

## 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 500 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 °C. As for volume controllers with actuators the limiting operating temperatures of the actuators apply, -30°C to +50°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 232

### CONSTANT VOLUME FLOW CONTROLLER



PRESSURE RANGE 50 - 500 Pa  
FOR LOW AIR VELOCITIES

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

## TECHNICAL INFORMATION

### 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 232

### CONSTANT VOLUME FLOW CONTROLLER

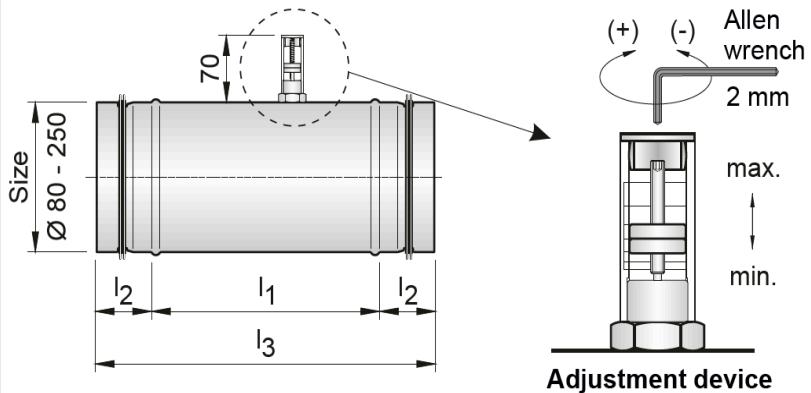


PRESSURE RANGE 50 - 500 Pa  
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## EXECUTIONS

VERSION 1

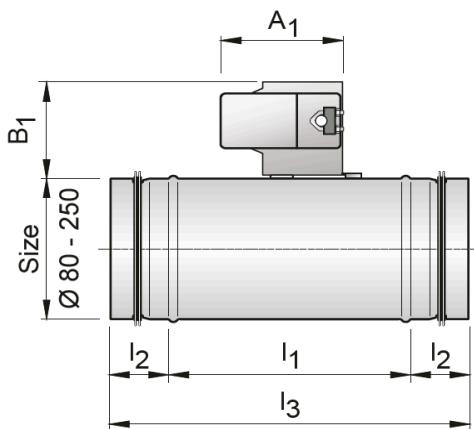


- Constant volume flow controller with proof plug connection (only fitting measure)
- Automatically regulating without auxiliary energy
- Customers can change the amount of air by manual adjustment

**l<sub>1</sub>** = Insertion length

total length =  $l_1 + 2 * l_2 = l_3$

VERSION 5

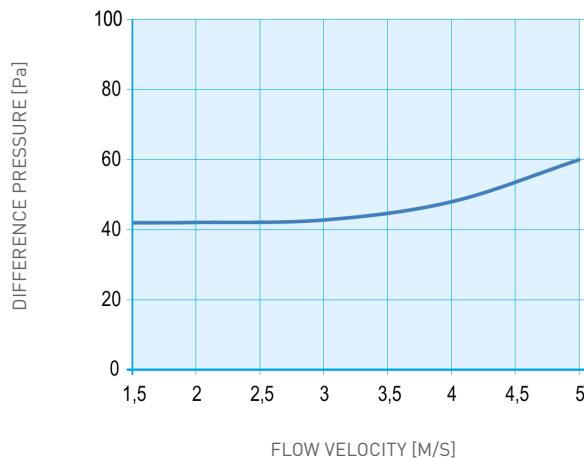


Controller structure and functioning as before, factory default setting, two-setpoint control via electric adjustment for an operating voltage of 24 volts, 50 Hz, as a two-setpoint controller with no intermediate position, V<sub>min</sub> and V<sub>max</sub> can be fixed by adjusting the mechanical travel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

