

Measuring probe For ventilation and air-conditioning Model A2G-FM

WIKA data sheet SP 69.10



Applications

- Air flow measurement in circular ventilation pipes
- Air flow measurement in rectangular ventilation ducts

Special features

- Multipoint averaging on the basis of the “Log-Tchebycheff” method to ensure a high accuracy
- Bevelled sensor points guarantee uniform measured values
- Very easy to install
- Available in two versions
 - For circular ventilation pipes (version R)
 - For rectangular ventilation ducts (version L)



Measuring probe, model A2G-FM

Description

The model A2G-FM measuring probe measures air velocities and air flows in ventilation and air-conditioning systems. The intelligent design makes for a very easy installation in existing ventilation pipes and ducts.

Based on the pitot tube principle, the probe measures the total pressure (P_{total}) and the static pressure (P_{static}) of the air flow. The probe determines the average air velocity, measured via 6, 8 or 10 exactly positioned sensor openings, depending on the diameter of the ventilation pipes or the length of the ventilation ducts.

The unique shape of the probe enables measurement even at very low air velocities of down to 1.0 m/s. Bevelled inlets to the measuring probe openings provide for a high measurement accuracy, even under unfavourable flow conditions.

In combination with the model A2G-25 air flow meter, this offers the user a very accurate and cost-effective air flow measuring equipment.

In conjunction with the model A2G-100 PID controller, a highly efficient and very easily adjusted air flow control for ventilation and air-conditioning systems can be provided.

The measuring probe is available in two different versions, depending on the requirements and the installation situation.

Specifications

Measuring probe, model A2G-FM	
Accuracy	±2 %
Permissible medium temperature	5 ... 95 °C
Process connection	4.5 mm brass with barbs + High pressure - Low pressure
Versions	
■ Pipe	100, 125, 160, 200, 250, 300, 315, 400, 450, 500, 550, 600, 630, 750, 800, 900, 1,000, 1,100, 1,200 mm Version R: Version for circular ventilation pipes Diameter of the ventilation pipe in mm = Length of the measuring probe Example: Ventilation pipe diameter 100 mm = A2G-FM R100
■ Duct	250, 300 ... 1,200 mm (in 50 mm increments) Version L: Version for rectangular ventilation ducts Depth of the ventilation duct = Length of the measuring probe Example: Duct depth 600 mm = A2G-FM L600
Material	
■ Probe	T3015 aluminium
■ Mounting plate	Sheet steel
■ Sealing	Polyurethane foam
Relative humidity	0 ... 95 % r. h., non-condensing
Weight	on request

Pitot tube principle

The measuring probe works according to the pitot tube principle. The total pressure (P_{total}) and the static pressure (P_{static}) of the air flow is measured. The measurement openings on the front surface of the probe measure the total pressure (P_{total}) and the measurement openings on the rear side measure the static pressure (P_{static}). The difference between the total pressure and the static pressure gives the dynamic pressure (P_{dynamic}).

The dynamic pressure is related to the square of the air velocity:

$$P_{\text{dynamic}} = \frac{1}{2} \times \rho \times v^2$$

In order to simplify the measurement and calculation for practical use, the model A2G-FM measuring probe works with an air flow constant K_{VOL} . The air flow is calculated using the following formula:

$$V = K_{\text{VOL}} \times \sqrt{P_{\text{probe}}}$$

Legend:

P_{dynamic} = Dynamic pressure
(pressure units, Pa, inWC, etc.)

