

VAV damper

HLBHA00200QF, HLBHA00250QF, HLBAA00315QF



For precise and fast air volume flow control and measurement of fume hood applications

- Three variants of VAV dampers with mounted fast running actuators
- Nominal flow of 850, 1400, and 2370 m³/h with DXA.FH02-1
- Mounted fast running (90° within 2 sec) and silent damper actuator with 2.5 m cable and pre-wired connector and a pair of 2.5 m tubes
- Circular design with flange connection
- Scaled diameters of 200 mm, 250 mm, and 315 mm
- For aggressive and corrosive air volume flows (PPs, polypropylene, flame resistant)

The VAV damper HLBx.. is used for fast and precise air volume flow control of contaminated exhaust air in fume hoods

- Low pressure loss
- Differential pressure process by Venturi orifice
- Reliable measurements event at low volume flows
- High control accuracy ($\pm 5\%$)
- Ultra short form (HLBHA...) and short form (HLBAA...)
- Flange connection
- No cleaning of pressure pickups necessary
- Low-maintenance construction

Application

The circular volume flow controllers are used for the reliable, precise, and fast control and stabilizing of contaminated volume flows in fume hood applications. All parts coming into contact with media flows are made of thermoplastic material. This makes the volume flow controllers particularly suitable for regulating chemically contaminated process air. Determination of the volume flow is carried out by differential pressure measurement at the integrated DIN-compliant Venturi tube. The design also guarantees very low pressure loss.

The design of the Venturi tube according to DIN EN ISO 5167-1, as well as the high quality demand made on the product, guarantee precise and perfectly repeatable measurement results even with lowest possible volume flows. The nominal diameter of the volume flow controller is chosen so that it can be connected to standard circular pipes without any adapters.

For the housing and installations, a PP thermoplastic, highly chemical-resistant material is used. The volume flow control and flowmeters have completely enclosed housing in flange connection. The seal of the integrated throttle valve blade against the housing is achieved using a special, highly chemical-resistant elastomer material. The drive shaft of the control damper blade is fed through a 3-way adjustable condensation-proof O-ring seal in the volume flow controller housing and mounted in the counter bearing.

The ultrashort versions (HLBHA00200QF and HLBHA00250QF) have an oval damper blade with elastomer seal which has been positioned for improved flow in an exact, geometrically defined area of the diffuser. As a result, they have a drastically shortened installation length, precise differential pressure, and high control speed.

The volume flow controllers have also been tested and certified in the overall system (including automation station, operating unit, and sensors) for fume hood volume flow control according to EN 14175-6.

Functions

The circular volume flow control damper with a self-cleaning Venturi nozzle flowmeter system is based on DIN EN ISO 5761-1 for measuring differential pressure with an external differential pressure sensor. It controls and blocks air flow in corrosive environments. Under this measuring principle, the differential pressure, which rises as the volume increases, builds up in the air duct via a Venturi nozzle as the flow velocity changes due to changes in cross-section. The buildup in pressure ensures an adequate differential pressure even at small air volumes to precisely balance the desired volume flow and minimizes losses with a suitable design.

The housing air leakage flow complies with DIN EN 1751, Class C. The damper position can be viewed from the outside on the axis.

The nominal diameters are selected so that the dampers can be connected directly to standardized circular ducts via flange connections without additional adapters.

Type summary

Type	Order number	Product name	Description
HLBHA00200QF	S55376-C201	VAV damper - ultra short 200	Ultrashort 200 mm, PPs, flange, 60° damper plate rotation, GAP191.1E/25W ¹⁾
HLBHA00250QF	S55376-C202	VAV damper - ultra short 250	Ultrashort 250 mm, PPs, flange, 60° damper plate rotation, GAP191.1E/25W ¹⁾
HLBAA00315QF	S55376-C203	VAV damper - short 315	Short 315 mm, PPs, flange, 90° damper plate rotation, GAP191.1E/25W ¹⁾

¹⁾ GAP191.1E/25W identical to GAP191.1E but with 2.5 m 3pol cable and pre-mounted connector

