



New option
with duct silencer

Maintenance-free

VR1 volume flow controller

that operates without an auxiliary power supply,
for ventilation and air conditioning systems.

- Adjustable on site.
- Outstanding control accuracy.
- Sizes DN 80 to DN 315.
- Casing tightness class C according to DIN EN 1751.

VR1 volume flow controller

Overview



With the basic version of the VR1 volume flow controller, the volume flow set point is adjusted manually.

The controllers operate without an auxiliary power supply!

The volume flow set point is preselected at an adjusting device with scale and kept constant at variable pressures to a high degree of accuracy. The controllers are adjusted at the factory for the entire volume flow range.

- The volume flow set point is easy to adjust on site!
- The volume flow set point can be preset at the factory if requested when ordering. Subsequent changes on site can be made. ⇒ see page 9



Option

VR1 volume flow controller with actuator driven adjustment of the volume flow set point. Electrical auxiliary power is required to carry out the adjustment.

Depending on which drive is selected, two set points or any intermediate values are possible.

Use in systems with variable volume flows, with day/night changeover or fully variable load-dependent operation for example.



Option

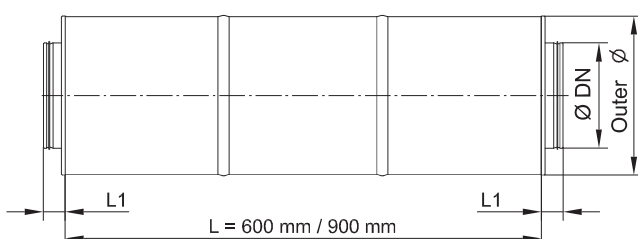
VR1 volume flow controller with acoustic insulation for thermal insulation and reduction of external sound radiation.

Can be used for controllers with manual and actuator-driven adjustment of the volume flow set point!

All illustrations show volume flow controllers with lip seals!

Option

SRC duct silencer for volume flow controller for reduction of flow noise in the circular ventilation duct.

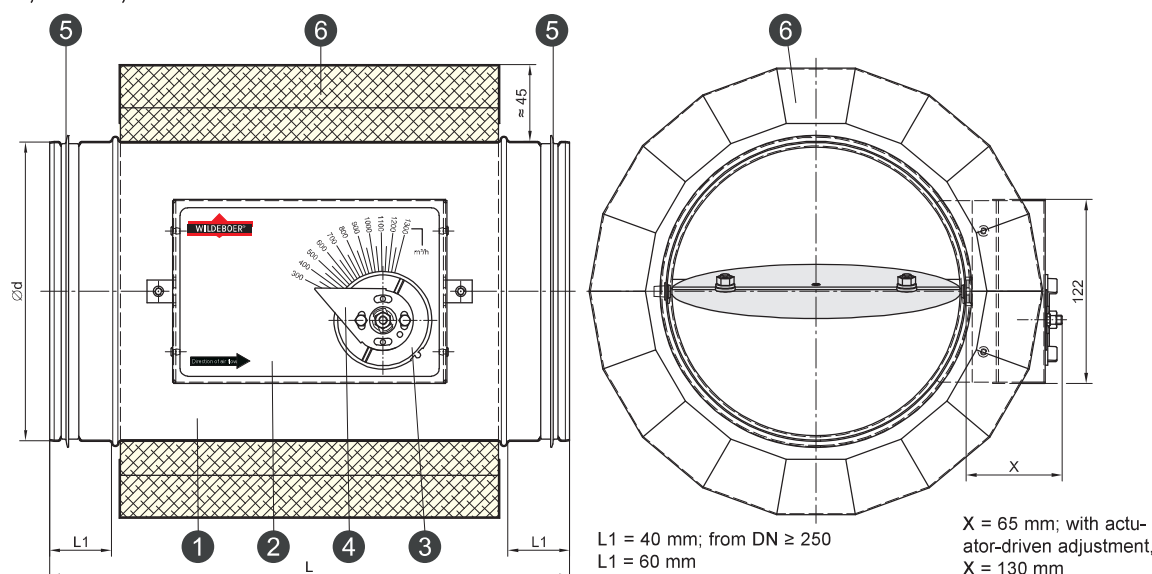


Maximum possible reduction of flow noise with sound attenuator lengths

Size DN	Outer diameter Ø [mm]	L1 [mm]	L [mm]	
			600	900
80	200	40	-22 [dB]	-
100	200	40	-22 [dB]	-25 [dB]
125	225	40	-22 [dB]	-25 [dB]
160	260	40	-21 [dB]	-24 [dB]
200	300	40	-19 [dB]	-24 [dB]
250	355	40	-18 [dB]	-22 [dB]
315	415	40	-15 [dB]	-19 [dB]

VR1 volume flow controller

Description, sizes, technical data



VR1 volume flow controllers are maintenance-free mechanical controllers that operate without an auxiliary power supply to maintain volume flows in ventilation and air conditioning systems constant.

They are installed in supply and exhaust air ventilation ducts and are not position-sensitive. The casing and control mechanism are made of galvanized sheet steel. The centrally supported damper blade which controls the volume flow has a stainless steel bearing axis in special bushings. The adjustment device is equipped with rotary pointer, scale and locking device. The volume flow set points can be adjusted manually or by actuator within the volume flow ranges $V_{\min}$ to $V_{\max}$.

The special control mechanism ensures a high degree of control accuracy with a deviation of only approx. $\pm 5\%$ to $\pm 10\%$ *). Accordingly, the volume flow throughout the entire pressure range is kept constant.

