32,8	0,2593	
600	11,6	18,8	32	46,3	0,5556		300	8,5	14,8	26,6	39,1	0,2778	
630 x 1200	12	15,9	32,7	40,4	0,5834		315	10,4	13,9	27	33,8	0,2917	
650	12,2	19,6	33,2	47,9	0,6019		350	9,2	15,7	27,9	40,8	0,3241	
700	16,6	24,2	34,4	49,4	0,6482		355	11,2	14,8	28	35	0,3287	
710	16,8	20,8	34,6	42,6	0,6575		400	9,9	16,6	29,2	42,5	0,3704	
750	17,5	25,2	35,6	51	0,6945		450	10,6	17,5	30,4	44,1	0,4167	
800	18,3	26,3	36,7	52,6	0,7408		500 x 1300	11,3	18,5	31,7	45,8	0,4630	
850	19,2	27,4	37,9	54,2	0,7871		550	12,1	19,4	33	47,5	0,5093	
900	20,1	28,5	39,1	55,8	0,8334		560	12,2	16,1	33,2	41	0,5186	
950	21	29,6	40,3	57,4	0,8797		600	12,8	20,3	34,2	49,2	0,5556	
1000	21,9	30,7	41,4	59	0,9260	20	630	13,2	17,3	35	43	0,5834	
1050	22,7	31,8	42,6	60,7	0,9723		650	13,5	21,2	35,5	50,9	0,6019	
1100	17,8	27,1	43,8	62,2	1,0186		700	17,9	25,9	36,8	52,6	0,6482	
1120	18,1	23	44,3	53,9	1,0371		710	18,1	22,3	37	45,4	0,6575	
1150	18,4	28	45	63,8	1,0649		750	18,9	27	38	54,2	0,6945	
1200	19,1	28,8	46,1	65,4	1,1112		800	19,9	28,2	39,3	55,9	0,7408	

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]	A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]				Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
850	20,9	29,4	40,6	57,6	0,7871	20	550	13,5	21,5	36,5	52,5	0,5737	20
900	21,8	30,6	41,9	59,3	0,8334		560	13,7	18	36,8	45,3	0,5841	
950	22,8	31,8	43,1	61	0,8797		600	14,3	22,5	37,9	54,2	0,6258	
1000	23,8	32,9	44,4	62,7	0,9260		630	14,8	19,2	38,7	47,5	0,6571	
1050	24,7	34,2	45,7	64,4	0,9723		650	15,1	23,5	39,2	56	0,6780	
1100	19,9	29,6	46,9	66,1	1,0186		700	19,6	28,3	40,6	57,8	0,7301	
1120	20,2	25,3	47,5	57,4	1,0371		710	19,9	24,4	40,8	49,9	0,7405	
1150	20,6	30,5	48,2	67,8	1,0649		750	20,7	29,6	41,9	59,5	0,7823	
1200	21,4	31,5	49,5	69,5	1,1112		800	21,8	30,8	43,3	61,3	0,8344	
1250	22,1	32,4	50,8	71,2	1,1575		850	22,8	32,1	44,7	63,1	0,8866	
1300	29	39,5	58,2	79	1,2038		900	23,9	33,4	46	64,9	0,9387	
1400	30,9	41,8	61,2	82,9	1,2964		950	25	34,6	47,4	66,6	0,9909	
1500	40,6	52	64,3	86,7	1,3890		1000	26	35,9	48,7	68,4	1,0430	
1600	43,1	54,8	67,3	90,6	1,4816		1050	27,1	37,3	50,1	70,3	1,0952	
200	8,9	15,1	25,8	38,2	0,2086	15	1100	22,4	32,7	51,5	72,1	1,1473	15
250	9,9	16,4	27,1	39,9	0,2608		1120	22,7	28,1	52	62,8	1,1682	
280	9	12,6	27,9	35	0,2920		1150	23,2	33,8	52,8	73,8	1,1995	
300	9,3	15,9	28,4	41,6	0,3129		1200	24	34,8	54,2	75,6	1,2516	
315	11,3	14,9	28,8	36,1	0,3285		1250	24,8	35,8	55,6	77,4	1,3038	
350	10	16,9	29,8	43,4	0,3651		1300	32,5	43,8	63,9	86,1	1,3559	
355	12,1	15,8	29,9	37,3	0,3703		1400	34,7	46,3	67,1	90,2	1,4602	
400	10,8	17,9	31,1	45,1	0,4172		1500	36,9	48,9	70,4	94,3	1,5645	
450	11,6	18,9	32,4	46,9	0,4694		200	18,1	25,1	28,6	42,4	0,2320	
500	12,4	19,8	33,8	48,6	0,5215		250	19,2	26,4	30	44,3	0,2900	
550	13,2	20,8	35,1	50,4	0,5737		280	18,3	22,3	30,9	38,7	0,3248	
560	13,3	17,4	35,4	43,5	0,5841		300	18,7	26	31,5	46,1	0,3480	
600	13,9	21,8	36,4	52,1	0,6258		315	20,7	24,7	31,9	39,9	0,3654	
630	14,4	18,7	37,2	45,7	0,6571		350	19,5	27,1	32,9	47,9	0,4060	
650	14,7	22,8	37,8	53,9	0,6780	20	355	21,6	25,7	33	41,1	0,4118	20
700	19,2	27,5	39,1	55,6	0,7301		400	20,4	28,2	34,3	49,7	0,4640	
710	19,4	23,8	39,4	48,1	0,7405		450	21,3	29,2	35,7	51,6	0,5220	
750	20,3	28,7	40,4	57,3	0,7823		500	22,1	30,3	37,1	53,4	0,5800	
800	21,3	30	41,8	59,1	0,8344		550	23	31,4	38,5	55,2	0,6380	
850	22,3	31,2	43,1	60,8	0,8866		560	23,2	27,7	38,8	47,7	0,6496	
900	23,4	32,5	44,4	62,6	0,9387		600	23,8	32,4	40	57,1	0,6960	
950	24,4	33,7	45,8	64,3	0,9909		630	24,4	29	40,8	50	0,7308	
1000	25,4	35	47,1	66,1	1,0430		650	24,7	33,5	41,4	58,9	0,7540	
1050	26,5	36,3	48,4	67,9	1,0952		700	29,3	38,3	42,8	60,7	0,8120	
1100	21,7	31,7	49,8	69,7	1,1473		710	29,5	34,3	43,1	52,5	0,8236	
1120	22	27,3	50,3	60,7	1,1682		750	30,4	39,6	44,2	62,5	0,8700	
1150	22,5	32,7	51,1	71,4	1,1995		800	31,5	40,9	45,6	64,3	0,9280	
1200	23,3	33,7	52,4	73,2	1,2516	15	850	32,6	42,3	47	66,2	0,9860	20
1250	24	34,7	53,8	74,9	1,3038		900	33,8	43,6	48,4	68	1,0440	
1300	31,8	42,6	62,1	83,6	1,3559		950	34,9	44,9	49,8	69,8	1,1020	
1400	33,9	45,1	65,3	87,6	1,4602		1000	36	46,2	51,3	71,7	1,1600	
1500	43,8	55,5	68,5	91,7	1,5645		1050	37,1	47,6	52,7	73,6	1,2180	
1600	46,4	58,5	71,7	95,7	1,6688		1100	32,4	43,2	54,1	75,4	1,2760	
200	9	15,6	26,9	40	0,2086		1120	32,8	38,4	54,7	65,8	1,2992	
250	10,1	16,9	28,3	41,8	0,2608		1150	33,3	44,2	55,5	77,2	1,3340	
280	9,1	12,9	29,1	36,6	0,2920		1200	34,2	45,3	56,9	79,1	1,3920	
300	9,5	16,5	29,7	43,6	0,3129		1250	35	46,4	58,3	80,9	1,4500	
315	11,4	15,3	30,1	37,7	0,3285		1300	43,6	55,2	67,5	90,4	1,5080	
350	10,3	17,5	31	45,4	0,3651		200	19,3	26,6	30,3	44,9	0,2554	20
355	12,3	16,2	31,2	38,9	0,3703		250	20,5	28	31,8	46,8	0,3193	
400	11,1	18,5	32,4	47,1	0,4172		280	19,6	23,8	32,7	40,9	0,3576	
450	11,9	19,5	33,8	48,9	0,4694		300	20	27,7	33,3	48,6	0,3831	
500	12,7	20,5	35,1	50,7	0,5215		315	22	26,3	33,7	42,1	0,4023	

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]	A x B [mm]	Weight L = 200 *		Weight L = 400 *		Free area S _f [m ²]	Actuator [N.m]
	Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]				Without insulation [kg]	With insulation [kg]	Without insulation [kg]	With insulation [kg]		
350	20,9	28,8	34,8	50,5	0,4470	20	750	34	44	48,9	68,6	1,0455	20
355	23	27,3	34,9	43,4	0,4533		800 x 1800	35,3	45,4	50,4	70,6	1,1152	
400	21,9	30	36,3	52,4	0,5108		200	21,2	29,2	33,2	49,2	0,2788	20
450	22,8	31,1	37,7	54,3	0,5747		250	22,4	30,7	34,8	51,2	0,3485	
500	23,7	32,2	39,2	56,2	0,6385		280	21,6	26,2	35,7	44,7	0,3903	
550	24,6	33,4	40,7	58,1	0,7024		300	22	30,4	36,4	53,1	0,4182	
560	24,8	29,5	41	50,3	0,7151		315	24,1	28,7	36,8	46	0,4391	
600	25,6	34,5	42,2	60	0,7662		350	23	31,7	37,9	55,1	0,4879	
630 x 1700	26,1	30,9	43,1	52,6	0,8045		355	25,1	29,8	38,1	47,4	0,4949	
650	26,5	35,6	43,7	61,9	0,8301		400	24,1	32,9	39,5	57,1	0,5576	
700	31,1	40,5	45,1	63,8	0,8939		450	25,1	34,1	41,1	59,1	0,6273	
710	31,4	36,3	45,4	55,3	0,9067		500 x 1900	26,1	35,3	42,6	61	0,6970	20
750	32,3	41,9	46,6	65,6	0,9578		550	27,1	36,5	44,2	63	0,7667	
800	33,5	43,3	48,1	67,5	1,0216		560	27,3	32,4	44,5	54,6	0,7806	
850	34,7	44,6	49,6	69,4	1,0855		600	28,1	37,8	45,8	65	0,8364	
900	35,8	46	51	71,3	1,1493		630	28,7	33,9	46,7	57	0,8782	
950	37	47,4	52,5	73,2	1,2132		650	29,1	39	47,3	67	0,9061	
1000	38,2	48,8	54	75,1	1,2770		700	33,9	43,9	48,9	69	0,9758	
200	20,5	28,1	32	47,3	0,2788	20	710	34,1	39,5	49,2	59,8	0,9897	20
250	21,7	29,6	33,6	49,2	0,3485		750	35,1	45,4	50,5	70,9	1,0455	
280	20,9	25,2	34,5	43,1	0,3903		800	36,4	46,9	52	72,9	1,1152	
300	21,3	29,3	35,1	51,1	0,4182		200	11,8	20,1	34,9	51,6	0,3022	
315	23,3	27,7	35,5	44,3	0,4391		250	13,1	21,7	36,5	53,6	0,3778	
350	22,2	30,5	36,6	53,1	0,4879		280	12,3	17	37,5	46,9	0,4231	
355	24,3	28,8	36,8	45,7	0,4949		300	12,7	21,5	38,2	55,6	0,4533	
400	23,2	31,7	38,2	55	0,5576		315	14,8	19,6	38,6	48,2	0,4760	
450 x 1800	24,2	32,9	39,7	57	0,6273		350	13,8	22,8	39,8	57,7	0,5289	
500	25,2	34,1	41,2	58,9	0,6970		355 x 2000	15,9	20,7	39,9	49,6	0,5364	20
550	26,1	35,2	42,7	60,9	0,7667		400	14,9	24,1	41,4	59,7	0,6044	
560	26,3	31,2	43	52,7	0,7806		450	15,9	25,3	43	61,8	0,6800	
600	27,1	36,4	44,3	62,8	0,8364		500	17	26,6	44,7	63,8	0,7555	
630	27,7	32,7	45,2	55,1	0,8782		550	18,1	27,9	46,3	65,8	0,8311	
650	28,1	37,6	45,8	64,7	0,9061		560	18,3	23,5	46,6	57	0,8462	
700	32,8	42,5	47,3	66,7	0,9758		600	19,2	29,2	47,9	67,9	0,9066	
710	33	38,2	47,6	57,9	0,9897		630	19,8	25,2	48,9	59,6	0,9519	

Dimensions in 5 mm increments are available on request.

* For designs with VRU-xx-BAC, add 0.3 kg to the weight.

