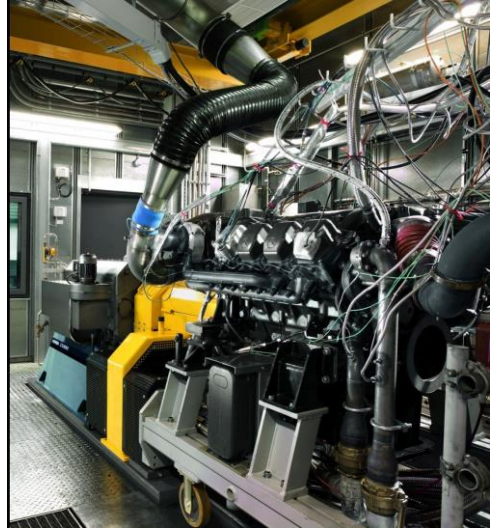


Flowmeter for precise measurement of gas mass flow with long-term stability and high level of accuracy, under extreme conditions, also for applications in condensate and particle laden gases



Measured variables

- gas mass flow
- standard flow rate
- actual flow rate
- pressure
- temperature

Examples of application

- engine test stations
- filter testing devices
- valve test benches
- turbocharger test stands
- climatic test chambers

Media

- single-phase gases or gas mixtures with air, nitrogen, oxygen, methane, natural gas, carbon monoxide, carbon dioxide, argon as dominant components

Design

- measuring tube with integrated transducer and flow straightener

Functional principle

- measurement of vortex shedding frequency f combined with absolute pressure and temperature measurement
- ultrasonic detection of the vortex



Kármán vortex street

Advantages

- long-term stability even under extreme conditions
- high turndown ratio (1:100)
- no moving parts
- corrosion resistant
- fast response time
- marginal pressure drop
- easy to use
- no separate evaluation unit necessary
- easy to install
- conform to e-CFR Part 1065

Particles, condensate, humidity in the gas

- Loading with particles such as dust and fibres does not affect the measurement, as long as these are no abrasions on the sensor
- relative gas humidity of less than 100 % does not affect the measurement uncertainty

Types

Type	Article No.
ExactFlow II DN50 ZG1	B015/601
ExactFlow II DN80 ZG1	B015/602
ExactFlow II DN100 ZG1	B015/603
ExactFlow II DN150 ZG1	B015/604
ExactFlow II DN200 ZG1	B015/605

Design / Functional principle

Measuring tube / vortex flowmeter with integrated transducer and flow straightener combined with precision absolute pressure transmitter 0.6 ... 1.2 bar abs; 0.1 % FSO and 4-wire Pt100 temperature sensor, class AA DIN EN 60751 as in Diagram 1 (ZG1), Page 4

Measured variables

Measured variables	Unit of display
Gas mass flow m/t	kg/h
Standard flow rate NV/t	Nm ³ /h
Actual flow rate V/t	m ³ /h
Working pressure p	hPa
Working temperature T	°C

Measuring ranges

Nominal diameter	Inside diameter [mm]	Mass flow* [kg/h]	Actual flow rate [m ³ /h]
DN 50	58.3	5 ... 345	4 ... 288
DN 80	80.0	9 ... 870	7 ... 724
DN 100	110.3	17 ... 1600	14 ... 1330
DN 150	150.0	31 ... 3060	26 ... 2540
DN 200	200.0	55 ... 5440	45 ... 4520

*Mass flow for example at $t_B + 20$ °C and $p_B = 1013$ hPa (actual density of 1.204 kg/m³)

Calibration

Nominal diameter	Article no. for ISO calibration*	Article no. for DAkkS calibration*
DN 50	CQ-1600 ISO	CQ-1600 DAKKS
DN 80	CQ-1600 ISO	CQ-1600 DAKKS
DN 100	CQ-1600 ISO	CQ-1600 DAKKS
DN 150	CQ-5500 ISO	CQ-5500 DAKKS
DN 200	CQ-5500 ISO	CQ-5500 DAKKS

* For each sensor, one of the two calibration options listed below must be selected.

