

TECHNICAL INFORMATION

APPLICATION	The volume flow controllers VRK are used in complex piping systems for automatically controlling the amount of air distribution. Their task is to maintain a predetermined desired value of the air flow for the supply or exhaust air of a room sustainable and independent from fluctuating channel air pressure.
FUNCTION	In constant-volume controllers without auxiliary power, the flow control is achieved by an easy-moving, asymmetrical angled control panel that ensures a sensitive response and control behavior even for small amounts of air flow rates.
RESPONSE AND CONTROL ACCURACY	The controller operates from the minimum pressure difference, which is a function of the volume flow (see diagram), up to the maximum pressure difference of 1000 Pa in a stable control range. Over this entire pressure range, the flow rate deviation is $\pm 10\%$. For smaller air speeds below 4 m/s, the flow deviation can be $\pm 20\%$. Unfavorable flow conditions, pollution or minor bracing during installation can also cause larger deviations.
TEMPERATURE RANGE	The components of the controller are largely resistant to aging and temperature resistant from -30°C to $+100^{\circ}\text{C}$. As for volume controllers with actuators the limiting operating temperatures of the actuators apply, -30°C to $+50^{\circ}\text{C}$.
CONTROLLER ASSEMBLY	The control panel is mounted in a smooth and maintenance-free PTFE bushing. The support is not guided through the pipe bodyshell, which means that no leaks or high-frequency whistling sounds occur. A pneumatic piston damper prevents overshoot and oscillation of the control plate and ensures an accurate response and control behavior.
INSTALLATION	The exact balancing of the control plate is ensured by a counterweight arranged vertically on the control plate, which ensures an accurate control response in all orientations. The flow profile in front of the flow controller should be cross-section-filling, since unfavorable flow conditions (such as asymmetric flow, necking, deflection around sharp edges) can negatively affect the response and control behavior.
SETTING	The constant-volume flow controllers are shipped with a reference flow rate set at the factory. The volume flow can be changed at any time by the customer and read on a scale by manual adjustment with an Allen wrench (2 mm). Optionally, the air flow setpoint can be varied by an electric actuator.

VRK 233

CONSTANT VOLUME FLOW CONTROLLER



PRESSURE RANGE 50 -1000 Pa

Constant volume flow controller, model VRK - circular, self-regulating with rubber seal air tight Class D laser-welded housing.

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INSULATION	The flow controllers can be implemented with a sound and heat insulation of 50mm thickness.
INSTALLATION NOTE	According to DIN EN 12097 an accessibility to the piping system and the volume flow controller for operation and maintenance must be observed. When installing behind redirections or junctions, the free flow section must be at least $2,5 * ND$.
PIPE BODY	The body tubes are made of galvanized sheet steel. These are laser butt welded without disturbing misalignment of the inner and outer shell surface. The plug ends are dimensionally press calibrated according to DIN 12237 and are hereby dimensionally stable and fit accurately.

SEALING SYSTEM OF THE CONNECTOR

TIGHTNESS	The connector with rubber lip is air-tight according to DIN EN 12237 Class D.
REMOVAL	By the seal design, the components can be separated again.
VIEW MOUNTING	There is no need for additional sealing means such as duct tape, hence the seal design with lip rubber seal is particularly suitable for visual montages. Contemporary, attractive, architectonic style.
HYGIENE	The smooth surface of the laser-welded housing prevents the accumulation of dirt and dust particles.
RESISTANCE	Ageing resistant rubber lip seal made of EPDM material, inert against weakly aggressive vapors and chemicals.

VRK 233

CONSTANT VOLUME FLOW CONTROLLER

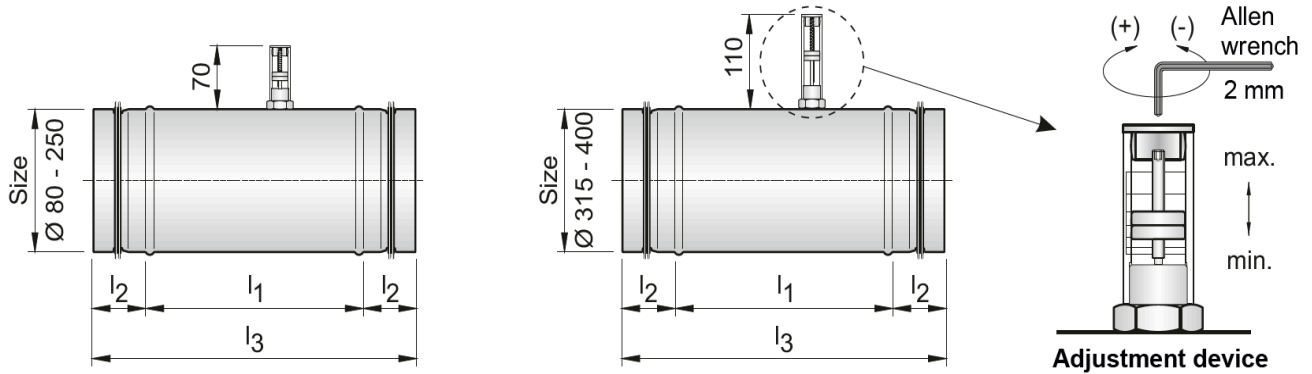


PRESSURE RANGE 50 -1000 Pa

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VRK 233 CONSTANT VOLUME FLOW CONTROLLER