- **Sizes:** DN 80 to DN 315
- **Total volume flow range:** $V_{\min} = 50$ to $V_{\max} = 3100 \text{ m}^3/\text{h}$
- **Pressure range:** 50 to 1000 Pa $\Rightarrow$ see pages 4 to 7
- **Casing tightness:** Class C according to DIN EN 1751
- **Interior temperature range:** -20 to $+70^\circ\text{C}$, 90°C for a short time only
- **Options**
 - Actuator AC 230 V or AC/DC 24 V, setting to two volume flow set points.
 - Continuous actuator AC/DC 24 V, setting to any desired volume flow set point.
 - External acoustic insulation with sheet metal jacket.
 - Lip seals on both sides.
 - Presetting of volume flow set point at the factory. $\Rightarrow$ see page 9
 - SRC duct silencer, available in 600 mm and 900 mm lengths.

- 1 Duct casing
- 2 Control system
- 3 Volume flow set point adjustment
- 4 Setting pointer with scale
- 5 Lip seal (optional equipment)
- 6 Acoustic insulation with sheet metal jacket (optional equipment)

Size DN	$V_{\min}$ [m ³ /h]	$V_{\max}$ [m ³ /h]	$\varnothing d$ [mm]	L [mm]	A_A [m ²]
80	50	280	79	329	0.005
100	70	380	99	329	0.008
125	120	600	124	329	0.012
160	150	900	159	329	0.020
200	250	1300	199	329	0.031
250	400	2100	249	406	0.049
315	600	3100	314	456	0.078

Nomenclature $\Rightarrow$ see page 7

*) Larger deviations occur with lower volume flow rates, especially with small sizes! Where control deviations are specified as a percentage, the corresponding volume flow set point specified is used as reference. It is assumed that the incoming flows are extensively undisturbed.

VR1 volume flow controllers

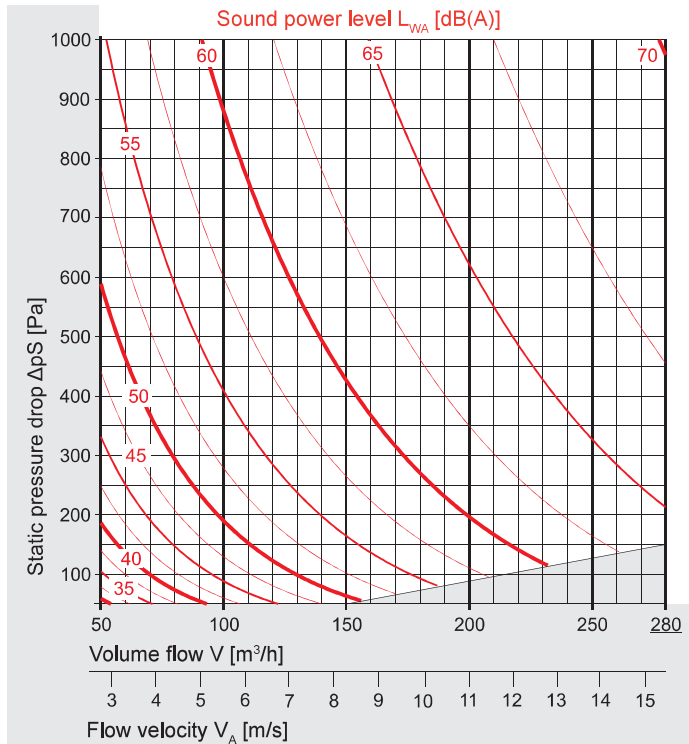
- satisfy the **hygiene requirements** in accordance with VDI 6022-1, VDI 3803-1, DIN 1946-4, DIN EN 13779, SWKI VA104-01, SWKI 99-3, ÖNORM H6020 and ÖNORM H6021.
- are **resistant to microbes**, and therefore **do not promote the growth of micro-organisms (mould, bacteria)**. This reduces the risk of infection for people and also the necessary cleaning and disinfection work!
- are **resistant to cleaning agents and disinfectants** and are suitable for use in hospitals and similar facilities!
- with **environmental product declaration** according to ISO 14025 and EN 15804: EPD-WIL-20150036-ICA1-DE.



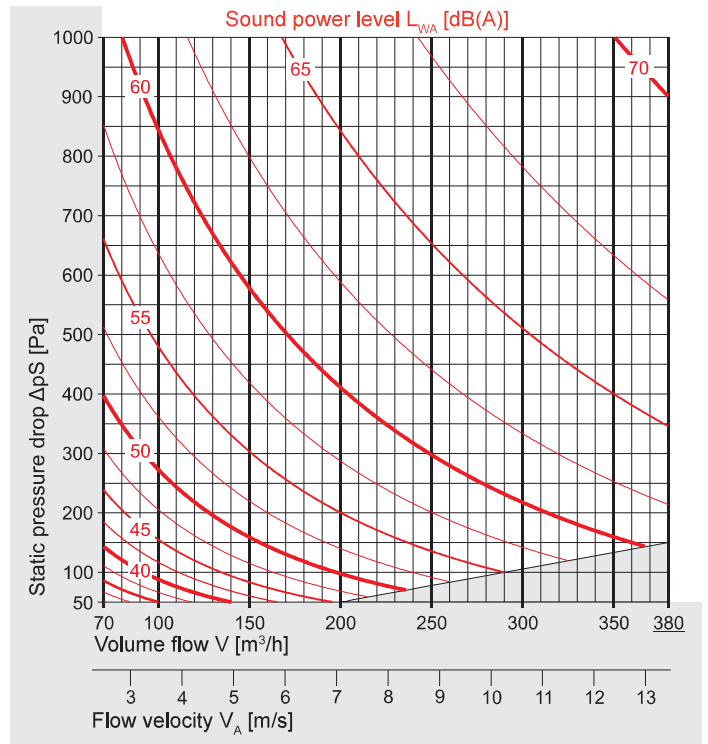
VR1 volume flow controller

Sound power level in the connecting duct (flow noise)