Calibration possibilities

ISO calibration (inclusive calibration certificate)

calibration medium air, adjustment in sensor measuring range, 6 calibration values in the scaled measuring range

DAkkS calibration (inclusive calibration certificate)

calibration medium air, adjustment in sensor measuring range, 6 calibration values in the scaled measuring range

Measurement accuracy	< 0.7 % of actual value (measuring range 2-100 % at +20 °C/1000 hPa)
Repeatability	± 0.15 % of actual value
Input/output section (see Accessories)	to achieve as great a measurement accuracy as possible, an input section of 20 x Di is recommended. The output section should be no shorter than 5 x Di. These can be reduced and operation without flow straightener is also possible. However, this leads in both cases to increased measurement uncertainties, which are dependent on the path of the pipeline, disturbances and the actual working flow velocity. With defined air intake requirements, such as suction filters, the input sections can be shortened to 10 x Di. (Please state when placing order).

Materials in contact with the medium

stainless steel 1.4571, 1.4404, 1.4301, ceramics, FKM, aluminium

Working pressure

up to 1.2 bar / 120 kPa overpressure,
higher working pressure in conjunction with integral flange connection and other pipelines on request

Working temperature ranges

Medium	-20 ... +80 °C (up to +240 °C on request)
Permissible ambient	-25 ... +60 °C

Transducer UVATP in the AS102 housing

Input vortex frequency	resolution : 0.125 Hz
Input t: Pt100	resolution : 0.1 K
Input p: 4-20 mA	resolution : 1 hPa time constant : 0.125 s
2 analog outputs	4 ... 20 mA, resistance max. 500 Ohm 16-bit resolution (1/65000)
Analog output A1 'high precision'	gas mass flow proportional time constant 4 s, frequency hopping >25% 2 s updating time 0.125 s measurement accuracy 0.7 % of actual value (in the measuring range 2-100 %)
Analog output A2 'short time constant'	gas mass flow proportional time constant 0.065 s updating time 0.065 s measurement accuracy 1 % of actual value (in the measuring range 2-100 %)
	The output signals are electrically isolated from the power supply. Optionally, the analog outputs can be electrically isolated mutually and from the inputs using an additional isolating amplifier.
Supply	24 V DC
Consumption	< 5 W
LCD display in housing cover	1 st row: 'flow rate' or 'mass flow' 2 nd row: 'temperature and pressure' or 'error code' 2 x 16 digit, character height 5.5 mm working temperature range -25 ... +60 °C
	Article No. A010/017

