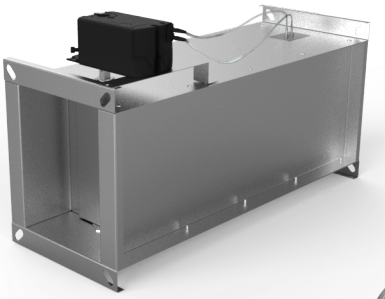
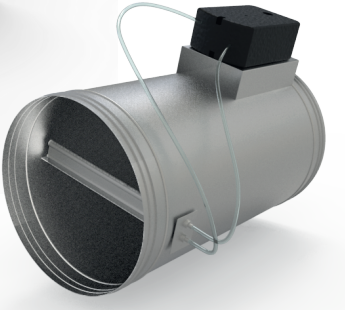
Ventservice

Technical passport
CAV valve





CONTENT

1. APPLICATION

The CAV controller responds to changes in the heat load of individual rooms or zones of the building and changes the actual amount of air supplied to the room or zone. Due to this, the CAV ventilation system works with a total air flow rate lower than that required for the total maximum heat load of all individual rooms.

This ensures a reduction in energy consumption while maintaining a given indoor air quality. The reduction in energy costs can be 25% or more, compared to ventilation systems with constant air flow. The SIEMENS GDB181.1E/MO rotary actuator is designed to control a CAV terminal with an area of 1 m2.

2. PRINCIPLE OF OPERATION

The task of the terminal is to maintain a given amount of supply and exhaust air depending on the current need. The required flow rate is determined by the value of the external control signal. This signal comes to the controller from temperature controllers, CO2 sensors or other elements of the control system installed in the premises of the building.

A pressure drop occurs on the measuring elements of the CAV terminal installed in the ventilation channel, the magnitude of which depends on the air speed. The value of this difference is fed to the measuring transducer, which determines the actual air flow depending on the cross-sectional area of the terminal, then the value of the current air flow is compared with the specified one.

Based on this comparison, the value of the deviation of the control system parameter is formed, on the basis of which the throttle position change signal is generated.

3. MAIN TECHNICAL CHARACTERISTICS

3.1. Main technical characteristics of the drive

Power supply		
Operating voltage	G..B181.1E/..	AC 24 V ± 10 % (SELV) or AC 24 V class 2 (US)
Frequency		50/60 Hz
Power consumption	at 50 Hz	
	Drive	1 VA / 0.5 W
	Drive speed	3 VA / 2.5 W

Functional data		
Positioning time for nominal turning angle	G..B181.1E/..	150 s (50 Hz) 120 s (60 Hz)
Rated torque	GDB..	5 Nm
	GLB..	10 Nm
Maximum torque	GDB..	< 7 Nm
	GLB..	< 14 Nm
Nominal / maximum turning angle		90° / 95° ± 2°
Direction of rotation	Adjusted by the tool	Clockwise (CW) / Counterclockwise (CCW)

Connecting cables		
Cable length		0.9 m
Power supply	Number of cores and cross-sectional area	2 x 0.75 mm^2
Connection	Number of cores and cross-sectional area	3 x 0.75 mm^2
Service interface	Terminal block	7-pin, grid 2.00 mm

Communication		
Communication protocol	Modbus RTU	RS-485
	Number of nodes	Max. 32
	Address range	1...247 / 255 By default: 255
	Transmission formats	1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2 By default: 1-8-E-1
	Baudrates (kBaud)	Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2 By default: Auto
	Completion	120 Ω electronic switching By default: disabled

Protection level		
Protection level	Protection degree according to EN 60529	IP54
Security class	Safety class in accordance with EN 60730	III

Environmental conditions		
The applied standard		IEC 60721-3-x
Operation	Climatic conditions	Class 3K5
	Place of installation	indoor
	General temperature	0…50 °C
	Humidity (non-condensing)	5…95 % r. F.
Transport	Climatic conditions	Class 2K3
	Temperature	-25…70 °C
	Humidity	5...95 % r. h.
Storage location	Climatic conditions	Class 1K3
	Temperature	-5…45 °C
	Humidity	5...95 % r. h.