IV. INSTALLATION

Placement and installation

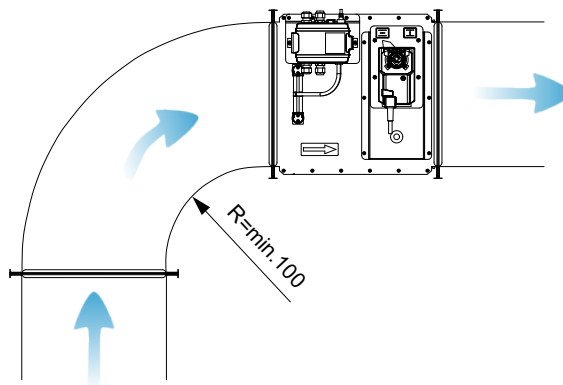
Controllers are intended for installation

- in any position for controllers with $A \leq 1000$ mm
- with damper blade axes horizontal for larger controllers with $A > 1000$ mm

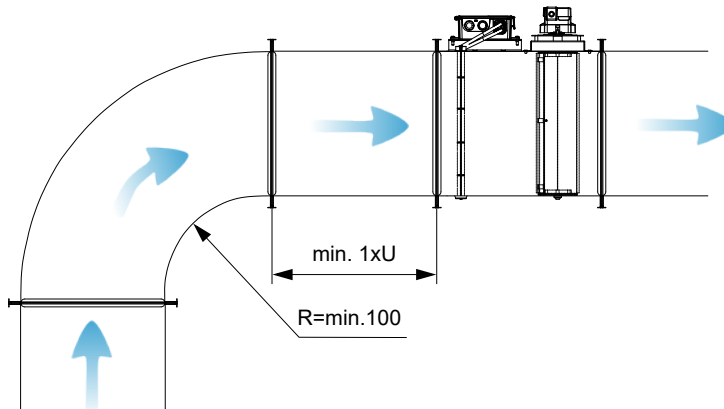
The controller is intended for installation in straight duct sections with a fully developed airflow profile

- The controller may also be installed:
 - directly downstream of a bend in the plane of damper blade rotation
 - downstream of a bend with arbitrary orientation at a minimum distance of $1 \times U$, where U is the diagonal of the rectangular cross-section $A \times B$ ($U = \sqrt{A^2 + B^2}$)
 - downstream of a T-piece at a minimum distance of $2 \times U$, where U is the diagonal of the rectangular cross-section $A \times B$ ($U = \sqrt{A^2 + B^2}$)

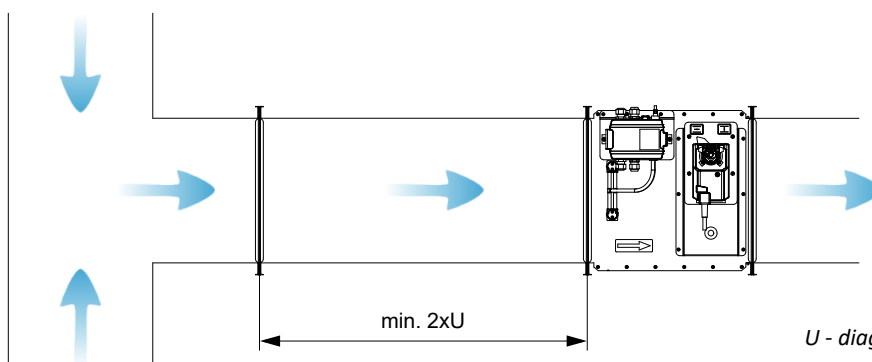
RDTM-V installed directly downstream of a bend in the plane of damper blade rotation



RDTM-V installed downstream of a bend with arbitrary orientation at a minimum distance of $1 \times U$



RDTM-V installed downstream of a T-piece at a minimum distance of $2 \times U$



U - diagonal of the rectangle $A \times B$
 $(U = \sqrt{A^2 + B^2})$

V. TECHNICAL DATA

Controller configuration

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/V _{Δp}	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
200	58	16	504	140	720	200	864	240	58	16
250	72	20	630	175	900	250	1080	300	72	20
280	79	22	706	196	1008	280	1210	336	81	22
300	86	24	756	210	1080	300	1296	360	86	24
315	90	25	794	221	1134	315	1361	378	91	25
350	101	28	882	245	1260	350	1512	420	101	28
355	101	28	895	249	1278	355	1534	426	102	28
400	115	32	1008	280	1440	400	1728	480	115	32
200	86	24	756	210	1080	300	1296	360	86	24
250	108	30	945	263	1350	375	1620	450	108	30
280	122	34	1058	294	1512	420	1814	504	121	34
300	130	36	1134	315	1620	450	1944	540	130	36
315	137	38	1191	331	1701	473	2041	567	136	38
350	151	42	1323	368	1890	525	2268	630	151	42
355	155	43	1342	373	1917	533	2300	639	153	43
400	173	48	1512	420	2160	600	2592	720	173	48
200	115	32	1008	280	1440	400	1728	480	115	32
250	144	40	1260	350	1800	500	2160	600	144	40
280	162	45	1411	392	2016	560	2419	672	161	45
300	173	48	1512	420	2160	600	2592	720	173	48
315	180	50	1588	441	2268	630	2722	756	181	50
350	202	56	1764	490	2520	700	3024	840	202	56
355	205	57	1789	497	2556	710	3067	852	205	57
400	230	64	2016	560	2880	800	3456	960	230	64
450	259	72	2268	630	3240	900	3888	1080	259	72
500	288	80	2520	700	3600	1000	4320	1200	288	80
550	317	88	2772	770	3960	1100	4752	1320	317	88
560	324	90	2822	784	4032	1120	4838	1344	323	90
600	346	96	3024	840	4320	1200	5184	1440	346	96
630	364	101	3175	882	4536	1260	5443	1512	363	101
650	374	104	3276	910	4680	1300	5616	1560	374	104
700	403	112	3528	980	5040	1400	6048	1680	403	112
710	410	114	3578	994	5112	1420	6134	1704	409	114
750	432	120	3780	1050	5400	1500	6480	1800	432	120
800	461	128	4032	1120	5760	1600	6912	1920	461	128
200	144	40	1260	350	1800	500	2160	600	144	40
250	180	50	1575	438	2250	625	2700	750	180	50
280	202	56	1764	490	2520	700	3024	840	202	56
300	216	60	1890	525	2700	750	3240	900	216	60
315	227	63	1985	551	2835	788	3402	945	227	63
350	252	70	2205	613	3150	875	3780	1050	252	70
355	256	71	2237	621	3195	888	3834	1065	256	71
400	288	80	2520	700	3600	1000	4320	1200	288	80
450	324	90	2835	788	4050	1125	4860	1350	324	90
500	360	100	3150	875	4500	1250	5400	1500	360	100
550	396	110	3465	963	4950	1375	5940	1650	396	110
560	403	112	3528	980	5040	1400	6048	1680	403	112
600	432	120	3780	1050	5400	1500	6480	1800	432	120
630	454	126	3969	1103	5670	1575	6804	1890	454	126
650	468	130	4095	1138	5850	1625	7020	1950	468	130
700	504	140	4410	1225	6300	1750	7560	2100	504	140
710	511	142	4473	1243	6390	1775	7668	2130	511	142
750	540	150	4725	1313	6750	1875	8100	2250	540	150
800	576	160	5040	1400	7200	2000	8640	2400	576	160

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/V _{Δp}	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
200	162	45	1411	392	2016	560	2419	672	161	45
250	202	56	1764	490	2520	700	3024	840	202	56
280	227	63	1976	549	2822	784	3387	941	226	63
300	241	67	2117	588	3024	840	3629	1008	242	67
315	256	71	2223	617	3175	882	3810	1058	254	71
350	281	78	2470	686	3528	980	4234	1176	282	78
355	288	80	2505	696	3578	994	4294	1193	286	80
400	324	90	2822	784	4032	1120	4838	1344	323	90
450	364	101	3175	882	4536	1260	5443	1512	363	101
500 x 280	403	112	3528	980	5040	1400	6048	1680	403	112
550	443	123	3881	1078	5544	1540	6653	1848	444	123
560	450	125	3951	1098	5645	1568	6774	1882	452	125
600	482	134	4234	1176	6048	1680	7258	2016	484	134
630	508	141	4445	1235	6350	1764	7620	2117	508	141
650	526	146	4586	1274	6552	1820	7862	2184	524	146
700	565	157	4939	1372	7056	1960	8467	2352	565	157
710	572	159	5010	1392	7157	1988	8588	2386	573	159
750	605	168	5292	1470	7560	2100	9072	2520	605	168
800	644	179	5645	1568	8064	2240	9677	2688	645	179
200	173	48	1512	420	2160	600	2592	720	173	48
250	216	60	1890	525	2700	750	3240	900	216	60
280	241	67	2117	588	3024	840	3629	1008	242	67
300	259	72	2268	630	3240	900	3888	1080	259	72
315	274	76	2381	662	3402	945	4082	1134	272	76
350	302	84	2646	735	3780	1050	4536	1260	302	84
355	306	85	2684	746	3834	1065	4601	1278	307	85
400	346	96	3024	840	4320	1200	5184	1440	346	96
450	389	108	3402	945	4860	1350	5832	1620	389	108
500	432	120	3780	1050	5400	1500	6480	1800	432	120
550	475	132	4158	1155	5940	1650	7128	1980	475	132
560 x 300	482	134	4234	1176	6048	1680	7258	2016	484	134
600	518	144	4536	1260	6480	1800	7776	2160	518	144
630	544	151	4763	1323	6804	1890	8165	2268	544	151
650	562	156	4914	1365	7020	1950	8424	2340	562	156
700	605	168	5292	1470	7560	2100	9072	2520	605	168
710	612	170	5368	1491	7668	2130	9202	2556	613	170
750	648	180	5670	1575	8100	2250	9720	2700	648	180
800	691	192	6048	1680	8640	2400	10368	2880	691	192
850	734	204	6426	1785	9180	2550	11016	3060	734	204
900	778	216	6804	1890	9720	2700	11664	3240	778	216
950	821	228	7182	1995	10260	2850	12312	3420	821	228
1000	864	240	7560	2100	10800	3000	12960	3600	864	240
200	180	50	1588	441	2268	630	2722	756	181	50
250	227	63	1985	551	2835	788	3402	945	227	63
280	256	71	2223	617	3175	882	3810	1058	254	71
300	274	76	2381	662	3402	945	4082	1134	272	76
315	284	79	2500	695	3572	992	4287	1191	286	79
350	317	88	2778	772	3969	1103	4763	1323	318	88
355	320	89	2818	783	4026	1118	4831	1342	322	90
400	364	101	3175	882	4536	1260	5443	1512	363	101
450 x 315	407	113	3572	992	5103	1418	6124	1701	408	113
500	454	126	3969	1103	5670	1575	6804	1890	454	126
550	500	139	4366	1213	6237	1733	7484	2079	499	139
560	508	141	4445	1235	6350	1764	7620	2117	508	141
600	544	151	4763	1323	6804	1890	8165	2268	544	151
630	572	159	5001	1389	7144	1985	8573	2381	572	159
650	590	164	5160	1433	7371	2048	8845	2457	590	164
700	634	176	5557	1544	7938	2205	9526	2646	635	176
710	644	179	5636	1566	8051	2237	9662	2684	644	179

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
750	680	189	5954	1654	8505	2363	10206	2835	680	189
800	727	202	6350	1764	9072	2520	10886	3024	726	202
850	770	214	6747	1874	9639	2678	11567	3213	771	214
900	817	227	7144	1985	10206	2835	12247	3402	817	227
950	860	239	7541	2095	10773	2993	12928	3591	862	239
1000	907	252	7938	2205	11340	3150	13608	3780	907	252
200	202	56	1764	490	2520	700	3024	840	202	56
250	252	70	2205	613	3150	875	3780	1050	252	70
280	281	78	2470	686	3528	980	4234	1176	282	78
300	302	84	2646	735	3780	1050	4536	1260	302	84
315	317	88	2778	772	3969	1103	4763	1323	318	88
350	353	98	3087	858	4410	1225	5292	1470	353	98
355	356	99	3131	870	4473	1243	5368	1491	358	99
400	403	112	3528	980	5040	1400	6048	1680	403	112
450	454	126	3969	1103	5670	1575	6804	1890	454	126
500	504	140	4410	1225	6300	1750	7560	2100	504	140
550	554	154	4851	1348	6930	1925	8316	2310	554	154
560	565	157	4939	1372	7056	1960	8467	2352	565	157
600	605	168	5292	1470	7560	2100	9072	2520	605	168
630	634	176	5557	1544	7938	2205	9526	2646	635	176
650	655	182	5733	1593	8190	2275	9828	2730	655	182
700	706	196	6174	1715	8820	2450	10584	2940	706	196
710	716	199	6262	1740	8946	2485	10735	2982	716	199
750	756	210	6615	1838	9450	2625	11340	3150	756	210
800	806	224	7056	1960	10080	2800	12096	3360	806	224
850	857	238	7497	2083	10710	2975	12852	3570	857	238
900	907	252	7938	2205	11340	3150	13608	3780	907	252
950	958	266	8379	2328	11970	3325	14364	3990	958	266
1000	1008	280	8820	2450	12600	3500	15120	4200	1008	280
200	205	57	1789	497	2556	710	3067	852	205	57
250	256	71	2237	621	3195	888	3834	1065	256	71
280	288	80	2505	696	3578	994	4294	1193	286	80
300	306	85	2684	746	3834	1065	4601	1278	307	85
315	320	89	2818	783	4026	1118	4831	1342	322	90
350	356	99	3131	870	4473	1243	5368	1491	358	99
355	364	101	3176	882	4537	1260	5444	1512	363	101
400	410	114	3578	994	5112	1420	6134	1704	409	114
450	461	128	4026	1118	5751	1598	6901	1917	460	128
500	511	142	4473	1243	6390	1775	7668	2130	511	142
550	562	156	4920	1367	7029	1953	8435	2343	562	156
560	572	159	5010	1392	7157	1988	8588	2386	573	159
600	612	170	5368	1491	7668	2130	9202	2556	613	170
630	644	179	5636	1566	8051	2237	9662	2684	644	179
650	666	185	5815	1615	8307	2308	9968	2769	665	185
700	716	199	6262	1740	8946	2485	10735	2982	716	199
710	727	202	6352	1764	9074	2521	10889	3025	726	202
750	767	213	6710	1864	9585	2663	11502	3195	767	213
800	817	227	7157	1988	10224	2840	12269	3408	818	227
850	868	241	7604	2112	10863	3018	13036	3621	869	241
900	922	256	8051	2237	11502	3195	13802	3834	920	256
950	972	270	8499	2361	12141	3373	14569	4047	971	270
1000	1022	284	8946	2485	12780	3550	15336	4260	1022	284
200	230	64	2016	560	2880	800	3456	960	230	64
250	288	80	2520	700	3600	1000	4320	1200	288	80
280	324	90	2822	784	4032	1120	4838	1344	323	90
300	346	96	3024	840	4320	1200	5184	1440	346	96
315	364	101	3175	882	4536	1260	5443	1512	363	101
350	403	112	3528	980	5040	1400	6048	1680	403	112
355	410	114	3578	994	5112	1420	6134	1704	409	114