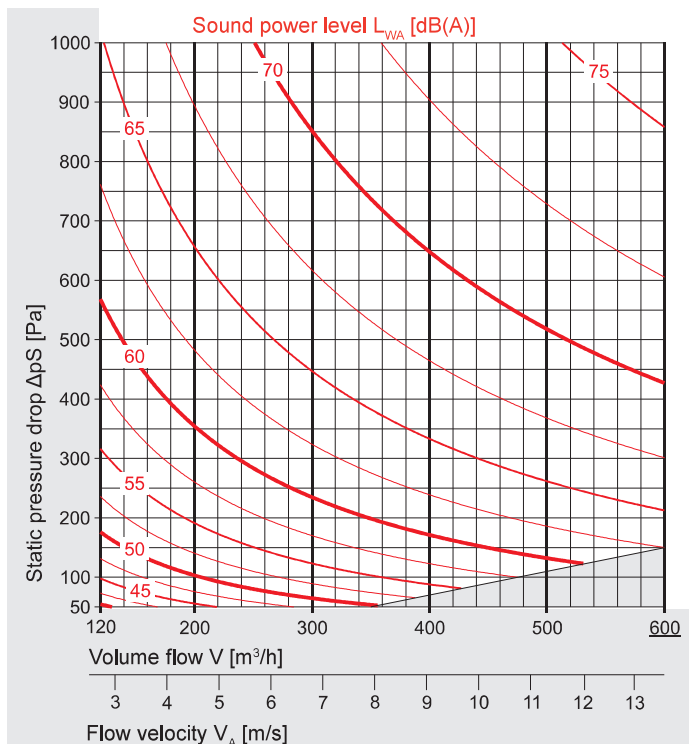
Size DN 80



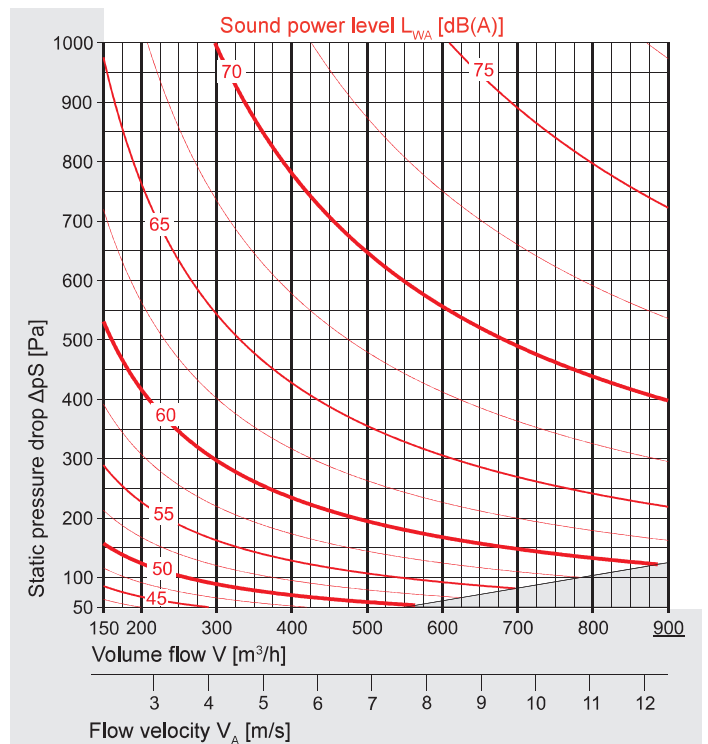
Size DN 100



Size DN 125



Size DN 160



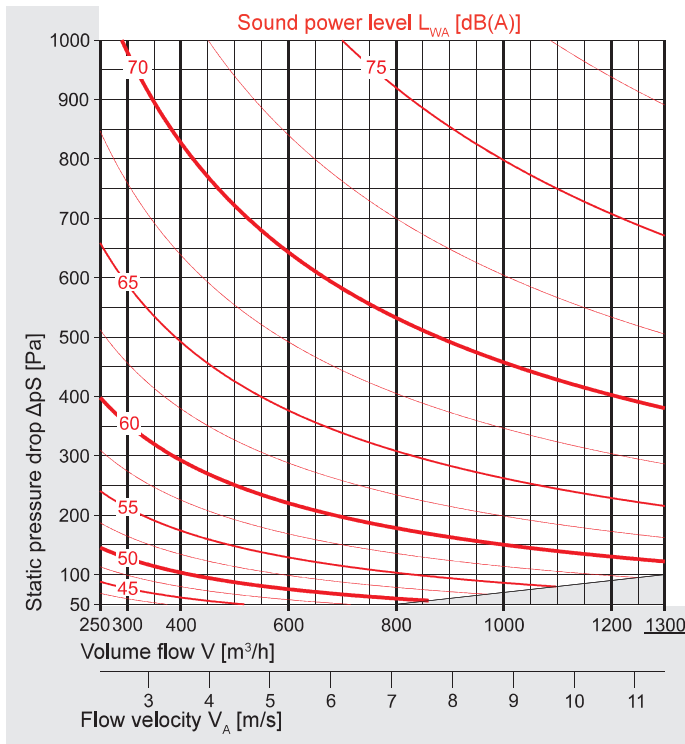
Observe limitations shaded in grey.

Nomenclature $\Rightarrow$ see page 7

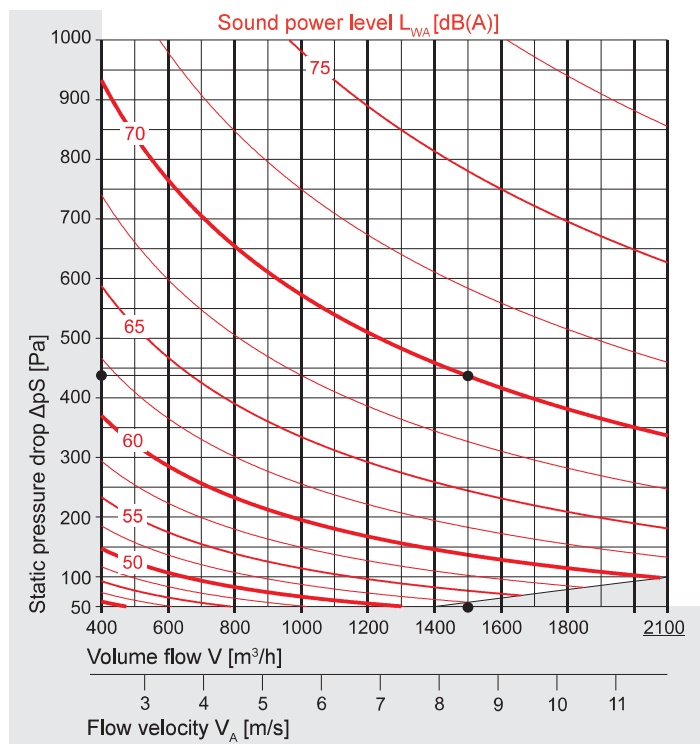
VR1 volume flow controller

Sound power level in the connecting duct (flow noise)