Directives and standards			
Product standard		EN60730-x	
Product family	EN 50491-3, EN 50491-5 General Requirements for Home and Building Electronic Systems (HBES) and Building Automation Systems (BACS)		
Electromagnetic compatibility		For residential, commercial and industrial environments	
EC (CE) compliance		GDB181.1E/MO	GLB181.1E/MO
		A5W00003842 [1)]	A5W00000176 [1)]
RCM compliance		GDB181.1E/MO	GLB181.1E/MO
		A5W00003843 [1)]	A5W00000177 [1)]
UL, cUL	AC 24 V	UL 873 http://ul.com/database	

Environmental compatibility	
	Environmental product declaration A6V10209938 contains data on environmentally compatible design and product evaluations (RoHS compliance, material composition, packaging, environmental benefit, disposal).

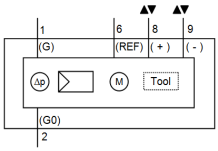
Dimensions / Weight		
Weight	Without packaging	0.6 kg
Overall dimensions		71 x 158 x 61 mm
Drive shafts	Round shaft (with centering electric)	8...16 mm (8...10 mm)
	Square shaft	6...12.8 mm
	Min. drive shaft length	30 mm
	Max. shaft strength	<300 HV

Air flow regulator		
Type	3-position controller with hysteresis	
Vmax, adjustable	tolerance 1% / head setting 100%Vmin,	20%...120%
adjustable	tolerance 1% / head setting 0%Vn = f(dp_n),	-20%...100%
adjustable	tolerance0,01 /head setting1,00	1.0…3.16

Differential pressure sensor		
	Connecting pipes (Inside diameter)	3…8 mm
	Measuring range	0…500 Pa
	Working range	0…300 Pa
Accuracy at 23°C, 966 mbar and additional mounting position	Zero	± 0.2 Pa
	Amplitude	± 4.5 % of the measured value
	Drift	± 0.1 Pa / Year
	Max. permissible working pressure	3000 Pa
Max. permissible overload from 1 side		3000 Pa

Compact CAV controllers are supplied with two pre-laid cables (power / communication).

G..B181.1E/MO



Tool = Configuration and maintenance interface (7-pin)

Power and communication cables

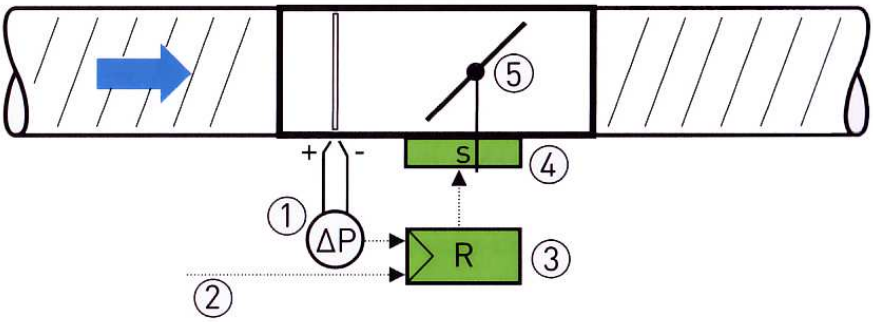
Marking	Color	Terminal code	Description
Cable 1: Power /	black sheath		
1	red (RD)	G	System voltage AC 24 V
2	black (BK)	G0	System neutral AC 24 V
Cable 2: Communication / blue sheath			
6	violet (VT)	REF	Certificate
8	grey (GY)	+	Bus (Modbus RTU)
9	pink (PK)	-	Bus (Modbus RTU)

Note

The operating voltage at terminals G and G0 must meet SELV or PELV requirements. Protective transformers with double insulation according to EN 61558 are required; they must be calculated 100% of the time.

3.2. Basic technical characteristics of the terminal

Elements of the CAV regulator

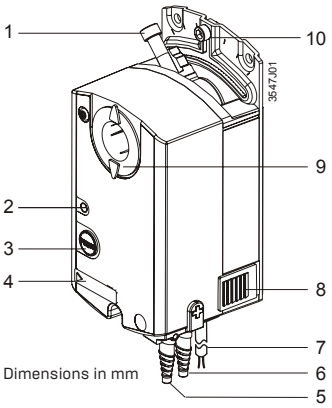


1 - pressure drop converter;
2 - external modbus signal;
3 - CAV regulator;
4 - throttle electric drive;
5 - throttle.