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/V _{Δp}	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
400	461	128	4032	1120	5760	1600	6912	1920	461	128
450	518	144	4536	1260	6480	1800	7776	2160	518	144
500	576	160	5040	1400	7200	2000	8640	2400	576	160
550	634	176	5544	1540	7920	2200	9504	2640	634	176
560	644	179	5645	1568	8064	2240	9677	2688	645	179
600	691	192	6048	1680	8640	2400	10368	2880	691	192
630	727	202	6350	1764	9072	2520	10886	3024	726	202
650	749	208	6552	1820	9360	2600	11232	3120	749	208
700	806	224	7056	1960	10080	2800	12096	3360	806	224
710	817	227	7157	1988	10224	2840	12269	3408	818	227
750	864	240	7560	2100	10800	3000	12960	3600	864	240
800	922	256	8064	2240	11520	3200	13824	3840	922	256
850	979	272	8568	2380	12240	3400	14688	4080	979	272
900	1037	288	9072	2520	12960	3600	15552	4320	1037	288
950	1094	304	9576	2660	13680	3800	16416	4560	1094	304
1000	1152	320	10080	2800	14400	4000	17280	4800	1152	320
1050	1210	336	10584	2940	15120	4200	18144	5040	1210	336
1100	1267	352	11088	3080	15840	4400	19008	5280	1267	352
1120	1289	358	11290	3136	16128	4480	19354	5376	1290	358
1150	1325	368	11592	3220	16560	4600	19872	5520	1325	368
1200	1382	384	12096	3360	17280	4800	20736	5760	1382	384
1250	1440	400	12600	3500	18000	5000	21600	6000	1440	400
200	259	72	2268	630	3240	900	3888	1080	259	72
250	324	90	2835	788	4050	1125	4860	1350	324	90
280	364	101	3175	882	4536	1260	5443	1512	363	101
300	389	108	3402	945	4860	1350	5832	1620	389	108
315	407	113	3572	992	5103	1418	6124	1701	408	113
350	454	126	3969	1103	5670	1575	6804	1890	454	126
355	461	128	4026	1118	5751	1598	6901	1917	460	128
400	518	144	4536	1260	6480	1800	7776	2160	518	144
450	583	162	5103	1418	7290	2025	8748	2430	583	162
500	648	180	5670	1575	8100	2250	9720	2700	648	180
550	713	198	6237	1733	8910	2475	10692	2970	713	198
560	727	202	6350	1764	9072	2520	10886	3024	726	202
600	778	216	6804	1890	9720	2700	11664	3240	778	216
630	817	227	7144	1985	10206	2835	12247	3402	817	227
650	842	234	7371	2048	10530	2925	12636	3510	842	234
700	907	252	7938	2205	11340	3150	13608	3780	907	252
710	922	256	8051	2237	11502	3195	13802	3834	920	256
750	972	270	8505	2363	12150	3375	14580	4050	972	270
800	1037	288	9072	2520	12960	3600	15552	4320	1037	288
850	1102	306	9639	2678	13770	3825	16524	4590	1102	306
900	1166	324	10206	2835	14580	4050	17496	4860	1166	324
950	1231	342	10773	2993	15390	4275	18468	5130	1231	342
1000	1296	360	11340	3150	16200	4500	19440	5400	1296	360
1050	1361	378	11907	3308	17010	4725	20412	5670	1361	378
1100	1426	396	12474	3465	17820	4950	21384	5940	1426	396
1120	1451	403	12701	3528	18144	5040	21773	6048	1452	403
1150	1490	414	13041	3623	18630	5175	22356	6210	1490	414
1200	1555	432	13608	3780	19440	5400	23328	6480	1555	432
1250	1620	450	14175	3938	20250	5625	24300	6750	1620	450
1300	1685	468	14742	4095	21060	5850	25272	7020	1685	468
1400	1814	504	15876	4410	22680	6300	27216	7560	1814	504
1500	1944	540	17010	4725	24300	6750	29160	8100	1944	540
1600	2074	576	18144	5040	25920	7200	31104	8640	2074	576
200	288	80	2520	700	3600	1000	4320	1200	288	80
250	360	100	3150	875	4500	1250	5400	1500	360	100
280	403	112	3528	980	5040	1400	6048	1680	403	112
300	432	120	3780	1050	5400	1500	6480	1800	432	120

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/V _{Δp}	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
315	454	126	3969	1103	5670	1575	6804	1890	454	126
350	504	140	4410	1225	6300	1750	7560	2100	504	140
355	511	142	4473	1243	6390	1775	7668	2130	511	142
400	576	160	5040	1400	7200	2000	8640	2400	576	160
450	648	180	5670	1575	8100	2250	9720	2700	648	180
500	720	200	6300	1750	9000	2500	10800	3000	720	200
550	792	220	6930	1925	9900	2750	11880	3300	792	220
560	806	224	7056	1960	10080	2800	12096	3360	806	224
600	864	240	7560	2100	10800	3000	12960	3600	864	240
630	907	252	7938	2205	11340	3150	13608	3780	907	252
650	936	260	8190	2275	11700	3250	14040	3900	936	260
700	1008	280	8820	2450	12600	3500	15120	4200	1008	280
710	1022	284	8946	2485	12780	3550	15336	4260	1022	284
750	1080	300	9450	2625	13500	3750	16200	4500	1080	300
800 x 500	1152	320	10080	2800	14400	4000	17280	4800	1152	320
850	1224	340	10710	2975	15300	4250	18360	5100	1224	340
900	1296	360	11340	3150	16200	4500	19440	5400	1296	360
950	1368	380	11970	3325	17100	4750	20520	5700	1368	380
1000	1440	400	12600	3500	18000	5000	21600	6000	1440	400
1050	1512	420	13230	3675	18900	5250	22680	6300	1512	420
1100	1584	440	13860	3850	19800	5500	23760	6600	1584	440
1120	1613	448	14112	3920	20160	5600	24192	6720	1613	448
1150	1656	460	14490	4025	20700	5750	24840	6900	1656	460
1200	1728	480	15120	4200	21600	6000	25920	7200	1728	480
1250	1800	500	15750	4375	22500	6250	27000	7500	1800	500
1300	1872	520	16380	4550	23400	6500	28080	7800	1872	520
1400	2016	560	17640	4900	25200	7000	30240	8400	2016	560
1500	2160	600	18900	5250	27000	7500	32400	9000	2160	600
1600	2304	640	20160	5600	28800	8000	34560	9600	2304	640
200	317	88	2772	770	3960	1100	4752	1320	317	88
250	396	110	3465	963	4950	1375	5940	1650	396	110
280	443	123	3881	1078	5544	1540	6653	1848	444	123
300	475	132	4158	1155	5940	1650	7128	1980	475	132
315	500	139	4366	1213	6237	1733	7484	2079	499	139
350	554	154	4851	1348	6930	1925	8316	2310	554	154
355	562	156	4920	1367	7029	1953	8435	2343	562	156
400	634	176	5544	1540	7920	2200	9504	2640	634	176
450	713	198	6237	1733	8910	2475	10692	2970	713	198
500	792	220	6930	1925	9900	2750	11880	3300	792	220
550	871	242	7623	2118	10890	3025	13068	3630	871	242
560	886	246	7762	2156	11088	3080	13306	3696	887	246
600	950	264	8316	2310	11880	3300	14256	3960	950	264
630	997	277	8732	2426	12474	3465	14969	4158	998	277
650	1030	286	9009	2503	12870	3575	15444	4290	1030	286
700 x 550	1109	308	9702	2695	13860	3850	16632	4620	1109	308
710	1123	312	9841	2734	14058	3905	16870	4686	1125	312
750	1188	330	10395	2888	14850	4125	17820	4950	1188	330
800	1267	352	11088	3080	15840	4400	19008	5280	1267	352
850	1346	374	11781	3273	16830	4675	20196	5610	1346	374
900	1426	396	12474	3465	17820	4950	21384	5940	1426	396
950	1505	418	13167	3658	18810	5225	22572	6270	1505	418
1000	1584	440	13860	3850	19800	5500	23760	6600	1584	440
1050	1663	462	14553	4043	20790	5775	24948	6930	1663	462
1100	1742	484	15246	4235	21780	6050	26136	7260	1742	484
1120	1775	493	15523	4312	22176	6160	26611	7392	1774	493
1150	1822	506	15939	4428	22770	6325	27324	7590	1822	506
1200	1901	528	16632	4620	23760	6600	28512	7920	1901	528
1250	1980	550	17325	4813	24750	6875	29700	8250	1980	550
1300	2059	572	18018	5005	25740	7150	30888	8580	2059	572

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
1400	2218	616	19404	5390	27720	7700	33264	9240	2218	616
1500 x 550	2376	660	20790	5775	29700	8250	35640	9900	2376	660
1600	2534	704	22176	6160	31680	8800	38016	10560	2534	704
200	324	90	2822	784	4032	1120	4838	1344	323	90
250	403	112	3528	980	5040	1400	6048	1680	403	112
280	450	125	3951	1098	5645	1568	6774	1882	452	125
300	482	134	4234	1176	6048	1680	7258	2016	484	134
315	508	141	4445	1235	6350	1764	7620	2117	508	141
350	565	157	4939	1372	7056	1960	8467	2352	565	157
355	572	159	5010	1392	7157	1988	8588	2386	573	159
400	644	179	5645	1568	8064	2240	9677	2688	645	179
450	727	202	6350	1764	9072	2520	10886	3024	726	202
500	806	224	7056	1960	10080	2800	12096	3360	806	224
550	886	246	7762	2156	11088	3080	13306	3696	887	246
560	904	251	7903	2195	11290	3136	13548	3763	903	251
600	968	269	8467	2352	12096	3360	14515	4032	968	269
630	1015	282	8891	2470	12701	3528	15241	4234	1016	282
650	1048	291	9173	2548	13104	3640	15725	4368	1048	291
700	1130	314	9878	2744	14112	3920	16934	4704	1129	314
710 x 560	1145	318	10020	2783	14314	3976	17176	4771	1145	318
750	1210	336	10584	2940	15120	4200	18144	5040	1210	336
800	1289	358	11290	3136	16128	4480	19354	5376	1290	358
850	1372	381	11995	3332	17136	4760	20563	5712	1371	381
900	1451	403	12701	3528	18144	5040	21773	6048	1452	403
950	1534	426	13406	3724	19152	5320	22982	6384	1532	426
1000	1613	448	14112	3920	20160	5600	24192	6720	1613	448
1050	1692	470	14818	4116	21168	5880	25402	7056	1693	470
1100	1775	493	15523	4312	22176	6160	26611	7392	1774	493
1120	1807	502	15805	4390	22579	6272	27095	7526	1806	502
1150	1854	515	16229	4508	23184	6440	27821	7728	1855	515
1200	1937	538	16934	4704	24192	6720	29030	8064	1935	538
1250	2016	560	17640	4900	25200	7000	30240	8400	2016	560
1300	2095	582	18346	5096	26208	7280	31450	8736	2097	582
1400	2257	627	19757	5488	28224	7840	33869	9408	2258	627
1500	2419	672	21168	5880	30240	8400	36288	10080	2419	672
1600	2581	717	22579	6272	32256	8960	38707	10752	2581	717
200	346	96	3024	840	4320	1200	5184	1440	346	96
250	432	120	3780	1050	5400	1500	6480	1800	432	120
280	482	134	4234	1176	6048	1680	7258	2016	484	134
300	518	144	4536	1260	6480	1800	7776	2160	518	144
315	544	151	4763	1323	6804	1890	8165	2268	544	151
350	605	168	5292	1470	7560	2100	9072	2520	605	168
355	612	170	5368	1491	7668	2130	9202	2556	613	170
400	691	192	6048	1680	8640	2400	10368	2880	691	192
450	778	216	6804	1890	9720	2700	11664	3240	778	216
500	864	240	7560	2100	10800	3000	12960	3600	864	240
550	950	264	8316	2310	11880	3300	14256	3960	950	264
560 x 600	968	269	8467	2352	12096	3360	14515	4032	968	269
600	1037	288	9072	2520	12960	3600	15552	4320	1037	288
630	1087	302	9526	2646	13608	3780	16330	4536	1089	302
650	1123	312	9828	2730	14040	3900	16848	4680	1123	312
700	1210	336	10584	2940	15120	4200	18144	5040	1210	336
710	1228	341	10735	2982	15336	4260	18403	5112	1227	341
750	1296	360	11340	3150	16200	4500	19440	5400	1296	360
800	1382	384	12096	3360	17280	4800	20736	5760	1382	384
850	1469	408	12852	3570	18360	5100	22032	6120	1469	408
900	1555	432	13608	3780	19440	5400	23328	6480	1555	432
950	1642	456	14364	3990	20520	5700	24624	6840	1642	456
1000	1728	480	15120	4200	21600	6000	25920	7200	1728	480

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
1050	1814	504	15876	4410	22680	6300	27216	7560	1814	504
1100	1901	528	16632	4620	23760	6600	28512	7920	1901	528
1120	1937	538	16934	4704	24192	6720	29030	8064	1935	538
1150	1987	552	17388	4830	24840	6900	29808	8280	1987	552
1200	2074	576	18144	5040	25920	7200	31104	8640	2074	576
1250	2160	600	18900	5250	27000	7500	32400	9000	2160	600
1300	2246	624	19656	5460	28080	7800	33696	9360	2246	624
1400	2419	672	21168	5880	30240	8400	36288	10080	2419	672
1500	2592	720	22680	6300	32400	9000	38880	10800	2592	720
1600	2765	768	24192	6720	34560	9600	41472	11520	2765	768
200	364	101	3175	882	4536	1260	5443	1512	363	101
250	454	126	3969	1103	5670	1575	6804	1890	454	126
280	508	141	4445	1235	6350	1764	7620	2117	508	141
300	544	151	4763	1323	6804	1890	8165	2268	544	151
315	572	159	5001	1389	7144	1985	8573	2381	572	159
350	634	176	5557	1544	7938	2205	9526	2646	635	176
355	644	179	5636	1566	8051	2237	9662	2684	644	179
400	727	202	6350	1764	9072	2520	10886	3024	726	202
450	817	227	7144	1985	10206	2835	12247	3402	817	227
500	907	252	7938	2205	11340	3150	13608	3780	907	252
550	997	277	8732	2426	12474	3465	14969	4158	998	277
560	1015	282	8891	2470	12701	3528	15241	4234	1016	282
600	1087	302	9526	2646	13608	3780	16330	4536	1089	302
630	1145	318	10002	2778	14288	3969	17146	4763	1143	318
650	1181	328	10319	2867	14742	4095	17690	4914	1179	328
700	1271	353	11113	3087	15876	4410	19051	5292	1270	353
710	1289	358	11272	3131	16103	4473	19323	5368	1288	358
750	1361	378	11907	3308	17010	4725	20412	5670	1361	378
800	1451	403	12701	3528	18144	5040	21773	6048	1452	403
850	1541	428	13495	3749	19278	5355	23134	6426	1542	428
900	1634	454	14288	3969	20412	5670	24494	6804	1633	454
950	1724	479	15082	4190	21546	5985	25855	7182	1724	479
1000	1814	504	15876	4410	22680	6300	27216	7560	1814	504
1050	1904	529	16670	4631	23814	6615	28577	7938	1905	529
1100	1994	554	17464	4851	24948	6930	29938	8316	1996	554
1120	2030	564	17781	4939	25402	7056	30482	8467	2032	565
1150	2088	580	18257	5072	26082	7245	31298	8694	2087	580
1200	2178	605	19051	5292	27216	7560	32659	9072	2177	605
1250	2268	630	19845	5513	28350	7875	34020	9450	2268	630
1300	2358	655	20639	5733	29484	8190	35381	9828	2359	655
1400	2542	706	22226	6174	31752	8820	38102	10584	2540	706
1500	2722	756	23814	6615	34020	9450	40824	11340	2722	756
1600	2902	806	25402	7056	36288	10080	43546	12096	2903	806
200	374	104	3276	910	4680	1300	5616	1560	374	104
250	468	130	4095	1138	5850	1625	7020	1950	468	130
280	526	146	4586	1274	6552	1820	7862	2184	524	146
300	562	156	4914	1365	7020	1950	8424	2340	562	156
315	590	164	5160	1433	7371	2048	8845	2457	590	164
350	655	182	5733	1593	8190	2275	9828	2730	655	182
355	666	185	5815	1615	8307	2308	9968	2769	665	185
400	749	208	6552	1820	9360	2600	11232	3120	749	208
450	842	234	7371	2048	10530	2925	12636	3510	842	234
500	936	260	8190	2275	11700	3250	14040	3900	936	260
550	1030	286	9009	2503	12870	3575	15444	4290	1030	286
560	1048	291	9173	2548	13104	3640	15725	4368	1048	291
600	1123	312	9828	2730	14040	3900	16848	4680	1123	312
630	1181	328	10319	2867	14742	4095	17690	4914	1179	328
650	1217	338	10647	2958	15210	4225	18252	5070	1217	338
700	1310	364	11466	3185	16380	4550	19656	5460	1310	364