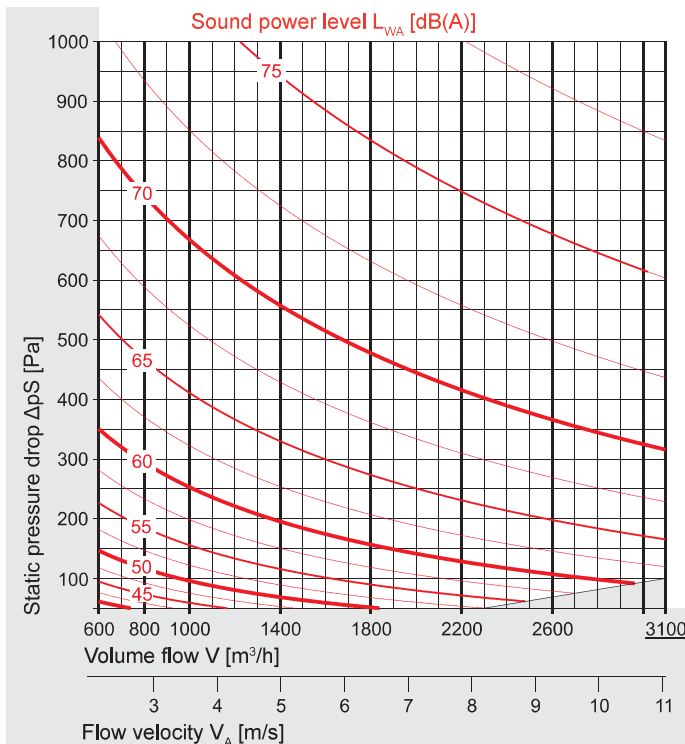
Size DN 200



Size DN 250



Size DN 315



Example:

Specified:	Size	DN 250
	Volume flow	$V = 1500 \text{ m}^3/\text{h}$
	Flow velocity	$v_A = 8.5 \text{ m/s}$
	Static pressure drop	$\Delta p_S = 435 \text{ Pa}$
Result:	Flow noise	
	Sound power level	$L_{WA} = 70 \text{ dB(A)}$

- The sound power level inside the connecting duct is calculated in the nomograms as an A-weighted overall level L_{WA} . The Wildeboer dimensioning software calculates corresponding octave sound power levels L_{W-Oct} for every size and all operating points; and also when incorporating additional SRC duct silencers into the design.
- With SRC duct silencers, the sound power levels L_{WA} can be reduced by up to 25 dB.
- Important: The sound levels indicated in the nomograms are sound power levels! The values represent the sound energy introduced into the duct system. They should be applied for acoustic calculations, e.g. when adding sound attenuators. Please note: The sound power levels L_p or L_{pA} are specified more than once to generally indicate attenuations of up to 16 dB. When comparing numerical values, always bear in mind the difference between the sound power level and sound pressure level. Furthermore, the degree of attenuation only becomes apparent once the specific ducts, deflections, branches and rooms have actually been connected.