Accessories, fume hood specific according EN 14175-6

Type	Order number	Product name
QMX3.P87-1WSC	S55624-H111	Room Operating Unit (QMX3.P87)
QMX3.P88-1WSC	S55624-H112	Room Operating Unit (QMX3.P88)
DXA.B130	S55376-C158	Sash Sensor (1300mm/50in)
DXA.B200	S55376-C159	Sash Sensor (2000mm/80in)
QVE3001	QVE3001	Flow Sensor
DXA.S04P1	S55376-C139	Communicative Air Flow Pressure Sensor
DXA.S04P1-B	S55376-C140	Communicative Air Flow Pressure Sensor IP54
DXR2.E17C-103A	S55376-C134	Compact Room Automation Station
DXA.FH02-1	S55376-C200	Fume Hood Control Box

Product documentation

Topic	Title	Document ID
Environmental product declaration	Environmental product declaration	CM1E9205

Related documents such as environmental declarations, CE declarations, etc., can also be downloaded at the following Internet address:

www.siemens.com/bt/download

The entire range of VAV dampers and air volume flow orifice plates as well as all other components are shown and described in the Critical Environment Technology manual, organized by group. The Air Valve & Terminal Configurator tool is available for easy component selection. Additional information on the Critical Environment Technology system can be found at: www.siemens.com/lifescience.

Safety

Follow all safety instructions to prevent accidents. Failure to follow the safety instructions may result in controller fault or damage the volume flow controller.

The VAV damper is constructed using state-of-the-art technology and is dependable. It is used in exhaust systems with aggressive substances that are hazardous to health. No solid particulates are allowed in the transport medium. Only trained operators may start up the equipment and no unauthorized changes or modifications are permitted to the volume flow controller.

Never exceed the limit values specified in the operating instructions for operating temperatures (environment /media). Always check the chemical resistance of the materials and contact the manufacturer when in doubt. Comply with all regulations applicable to the extracted media when cleaning the VAV damper. Always wear the following protective clothing:

- Acid-resistant goggles
- Acid-resistant gloves
- Acid-resistant suit

Only properly trained and qualified personnel may conduct maintenance work. Do not conduct maintenance work while the damper is operating. Disconnect any power supplies and compressed air sources prior to conducting maintenance activities. Contact the manufacturer for additional information.

CAUTION



National safety regulations

Failure to comply with national safety regulations may result in personal injury and property damage.

- Observe national provisions and comply with the appropriate safety regulations.

Engineering

General

The controller operates in a stable control range starting at the minimum response pressure, which is a function of the volume flow, up to a maximum pressure difference of 1,500 Pa.

The volume flow deviation is low across the entire pressure range. The effective volume flow and deviations depend on the controller type and must be clarified prior to ordering.

Flow velocity is between 1 m/s and 8 m/s for adequate response sensitivity and control precision.

Wiring

Insulate all wiring to the available rated voltage. Sizing and fusing of the wiring is based on the connected load.