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
710	1328	369	11630	3231	16614	4615	19937	5538	1329	369
750	1404	390	12285	3413	17550	4875	21060	5850	1404	390
800	1498	416	13104	3640	18720	5200	22464	6240	1498	416
850	1591	442	13923	3868	19890	5525	23868	6630	1591	442
900	1685	468	14742	4095	21060	5850	25272	7020	1685	468
950	1778	494	15561	4323	22230	6175	26676	7410	1778	494
1000	1872	520	16380	4550	23400	6500	28080	7800	1872	520
1050	1966	546	17199	4778	24570	6825	29484	8190	1966	546
1100 x 650	2059	572	18018	5005	25740	7150	30888	8580	2059	572
1120	2095	582	18346	5096	26208	7280	31450	8736	2097	582
1150	2153	598	18837	5233	26910	7475	32292	8970	2153	598
1200	2246	624	19656	5460	28080	7800	33696	9360	2246	624
1250	2340	650	20475	5688	29250	8125	35100	9750	2340	650
1300	2434	676	21294	5915	30420	8450	36504	10140	2434	676
1400	2621	728	22932	6370	32760	9100	39312	10920	2621	728
1500	2808	780	24570	6825	35100	9750	42120	11700	2808	780
1600	2995	832	26208	7280	37440	10400	44928	12480	2995	832
200	403	112	3528	980	5040	1400	6048	1680	403	112
250	504	140	4410	1225	6300	1750	7560	2100	504	140
280	565	157	4939	1372	7056	1960	8467	2352	565	157
300	605	168	5292	1470	7560	2100	9072	2520	605	168
315	634	176	5557	1544	7938	2205	9526	2646	635	176
350	706	196	6174	1715	8820	2450	10584	2940	706	196
355	716	199	6262	1740	8946	2485	10735	2982	716	199
400	806	224	7056	1960	10080	2800	12096	3360	806	224
450	907	252	7938	2205	11340	3150	13608	3780	907	252
500	1008	280	8820	2450	12600	3500	15120	4200	1008	280
550	1109	308	9702	2695	13860	3850	16632	4620	1109	308
560	1130	314	9878	2744	14112	3920	16934	4704	1129	314
600	1210	336	10584	2940	15120	4200	18144	5040	1210	336
630	1271	353	11113	3087	15876	4410	19051	5292	1270	353
650	1310	364	11466	3185	16380	4550	19656	5460	1310	364
700	1411	392	12348	3430	17640	4900	21168	5880	1411	392
710 x 700	1433	398	12524	3479	17892	4970	21470	5964	1431	398
750	1512	420	13230	3675	18900	5250	22680	6300	1512	420
800	1613	448	14112	3920	20160	5600	24192	6720	1613	448
850	1714	476	14994	4165	21420	5950	25704	7140	1714	476
900	1814	504	15876	4410	22680	6300	27216	7560	1814	504
950	1915	532	16758	4655	23940	6650	28728	7980	1915	532
1000	2016	560	17640	4900	25200	7000	30240	8400	2016	560
1050	2117	588	18522	5145	26460	7350	31752	8820	2117	588
1100	2218	616	19404	5390	27720	7700	33264	9240	2218	616
1120	2257	627	19757	5488	28224	7840	33869	9408	2258	627
1150	2318	644	20286	5635	28980	8050	34776	9660	2318	644
1200	2419	672	21168	5880	30240	8400	36288	10080	2419	672
1250	2520	700	22050	6125	31500	8750	37800	10500	2520	700
1300	2621	728	22932	6370	32760	9100	39312	10920	2621	728
1400	2822	784	24696	6860	35280	9800	42336	11760	2822	784
1500	3024	840	26460	7350	37800	10500	45360	12600	3024	840
1600	3226	896	28224	7840	40320	11200	48384	13440	3226	896
200	410	114	3578	994	5112	1420	6134	1704	409	114
250	511	142	4473	1243	6390	1775	7668	2130	511	142
280	572	159	5010	1392	7157	1988	8588	2386	573	159
300	612	170	5368	1491	7668	2130	9202	2556	613	170
315 x 710	644	179	5636	1566	8051	2237	9662	2684	644	179
350	716	199	6262	1740	8946	2485	10735	2982	716	199
355	727	202	6352	1764	9074	2521	10889	3025	726	202
400	817	227	7157	1988	10224	2840	12269	3408	818	227
450	922	256	8051	2237	11502	3195	13802	3834	920	256

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
500	1022	284	8946	2485	12780	3550	15336	4260	1022	284
550	1123	312	9841	2734	14058	3905	16870	4686	1125	312
560	1145	318	10020	2783	14314	3976	17176	4771	1145	318
600	1228	341	10735	2982	15336	4260	18403	5112	1227	341
630	1289	358	11272	3131	16103	4473	19323	5368	1288	358
650	1328	369	11630	3231	16614	4615	19937	5538	1329	369
700	1433	398	12524	3479	17892	4970	21470	5964	1431	398
710	1451	403	12703	3529	18148	5041	21777	6049	1452	403
750	1534	426	13419	3728	19170	5325	23004	6390	1534	426
800	1634	454	14314	3976	20448	5680	24538	6816	1636	454
850	1739	483	15208	4225	21726	6035	26071	7242	1738	483
900	1840	511	16103	4473	23004	6390	27605	7668	1840	511
950	1944	540	16997	4722	24282	6745	29138	8094	1943	540
1000	2045	568	17892	4970	25560	7100	30672	8520	2045	568
1050	2146	596	18787	5219	26838	7455	32206	8946	2147	596
1100	2250	625	19681	5467	28116	7810	33739	9372	2249	625
1120	2290	636	20039	5566	28627	7952	34353	9542	2290	636
1150	2351	653	20576	5716	29394	8165	35273	9798	2352	653
1200	2455	682	21470	5964	30672	8520	36806	10224	2454	682
1250	2556	710	22365	6213	31950	8875	38340	10650	2556	710
1300	2657	738	23260	6461	33228	9230	39874	11076	2658	738
1400	2862	795	25049	6958	35784	9940	42941	11928	2863	795
1500	3067	852	26838	7455	38340	10650	46008	12780	3067	852
1600	3272	909	28627	7952	40896	11360	49075	13632	3272	909
200	432	120	3780	1050	5400	1500	6480	1800	432	120
250	540	150	4725	1313	6750	1875	8100	2250	540	150
280	605	168	5292	1470	7560	2100	9072	2520	605	168
300	648	180	5670	1575	8100	2250	9720	2700	648	180
315	680	189	5954	1654	8505	2363	10206	2835	680	189
350	756	210	6615	1838	9450	2625	11340	3150	756	210
355	767	213	6710	1864	9585	2663	11502	3195	767	213
400	864	240	7560	2100	10800	3000	12960	3600	864	240
450	972	270	8505	2363	12150	3375	14580	4050	972	270
500	1080	300	9450	2625	13500	3750	16200	4500	1080	300
550	1188	330	10395	2888	14850	4125	17820	4950	1188	330
560	1210	336	10584	2940	15120	4200	18144	5040	1210	336
600	1296	360	11340	3150	16200	4500	19440	5400	1296	360
630	1361	378	11907	3308	17010	4725	20412	5670	1361	378
650	1404	390	12285	3413	17550	4875	21060	5850	1404	390
700	1512	420	13230	3675	18900	5250	22680	6300	1512	420
710	1534	426	13419	3728	19170	5325	23004	6390	1534	426
750	1620	450	14175	3938	20250	5625	24300	6750	1620	450
800	1728	480	15120	4200	21600	6000	25920	7200	1728	480
850	1836	510	16065	4463	22950	6375	27540	7650	1836	510
900	1944	540	17010	4725	24300	6750	29160	8100	1944	540
950	2052	570	17955	4988	25650	7125	30780	8550	2052	570
1000	2160	600	18900	5250	27000	7500	32400	9000	2160	600
1050	2268	630	19845	5513	28350	7875	34020	9450	2268	630
1100	2376	660	20790	5775	29700	8250	35640	9900	2376	660
1120	2419	672	21168	5880	30240	8400	36288	10080	2419	672
1150	2484	690	21735	6038	31050	8625	37260	10350	2484	690
1200	2592	720	22680	6300	32400	9000	38880	10800	2592	720
1250	2700	750	23625	6563	33750	9375	40500	11250	2700	750
1300	2808	780	24570	6825	35100	9750	42120	11700	2808	780
1400	3024	840	26460	7350	37800	10500	45360	12600	3024	840
1500	3240	900	28350	7875	40500	11250	48600	13500	3240	900
1600	3456	960	30240	8400	43200	12000	51840	14400	3456	960
200	461	128	4032	1120	5760	1600	6912	1920	461	128
250	576	160	5040	1400	7200	2000	8640	2400	576	160

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
280	644	179	5645	1568	8064	2240	9677	2688	645	179
300	691	192	6048	1680	8640	2400	10368	2880	691	192
315	727	202	6350	1764	9072	2520	10886	3024	726	202
350	806	224	7056	1960	10080	2800	12096	3360	806	224
355	817	227	7157	1988	10224	2840	12269	3408	818	227
400	922	256	8064	2240	11520	3200	13824	3840	922	256
450	1037	288	9072	2520	12960	3600	15552	4320	1037	288
500	1152	320	10080	2800	14400	4000	17280	4800	1152	320
550	1267	352	11088	3080	15840	4400	19008	5280	1267	352
560	1289	358	11290	3136	16128	4480	19354	5376	1290	358
600	1382	384	12096	3360	17280	4800	20736	5760	1382	384
630	1451	403	12701	3528	18144	5040	21773	6048	1452	403
650	1498	416	13104	3640	18720	5200	22464	6240	1498	416
700	1613	448	14112	3920	20160	5600	24192	6720	1613	448
710	1634	454	14314	3976	20448	5680	24538	6816	1636	454
750 x 800	1728	480	15120	4200	21600	6000	25920	7200	1728	480
800	1843	512	16128	4480	23040	6400	27648	7680	1843	512
850	1958	544	17136	4760	24480	6800	29376	8160	1958	544
900	2074	576	18144	5040	25920	7200	31104	8640	2074	576
950	2189	608	19152	5320	27360	7600	32832	9120	2189	608
1000	2304	640	20160	5600	28800	8000	34560	9600	2304	640
1050	2419	672	21168	5880	30240	8400	36288	10080	2419	672
1100	2534	704	22176	6160	31680	8800	38016	10560	2534	704
1120	2581	717	22579	6272	32256	8960	38707	10752	2581	717
1150	2650	736	23184	6440	33120	9200	39744	11040	2650	736
1200	2765	768	24192	6720	34560	9600	41472	11520	2765	768
1250	2880	800	25200	7000	36000	10000	43200	12000	2880	800
1300	2995	832	26208	7280	37440	10400	44928	12480	2995	832
1400	3226	896	28224	7840	40320	11200	48384	13440	3226	896
1500	3456	960	30240	8400	43200	12000	51840	14400	3456	960
1600	3686	1024	32256	8960	46080	12800	55296	15360	3686	1024
200	490	136	4284	1190	6120	1700	7344	2040	490	136
250	612	170	5355	1488	7650	2125	9180	2550	612	170
280	684	190	5998	1666	8568	2380	10282	2856	685	190
300	734	204	6426	1785	9180	2550	11016	3060	734	204
315	770	214	6747	1874	9639	2678	11567	3213	771	214
350	857	238	7497	2083	10710	2975	12852	3570	857	238
355	868	241	7604	2112	10863	3018	13036	3621	869	241
400	979	272	8568	2380	12240	3400	14688	4080	979	272
450	1102	306	9639	2678	13770	3825	16524	4590	1102	306
500	1224	340	10710	2975	15300	4250	18360	5100	1224	340
550	1346	374	11781	3273	16830	4675	20196	5610	1346	374
560	1372	381	11995	3332	17136	4760	20563	5712	1371	381
600	1469	408	12852	3570	18360	5100	22032	6120	1469	408
630 x 850	1541	428	13495	3749	19278	5355	23134	6426	1542	428
650	1591	442	13923	3868	19890	5525	23868	6630	1591	442
700	1714	476	14994	4165	21420	5950	25704	7140	1714	476
710	1739	483	15208	4225	21726	6035	26071	7242	1738	483
750	1836	510	16065	4463	22950	6375	27540	7650	1836	510
800	1958	544	17136	4760	24480	6800	29376	8160	1958	544
850	2081	578	18207	5058	26010	7225	31212	8670	2081	578
900	2203	612	19278	5355	27540	7650	33048	9180	2203	612
950	2326	646	20349	5653	29070	8075	34884	9690	2326	646
1000	2448	680	21420	5950	30600	8500	36720	10200	2448	680
1050	2570	714	22491	6248	32130	8925	38556	10710	2570	714
1100	2693	748	23562	6545	33660	9350	40392	11220	2693	748
1120	2743	762	23990	6664	34272	9520	41126	11424	2742	762
1150	2815	782	24633	6843	35190	9775	42228	11730	2815	782
1200	2938	816	25704	7140	36720	10200	44064	12240	2938	816