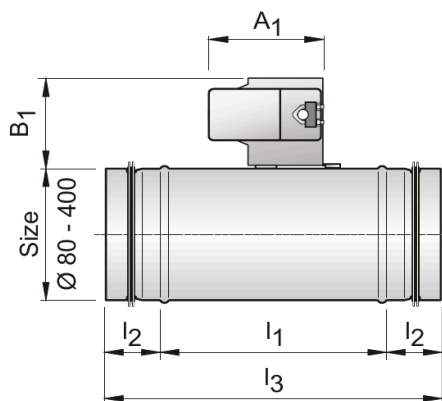
VERSION 1



- Constant volume flow controller with proof plug connection (only fitting measure)
- Automatically regulating without auxiliary energy
- Customers can change the amount of air by manual adjustment

l1 = Insertion length
 total length = l1 + 2 * l2 = l3

VERSION 5

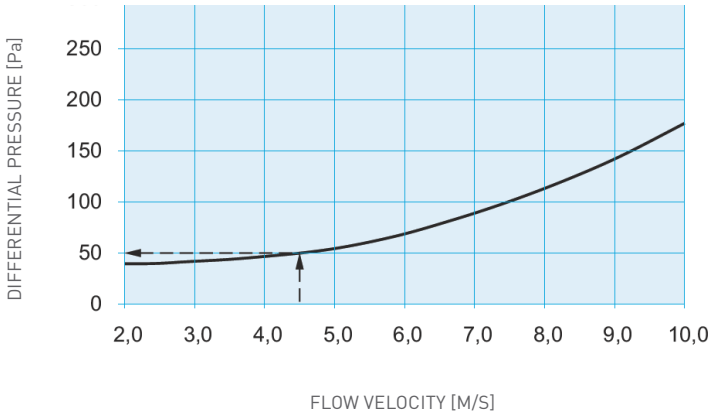


Controller structure and functioning as before, factory default setting, two-setpoint control via electric adjustment for an operating voltage of 24 volts, 50 Hz, as a two-setpoint controller with no intermediate position, Vmin and Vmax can be fixed by adjusting the mechanical travel stops.

Actuator type: Belimo LM 24A
 ND ø 80 - 400 mm

SELECTION

DIAGRAM



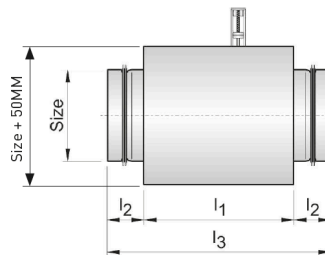
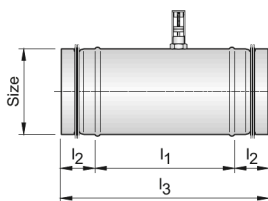
FLOW CONTROLLER	TYPE 233
NOMINAL DIAMETER	160 MM
FLOW VELOCITY	4,5 M/S
VOLUME FLOW	325 M ³ /H
MINIMUM STATIC PRESSURE DIFFERENCE [Pa]: ΔP [Pa] ACCORDING TO DIAGRAM	50 Pa

MINIMUM RESPONSE PRESSURE DIFFERENCE

When dimensioning the tube system, the static minimum response pressure difference of the flow regulator according to this diagram is to be observed.

DIMENSIONS - WORKING RANGE

SIZE	VOLUME FLOW [M ³ /H]		FLOW VELOCITY [M/S]		DIMENSIONS [MM]		
	MIN.	MAX.	MIN.	MAX.	L1	L2	L3
80	40	125	2.2	6.9	135	40	215
100	70	220	2.5	7.8	165	40	245
125	100	280	2.3	6.3	165	40	245
160	180	500	2.4	6.9	235	40	315
200	250	900	2.2	8.0	235	40	315
250	500	1600	2.8	9.0	235	40	315
315	800	2800	2.9	10.0	235	60	345
355	900	3200	2.5	9.0	295	60	415
400	1000	4000	2.2	8.8	295	60	415