Actuator type: Belimo LM 24A  
ND ø 80 - 250 mm

## SELECTION

DIAGRAM

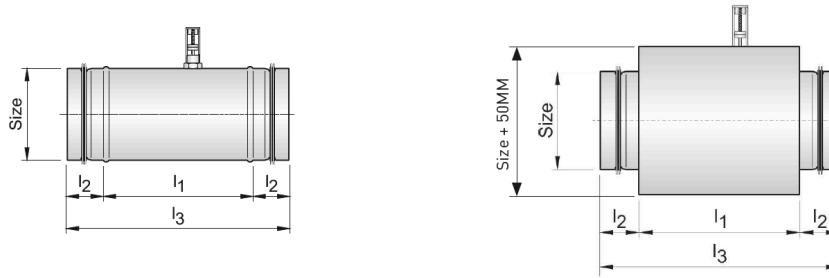


## MINIMUM RESPONSE PRESSURE DIFFERENCE

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 MM	VOLUME FLOW [M³/H]		FLOW VELOCITY [M/S]		DIMENSIONS [MM]		
	MIN.	MAX.	MIN.	MAX.	L1	L2	L3
80	25	80	1.4	4.4	135	40	215
100	40	125	1.4	4.4	165	40	245
125	65	220	1.5	5.0	165	40	245
160	100	350	1.4	4.8	235	40	315
200	160	500	1.4	4.4	235	40	315
250	240	800	1.4	4.5	235	40	315



## AIR FLOW NOISE GENERATED BY THE CONTROLLER

Size [mm]	Flow velocity [m/s]	Volume flow [ $m^3/h$ ]	Static pressure difference at the controller [Pa]																		$L_{WA}^{sum A}$ A-weighted dB(A)									
			100 Pa						250 Pa						500 Pa															
			Octave power level* $L_w$ [dB/octave]						Octave power level* $L_w$ [dB/octave]						Octave power level* $L_w$ [dB/octave]															
			63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz				
80	1,4	25	29	33	32	32	32	33	28	27	37	38	40	40	40	41	42	36	35	46	45	47	47	47	47	48	43	42	53	
	2,9	52	39	39	37	36	35	36	31	30	41	40	43	44	45	46	49	44	44	53	46	49	50	52	53	55	51	51	59	
	4,4	80	48	46	43	41	39	39	33	31	44	51	51	50	48	48	49	44	44	54	57	57	56	55	55	56	51	50	60	
	1,4	40	32	34	34	33	33	34	29	27	39	41	42	42	42	42	43	38	36	48	47	49	49	49	49	50	44	43	54	
100	2,9	82	46	43	40	37	35	35	28	27	41	50	49	48	46	45	46	40	40	51	50	52	53	54	55	57	57	52	52	61
	4,4	125	50	48	45	42	40	40	33	32	45	53	53	51	50	50	50	45	45	55	59	59	58	57	56	57	52	51	62	
	1,5	65	35	36	36	35	35	36	30	29	41	43	45	45	44	44	45	39	37	49	50	52	51	51	51	51	45	44	56	
	3,2	142	48	46	42	39	37	37	30	29	43	52	52	50	49	48	48	43	42	53	53	55	56	57	57	59	54	54	63	
125	5,0	220	52	50	47	44	42	42	36	34	48	61	59	56	53	51	51	44	43	56	62	62	60	59	59	59	54	53	64	
	1,4	100	37	38	38	37	36	36	30	28	41	46	47	46	45	45	45	39	37	50	53	54	53	52	52	52	45	44	57	
	3,1	225	49	47	43	40	38	37	31	29	43	54	54	52	50	49	49	43	42	54	56	58	58	59	59	60	55	54	65	
	4,8	350	53	51	48	45	43	42	36	35	48	62	60	57	54	52	51	45	43	57	64	64	62	60	60	60	55	54	65	
200	1,4	160	40	41	40	38	38	37	31	29	43	48	49	48	47	46	46	40	38	51	55	56	55	54	53	53	46	44	58	
	2,9	330	50	47	44	40	38	37	30	29	43	56	55	52	50	49	49	43	42	55	58	60	60	60	61	55	54	65		
	4,4	500	54	51	48	45	43	42	36	34	48	59	58	56	54	54	54	48	47	59	65	65	63	61	60	61	55	54	66	
	1,4	240	42	42	41	39	38	38	31	28	43	51	51	50	48	47	47	40	37	52	57	58	56	55	54	53	46	44	59	
250	2,9	520	51	48	45	41	39	38	31	29	44	57	56	54	52	50	50	44	43	56	61	62	62	61	62	56	55	67		
	4,5	800	55	53	49	46	44	43	37	35	49	61	60	58	56	55	55	49	48	60	67	67	65	63	62	62	56	55	67	

\* sound level in dB/octave in relation to  $10^{-12} \text{ W}$ 

## 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	2	S	0	2	0	0	1
Nominal diameter {mm}: 80, 100, 125, 160, 200, 250											
S: single walled, non-insulated D: double walled, insulated with 50mm mineral wool										1: without power supply 5: with servomotor 24V	