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
1250	3060	850	26775	7438	38250	10625	45900	12750	3060	850
1300	3182	884	27846	7735	39780	11050	47736	13260	3182	884
1400 x 850	3427	952	29988	8330	42840	11900	51408	14280	3427	952
1500	3672	1020	32130	8925	45900	12750	55080	15300	3672	1020
1600	3917	1088	34272	9520	48960	13600	58752	16320	3917	1088
200	518	144	4536	1260	6480	1800	7776	2160	518	144
250	648	180	5670	1575	8100	2250	9720	2700	648	180
280	727	202	6350	1764	9072	2520	10886	3024	726	202
300	778	216	6804	1890	9720	2700	11664	3240	778	216
315	817	227	7144	1985	10206	2835	12247	3402	817	227
350	907	252	7938	2205	11340	3150	13608	3780	907	252
355	922	256	8051	2237	11502	3195	13802	3834	920	256
400	1037	288	9072	2520	12960	3600	15552	4320	1037	288
450	1166	324	10206	2835	14580	4050	17496	4860	1166	324
500	1296	360	11340	3150	16200	4500	19440	5400	1296	360
550	1426	396	12474	3465	17820	4950	21384	5940	1426	396
560	1451	403	12701	3528	18144	5040	21773	6048	1452	403
600	1555	432	13608	3780	19440	5400	23328	6480	1555	432
630	1634	454	14288	3969	20412	5670	24494	6804	1633	454
650	1685	468	14742	4095	21060	5850	25272	7020	1685	468
700	1814	504	15876	4410	22680	6300	27216	7560	1814	504
710 x 900	1840	511	16103	4473	23004	6390	27605	7668	1840	511
750	1944	540	17010	4725	24300	6750	29160	8100	1944	540
800	2074	576	18144	5040	25920	7200	31104	8640	2074	576
850	2203	612	19278	5355	27540	7650	33048	9180	2203	612
900	2333	648	20412	5670	29160	8100	34992	9720	2333	648
950	2462	684	21546	5985	30780	8550	36936	10260	2462	684
1000	2592	720	22680	6300	32400	9000	38880	10800	2592	720
1050	2722	756	23814	6615	34020	9450	40824	11340	2722	756
1100	2851	792	24948	6930	35640	9900	42768	11880	2851	792
1120	2902	806	25402	7056	36288	10080	43546	12096	2903	806
1150	2981	828	26082	7245	37260	10350	44712	12420	2981	828
1200	3110	864	27216	7560	38880	10800	46656	12960	3110	864
1250	3240	900	28350	7875	40500	11250	48600	13500	3240	900
1300	3370	936	29484	8190	42120	11700	50544	14040	3370	936
1400	3629	1008	31752	8820	45360	12600	54432	15120	3629	1008
1500	3888	1080	34020	9450	48600	13500	58320	16200	3888	1080
1600	4147	1152	36288	10080	51840	14400	62208	17280	4147	1152
200	547	152	4788	1330	6840	1900	8208	2280	547	152
250	684	190	5985	1663	8550	2375	10260	2850	684	190
280	767	213	6703	1862	9576	2660	11491	3192	766	213
300	821	228	7182	1995	10260	2850	12312	3420	821	228
315	860	239	7541	2095	10773	2993	12928	3591	862	239
350	958	266	8379	2328	11970	3325	14364	3990	958	266
355	972	270	8499	2361	12141	3373	14569	4047	971	270
400	1094	304	9576	2660	13680	3800	16416	4560	1094	304
450	1231	342	10773	2993	15390	4275	18468	5130	1231	342
500	1368	380	11970	3325	17100	4750	20520	5700	1368	380
550 x 950	1505	418	13167	3658	18810	5225	22572	6270	1505	418
560	1534	426	13406	3724	19152	5320	22982	6384	1532	426
600	1642	456	14364	3990	20520	5700	24624	6840	1642	456
630	1724	479	15082	4190	21546	5985	25855	7182	1724	479
650	1778	494	15561	4323	22230	6175	26676	7410	1778	494
700	1915	532	16758	4655	23940	6650	28728	7980	1915	532
710	1944	540	16997	4722	24282	6745	29138	8094	1943	540
750	2052	570	17955	4988	25650	7125	30780	8550	2052	570
800	2189	608	19152	5320	27360	7600	32832	9120	2189	608
850	2326	646	20349	5653	29070	8075	34884	9690	2326	646
900	2462	684	21546	5985	30780	8550	36936	10260	2462	684

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
950	2599	722	22743	6318	32490	9025	38988	10830	2599	722
1000	2736	760	23940	6650	34200	9500	41040	11400	2736	760
1050	2873	798	25137	6983	35910	9975	43092	11970	2873	798
1100	3010	836	26334	7315	37620	10450	45144	12540	3010	836
1120	3064	851	26813	7448	38304	10640	45965	12768	3064	851
1150	3146	874	27531	7648	39330	10925	47196	13110	3146	874
1200	3283	912	28728	7980	41040	11400	49248	13680	3283	912
1250	3420	950	29925	8313	42750	11875	51300	14250	3420	950
1300	3557	988	31122	8645	44460	12350	53352	14820	3557	988
1400	3830	1064	33516	9310	47880	13300	57456	15960	3830	1064
1500	4104	1140	35910	9975	51300	14250	61560	17100	4104	1140
1600	4378	1216	38304	10640	54720	15200	65664	18240	4378	1216
200	576	160	5040	1400	7200	2000	8640	2400	576	160
250	720	200	6300	1750	9000	2500	10800	3000	720	200
280	806	224	7056	1960	10080	2800	12096	3360	806	224
300	864	240	7560	2100	10800	3000	12960	3600	864	240
315	907	252	7938	2205	11340	3150	13608	3780	907	252
350	1008	280	8820	2450	12600	3500	15120	4200	1008	280
355	1022	284	8946	2485	12780	3550	15336	4260	1022	284
400	1152	320	10080	2800	14400	4000	17280	4800	1152	320
450	1296	360	11340	3150	16200	4500	19440	5400	1296	360
500	1440	400	12600	3500	18000	5000	21600	6000	1440	400
550	1584	440	13860	3850	19800	5500	23760	6600	1584	440
560	1613	448	14112	3920	20160	5600	24192	6720	1613	448
600	1728	480	15120	4200	21600	6000	25920	7200	1728	480
630	1814	504	15876	4410	22680	6300	27216	7560	1814	504
650	1872	520	16380	4550	23400	6500	28080	7800	1872	520
700	2016	560	17640	4900	25200	7000	30240	8400	2016	560
710	2045	568	17892	4970	25560	7100	30672	8520	2045	568
750	2160	600	18900	5250	27000	7500	32400	9000	2160	600
800	2304	640	20160	5600	28800	8000	34560	9600	2304	640
850	2448	680	21420	5950	30600	8500	36720	10200	2448	680
900	2592	720	22680	6300	32400	9000	38880	10800	2592	720
950	2736	760	23940	6650	34200	9500	41040	11400	2736	760
1000	2880	800	25200	7000	36000	10000	43200	12000	2880	800
1050	3024	840	26460	7350	37800	10500	45360	12600	3024	840
1100	3168	880	27720	7700	39600	11000	47520	13200	3168	880
1120	3226	896	28224	7840	40320	11200	48384	13440	3226	896
1150	3312	920	28980	8050	41400	11500	49680	13800	3312	920
1200	3456	960	30240	8400	43200	12000	51840	14400	3456	960
1250	3600	1000	31500	8750	45000	12500	54000	15000	3600	1000
1300	3744	1040	32760	9100	46800	13000	56160	15600	3744	1040
1400	4032	1120	35280	9800	50400	14000	60480	16800	4032	1120
1500	4320	1200	37800	10500	54000	15000	64800	18000	4320	1200
1600	4608	1280	40320	11200	57600	16000	69120	19200	4608	1280
200	605	168	5292	1470	7560	2100	9072	2520	605	168
250	756	210	6615	1838	9450	2625	11340	3150	756	210
280	846	235	7409	2058	10584	2940	12701	3528	847	235
300	907	252	7938	2205	11340	3150	13608	3780	907	252
315	954	265	8335	2315	11907	3308	14288	3969	953	265
350	1058	294	9261	2573	13230	3675	15876	4410	1058	294
355	1073	298	9393	2609	13419	3728	16103	4473	1074	298
400	1210	336	10584	2940	15120	4200	18144	5040	1210	336
450	1361	378	11907	3308	17010	4725	20412	5670	1361	378
500	1512	420	13230	3675	18900	5250	22680	6300	1512	420
550	1663	462	14553	4043	20790	5775	24948	6930	1663	462
560	1692	470	14818	4116	21168	5880	25402	7056	1693	470
600	1814	504	15876	4410	22680	6300	27216	7560	1814	504
630	1904	529	16670	4631	23814	6615	28577	7938	1905	529

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
650	1966	546	17199	4778	24570	6825	29484	8190	1966	546
700	2117	588	18522	5145	26460	7350	31752	8820	2117	588
710	2146	596	18787	5219	26838	7455	32206	8946	2147	596
750	2268	630	19845	5513	28350	7875	34020	9450	2268	630
800	2419	672	21168	5880	30240	8400	36288	10080	2419	672
850	2570	714	22491	6248	32130	8925	38556	10710	2570	714
900	2722	756	23814	6615	34020	9450	40824	11340	2722	756
950	2873	798	25137	6983	35910	9975	43092	11970	2873	798
1000	3024	840	26460	7350	37800	10500	45360	12600	3024	840
1050 x 1050	3175	882	27783	7718	39690	11025	47628	13230	3175	882
1100	3326	924	29106	8085	41580	11550	49896	13860	3326	924
1120	3388	941	29635	8232	42336	11760	50803	14112	3387	941
1150	3478	966	30429	8453	43470	12075	52164	14490	3478	966
1200	3629	1008	31752	8820	45360	12600	54432	15120	3629	1008
1250	3780	1050	33075	9188	47250	13125	56700	15750	3780	1050
1300	3931	1092	34398	9555	49140	13650	58968	16380	3931	1092
1400	4234	1176	37044	10290	52920	14700	63504	17640	4234	1176
1500	4536	1260	39690	11025	56700	15750	68040	18900	4536	1260
1600	4838	1344	42336	11760	60480	16800	72576	20160	4838	1344
200	634	176	5544	1540	7920	2200	9504	2640	634	176
250	792	220	6930	1925	9900	2750	11880	3300	792	220
280	886	246	7762	2156	11088	3080	13306	3696	887	246
300	950	264	8316	2310	11880	3300	14256	3960	950	264
315	997	277	8732	2426	12474	3465	14969	4158	998	277
350	1109	308	9702	2695	13860	3850	16632	4620	1109	308
355	1123	312	9841	2734	14058	3905	16870	4686	1125	312
400	1267	352	11088	3080	15840	4400	19008	5280	1267	352
450	1426	396	12474	3465	17820	4950	21384	5940	1426	396
500	1584	440	13860	3850	19800	5500	23760	6600	1584	440
550	1742	484	15246	4235	21780	6050	26136	7260	1742	484
560	1775	493	15523	4312	22176	6160	26611	7392	1774	493
600	1901	528	16632	4620	23760	6600	28512	7920	1901	528
630	1994	554	17464	4851	24948	6930	29938	8316	1996	554
650	2059	572	18018	5005	25740	7150	30888	8580	2059	572
700	2218	616	19404	5390	27720	7700	33264	9240	2218	616
710 x 1100	2250	625	19681	5467	28116	7810	33739	9372	2249	625
750	2376	660	20790	5775	29700	8250	35640	9900	2376	660
800	2534	704	22176	6160	31680	8800	38016	10560	2534	704
850	2693	748	23562	6545	33660	9350	40392	11220	2693	748
900	2851	792	24948	6930	35640	9900	42768	11880	2851	792
950	3010	836	26334	7315	37620	10450	45144	12540	3010	836
1000	3168	880	27720	7700	39600	11000	47520	13200	3168	880
1050	3326	924	29106	8085	41580	11550	49896	13860	3326	924
1100	3485	968	30492	8470	43560	12100	52272	14520	3485	968
1120	3550	986	31046	8624	44352	12320	53222	14784	3548	986
1150	3643	1012	31878	8855	45540	12650	54648	15180	3643	1012
1200	3802	1056	33264	9240	47520	13200	57024	15840	3802	1056
1250	3960	1100	34650	9625	49500	13750	59400	16500	3960	1100
1300	4118	1144	36036	10010	51480	14300	61776	17160	4118	1144
1400	4435	1232	38808	10780	55440	15400	66528	18480	4435	1232
1500	4752	1320	41580	11550	59400	16500	71280	19800	4752	1320
1600	5069	1408	44352	12320	63360	17600	76032	21120	5069	1408
200	644	179	5645	1568	8064	2240	9677	2688	645	179
250	806	224	7056	1960	10080	2800	12096	3360	806	224
280	904	251	7903	2195	11290	3136	13548	3763	903	251
300 x 1120	968	269	8467	2352	12096	3360	14515	4032	968	269
315	1015	282	8891	2470	12701	3528	15241	4234	1016	282
350	1130	314	9878	2744	14112	3920	16934	4704	1129	314
355	1145	318	10020	2783	14314	3976	17176	4771	1145	318