AIR FLOW NOISE GENERATED BY THE CONTROLLER

Size [mm]	Static pressure difference at the controller [Pa]																													
	100 Pa										250 Pa										500 Pa									
	Octave power level*										Octave power level*										Octave power level*									
	L _w [dB/octave]										L _w [dB/octave]										L _w [dB/octave]									
Volume flow [m ³ /h]	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Summation L _{w, sum} A-weighted dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Summation L _{w, sum} A-weighted dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Summation L _{w, sum} A-weighted dB(A)			
80	40	37	37	35	33	33	28	27	38	39	42	43	44	44	46	41	41	50	46	49	49	50	51	53	48	48	57			
	82	49	47	44	41	39	39	33	32	45	51	51	50	49	48	49	44	54	58	58	56	55	55	56	51	51	61			
	125	52	51	48	45	44	44	38	37	49	61	60	57	54	53	53	47	46	58	66	63	61	59	59	53	52	65			
100	70	40	39	38	36	35	30	29	41	43	45	46	46	47	49	44	43	53	49	52	52	53	54	55	50	50	60			
	135	50	48	45	42	41	40	34	33	46	59	57	54	51	50	49	43	42	55	60	60	58	57	57	58	53	63			
125	200	54	52	49	47	45	45	39	38	51	63	61	58	55	54	54	48	47	59	70	68	65	62	61	60	54	66			
	100	41	40	38	36	35	36	30	29	41	45	47	47	48	48	49	44	43	54	52	54	54	55	56	50	49	60			
	190	51	49	46	42	41	40	34	32	46	55	54	53	51	51	51	46	45	56	61	61	59	58	57	58	52	63			
160	280	54	53	50	47	45	45	39	37	50	63	61	58	55	54	53	47	46	59	64	64	62	61	61	62	57	67			
	180	44	43	41	39	38	38	32	31	43	48	50	50	50	50	51	46	45	56	55	57	57	57	57	58	53	63			
	340	53	51	48	44	43	42	36	34	48	62	60	56	53	51	51	44	43	57	64	64	62	60	60	60	55	65			
200	500	57	55	52	49	47	47	40	39	52	66	64	61	58	56	55	49	48	61	72	70	67	64	62	62	56	68			
	250	45	43	41	39	38	37	31	30	43	51	52	52	51	51	45	44	56	57	59	58	58	57	58	52	63				
	575	55	53	50	46	44	44	37	36	50	64	62	58	55	53	53	46	45	59	66	66	64	62	62	62	56	67			
250	900	-	-	-	-	-	-	-	-	68	66	63	60	58	58	52	50	64	75	73	70	67	65	65	58	70				
	500	48	47	45	43	41	41	35	34	47	54	56	55	55	54	55	49	48	60	61	62	62	61	61	62	56	66			
	1000	57	55	52	49	47	46	39	38	52	66	64	61	57	55	55	48	47	61	69	68	67	65	64	64	59	69			
315	1500	-	-	-	-	-	-	-	-	70	68	65	62	60	60	53	52	65	77	75	72	68	67	66	60	58	72			
	800	48	46	44	41	39	39	32	31	44	55	56	55	54	53	46	44	58	62	63	62	61	60	59	53	65				
	1400	57	55	52	48	46	45	39	37	51	66	64	60	57	55	54	47	46	60	70	69	67	65	64	64	58	69			
355	2200	-	-	-	-	-	-	-	-	71	69	65	62	60	59	53	51	65	77	75	72	69	67	66	60	58	72			
	900	50	48	46	43	42	41	35	33	47	57	58	57	56	55	49	47	60	64	65	64	63	62	62	55	67				
	2000	59	57	53	50	48	47	40	39	53	68	66	62	59	57	56	49	47	62	72	71	69	67	66	66	60	71			
400	3200	-	-	-	-	-	-	-	-	73	71	67	64	62	61	55	54	68	79	77	74	71	69	68	62	60	74			
	1000	50	48	45	42	41	40	33	31	46	58	59	57	56	55	54	47	45	59	65	65	64	62	61	61	54	66			
	2200	58	56	52	49	47	46	39	37	52	67	65	61	57	55	54	48	46	61	72	71	68	66	65	65	59	70			
	3800	-	-	-	-	-	-	-	-	73	71	67	64	62	61	55	53	67	79	77	74	70	68	68	61	60	74			

* sound level in dB/octave in relation to 10⁻¹²W

Key to symbols (general sound acoustically relevant indices)

L _w	[dB]	sound power level
L _{WA}	[dB (A)]	sound power level, A-evaluated
L	[dB]	sound pressure level
L _A	[dB (A)]	Sound pressure level, A-evaluated

If air is blown into a room, the tube orifice and the room absorption provide an additional damping and thus reduce the sound power level. According to VDI 2081, the spatial and mouth damping can be calculated. Roughly, approximately 8 dB can be deducted.

The flow noise is highly dependent on local conditions, the radiating area of the pipe (pipe diameter and length) after the muffler and the sound insulation. The data reported here, which were determined in the laboratory, can only be an indication of value. The sound power can be increased by an additional sound source (e.g. a fan, unfavorable flow conditions or the like).

PRODUCT KEY

V R K 2 3 3 S 0 2 0 0 1

Nominal diameter (mm):
80, 100, 125, 160, 200, 250, 315, 355, 400

S: single walled, non-insulated
D: double walled, insulated with
50mm mineral wool

1: without power supply
5: with servomotor 24V