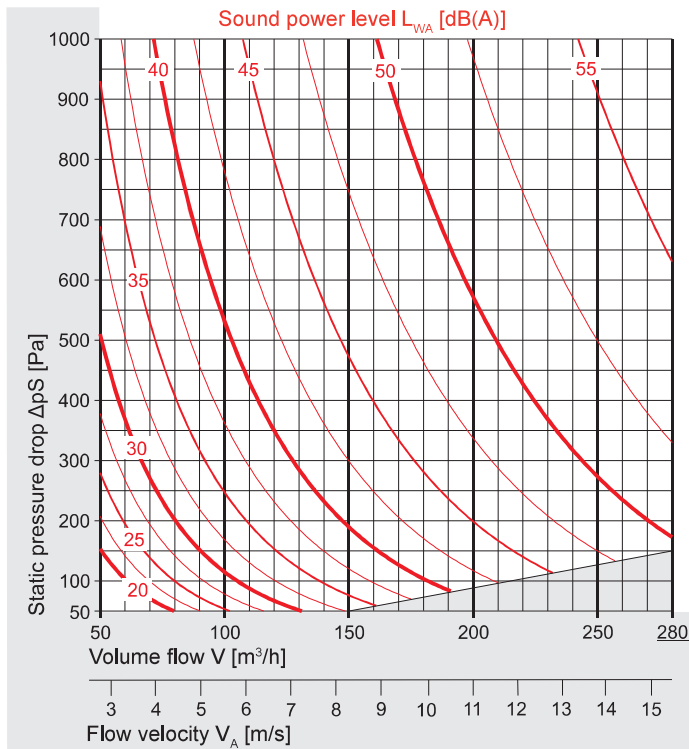
Nomenclature $\Rightarrow$ see page 7

Dimensioning software $\Rightarrow$ download at www.wildeboer.de

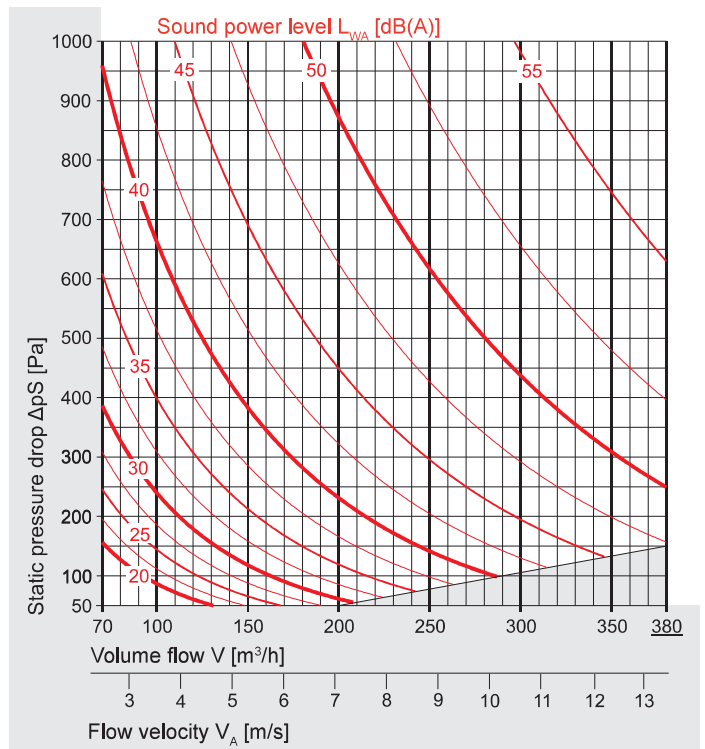
VR1 volume flow controller

Sound power level outside the connecting duct (radiated noise)