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
400	1289	358	11290	3136	16128	4480	19354	5376	1290	358
450	1451	403	12701	3528	18144	5040	21773	6048	1452	403
500	1613	448	14112	3920	20160	5600	24192	6720	1613	448
550	1775	493	15523	4312	22176	6160	26611	7392	1774	493
560	1807	502	15805	4390	22579	6272	27095	7526	1806	502
600	1937	538	16934	4704	24192	6720	29030	8064	1935	538
630	2030	564	17781	4939	25402	7056	30482	8467	2032	565
650	2095	582	18346	5096	26208	7280	31450	8736	2097	582
700	2257	627	19757	5488	28224	7840	33869	9408	2258	627
710	2290	636	20039	5566	28627	7952	34353	9542	2290	636
750	2419	672	21168	5880	30240	8400	36288	10080	2419	672
800	2581	717	22579	6272	32256	8960	38707	10752	2581	717
850	2743	762	23990	6664	34272	9520	41126	11424	2742	762
900	2902	806	25402	7056	36288	10080	43546	12096	2903	806
950	3064	851	26813	7448	38304	10640	45965	12768	3064	851
1000	3226	896	28224	7840	40320	11200	48384	13440	3226	896
1050	3388	941	29635	8232	42336	11760	50803	14112	3387	941
1100	3550	986	31046	8624	44352	12320	53222	14784	3548	986
1120	3614	1004	31611	8781	45158	12544	54190	15053	3613	1004
1150	3708	1030	32458	9016	46368	12880	55642	15456	3709	1030
1200	3870	1075	33869	9408	48384	13440	58061	16128	3871	1075
1250	4032	1120	35280	9800	50400	14000	60480	16800	4032	1120
1300	4194	1165	36691	10192	52416	14560	62899	17472	4193	1165
1400	4514	1254	39514	10976	56448	15680	67738	18816	4516	1254
1500	4838	1344	42336	11760	60480	16800	72576	20160	4838	1344
1600	5162	1434	45158	12544	64512	17920	77414	21504	5161	1434
200	662	184	5796	1610	8280	2300	9936	2760	662	184
250	828	230	7245	2013	10350	2875	12420	3450	828	230
280	929	258	8114	2254	11592	3220	13910	3864	927	258
300	994	276	8694	2415	12420	3450	14904	4140	994	276
315	1044	290	9129	2536	13041	3623	15649	4347	1043	290
350	1159	322	10143	2818	14490	4025	17388	4830	1159	322
355	1177	327	10288	2858	14697	4083	17636	4899	1176	327
400	1325	368	11592	3220	16560	4600	19872	5520	1325	368
450	1490	414	13041	3623	18630	5175	22356	6210	1490	414
500	1656	460	14490	4025	20700	5750	24840	6900	1656	460
550	1822	506	15939	4428	22770	6325	27324	7590	1822	506
560	1854	515	16229	4508	23184	6440	27821	7728	1855	515
600	1987	552	17388	4830	24840	6900	29808	8280	1987	552
630	2088	580	18257	5072	26082	7245	31298	8694	2087	580
650	2153	598	18837	5233	26910	7475	32292	8970	2153	598
700	2318	644	20286	5635	28980	8050	34776	9660	2318	644
710	2351	653	20576	5716	29394	8165	35273	9798	2352	653
750	2484	690	21735	6038	31050	8625	37260	10350	2484	690
800	2650	736	23184	6440	33120	9200	39744	11040	2650	736
850	2815	782	24633	6843	35190	9775	42228	11730	2815	782
900	2981	828	26082	7245	37260	10350	44712	12420	2981	828
950	3146	874	27531	7648	39330	10925	47196	13110	3146	874
1000	3312	920	28980	8050	41400	11500	49680	13800	3312	920
1050	3478	966	30429	8453	43470	12075	52164	14490	3478	966
1100	3643	1012	31878	8855	45540	12650	54648	15180	3643	1012
1120	3708	1030	32458	9016	46368	12880	55642	15456	3709	1030
1150	3809	1058	33327	9258	47610	13225	57132	15870	3809	1058
1200	3974	1104	34776	9660	49680	13800	59616	16560	3974	1104
1250	4140	1150	36225	10063	51750	14375	62100	17250	4140	1150
1300	4306	1196	37674	10465	53820	14950	64584	17940	4306	1196
1400	4637	1288	40572	11270	57960	16100	69552	19320	4637	1288
1500	4968	1380	43470	12075	62100	17250	74520	20700	4968	1380
1600	5299	1472	46368	12880	66240	18400	79488	22080	5299	1472

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
200	691	192	6048	1680	8640	2400	10368	2880	691	192
250	864	240	7560	2100	10800	3000	12960	3600	864	240
280	968	269	8467	2352	12096	3360	14515	4032	968	269
300	1037	288	9072	2520	12960	3600	15552	4320	1037	288
315	1087	302	9526	2646	13608	3780	16330	4536	1089	302
350	1210	336	10584	2940	15120	4200	18144	5040	1210	336
355	1228	341	10735	2982	15336	4260	18403	5112	1227	341
400	1382	384	12096	3360	17280	4800	20736	5760	1382	384
450	1555	432	13608	3780	19440	5400	23328	6480	1555	432
500	1728	480	15120	4200	21600	6000	25920	7200	1728	480
550	1901	528	16632	4620	23760	6600	28512	7920	1901	528
560	1937	538	16934	4704	24192	6720	29030	8064	1935	538
600	2074	576	18144	5040	25920	7200	31104	8640	2074	576
630	2178	605	19051	5292	27216	7560	32659	9072	2177	605
650	2246	624	19656	5460	28080	7800	33696	9360	2246	624
700	2419	672	21168	5880	30240	8400	36288	10080	2419	672
710 x 1200	2455	682	21470	5964	30672	8520	36806	10224	2454	682
750	2592	720	22680	6300	32400	9000	38880	10800	2592	720
800	2765	768	24192	6720	34560	9600	41472	11520	2765	768
850	2938	816	25704	7140	36720	10200	44064	12240	2938	816
900	3110	864	27216	7560	38880	10800	46656	12960	3110	864
950	3283	912	28728	7980	41040	11400	49248	13680	3283	912
1000	3456	960	30240	8400	43200	12000	51840	14400	3456	960
1050	3629	1008	31752	8820	45360	12600	54432	15120	3629	1008
1100	3802	1056	33264	9240	47520	13200	57024	15840	3802	1056
1120	3870	1075	33869	9408	48384	13440	58061	16128	3871	1075
1150	3974	1104	34776	9660	49680	13800	59616	16560	3974	1104
1200	4147	1152	36288	10080	51840	14400	62208	17280	4147	1152
1250	4320	1200	37800	10500	54000	15000	64800	18000	4320	1200
1300	4493	1248	39312	10920	56160	15600	67392	18720	4493	1248
1400	4838	1344	42336	11760	60480	16800	72576	20160	4838	1344
1500	5184	1440	45360	12600	64800	18000	77760	21600	5184	1440
1600	5530	1536	48384	13440	69120	19200	82944	23040	5530	1536
200	720	200	6300	1750	9000	2500	10800	3000	720	200
250	900	250	7875	2188	11250	3125	13500	3750	900	250
280	1008	280	8820	2450	12600	3500	15120	4200	1008	280
300	1080	300	9450	2625	13500	3750	16200	4500	1080	300
315	1134	315	9923	2756	14175	3938	17010	4725	1134	315
350	1260	350	11025	3063	15750	4375	18900	5250	1260	350
355	1278	355	11183	3106	15975	4438	19170	5325	1278	355
400	1440	400	12600	3500	18000	5000	21600	6000	1440	400
450	1620	450	14175	3938	20250	5625	24300	6750	1620	450
500	1800	500	15750	4375	22500	6250	27000	7500	1800	500
550	1980	550	17325	4813	24750	6875	29700	8250	1980	550
560	2016	560	17640	4900	25200	7000	30240	8400	2016	560
600	2160	600	18900	5250	27000	7500	32400	9000	2160	600
630 x 1250	2268	630	19845	5513	28350	7875	34020	9450	2268	630
650	2340	650	20475	5688	29250	8125	35100	9750	2340	650
700	2520	700	22050	6125	31500	8750	37800	10500	2520	700
710	2556	710	22365	6213	31950	8875	38340	10650	2556	710
750	2700	750	23625	6563	33750	9375	40500	11250	2700	750
800	2880	800	25200	7000	36000	10000	43200	12000	2880	800
850	3060	850	26775	7438	38250	10625	45900	12750	3060	850
900	3240	900	28350	7875	40500	11250	48600	13500	3240	900
950	3420	950	29925	8313	42750	11875	51300	14250	3420	950
1000	3600	1000	31500	8750	45000	12500	54000	15000	3600	1000
1050	3780	1050	33075	9188	47250	13125	56700	15750	3780	1050
1100	3960	1100	34650	9625	49500	13750	59400	16500	3960	1100
1120	4032	1120	35280	9800	50400	14000	60480	16800	4032	1120

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
1150	4140	1150	36225	10063	51750	14375	62100	17250	4140	1150
1200	4320	1200	37800	10500	54000	15000	64800	18000	4320	1200
1250	4500	1250	39375	10938	56250	15625	67500	18750	4500	1250
1300 x 1250	4680	1300	40950	11375	58500	16250	70200	19500	4680	1300
1400	5040	1400	44100	12250	63000	17500	75600	21000	5040	1400
1500	5400	1500	47250	13125	67500	18750	81000	22500	5400	1500
1600	5760	1600	50400	14000	72000	20000	86400	24000	5760	1600
200	749	208	6552	1820	9360	2600	11232	3120	749	208
250	936	260	8190	2275	11700	3250	14040	3900	936	260
280	1048	291	9173	2548	13104	3640	15725	4368	1048	291
300	1123	312	9828	2730	14040	3900	16848	4680	1123	312
315	1181	328	10319	2867	14742	4095	17690	4914	1179	328
350	1310	364	11466	3185	16380	4550	19656	5460	1310	364
355	1328	369	11630	3231	16614	4615	19937	5538	1329	369
400	1498	416	13104	3640	18720	5200	22464	6240	1498	416
450	1685	468	14742	4095	21060	5850	25272	7020	1685	468
500	1872	520	16380	4550	23400	6500	28080	7800	1872	520
550	2059	572	18018	5005	25740	7150	30888	8580	2059	572
560	2095	582	18346	5096	26208	7280	31450	8736	2097	582
600	2246	624	19656	5460	28080	7800	33696	9360	2246	624
630	2358	655	20639	5733	29484	8190	35381	9828	2359	655
650	2434	676	21294	5915	30420	8450	36504	10140	2434	676
700	2621	728	22932	6370	32760	9100	39312	10920	2621	728
710 x 1300	2657	738	23260	6461	33228	9230	39874	11076	2658	738
750	2808	780	24570	6825	35100	9750	42120	11700	2808	780
800	2995	832	26208	7280	37440	10400	44928	12480	2995	832
850	3182	884	27846	7735	39780	11050	47736	13260	3182	884
900	3370	936	29484	8190	42120	11700	50544	14040	3370	936
950	3557	988	31122	8645	44460	12350	53352	14820	3557	988
1000	3744	1040	32760	9100	46800	13000	56160	15600	3744	1040
1050	3931	1092	34398	9555	49140	13650	58968	16380	3931	1092
1100	4118	1144	36036	10010	51480	14300	61776	17160	4118	1144
1120	4194	1165	36691	10192	52416	14560	62899	17472	4193	1165
1150	4306	1196	37674	10465	53820	14950	64584	17940	4306	1196
1200	4493	1248	39312	10920	56160	15600	67392	18720	4493	1248
1250	4680	1300	40950	11375	58500	16250	70200	19500	4680	1300
1300	4867	1352	42588	11830	60840	16900	73008	20280	4867	1352
1400	5242	1456	45864	12740	65520	18200	78624	21840	5242	1456
1500	5616	1560	49140	13650	70200	19500	84240	23400	5616	1560
1600	5990	1664	52416	14560	74880	20800	89856	24960	5990	1664
200	806	224	7056	1960	10080	2800	12096	3360	806	224
250	1008	280	8820	2450	12600	3500	15120	4200	1008	280
280	1130	314	9878	2744	14112	3920	16934	4704	1129	314
300	1210	336	10584	2940	15120	4200	18144	5040	1210	336
315	1271	353	11113	3087	15876	4410	19051	5292	1270	353
350	1411	392	12348	3430	17640	4900	21168	5880	1411	392
355	1433	398	12524	3479	17892	4970	21470	5964	1431	398
400	1613	448	14112	3920	20160	5600	24192	6720	1613	448
450	1814	504	15876	4410	22680	6300	27216	7560	1814	504
500 x 1400	2016	560	17640	4900	25200	7000	30240	8400	2016	560
550	2218	616	19404	5390	27720	7700	33264	9240	2218	616
560	2257	627	19757	5488	28224	7840	33869	9408	2258	627
600	2419	672	21168	5880	30240	8400	36288	10080	2419	672
630	2542	706	22226	6174	31752	8820	38102	10584	2540	706
650	2621	728	22932	6370	32760	9100	39312	10920	2621	728
700	2822	784	24696	6860	35280	9800	42336	11760	2822	784
710	2862	795	25049	6958	35784	9940	42941	11928	2863	795
750	3024	840	26460	7350	37800	10500	45360	12600	3024	840
800	3226	896	28224	7840	40320	11200	48384	13440	3226	896