Terminal geometry

The main parts of the device

Dn [мм]
125
160
200
250
315
400

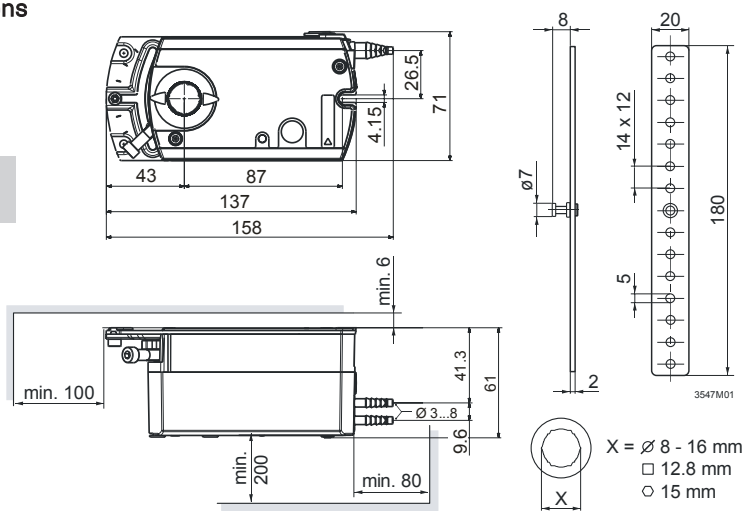


Dimensions in mm

1. Shaft fixing screw
2. LED
3. Button
4. Configuration and maintenance interface (under the hood)
5. Connecting nozzle for differential pressure measurement
6. Connecting nozzle for measurement differential pressure ("+": side with higher pressure)
7. Two connecting cables (power supply and communication), 2 cores each
8. Disabling gearing
9. Display of the angle of rotation
10. Angle adjustment screw

Overall dimensions

Disengaging the gearbox



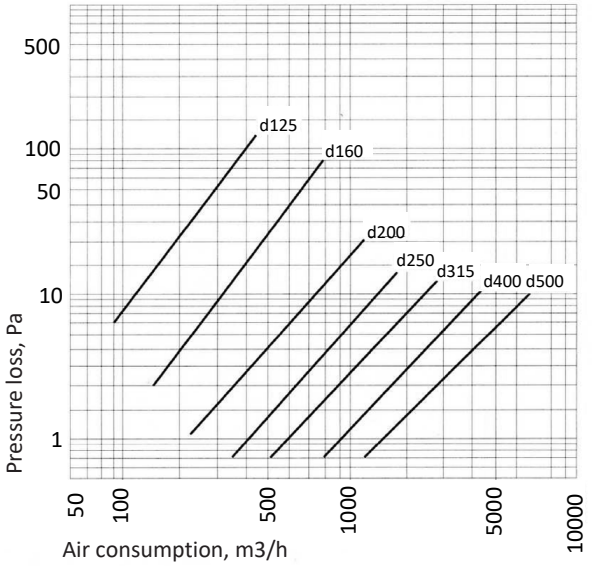
Level of acoustic power at the exit from the terminal

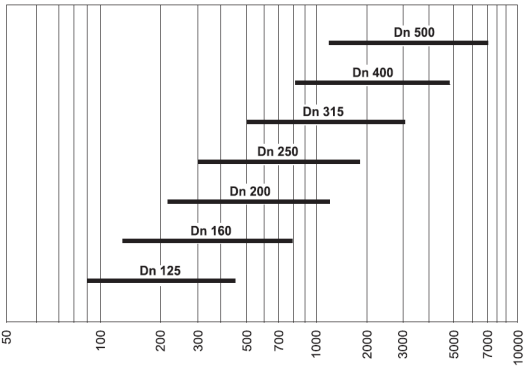
P (Па)	100				250				500			
V (м/с)	3	6	9	12	3	6	9	12	3	6	9	12
Dn125	42	49	58	63	55	63	65	69	60	66	70	71
Dn160	43	53	60	65	54	64	67	72	62	66	71	72
Dn200	42	52	59	63	55	60	65	71	62	65	70	73
Dn250	44	55	61	66	55	62	66	72	62	67	70	74