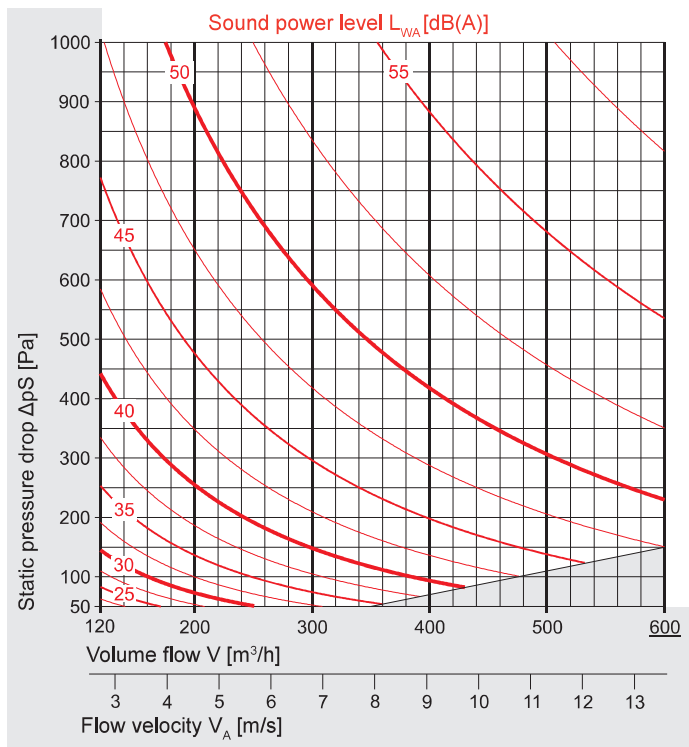
Size DN 80



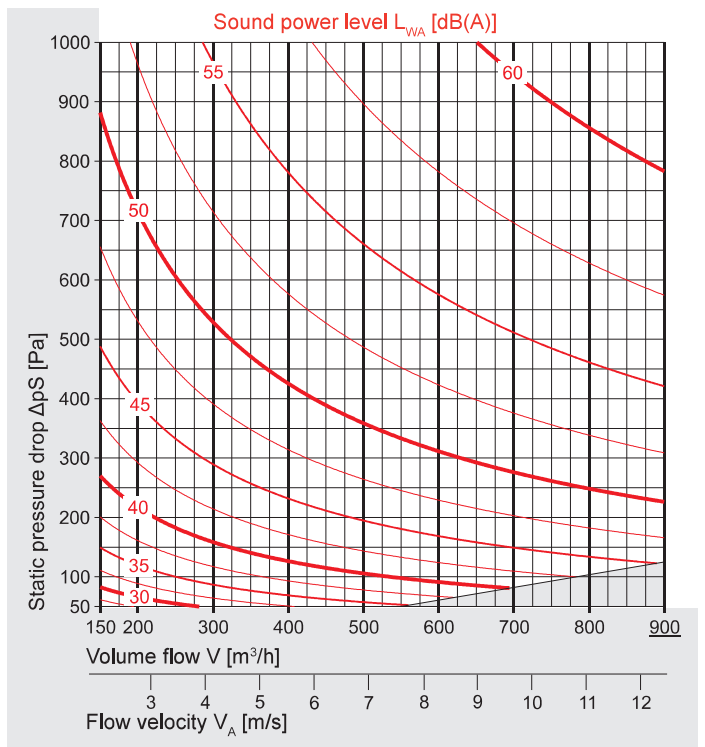
Size DN 100



Size DN 125



Size DN 160



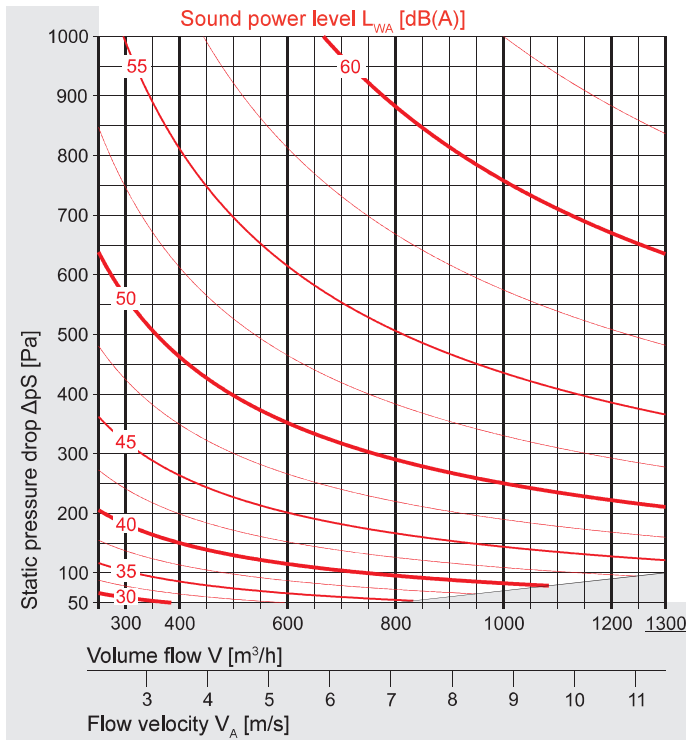
Observe limitations shaded in grey.

Nomenclature $\Rightarrow$ see page 7

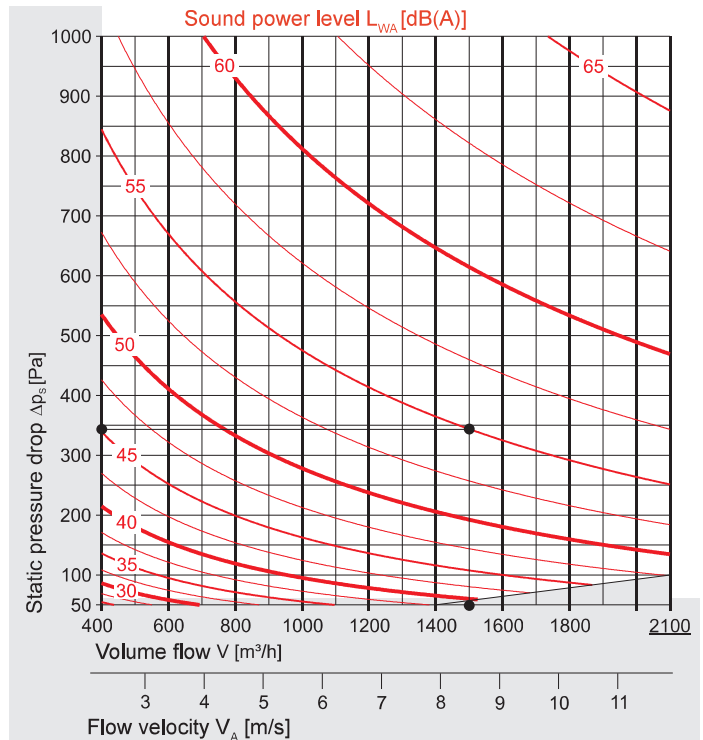
VR1 volume flow controller

Sound power level outside the connecting duct (flow noise), nomenclature

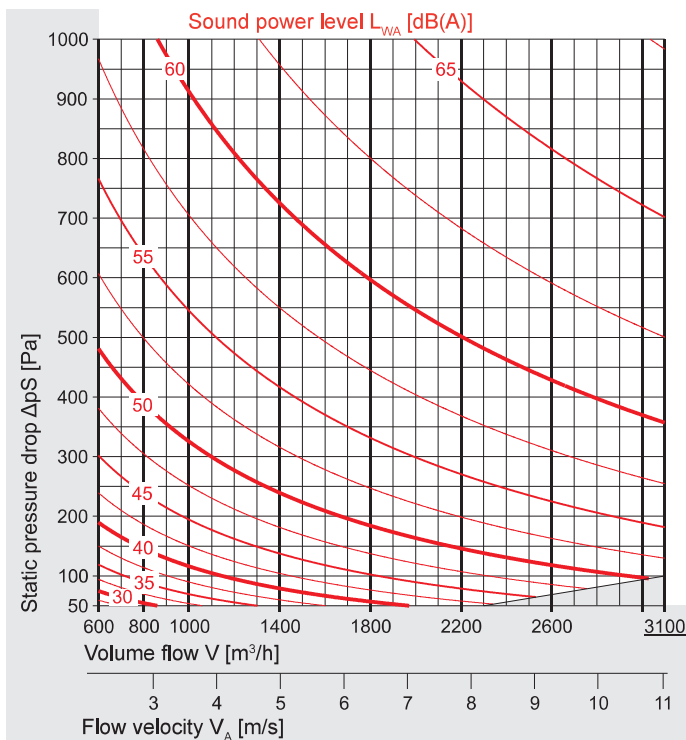
Size DN 200



Size DN 250



Size DN 315



Example:

Specified:	Size	DN 250
	Volume flow	$V = 1500 \text{ m}^3/\text{h}$
	Flow velocity	$v_A = 8.5 \text{ m/s}$
	Static pressure drop	$\Delta p_S = 340 \text{ Pa}$
Result:	Radiated noise	
	Sound power level*)	$L_{WA} = 55 \text{ dB(A)}$

*) The mean **sound pressure level in the room** with the following equipment is:

- 26 dB less **with** acoustic insulation
- 8 dB less **without** acoustic insulation

than the sound power levels specified in the nomograms L_{WA} .

However, the acoustic insulation can only achieve the stated values if the connected circular ventilation ducts are soundproofed (insulated) accordingly.

The sound pressure level can be further reduced by carrying out additional sound attenuation measures on site (suspended ceilings, high degree of room attenuation).