Measuring tubes on the volume flow controller

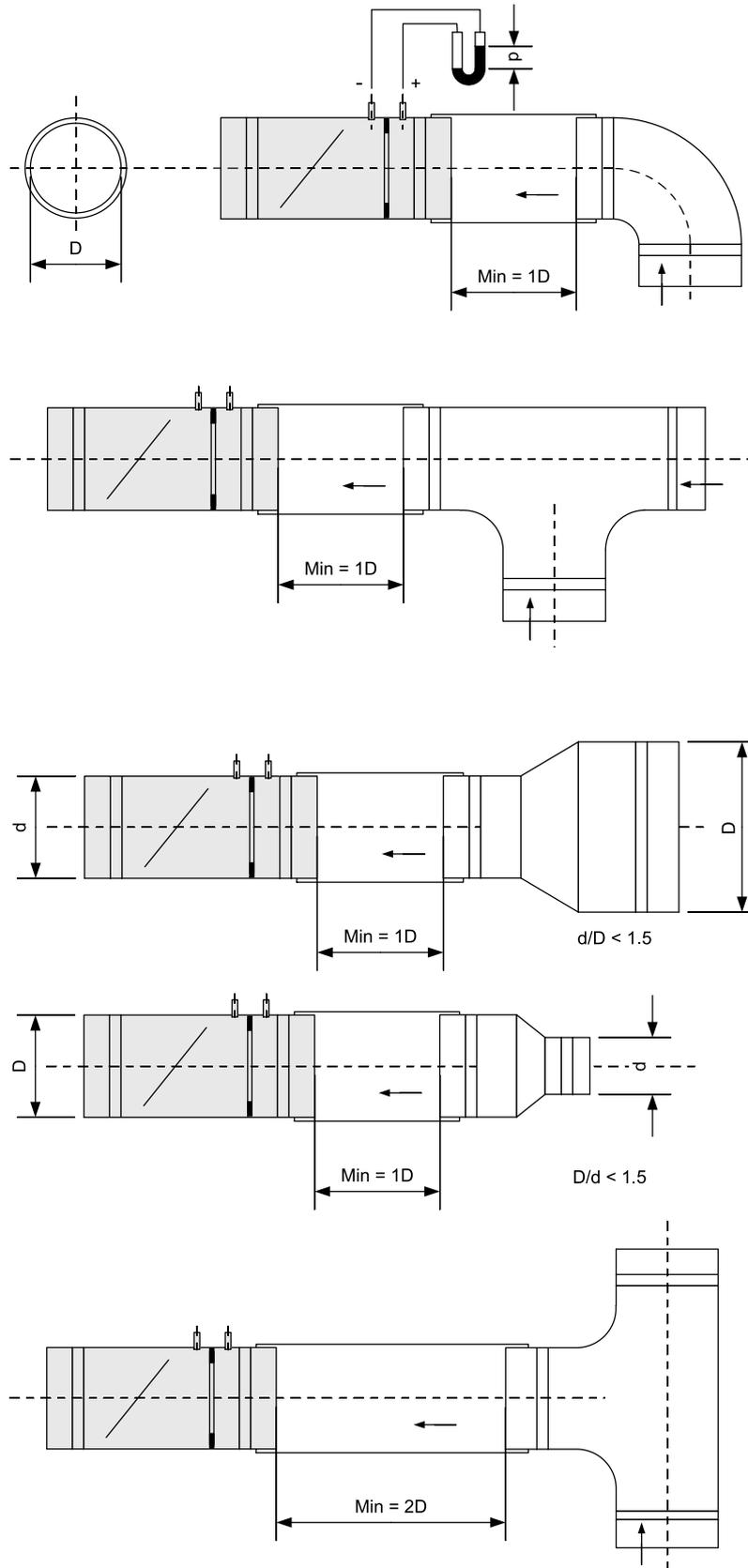
One red and one blue measuring tube (each 2.5 meters in length) are included with the volume flow controller. The measuring tubes can be shortened as needed. There are two pneumatic push-in fittings on the volume flow controller. The first pressure connector in the flow is for positive pressure (red tube). Protect the tube fittings during transport and installation. Ensure that the fittings are properly seated. Pneumatic push-in fittings are recommended to extend the length of the tubes.

Mounting

The damper is made of thermoplastic materials and is sensitive to impact and temperature. Observe proper handling for plastics and temperature-controlled storage.

Align the connecting ducts with no offset when assembling the equipment. We highly recommend using a sealing washer. Avoid force upon the flange joint when connecting flange connections. Only properly trained personnel may install the device.

Note the following installation situations to ensure optimum flow to the measuring point:



Legend: Min = minimum distance (measuring accuracy $\pm 5\%$ in relation to $V_{100\%}$)

1. The minimum distance is a multiple of the specified minimum value where the combination of fittings is not conducive to flow.
2. Always position the measuring nipple in unobstructed flow! (In other words, not where there is likely to be turbulence downstream of the fittings)

Installation

Ensure the VAV damper is installed in an easy-to-access location. Maintain a minimum clearance of 30 cm from the mounting plate to loosen the damper actuator.

Maintenance

VAV dampers are maintenance-free components. Check the maintenance interval for operating exhaust air installation.

Install using general ventilation rules for proper accessibility to the duct system and the volume flow controller in the event of adjustments or maintenance.

Disposal



The device is considered an electronic device for disposal in accordance with European Directive and may not be disposed of as domestic waste.

- Use only designated channels for disposing the devices.
- Comply with all local and currently applicable laws and regulations.

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Accessories". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Damper body

Material	Polypropylene (flame-resistant) PPs
Resistant	Acids, alkaline substances, and weak solvents
Non-resistant	Oxidizing solvents and acids, halogens
Leakage of pipe/connector DIN12273:	Class 4
Leakage in flow direction DIN EN 1751	Class 4 (up to 1500 Pa)
Flow velocity	0 to 13 m/s
Temperature limits for transport media (pressure-dependent)	-5°C to +80°C
Ambient temperature	Less than 40°C
Color	RAL7037 (light grey)
Weight	
HLBHA00200QF	4.4 kg
HLBHA00250QF	5.2 kg
HLBAA00315QF	7.5 kg