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/V _{Δp}	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
850	3427	952	29988	8330	42840	11900	51408	14280	3427	952
900	3629	1008	31752	8820	45360	12600	54432	15120	3629	1008
950	3830	1064	33516	9310	47880	13300	57456	15960	3830	1064
1000	4032	1120	35280	9800	50400	14000	60480	16800	4032	1120
1050	4234	1176	37044	10290	52920	14700	63504	17640	4234	1176
1100	4435	1232	38808	10780	55440	15400	66528	18480	4435	1232
1120	4514	1254	39514	10976	56448	15680	67738	18816	4516	1254
1150	4637	1288	40572	11270	57960	16100	69552	19320	4637	1288
1200	4838	1344	42336	11760	60480	16800	72576	20160	4838	1344
1250	5040	1400	44100	12250	63000	17500	75600	21000	5040	1400
1300	5242	1456	45864	12740	65520	18200	78624	21840	5242	1456
1400	5645	1568	49392	13720	70560	19600	84672	23520	5645	1568
1500	6048	1680	52920	14700	75600	21000	90720	25200	6048	1680
1600	6451	1792	56448	15680	80640	22400	96768	26880	6451	1792
200	864	240	7560	2100	10800	3000	12960	3600	864	240
250	1080	300	9450	2625	13500	3750	16200	4500	1080	300
280	1210	336	10584	2940	15120	4200	18144	5040	1210	336
300	1296	360	11340	3150	16200	4500	19440	5400	1296	360
315	1361	378	11907	3308	17010	4725	20412	5670	1361	378
350	1512	420	13230	3675	18900	5250	22680	6300	1512	420
355	1534	426	13419	3728	19170	5325	23004	6390	1534	426
400	1728	480	15120	4200	21600	6000	25920	7200	1728	480
450	1944	540	17010	4725	24300	6750	29160	8100	1944	540
500	2160	600	18900	5250	27000	7500	32400	9000	2160	600
550	2376	660	20790	5775	29700	8250	35640	9900	2376	660
560	2419	672	21168	5880	30240	8400	36288	10080	2419	672
600	2592	720	22680	6300	32400	9000	38880	10800	2592	720
630	2722	756	23814	6615	34020	9450	40824	11340	2722	756
650	2808	780	24570	6825	35100	9750	42120	11700	2808	780
700	3024	840	26460	7350	37800	10500	45360	12600	3024	840
710	3067	852	26838	7455	38340	10650	46008	12780	3067	852
750	3240	900	28350	7875	40500	11250	48600	13500	3240	900
800	3456	960	30240	8400	43200	12000	51840	14400	3456	960
850	3672	1020	32130	8925	45900	12750	55080	15300	3672	1020
900	3888	1080	34020	9450	48600	13500	58320	16200	3888	1080
950	4104	1140	35910	9975	51300	14250	61560	17100	4104	1140
1000	4320	1200	37800	10500	54000	15000	64800	18000	4320	1200
1050	4536	1260	39690	11025	56700	15750	68040	18900	4536	1260
1100	4752	1320	41580	11550	59400	16500	71280	19800	4752	1320
1120	4838	1344	42336	11760	60480	16800	72576	20160	4838	1344
1150	4968	1380	43470	12075	62100	17250	74520	20700	4968	1380
1200	5184	1440	45360	12600	64800	18000	77760	21600	5184	1440
1250	5400	1500	47250	13125	67500	18750	81000	22500	5400	1500
1300	5616	1560	49140	13650	70200	19500	84240	23400	5616	1560
1400	6048	1680	52920	14700	75600	21000	90720	25200	6048	1680
1500	6480	1800	56700	15750	81000	22500	97200	27000	6480	1800
200	922	256	8064	2240	11520	3200	13824	3840	922	256
250	1152	320	10080	2800	14400	4000	17280	4800	1152	320
280	1289	358	11290	3136	16128	4480	19354	5376	1290	358
300	1382	384	12096	3360	17280	4800	20736	5760	1382	384
315	1451	403	12701	3528	18144	5040	21773	6048	1452	403
350	1613	448	14112	3920	20160	5600	24192	6720	1613	448
355	1634	454	14314	3976	20448	5680	24538	6816	1636	454
400	1843	512	16128	4480	23040	6400	27648	7680	1843	512
450	2074	576	18144	5040	25920	7200	31104	8640	2074	576
500	2304	640	20160	5600	28800	8000	34560	9600	2304	640
550	2534	704	22176	6160	31680	8800	38016	10560	2534	704
560	2581	717	22579	6272	32256	8960	38707	10752	2581	717
600	2765	768	24192	6720	34560	9600	41472	11520	2765	768

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/√Δp		
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	
950 x 1600	630	2902	806	25402	7056	36288	10080	43546	12096	2903	806
	650	2995	832	26208	7280	37440	10400	44928	12480	2995	832
	700	3226	896	28224	7840	40320	11200	48384	13440	3226	896
	710	3272	909	28627	7952	40896	11360	49075	13632	3272	909
	750	3456	960	30240	8400	43200	12000	51840	14400	3456	960
	800	3686	1024	32256	8960	46080	12800	55296	15360	3686	1024
	850	3917	1088	34272	9520	48960	13600	58752	16320	3917	1088
	900	4147	1152	36288	10080	51840	14400	62208	17280	4147	1152
	950	4378	1216	38304	10640	54720	15200	65664	18240	4378	1216
	1000	4608	1280	40320	11200	57600	16000	69120	19200	4608	1280
	1050	4838	1344	42336	11760	60480	16800	72576	20160	4838	1344
	1100	5069	1408	44352	12320	63360	17600	76032	21120	5069	1408
	1120	5162	1434	45158	12544	64512	17920	77414	21504	5161	1434
	1150	5299	1472	46368	12880	66240	18400	79488	22080	5299	1472
	1200	5530	1536	48384	13440	69120	19200	82944	23040	5530	1536
	1250	5760	1600	50400	14000	72000	20000	86400	24000	5760	1600
	1300	5990	1664	52416	14560	74880	20800	89856	24960	5990	1664
560 x 1700	200	979	272	8568	2380	12240	3400	14688	4080	979	272
	250	1224	340	10710	2975	15300	4250	18360	5100	1224	340
	280	1372	381	11995	3332	17136	4760	20563	5712	1371	381
	300	1469	408	12852	3570	18360	5100	22032	6120	1469	408
	315	1541	428	13495	3749	19278	5355	23134	6426	1542	428
	350	1714	476	14994	4165	21420	5950	25704	7140	1714	476
	355	1739	483	15208	4225	21726	6035	26071	7242	1738	483
	400	1958	544	17136	4760	24480	6800	29376	8160	1958	544
	450	2203	612	19278	5355	27540	7650	33048	9180	2203	612
	500	2448	680	21420	5950	30600	8500	36720	10200	2448	680
	550	2693	748	23562	6545	33660	9350	40392	11220	2693	748
	560	2743	762	23990	6664	34272	9520	41126	11424	2742	762
	600	2938	816	25704	7140	36720	10200	44064	12240	2938	816
	630	3085	857	26989	7497	38556	10710	46267	12852	3085	857
	650	3182	884	27846	7735	39780	11050	47736	13260	3182	884
	700	3427	952	29988	8330	42840	11900	51408	14280	3427	952
	710	3478	966	30416	8449	43452	12070	52142	14484	3476	966
	750	3672	1020	32130	8925	45900	12750	55080	15300	3672	1020
	800	3917	1088	34272	9520	48960	13600	58752	16320	3917	1088
	850	4162	1156	36414	10115	52020	14450	62424	17340	4162	1156
	900	4406	1224	38556	10710	55080	15300	66096	18360	4406	1224
	950	4651	1292	40698	11305	58140	16150	69768	19380	4651	1292
	1000	4896	1360	42840	11900	61200	17000	73440	20400	4896	1360
	500 x 1800	200	1037	288	9072	2520	12960	3600	15552	4320	1037
250		1296	360	11340	3150	16200	4500	19440	5400	1296	360
280		1451	403	12701	3528	18144	5040	21773	6048	1452	403
300		1555	432	13608	3780	19440	5400	23328	6480	1555	432
315		1634	454	14288	3969	20412	5670	24494	6804	1633	454
350		1814	504	15876	4410	22680	6300	27216	7560	1814	504
355		1840	511	16103	4473	23004	6390	27605	7668	1840	511
400		2074	576	18144	5040	25920	7200	31104	8640	2074	576
450		2333	648	20412	5670	29160	8100	34992	9720	2333	648
500		2592	720	22680	6300	32400	9000	38880	10800	2592	720
550		2851	792	24948	6930	35640	9900	42768	11880	2851	792
560		2902	806	25402	7056	36288	10080	43546	12096	2903	806
600		3110	864	27216	7560	38880	10800	46656	12960	3110	864
630		3265	907	28577	7938	40824	11340	48989	13608	3266	907
650		3370	936	29484	8190	42120	11700	50544	14040	3370	936
700		3629	1008	31752	8820	45360	12600	54432	15120	3629	1008
710		3679	1022	32206	8946	46008	12780	55210	15336	3681	1022
750	3888	1080	34020	9450	48600	13500	58320	16200	3888	1080	
800	4147	1152	36288	10080	51840	14400	62208	17280	4147	1152	

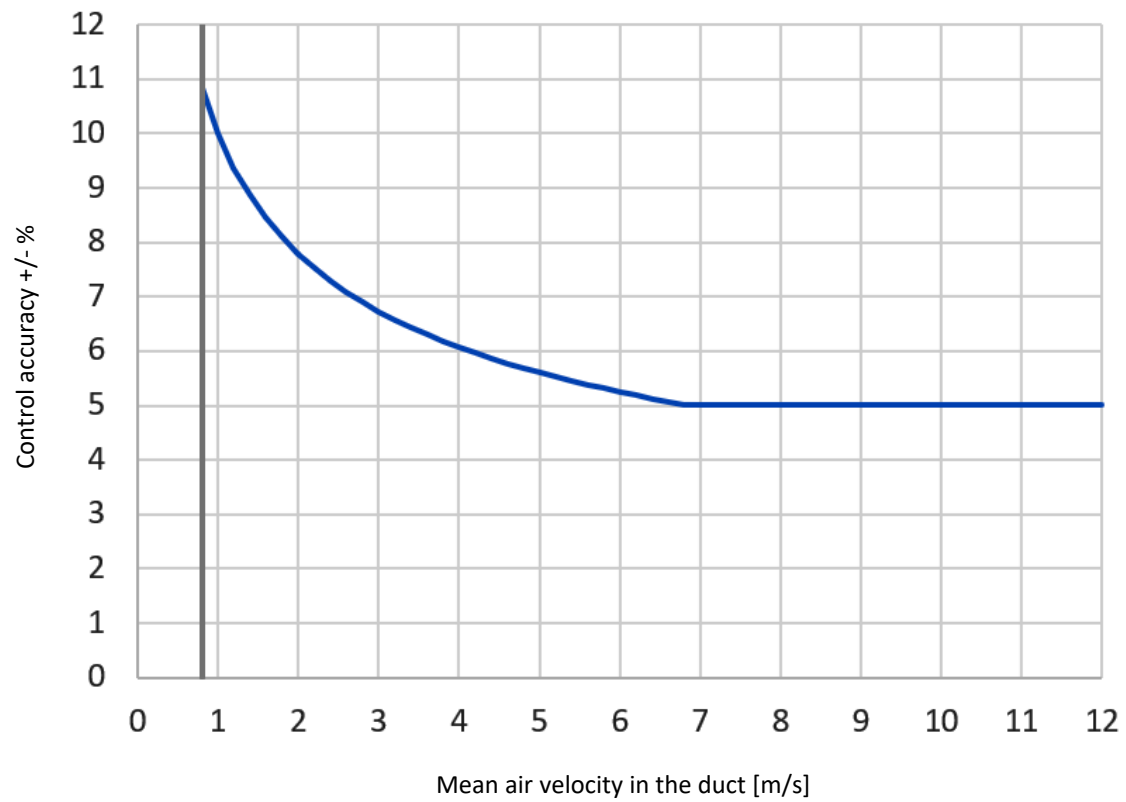
V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

A x B [mm]	V _{min}		V _{nom} 7m/s		V _{nom} 10m/s		V _{nom} 12m/s		k k = V/VΔp	
	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]
200	1094	304	9576	2660	13680	3800	16416	4560	1094	304
250	1368	380	11970	3325	17100	4750	20520	5700	1368	380
280	1534	426	13406	3724	19152	5320	22982	6384	1532	426
300	1642	456	14364	3990	20520	5700	24624	6840	1642	456
315	1724	479	15082	4190	21546	5985	25855	7182	1724	479
350	1915	532	16758	4655	23940	6650	28728	7980	1915	532
355	1944	540	16997	4722	24282	6745	29138	8094	1943	540
400	2189	608	19152	5320	27360	7600	32832	9120	2189	608
450	2462	684	21546	5985	30780	8550	36936	10260	2462	684
500 x 1900	2736	760	23940	6650	34200	9500	41040	11400	2736	760
550	3010	836	26334	7315	37620	10450	45144	12540	3010	836
560	3064	851	26813	7448	38304	10640	45965	12768	3064	851
600	3283	912	28728	7980	41040	11400	49248	13680	3283	912
630	3449	958	30164	8379	43092	11970	51710	14364	3447	958
650	3557	988	31122	8645	44460	12350	53352	14820	3557	988
700	3830	1064	33516	9310	47880	13300	57456	15960	3830	1064
710	3884	1079	33995	9443	48564	13490	58277	16188	3885	1079
750	4104	1140	35910	9975	51300	14250	61560	17100	4104	1140
800	4378	1216	38304	10640	54720	15200	65664	18240	4378	1216
200	1152	320	10080	2800	14400	4000	17280	4800	1152	320
250	1440	400	12600	3500	18000	5000	21600	6000	1440	400
280	1613	448	14112	3920	20160	5600	24192	6720	1613	448
300	1728	480	15120	4200	21600	6000	25920	7200	1728	480
315	1814	504	15876	4410	22680	6300	27216	7560	1814	504
350	2016	560	17640	4900	25200	7000	30240	8400	2016	560
355	2045	568	17892	4970	25560	7100	30672	8520	2045	568
400 x 2000	2304	640	20160	5600	28800	8000	34560	9600	2304	640
450	2592	720	22680	6300	32400	9000	38880	10800	2592	720
500	2880	800	25200	7000	36000	10000	43200	12000	2880	800
550	3168	880	27720	7700	39600	11000	47520	13200	3168	880
560	3226	896	28224	7840	40320	11200	48384	13440	3226	896
600	3456	960	30240	8400	43200	12000	51840	14400	3456	960
630	3629	1008	31752	8820	45360	12600	54432	15120	3629	1008

V_{max} is set to V_{nom} by default. Upon customer request, it can be set within the range of 20...100% of V_{nom}.