ρ = Density of the gas (air) in kg/m³

v = Flow rate in m/s

V = Air flow in l/s

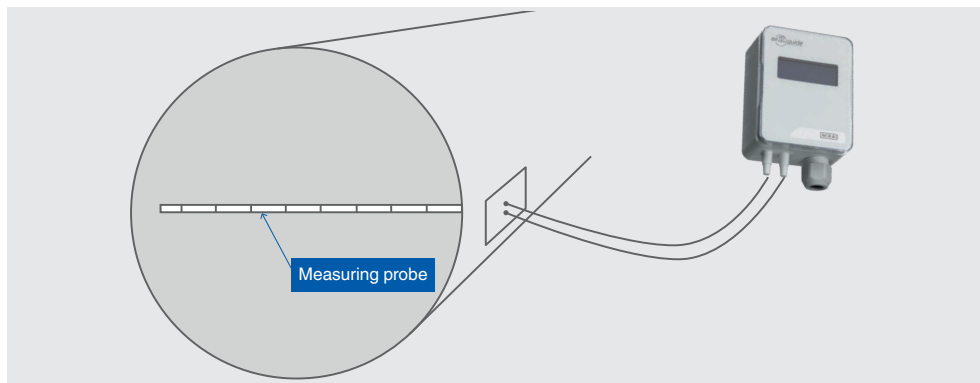
K_{VOL} = Air flow constant value in l/s / Pa
(see table page 3 and 4)

P_{probe} = Pressure differential measured by the probe

The K_{VOL} value is stated on the front panel of each measuring probe. This value is entered into the model A2G-25 air flow meter or the model A2G-100 PID controller during commissioning.

Air flow calculation

Version R (for circular ventilation pipes)



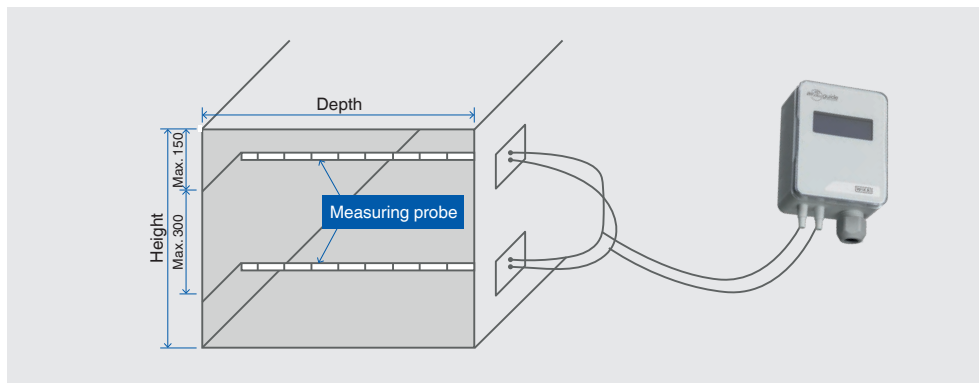
Product designation	Sensor length in mm	K faktor in l/s	K faktor in m³/h
A2G-FM R 100	100	5.6	20.16
A2G-FM R 125	125	9.17	33.012
A2G-FM R 160	160	15.62	56.232
A2G-FM R 200	200	25.06	90.216
A2G-FM R 250	250	38.43	138.348
A2G-FM R 300	300	56.68	204.048
A2G-FM R 315	315	62.85	226.26
A2G-FM R 400	400	103.76	373.536
A2G-FM R 450	450	132.59	477.324
A2G-FM R 500	500	164.93	593.748
A2G-FM R 550	550	200.8	722.88
A2G-FM R 600	600	240.2	864.72
A2G-FM R 630	630	266.61	959.796
A2G-FM R 750	750	379.51	1,366.236
A2G-FM R 800	800	433	1,558.8
A2G-FM R 900	900	550.53	1,981.908
A2G-FM R 1000	1,000	682.16	2,455.776
A2G-FM R 1100	1,100	827.88	2,980.368
A2G-FM R 1200	1,200	987.7	3,555.72

The K_{VOL} factor is based on $D_{pipe} = D - 3 \text{ mm}$

The table is valid for air at 20 °C, 50 % r. h. and 1,013 mbar ambient pressure, density = 1.20 kg/m³

K value determination

Version L (for rectangular ventilation ducts)