Nomenclature

V	[m³/h]	Volume flow
A_A	[m²]	Inflow cross-section
v_A	[m/s]	Flow velocity in A_A
Δp_S	[Pa]	Static pressure drop
L_{WA}	[dB(A)]	A-weighted sound power level
L_{W-Oct}	[dB]	Octave sound power level $L_{W-Oct} = L_{WA} + \Delta L$
ΔL	[dB]	Relative sound power level to L_{WA}
f	[Hz]	Octave mid frequency
L_p	[dB]	Sound pressure level
L_{pA}	[dB(A)]	A-weighted sound pressure level

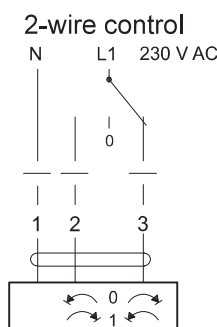
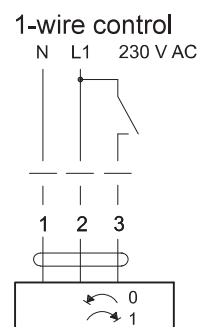
VR1 volume flow controller

Technical data for adjusting drives, installation instructions

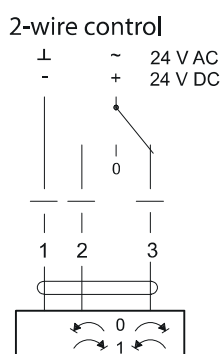
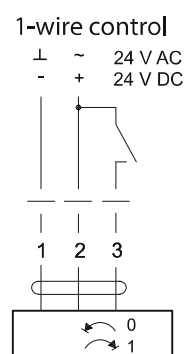
Technical data for actuator-driven adjusting drives

	M1	M2	M3
Supply voltage	230 V AC	24 V AC/DC	24 V AC/DC
Function area	85 to 265 V	19.2 to 28.8 V	19.2 to 28.8 V
Torque	5 Nm	5 Nm	5 Nm
Runtime for 90°	150 s	150 s	150 s
Connected load	4 VA	2 VA	2 VA
Power consumption	1.5 W	1 W	1 W
Degree of protection	IP 54	IP 54	IP 54
Connection cable approx. 1 m long	0.75 mm ² 3-wire	3-wire	4-wire
Ambient temperature	-30 to +50 °C	-30 to +50 °C	-30 to +50 °C

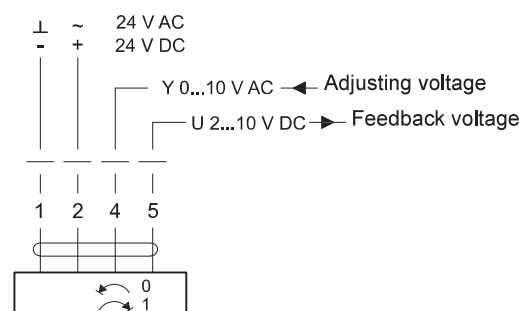
Adjusting drive M1



Adjusting drive M2



Adjusting drive M3



Installation instructions

- VRE1 volume flow controllers are adjusted for the entire scaled application range.
- To install the controller, a straight inlet section which is at least 3 times as long as the nominal diameter DN and a straight outlet section which is at least 1.5 times as long as the nominal diameter DN is required. Installation directly downstream or upstream of flow disruption points (bends, branches, etc.) reduces the control accuracy.
- The volume flow set point is set during installation by setting the pointer to the required set point on the scale and securing this setting. This does not affect the control accuracy.
- Volume flow controllers which are preset in the factory can be used immediately. The volume flow set point can be changed subsequently by carefully unfastening the prior setting.
- VR1 volume flow controllers and SRC duct silencers are supplied individually. Assembly on site!
- Volume flow controllers with motorised setting enable two-point operation (single-wire control) in combination with the actuators M1 (230 V AC) and M2 (24 V AC/DC). The corresponding motor limit stops are positioned in order to set the two volume flows.

In the delivery condition, the two limit stops of the actuators are set in the 0 direction of travel and to the largest possible angle of rotation. The maximum angle of rotation corresponds to the largest possible volume flow set point, and the minimum is equivalent to a "cutoff" at a residual leakage that is significantly lower than the minimum volume flow as specified in the catalogue.

This can be extended to include three-point operation using an additional 0 circuit arrangement (two-wire control). When actuated in this way, the actuator remains in its current position and the VR1 volume flow controller adjusts the corresponding set point.

- Volume flow controllers with actuator-driven adjustment in combination with the actuator M3 (24 V AC/DC) enable continuous adjustment of the set point. The actuator is activated by a setting voltage $Y = 0...10$ V DC and travels to the position specified by the actuating signal; in this case the operating range of the motor does not start until 2 V. The volume flow set point changes more or less linearly in relation to the setting voltage.

In the delivery condition, the actuator is set to 0 direction of travel and the adjustable mechanical limit stops are set for the largest possible angle of rotation, which means that when $Y = 10$ V, the maximum angle of rotation corresponding to the maximum volume flow set point is assumed, and at $0...2$ V the minimum angle of rotation is assumed; this corresponds to a "cutoff" at a residual leakage that is significantly lower than the minimum volume flow set point.

The purpose of the checkback voltage $U = 2...10$ V DC is to provide an electric display of the volume flow set point setting and serve as a subsequent actuating signal for other actuators.

- All motorised actuators are overload-proof, do not require a limit switch and stop automatically at the limit stop.
- Adjusting actuators are equipped with a self-resetting push button for manual adjustment.
- The direction of travel of all motorised actuators can be reversed via a changeover switch on the motor.
- In the event of a power failure, the motor remains in its current position and the controller controls the corresponding set point.
- Assembly instructions are enclosed with the volume flow controllers and must be observed!