V _{nom}	Δp@V _{nom}
7 m/s	77 [Pa]
10 m/s	156 [Pa]
12 m/s	225 [Pa]

Control accuracy



Pressure loss

Local pressure loss coefficient for a fully open controller damper

$$\Delta p_c = \zeta \cdot \frac{\rho \cdot w^2}{2}$$

Δp_c	[Pa]	local pressure loss
w	[m/s]	mean air velocity in the duct
ρ	[kg/m ³]	air density
ζ	[-]	local pressure loss coefficient for the nominal cross-section of the controller

Pressure loss and local pressure loss coefficient as a function of air density $\rho = 1,2 \text{ kg/m}^3$

B = 100 to 445						
w [m/s]	Δp_c [Pa] for damper closing angle [°]					
	0	10	20	40	60	80
1	<1	<1	3	10	42	366
2	1	3	11	42	169	1463
3	2	7	24	94	381	>1500
4	4	13	42	167	678	>1500
5	6	21	66	260	1059	>1500
6	9	30	94	375	>1500	>1500
7	12	40	129	510	>1500	>1500
8	15	53	168	667	>1500	>1500
9	19	67	212	844	>1500	>1500
10	24	82	262	1042	>1500	>1500
11	29	100	317	1260	>1500	>1500
12	35	118	378	1500	>1500	>1500
ζ	0,40	1,37	4,37	17,4	70,6	609

(in case the duct continues both upstream and downstream of the controller)

B = 450 to 2000						
w [m/s]	Δp_c [Pa] for damper closing angle [°]					
	0	10	20	40	60	80
1	<1	<1	1	9	62	478
2	<1	1	5	34	248	>1500
3	<1	3	11	77	558	>1500
4	1	5	19	137	992	>1500
5	2	8	30	215	>1500	>1500
6	2	11	43	309	>1500	>1500
7	3	15	59	421	>1500	>1500
8	4	19	77	550	>1500	>1500
9	5	24	98	696	>1500	>1500
10	6	30	121	859	>1500	>1500
11	7	36	146	1039	>1500	>1500
12	9	43	174	1236	>1500	>1500
ζ	0,10	0,50	2,01	14,3	103	796

Noise data

Level of acoustic output INTO THE DUCT corrected with filter A for controllers with dimensions B≤445

$$L_{WA} = L_{WA1} + 10 \times \log S$$

L_{WA}	[dB(A)]	level of acoustic output corrected with filter A
L_{WA1}	[dBA]	level of acoustic output L_{W1} related to a cross-sectional area of 1 m ²
S	[m ²]	nominal cross-sectional area of the controller $S=A \times B$

S [m ²]	w [m/s]	L_{WA} [dBA]				
		open 100 %	Δ_{pc} [Pa]			
			50	100	250	500
1	0,8	<20	49	57	74	77
1	1	<20	49	60	70	81
1	2	<20	53	62	73	83
1	3	29	54	65	75	84
1	4	38	54	65	77	86
1	5	45	55	67	79	87
1	6	51	58	65	79	88
1	7	55	60	66	79	90
1	8	60	63	68	78	90
1	9	63	66	69	79	90
1	10	66	68	71	79	90
1	11	69	71	73	80	89
1	12	72	73	74	81	89

$$L_{Woct} = L_{WA} + K_{oct}$$

L_{Woct}	[dB]	level of acoustic output in the given octave band
L_{WA}	[dB]	level of acoustic output corrected with filter A
K_{oct}	[dB]	correction for octave bands from the level corrected with filter A

f [Hz]	63	125	250	500	1000	2000	4000	8000
K_{oct} [dB]	11	6	-2	0	-8	-15	-21	-28

Noise parameters for all standard sizes AxB can be found [HERE](#) or on the [mansel.online](#) platform

Level of acoustic output INTO THE DUCT corrected with filter A for controllers with dimensions B≥450

$$L_{WA} = L_{WA1} + 10 \times \log S$$

L_{WA}	[dB(A)]	level of acoustic output corrected with filter A
L_{WA1}	[dBA]	level of acoustic output L_{W1} related to a cross-sectional area of 1 m ²
S	[m ²]	nominal cross-sectional area of the controller $S=A \times B$

		L_{WA} [dBA]				
S [m ²]	w [m/s]	open 100 %	Δ_{pc} [Pa]			
			50	100	250	500
1	0,8	<20	45	56	65	72
1	1	<20	45	55	66	75
1	2	24	50	60	71	81
1	3	36	53	62	73	81
1	4	45	56	63	75	83
1	5	52	60	66	76	86
1	6	58	64	68	77	86
1	7	63	67	70	78	87
1	8	67	70	73	80	88
1	9	70	73	76	81	88
1	10	74	76	78	83	89
1	11	77	78	80	84	90
1	12	79	80	82	86	91

$$L_{Woct} = L_{WA} + K_{oct}$$

L_{Woct}	[dB]	level of acoustic output in the given octave band
L_{WA}	[dB]	level of acoustic output corrected with filter A
K_{oct}	[dB]	correction for octave bands from the level corrected with filter A

f [Hz]	63	125	250	500	1000	2000	4000	8000
K_{oct} [dB]	11	3	2	-3	-6	-16	-18	-29

Noise parameters for all standard sizes AxB can be found [HERE](#) or on the [mansel.online](#) platform

Level of acoustic output OUTSIDE the duct corrected with filter A

$$L_{WA} = L_{WA1} + 10 \times \log S$$

L_{WA}	[dB(A)]	level of acoustic output corrected with filter A
L_{WA1}	[dBA]	level of acoustic output L_{W1} related to a cross-sectional area of 1 m ²
S	[m ²]	nominal cross-sectional area of the controller $S=A \times B$

		L _{WA} without insulation [dBA]				L _{WA} with insulation [dBA]			
S [m²]	w [m/s]	Δp _c [Pa]							
		50	100	250	500	50	100	250	500
1	0,8	43	47	54	60	31	35	42	48
1	1	44	48	55	61	32	36	43	49
1	2	47	51	58	64	35	39	46	52
1	3	49	53	60	66	37	41	48	54
1	4	50	54	61	67	38	42	49	55
1	5	51	55	62	68	39	43	50	56
1	6	52	56	63	69	40	44	51	57
1	7	52	56	63	69	40	44	51	57
1	8	53	57	64	70	41	45	52	58
1	9	54	58	65	71	42	46	53	59
1	10	54	58	65	71	42	46	53	59
1	11	54	58	65	71	42	46	53	59
1	12	55	59	66	72	43	47	54	60

$$L_{Woct} = L_{WA} + K_{Oct}$$

L_{Woct}	[dB]	level of acoustic output in the given octave band
L_{WA}	[dB]	level of acoustic output corrected with filter A
K_{Oct}	[dB]	correction for octave bands from the level corrected with filter A

f [Hz]	63	125	250	500	1000	2000	4000	8000
K_{Oct} [dB]	11	3	2	-3	-6	-16	-18	-29

Noise parameters for all standard sizes AxB can be found [HERE](#) or on the [mansel.online](#) platform

VI. MATERIAL, FINISHING

- The controller casing and damper blades are supplied as standard in galvanized sheet steel without additional surface treatment.
 - The blades are equipped with end caps made of mechanically resistant and stable PA6 plastic with reduced flammability class V-0 according to UL 94, fitted with a surface seal made of closed-cell EPDM rubber with a PA6 sliding foil.
 - The blades are provided on one edge with a seal made of closed-cell EPDM rubber.
 - Pressure sensing elements are made of extruded aluminium.
 - Pressure tapping tubes are made of PVC or polyurethane (PUR).
 - Insulation of the insulated controller consists of mineral wool and a small amount of closed-cell polyethylene (PE) foam.
 - Fasteners are galvanised.
 - The product does not contain lead or hexavalent chromium.
 - Neither the product nor its packaging contains materials with silicone, Teflon (PTFE) or polystyrene.
-
- According to the customer's requirements, controller can be made of stainless steel material.

Specifications for stainless-steel design:

- Class A2 – Food-grade stainless steel (AISI 304 – EN 1.4301)
- Class A4 – Chemistry-grade stainless steel (AISI 316, 316L – EN 1.4401, EN 1.4404)

All components located in or entering the internal space of the controller shall be made of the specified stainless steel. Components located outside the controller casing are, as standard, made of galvanized steel (e.g. actuator mounting fasteners).

The following components, including the fasteners, are made from stainless steel at all times:

- 1) Controller casing and all parts permanently connected to it
- 2) Blade shafts and metal parts of the blades
- 3) Measuring profiles inside the controller are always made of aluminium
- 4) External control components (linkages, control levers, metal part of the shaft or the entire shaft)
- 5) Actuator and control mounting bracket
- 6) Insulation casing (for insulated design)

Plastic and rubber components are identical for all material designs of the controller.

Some fasteners and components are only available in one class of stainless steel; the type will be used in all stainless-steel variants.

Any other requirements for the design will be considered atypical and will be addressed on an individual basis.

VII. TRANSPORTATION, STORAGE AND WARRANTY

Logistic terms

- Controllers are delivered on pallets. As standard, they are packed in plastic foil for protection during transport; however, this packaging shall not be used for long-term storage. Temperature changes during transport may cause condensation inside the packaging, which can result in corrosion of materials used in the controller (e.g. white corrosion on galvanized surfaces). Therefore, the transport packaging shall be removed immediately after unloading to allow air circulation around the product.
- Controllers shall be stored in a clean, dry, well-ventilated and dust-free environment, protected from direct sunlight. Protection against moisture and extreme temperatures shall be ensured (minimum temperature +5 °C). Prior to installation, controllers shall be protected against mechanical damage and accidental impacts.
- Any alternative packaging system shall be approved by the manufacturer. Packaging materials are non-returnable; if a different packaging system (material) is required and used, it is not included in the final price of the controller.
- Controllers are transported by trucks without direct exposure to weather conditions. Excessive vibrations shall be avoided and the ambient temperature shall not exceed +50 °C. During transport and handling, controllers shall be protected against impact.

Warranty

- The manufacturer provides a warranty of 24 months from the date of dispatch for the controllers.
- The warranty for RDTM-V controllers, provided by the manufacturer, is completely void if actuating, closing and control devices are unprofessionally handled by untrained workers or if electric components are dismantled.
- The warranty is void if controllers are used for other purposes, devices and working conditions than those allowed by these technical conditions or if the controllers are mechanically damaged during handling.
- If the controllers are damaged by transport, a record must be written down with the forwarder at reception for later complaint.

VIII. ASSEMBLY, ATTENDANCE AND MAINTENANCE

- Installation, maintenance and functional inspection of the controller may only be carried out by a qualified and trained person, i.e. an "AUTHORIZED PERSON" in accordance with the manufacturer's documentation. All work on the controllers must be performed in accordance with international and local standards and regulations.

Adjustment of $V_{\min}$ and $V_{\max}$ values set during manufacturing can be carried out as follows:

■ BELIMO devices

- Using the **BELIMO LINK.10** service and adjustment interface, which is intended for BELIMO actuators and controllers with PP (MP, ...) communication interface. The LINK.10 device is connected to the actuator or controller via a service socket or by means of a suitable service cable. In combination with the **BELIMO Assistant 2** application, it enables adjustment, parameterisation and diagnostics of the devices. Communication between the mobile device and the LINK.10 interface is performed via Bluetooth. The previously used BELIMO ZTH-EU service tool is gradually being replaced by the LINK.10 device.
- Using the **BELIMO Assistant 2** mobile or PC application, which is intended for configuration, parameterisation and diagnostics of BELIMO devices. The application is available for the following operating systems: Android 9 or later, Windows 10 or later, iOS 15 or later. Communication can be carried out via Bluetooth (e.g. via LINK.10) or via NFC, if supported by the BELIMO device. For Apple iPhone devices, in some cases it may be necessary to use the ZIP-BT-NFC converter, which enables NFC communication via Bluetooth. This converter can also be used for Android devices that do not support NFC.
- Using the **BELIMO PC-Tool** adjustment and programming software, which can be installed on a standard personal computer with Windows operating system. The computer is connected to the actuator or controller via a service interface (e.g. using a service converter). The PC-Tool software is primarily intended for configuration and diagnostics of older BELIMO devices. Further development of this tool is no longer planned and its functions are gradually being replaced by the BELIMO Assistant 2 application.

■ GRUNER devices

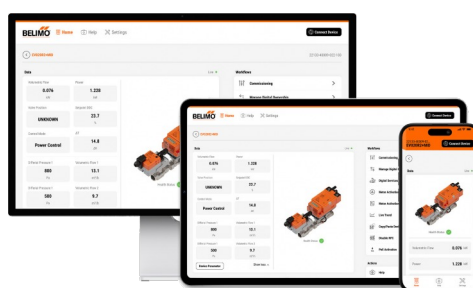
- Using the **display on the actuator**

■ Zařízení SIEMENS

- Using the **AST 20** service tool (hand-held tool) or ACS941 (PC tool to be used with ATS 22)
- More detailed information on the above adjustment methods is provided in the manufacturer's catalogue of the actuator/controller (BELIMO, GRUNER, SIEMENS).



BELIMO LINK.10



BELIMO Assistant 2



SIEMENS AST 20



BELIMO PC-Tool



Adjustment using the display on the GRUNER actuator

IX. ORDERING INFORMATION

Ordering key



EXAMPLE:

RDTM-V 700x400 .G62F 12 Q30-ZN I

RDTM-V controller, dimension 700x400 mm, pressure control design – GRUNER with spring return, dynamic measurement / analogue PP-Bus / controller GUAC-PM-DD3 + 341C-024-..-V/ST06, nominal air velocity 12 m/s, flange width 30 mm, galvanized steel design, with insulation.

1 | Controller type – RDTM-V

2 | Controller dimensions A x B → see pages 25 to 34

„A“ is the width of the controller

„B“ is the height of the controller

4 | Nominal air velocity

	Nominal air velocity 7 m/s
10	Nominal air velocity 10 m/s
12	Nominal air velocity 12 m/s

6 | Material and other design options

ZN	Galvanized
A2	Stainless steel 1.4301 (AISI 304)
A4	Stainless steel 1.4404 (AISI 316L)

3 | Controller design → see page 8

Extended list of designs available for download [HERE](#)

5 | Flange dimension

Q30	Flange width 30 mm
Q20	Flange width 20 mm

7 | Insulation

	Without insulation
I	With insulation

- The operating mode is set to DC 2...10 V as standard; upon customer request, it can be set to DC 0...10 V.
- Air volume flow values V_{min} and V_{max} shall be set by the manufacturer according to the customer order.
- Pressure values P_{min} and P_{max} shall be set according to the customer order.
- If the customer does not specify the required values, they shall be set according to TPM; for pressure, $P_{min} = 0$ Pa and P_{max} equal to the maximum value of the pressure sensor.
- These values can be subsequently adjusted using the LINK.10 device with the BELIMO Assistant 2 mobile application or via the BELIMO PC-Tool software. For GRUNER actuators, V_{min} / V_{max} values and the operating mode can be subsequently adjusted using the display on the actuator.

The producer reserves the right for innovations of the product.
For actual product information see www.mandik.com

MANDÍK[®]
www.mandik.com