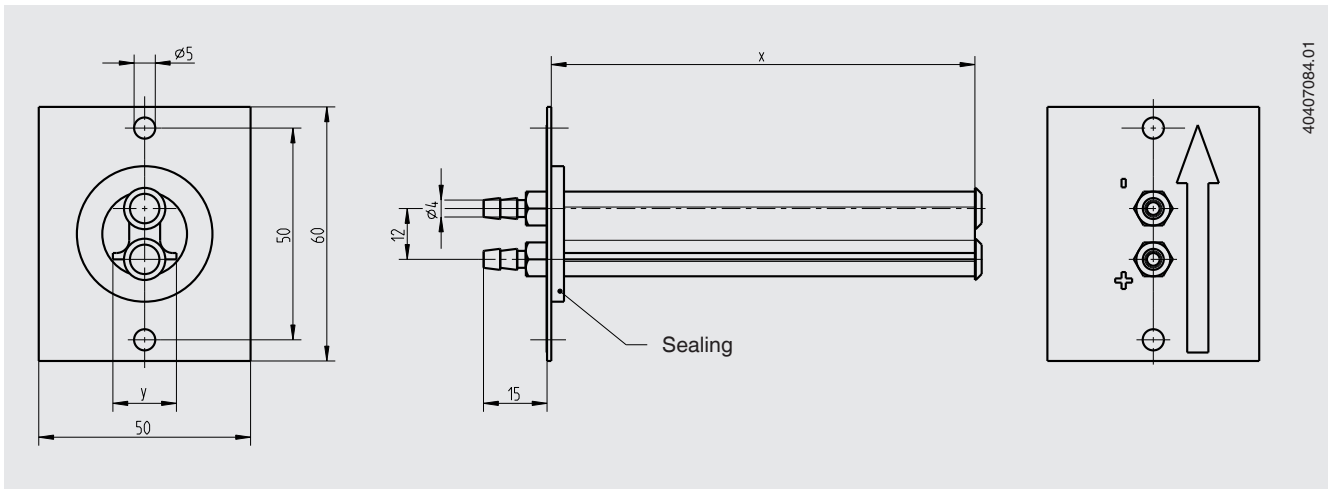
Duct height in mm	Number of probes	Duct depth in mm													
		200	250	300	350	400	450	500	600	700	800	900	1,000	1,100	1,200
		K factor in l/s / Pa													
150	1	23.0	28.8	34.5	40.3	46.0	51.8	57.5	69.1	80.6	92.1	104	115	127	138
200	1	33.1	41.4	49.7	58.0	66.3	74.6	82.9	99.4	116	133	149	166	182	199
250	1	41.4	51.8	62.7	72.5	82.9	93.2	104	124	145	166	186	207	228	249
300	1	47.0	58.7	70.4	82.2	94.0	106	117	141	164	188	211	235	258	282
350	2	55.2	69.1	82.9	96.7	110	124	138	166	193	221	249	276	304	331
400	2	65.4	81.7	98.1	114	131	147	163	196	229	261	294	327	360	392
450	2	73.7	92.1	110	129	147	166	184	221	258	295	331	368	405	442
500	2	83.8	105	126	147	168	189	209	251	293	335	377	419	461	503
600	2	101	127	152	177	203	228	253	304	354	405	456	506	557	608
700	3	115	144	173	201	230	259	288	345	403	460	518	575	633	691
800	3	133	167	200	234	267	300	334	400	467	534	601	667	734	801
900	3	152	190	228	266	304	342	380	456	532	608	684	760	836	911
1,000	4	166	207	249	290	331	373	414	497	580	663	746	829	911	994
1,100	4	184	230	276	322	368	414	460	552	644	737	829	921	1,013	1,105
1,200	4	203	253	304	354	405	456	506	608	709	810	911	1,013	1,114	1,215

K factor calculation when using > 4 probes

$$K = 921 \times T \text{ (duct depth in m)} \times H \text{ (duct height in m)} - 0.025 \times n \text{ (number of probes)}$$

The table is valid for air at 20 °C, 50 % r. h. and 1,013 mbar ambient pressure, density = 1.20 kg/m³

Dimensions in mm



Scope of delivery

- Measuring probe
- Sealing

Ordering information

Model / Duct version (circular or rectangular) / Duct dimensions (diameter or duct length and width) / Options

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