The level of acoustic power in the environment

p (Па)	100				250				500			
V (м/с)	3	6	8	12	3	6	9	12	3	6	9	12
Dn125	24	29	36	43	32	38	43	51	33	39	47	53
Dn160	24	32	38	65	33	40	44	53	41	44	48	55
Dn200	25	31	42	63	36	44	47	52	42	46	52	54
Dn250	30	41	44	65	39	46	47	55	48	51	54	59
Dn315	33	46	47	53	45	51	53	55	49	56	57	59
Dn400	36	49	50	53	48	55	56	58	54	56	61	64
Dn500	35	50	51	53	47	55	57	59	53	55	61	63

Pressure loss and air flow at the terminal (round terminals)





Rectangular terminals

Terminal cross section, mm		from	to	from	to
		Wmin, m/s		Wmax, m/s	
		1,5	3	5	8,5
A	B	Vmin, m3/h		Vmax, m3/h	
200	**100**	108	216	360	612
300	**100**	162	324	540	918
400	**100**	216	432	720	1224
500	**100**	270	540	900	1530
600	**100**	324	648	1080	1836
200	**200**	216	432	720	1224
300	**200**	324	648	1080	1836
400	**200**	432	864	1440	2448
500	**200**	540	1080	1800	3060
600	**200**	648	1296	2160	3672
700	**200**	756	1512	2520	4284
800	**200**	864	1728	2880	4896
300	**300**	486	972	1620	2754
400	**300**	648	1296	2160	3672
500	**300**	810	1620	2700	4590
600	**300**	972	1944	3240	5508
700	**300**	1134	2268	3780	6426
800	**300**	1296	2592	4320	7344
900	**300**	1458	2916	4860	8262
1000	**300**	1620	3240	5400	9180
400	**400**	864	1728	2880	4896
500	**400**	1080	2160	3600	6120
600	**400**	1296	2592	4320	7344
700	**400**	1512	3024	5040	8568

Terminal cross section, mm		from	to	from	to
		Wmin, м/с		Wmax, м/с	
		1,5	3	5	8,5
A	B	Vmin, m3/h		Vmax, m3/h	
800	**400**	1728	3456	5760	9792
900	**400**	1944	3888	6480	11016
1000	**400**	2160	4320	7200	12240
500	**500**	1350	2700	4500	7650
600	**500**	1620	3240	5400	9180
700	**500**	1890	3780	6300	10710
800	**500**	2160	4320	7200	12240
900	**500**	2430	4860	8100	13770
1000	**500**	2700	5400	9000	15300
600	**600**	1944	3888	6480	11016
700	**600**	2268	4536	7560	12852
800	**600**	2592	5184	8640	14688
900	**600**	2916	5832	9720	16524
1000	**600**	3240	6480	10800	18360
700	**700**	2646	5292	8820	14994
800	**700**	3024	6048	10080	17136
900	**700**	3402	6804	11340	19278
1000	**700**	3780	7560	12600	21420
800	**800**	3456	6912	11520	19584
900	**800**	3888	7776	12960	22032
1000	**800**	4320	8640	14400	24480
900	**900**	4374	8748	14580	24786
1000	**900**	4860	9720	16200	27540
1000	**1000**	5400	10800	18000	30600

4.MAINTENANCE

After installation, connection and commissioning, the electric drive does not require maintenance. When carrying out other service work, it is necessary to first of all disconnect the power supply of the electric drive.

5. STORAGE AND TRANSPORTATION

The electric drive in the manufacturer's packaging must be stored in a closed room at an air temperature of -20 to +80 ºC and a relative humidity of 95%. ті

6. SUPPLY SET

CAV-Terminal - 1 pc.
Technical passport - 1 pc.

7. WARRANTY

The manufacturer guarantees the operability of the electric drive provided that the consumer complies with the conditions of transportation, storage, installation and operation. The warranty period of operation is 12 months.

CERTIFICATE OF ACCEPTANCE

CAV air valve
manufactured in accordance with the Order and passed acceptance tests, meets the requirements of TU U 28.2-35851853-007:2021 and is recognized as suitable for operation.

Release date «_____»_____ 20__

Signature_____

FOR NOTES

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