Ventilation

Type	DN (mm)	V _{nom} (m ³ /h)	Flow coef.	Recommended volume flow		Recommended air velocity	
				V _{max} (m ³ /h)	V _{min} (m ³ /h)	w _{max} (m/s)	w _{min} (m/s)
HLBHA00200QF	200	850	54	800	80	7,07	0,71
HLBHA00250QF	250	1400	88	1350	130	7,64	0,74
HLBAA00315QF	315	2370	150	2300	230	8,20	0,82

Flow noise

Flow noise on the volume flow controller with integrated Venturi tube according to DIN EN ISO 5167-1

DN (mm)	w (m/s)	V (m ³ /h)	$\Delta p_g = 100 \text{ Pa}$								L_{WA} dB(A)
			L_w (dB/octave)								
			f_m (Hz)								
			63	125	250	500	1000	2000	4000	8000	
315	2	550	45	40	43	46	42	39	34	31	47
	4	1080	51	46	46	51	46	43	36	31	52
	6	1610	54	50	49	54	50	47	40	33	55
	8	2125	55	56	55	59	55	52	46	37	60
	10	2700	64	59	59	65	59	56	51	43	65

DN (mm)	w (m/s)	V (m ³ /h)	$\Delta p_g = 250 \text{ Pa}$								L_{WA} dB(A)
			L_w (dB/octave)								
			f_m (Hz)								
			63	125	250	500	1000	2000	4000	8000	
200	2	210	47	46	52	54	51	49	48	46	56
	4	420	52	49	50	54	53	50	46	40	57
	6	650	53	53	51	54	55	52	50	55	59
	8	850	55	55	54	56	56	53	51	52	60
	9	1055	58	56	55	57	58	55	51	44	61
250	2	345	46	42	45	46	42	38	33	31	47
	4	670	51	45	44	49	48	45	40	33	52
	6	1020	57	49	46	51	48	44	37	33	53
	8	1350	64	50	46	50	47	43	44	48	54
	9	1515	54	48	44	50	51	45	46	49	55
315	2	550	49	48	51	55	53	54	49	42	59
	4	1080	56	54	54	58	56	53	49	41	60
	6	1610	61	58	57	62	58	56	51	42	63
	8	2125	65	61	60	65	60	58	52	44	66
	10	2700	68	64	63	67	63	61	55	47	68

DN (mm)	w (m/s)	V (m ³ /h)	$\Delta p_g = 500 \text{ Pa}$								L_{WA} dB(A)
			L_w (dB/octave)								
			f_m (Hz)								
			63	125	250	500	1000	2000	4000	8000	
315	2	550	57	49	55	63	62	62	66	60	70
	4	1080	60	57	59	65	63	62	58	52	68
	6	1610	68	62	62	66	64	63	59	52	69
	8	2125	68	65	66	70	66	64	60	53	71
	10	2700	71	68	68	72	68	66	61	54	73

f_m Mid frequency of the octave band

L_w Sound power level determined in reverberation chamber

L_{WA} Total sound level, A-evaluated

Δp_g Total pressure difference (measured upstream and downstream from the volume flow controller)

V Volume flow

w Flow velocity

Radiant noise

Radiant noise on the volume flow controller with integrated Venturi tube according to DIN EN ISO 5167-1

DN (mm)	w (m/s)	V (m ³ /h)	$\Delta p_g = 100 \text{ Pa}$								L_{WA} dB(A)
			L_w (dB/octave)								
			f_m (Hz)								
			63	125	250	500	1000	2000	4000	8000	
315	2	550	38	32	26	24	24	28	22	30	34
	4	1080	38	34	27	26	27	24	22	30	33
	6	1610	41	38	31	31	31	27	23	30	36
	8	2125	47	41	33	36	35	30	25	30	39
	10	2700	47	47	40	40	39	35	29	31	43

DN (mm)	w (m/s)	V (m ³ /h)	$\Delta p_g = 250 \text{ Pa}$								L_{WA} dB(A)
			L_w (dB/octave)								
			f_m (Hz)								
			63	125	250	500	1000	2000	4000	8000	
200	2	210	29	27	34	36	33	31	30	29	38
	4	420	34	31	31	36	35	33	28	21	39
	6	650	36	35	33	36	36	34	32	37	41
	8	850	38	37	36	40	38	35	33	34	43
	9	1055	40	39	37	39	40	37	33	25	43
250	2	345	28	24	27	28	24	20	15	13	29
	4	670	33	27	26	31	30	27	22	15	34
	6	1020	39	31	28	33	30	26	19	15	34
	8	1350	46	33	28	34	29	25	26	30	36
	9	1515	36	31	26	32	33	27	28	29	37
315	2	550	38	35	29	28	31	33	28	31	38
	4	1080	44	38	31	32	33	32	26	31	38
	6	1610	43	43	34	36	36	34	29	31	41
	8	2125	47	46	38	39	39	36	30	31	43
	10	2700	54	50	42	44	42	40	33	32	47

