Volume Flow Rate Measuring Unit

Type VMR

TROX® TECHNIK

TROX GmbH

Heinrich-Trox-Platz
D-47504 Neukirchen-Vluyn

Telephone +49/28 45/2 02-0
Telefax +49/28 45/2 02-2 65
e-mail trox@trox.de
www.troxtechnik.com

Description · Technical Data

Application

TROX volume flow rate measuring unit type VMR is used for manual determination of volume flow rate or for continuous monitoring of the actual flow rate in ventilation ducts. Because of its low pressure drop it is suitable for permanent installation in ventilation system and is easily installed and dismantled.

Description

The measuring unit consists of a circular casing and a differential pressure grid which provides the mean value for determining the volume flow rate. If required, pressure transducers can be factory fitted, wired and tubed.

In systems with contaminated air and/or aggressive particles static pressure sensors should be used (diaphragm measurement principle).

Construction

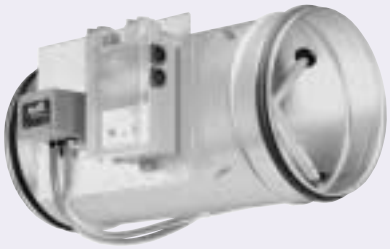
Casing

- Circular construction
- Suitable for ducts to DIN 24 145 or DIN 24 146
- Same connection diameter on both ends with groove for lip seal (lip seal can be fitted at the factory or on site by others)
- With optional flange to DIN 24 154, part 1 or with spun edge for use with duct clamping system (by others)
- Connection nipple for tube with d_i = 6 mm

Volume flow rate measurement

- Manometer (by others), or by optional pressure transducer
- For supply and extract air
- Measurement accuracy ± 5 % even with unfavourable supply and extract ducting arrangement
- Measured pressure differential from 5 to approx. 250 Pa
- Pressure drop 10 % to 26 % of measured pressure differential

VMR



VMR-FL

Installation conditions

Minimum straight duct length for supply and extract conditions

1) Bend connection 1D
   Angle of sensor tubes must be at 45° to the bend centreline
2) Connection to main duct branch 5D
3) Reducing duct transformation 2D

Nomenclature

$\dot{V}$	in l/s or m³/h:	Volume flow rate
Δp_w	in Pa:	Measured pressure differential
ϱ	in kg/m³:	Air density
Δp_g	in Pa:	Total pressure drop
$\Delta \dot{V}$	in ± %:	Accuracy of measurement

Technical data

Nominal size	$\dot{V}$ 3) in l/s	$\dot{V}$ 3) in m³/h	C-value 1)	$\Delta \dot{V}$ in ± %	Δp_g 2) in %
100	10- **95**	36- **342**	6.1	5	26
125	15- **150**	54- **540**	9.7	5	24
160	25- **250**	90- **900**	15.9	5	22
200	40- **405**	144-**1458**	25.5	5	19
250	60- **615**	216-**2214**	39.0	5	17
315	105-**1025**	378-**3690**	65.0	5	15
400	170-**1680**	612-**6048**	106.0	5	10

Highlighted values are nominal volume flow rates

1) At ϱ = 1.2 kg/m³ related to l/s
2) Of Δp_w
3) Typical values

Dimensions

Volume flow rate measurement

The volume flow rate is calculated using the formulae:
with $\varrho = 1.2$ kg/m³:

$$\dot{V} = C \cdot \sqrt{\Delta p_w} \quad \text{in l/s} \qquad \dot{V} = C \cdot \sqrt{\Delta p_w} \cdot 3.6 \quad \text{in m³/h}$$

for $\varrho \neq 1.2$ kg/m³:

$$\dot{V} = C \cdot \sqrt{\Delta p_w} \cdot \sqrt{\frac{1.2}{\varrho}} \quad \text{in l/s or m³/h}$$

Example

Given: Nominal size 160
C-value = 15.9 (from table page 2)
Δp_w = 100 Pa
(read by manometer)

Required: Volume flowrate $\dot{V}$ in l/s or m³/h
at $\varrho = 1.2$ kg/m³

Calculation: $\dot{V} = 15.9 \cdot \sqrt{100}$

Result: 159 l/s or 572 m³/h

Dimensions in mm

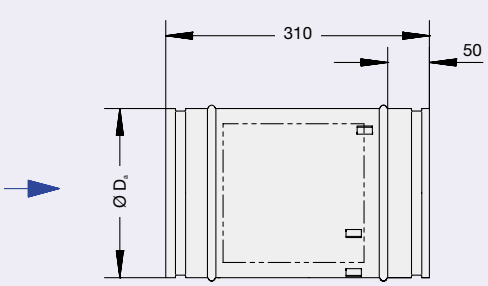
Nominal size	Ø D_a	Ø D_1	Ø D_2	b	s	Ø d	n[1])
100	99	111	132	25	3	9.5	4
125	124	136	157	25	3	9.5	4
160	159	171	192	25	4	9.5	6
200	199	211	233	25	4	9.5	6
250	249	261	283	25	4	9.5	6
315	314	326	352	30	4	9.5	8
400	399	411	438	30	4	9.5	8