VR1 volume flow controller

Order data, specification text

DN size:

80 / 100 / 125 / 160 / 200 / 250 / 315

⇒ see page 3

Actuator-driven set point adjustment:

Two-point / three-point actuator 230 V AC

M1

Two-point / three-point actuator 24 V AC/DC

M2

Continuous actuator 24 V AC/DC

M3

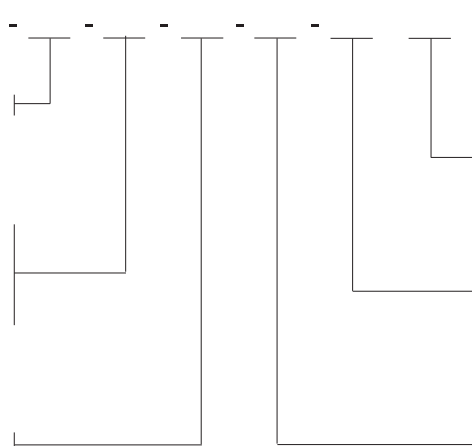
⇒ see pages 2, 3 and 8

Lip seal:

with two lip seals

LD

⇒ see pages 2 and 3



with **duct silencer**

- mounting on site -

SRC 600

SRC 900 (from size DN 100)

Presetting

- not with actuator-driven set point adjustment -

Volume flow [m³/h]

The numerical value must be in the range V_{min} and V_{max} according to the size of the controller!

with **acoustic insulation:**

DS

⇒ see pages 2 and 3

Ordering example: VR1 - 100 - LD - DS - 200 - SRC 900

Select texts not highlighted in bold as required!

Maintenance-free, circular volume flow controller for position-independent installation in circular ventilation ducts for supply and exhaust air ventilation and air conditioning systems. Casing and control mechanism made of galvanized sheet steel, with acoustic insulation, with lip seals. With centrally supported damper blade for volume flow control, with stainless steel bearing axis in special bushings. Setting device with rotary pointer, scale and locking device for the volume flow set point, can be adjusted manually or motorised. Volume flow controller designed as mechanical controller for constant volume flows without auxiliary power supply. With special control mechanism for a high degree of control accuracy throughout the entire control range. The volume flow set point must be infinitely adjustable throughout the control range. The volume flow must be kept constant at variable pressures of between 50 and 1000 Pa with a deviation of roughly $\pm 5\%$ to $\pm 10\%$. Casing tightness class C according to DIN EN 1751. Conformity certificate as proof of compliance with the hygiene requirements according to VDI 6022-1, VDI 3803, DIN 1946-4, DIN EN 13779, SWKI VA104-01, SWKI 99-3, ÖNORM H6020 and ÖNORM H6021. With environmental product declaration according to ISO 14025 and EN 15804.

Units

Volume flow: m³/h

Pressure drop: Pa

Maximum sound power level

Flow noise dB(A)

including SRC duct silencer

Radiated noise dB(A)

Manufacturer: WILDEBOER®

Type: VR1

Size:

complete with fixings

deliver:

install:

units SRC duct silencer 600 / 900

deliver:

install:

INNOVATIVE • PRACTICAL • ECONOMICAL

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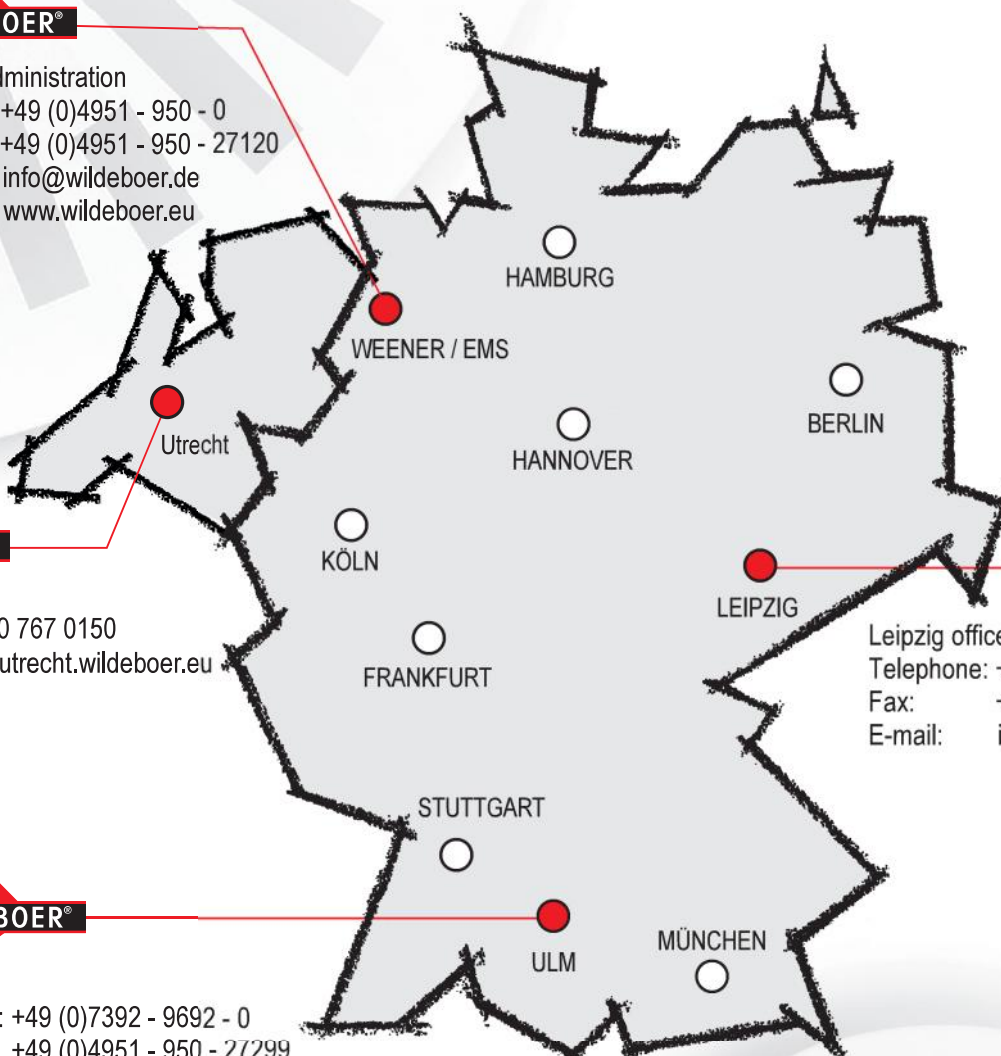
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air distribution fire protection noise protection

building control systems