DN (mm)	w (m/s)	V (m ³ /h)	$\Delta p_g = 500 \text{ Pa}$								L_{WA} dB(A)
			L_w (dB/octave)								
			f_m (Hz)								
			63	125	250	500	1000	2000	4000	8000	
315	2	550	43	37	32	35	38	39	36	37	45
	4	1080	46	43	36	38	40	40	34	33	45
	6	1610	51	45	40	40	41	41	34	33	46
	8	2125	52	49	42	43	43	43	42	36	49
	10	2700	58	55	45	47	46	44	42	37	51

f_m Mid frequency of the octave band

L_w Sound power level determined in reverberation chamber

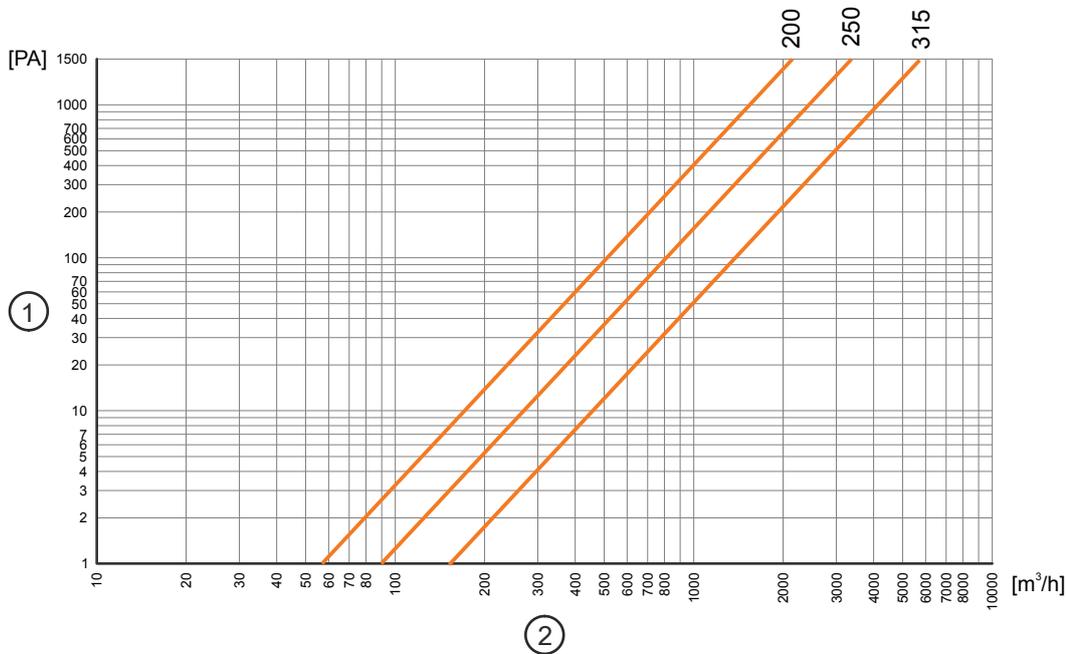
L_{WA} Total sound level, A-evaluated

Δp_g Total pressure difference (measured upstream and downstream from the volume flow controller)

V Volume flow

w Flow velocity

Effective pressure characteristic



1 Effective pressure at Venturi nozzle

2 Air volume flow rate

Damper actuator

Power		
Operating voltage (SELV/PELV)		AC/DC 24 V \pm 20 %
Frequency		50 Hz / 60 Hz
Power consumption	Running	30 VA / 22 W
	Holding	5 W

V_{nom}		
Operating voltage (SELV/PELV)		AC/DC 24 V \pm 20 %
Frequency		50 Hz / 60 Hz
Power consumption	Running	30 VA / 22 W

Functional data		
Torque	Nominal torque	6 Nm
	Maximum torque (when blocked)	18 Nm
Rotary angle	Nominal rotary angle	90°
	Maximum rotary angle	95° \pm 2°
Runtime for 90° rotary angle		2 s
Sound power level		45 dB(A)