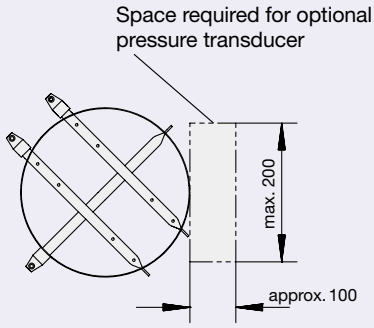
1) n = Number of flange holes

Weight in kg

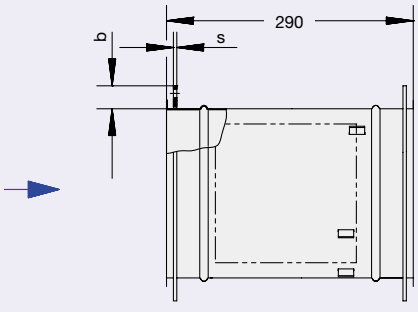
Nominal size	VMR, VMR-BK	VMR-FL
100	0.8	1.2
125	1.0	1.5
160	1.2	2.1
200	1.6	2.7
250	1.9	3.3
315	2.4	4.5
400	3.1	5.7

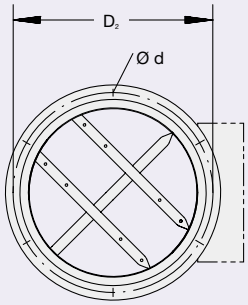
Standard construction



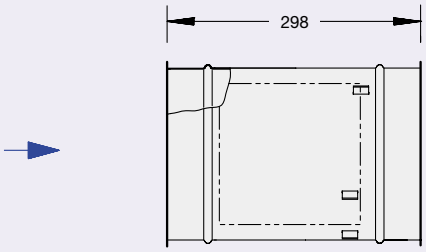


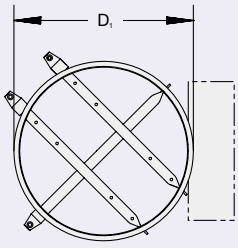
With flange





With spun edge





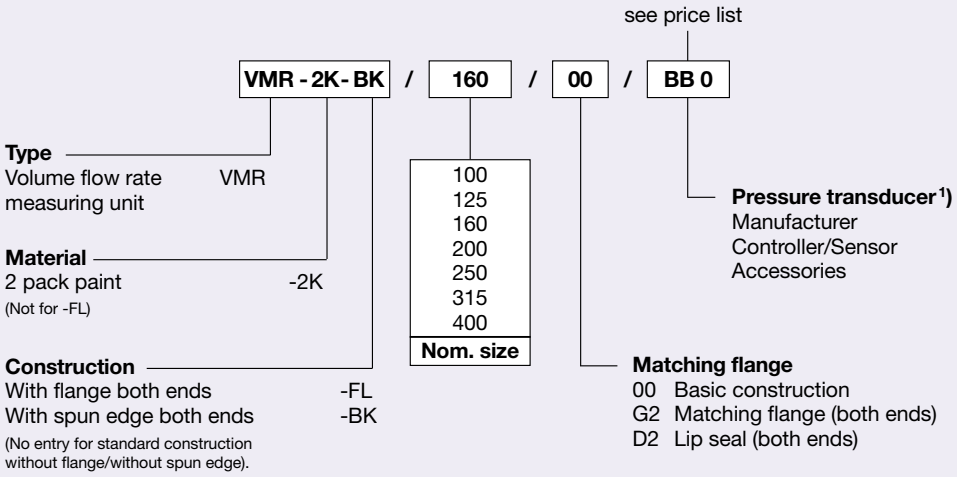
Order Details

Specification text

Volume flow rate measuring unit for manual determination of volume flow rate or for continuous monitoring of the actual flow rate in ventilation ducts. Consists of circular housing with averaging differential pressure sensor grid and factory fitted, pre-wired static pressure transducer as an option. Same connection diameter on both ends with groove for lip seal, to fit ducts DIN 24 145 or DIN 24 146. Measurement accuracy ± 5 % even with unfavourable supply and extract ducting arrangements. Pressure drop 10 % to 26 % of measured pressure differential, depending on size.

Materials:
Galvanised steel casing and attachments.
Aluminium sensor tubes.

Order code



1) No entry, measuring unit without pressure transducer

Order example

Make: TROX
Type: VMR - 2K- BK / 160 / 00 / BB 0