Inputs		
Positioning signal Y/Y1		
	Input voltage Y/Y1+ (Connector pin 1)	DC 0 (2)...10 V/0 (4)...20 mA or AC/DC 0 V, AC/DC 24 V "open"
	Positioning resolution DC 0 (2)...1 V / 0 (4)...20 mA	250 steps for 90°

Housing type and protection class GAP191.1E/25W	
Insulation class	EN 60730
Housing protection class	IP54 as per EN 60529 (observe mounting notes)

Environmental conditions		
Operation		IEC 60721-3-3
	Temperature	0...55 °C
	Humidity (non-condensing)	<95 % r.h.
Transportation		IEC 60721-3-2
	Temperature	-10...70 °C
	Humidity (non-condensing)	<95 % r.h.

Standards, directives and approvals	
Product safety	EN 60730-2-14 Automatic electronic controls for household and similar use (Type 1)
Electromagnetic compatibility (application)	For residential, commercial, and industrial environments
EU conformity (CE)	A5W00004380 ¹⁾
RCM conformity	A5W00004381 ¹⁾
Environmental compatibility ¹⁾	The product environmental declaration CE1E4608en ¹⁾ contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

Dimensions		
Actuator B x H x T		81 x 192 x 63 mm (see Dimensions [▶ 15])
Damper shaft	Circular	6.4 ... 20.5 mm
	Square	6.4 ... 13 mm
	Minimum shaft length	20 mm
Weight	Excluding packaging	1.260 kg

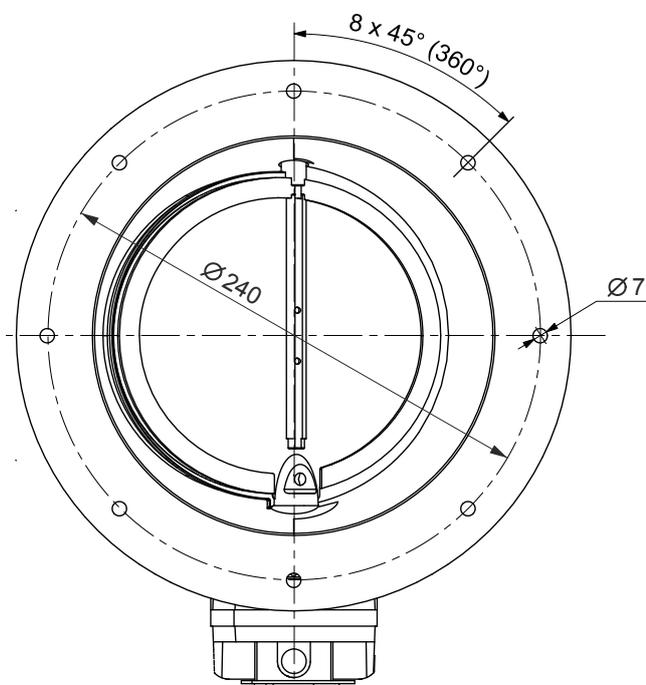
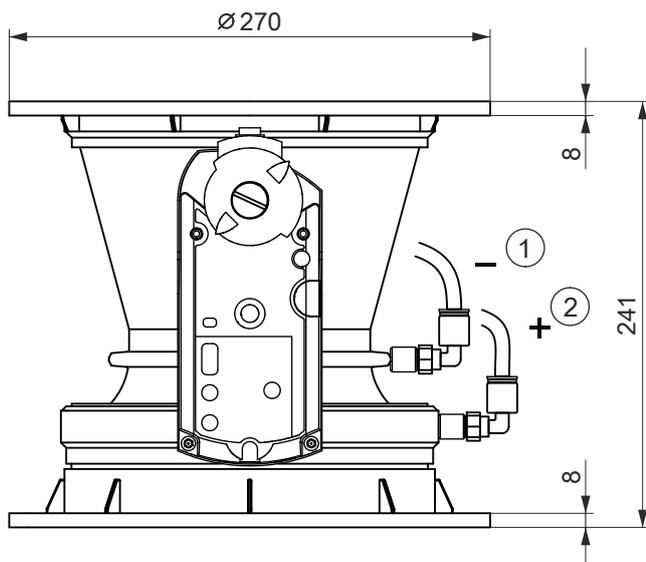
¹⁾ Documents can be downloaded at <http://siemens.com/bt/download>.

Connections

Interface	Damper	Description
Damper actuator	3-pin cable with preinstalled plug 1) Positioning signal DC 0 (2)...10 V 0 (4)...20 mA or 2) Positioning signal AC/DC 0 V, AC/DC 24 V "open" System potential AC/DC 24 V 3) System neutral	Wago Winsta special plug 770-253 3-pin with additional housing 770-503/023-000, strain relief Push-in CAGE CLAMP® 2 x 0.5 mm ² ... 4 mm ² / 2 x AWG 20...12 grey
Differential pressure +	High-pressure connector for measuring – red	Measuring tubes with 8 mm inside diameter Festo PUN 8 x 1.25 10 bar
Differential pressure -	Low-pressure connector for measuring tube – blue	Measuring tubes with 8 mm inside diameter Festo PUN 8 x 1.25 10 bar

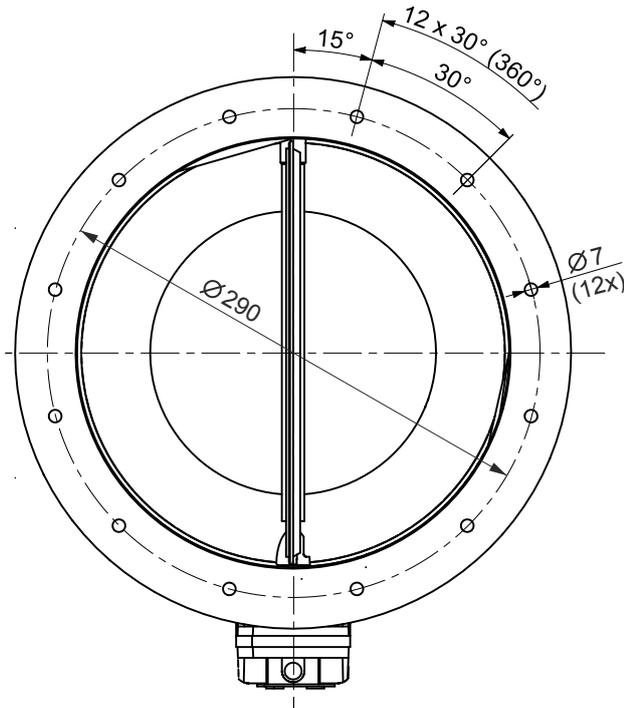
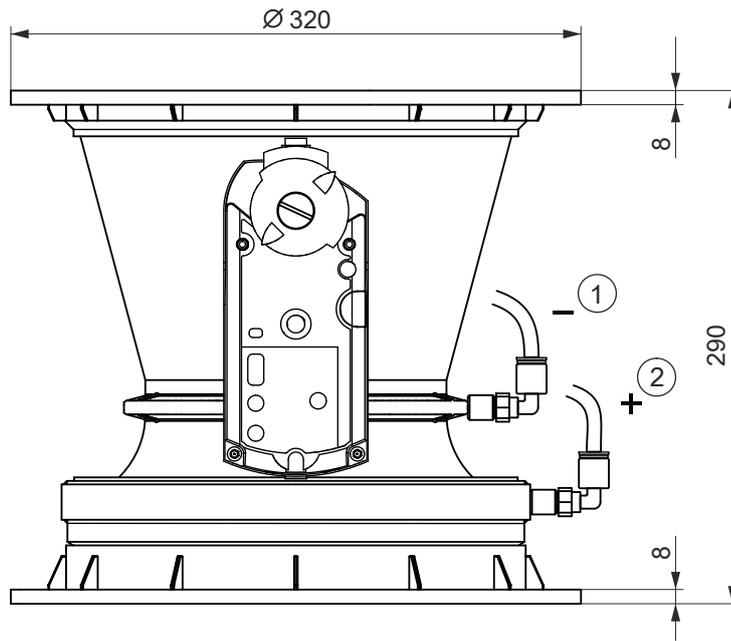
HLBHA00200QF (dimensions without damper actuator)

All dimensions in mm



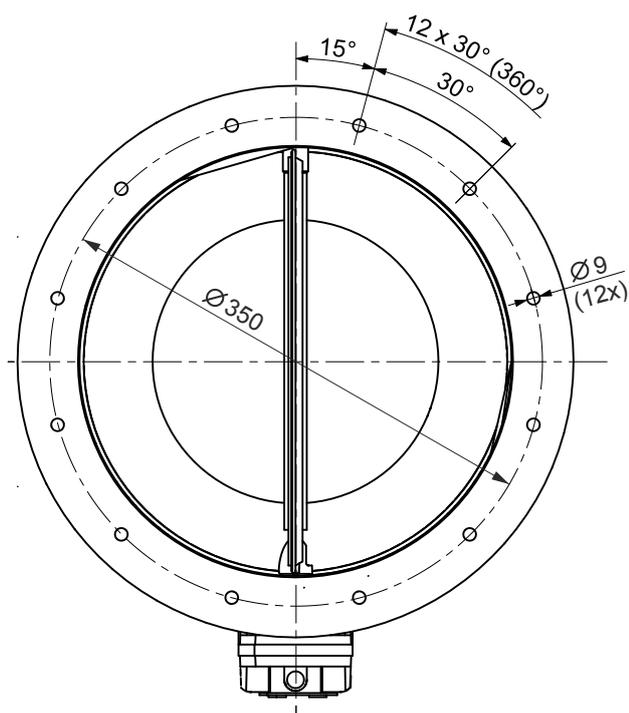
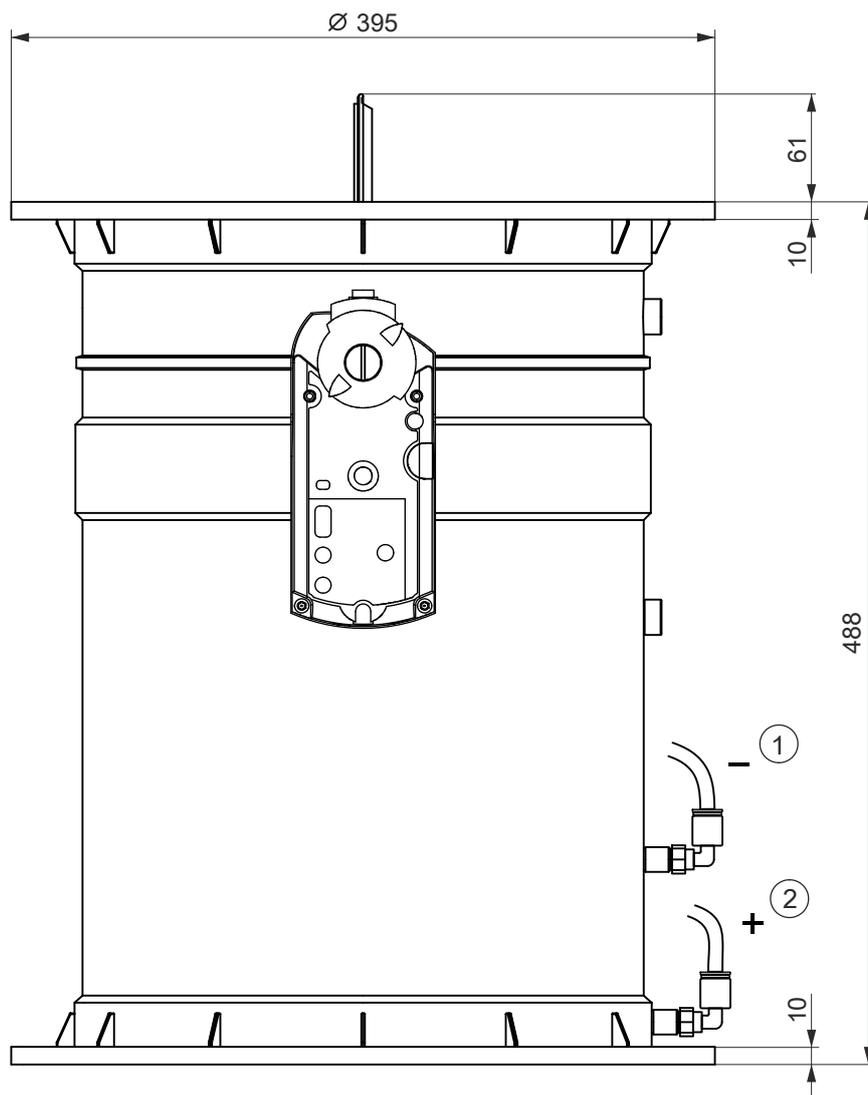
HLBHA00250QF (dimensions without damper actuator)

All dimensions in mm



HLBAA00315QF (dimensions without damper actuator)

All dimensions in mm



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