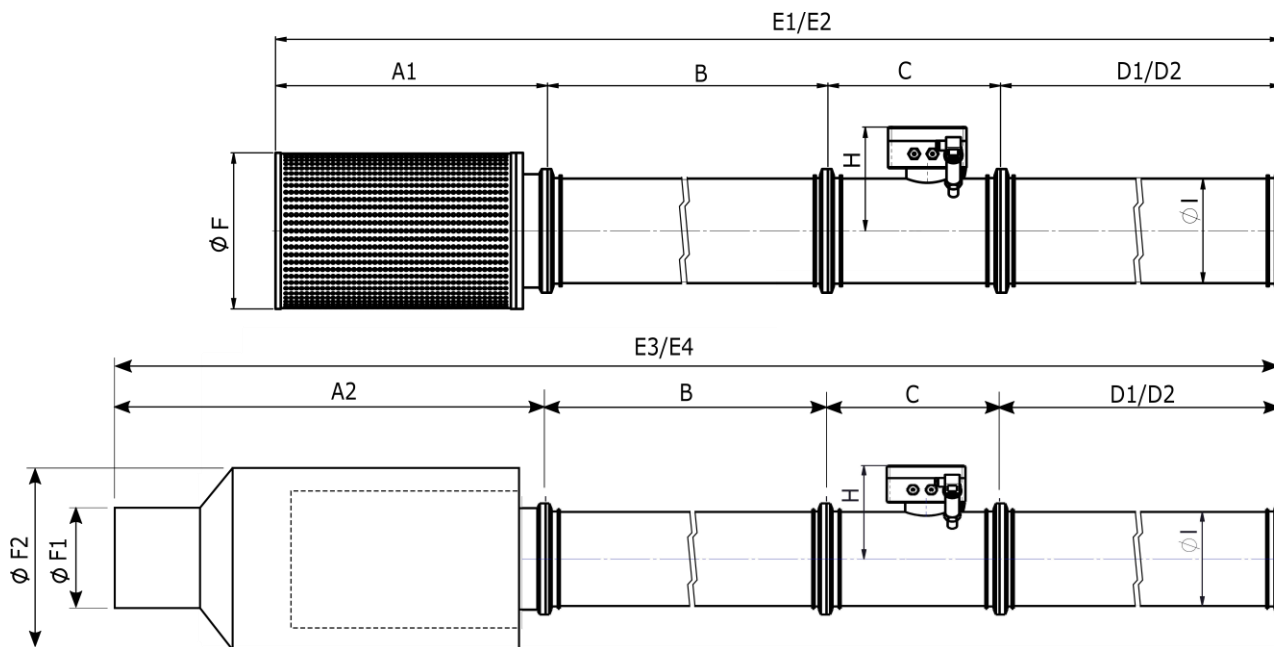
Transducer and connection housing

Dimensions	150 / 100 / 80 mm (L / W / H)
Connection	PUSH IN PCB terminals; no tools necessary; apply pressure with a pen or screwdriver to separate strands; for wires with cross sections 0.14 ... 1.5 mm ² ; feed through for shielded cables with outside diameter 5 ... 10 mm; shielded contact via metal cable glands

Electromagnetic compatibility (EMC)

according to EN 61 000-6-2 / IEC77

Dimensions / Drawing 1 (ZG1)



Nominal pipe size	Inside pipe diameter $\varnothing I$ [mm]	Air filter open A1 [mm]	Flow rectifier A2 [mm]	Input section B [mm]	Sensor length C [mm]	Output section D1/D2** [mm]
DN 50	58.3	356	773	506	184	256/254
DN 80	80.0	401	773	806	189	406/404
DN 100	110.3	526	843	1006	254	506/504
DN 150	150.0	513	903	1518	280	768/759
DN 200	200.0	513	783	2018	330	1018/1009

Nominal pipe size	Overall length E1/E2* [mm]	Overall length E3/E4** [mm]	Air filter open $\varnothing F$ [mm]	Flow rectifier $\varnothing F1$ [mm]	Flow rectifier $\varnothing F2$ [mm]	Height H [mm]
DN 50	1302/1300	1719/1717	150	80	203	184.5
DN 80	1802/1800	2174/2172	198	103	253	184.5
DN 100	2292/2290	2609/2607	243	153	303	162.0
DN 150	3079/3070	3469/3460	303	203	353	177.0
DN 200	3879/3870	4149/4140	303	253	353	202.0

* All measurement are subject to alteration

** with flange at the end of the output section (D1, E1 and E3)
with flat pipe ends of the output section (D2, E2 and E4)

Accessories		
	Description	Article No.
Raw signal output	via BNC connector 5 V (TTL); provides a frequency signal (vortex shedding frequency) in real-time	HWVAROH
PC software UCOM VTP	for configuring transducers UVATP via RS232 interface, PC connector cable RJ22 / D-Sub 9-pin (extra)	A010/053
PC cable RJ22 / D-Sub 9-pin	for configuring transducers; transducer connection: RJ22, PC connection: D-Sub 9-pin	A010/051
USB / RS232 Interface converter	connects PC with USB interface and Höntzsch programming adapter with RS232 interface, PC connection: USB plug type A programming adapter: D-sub 9-pin	A010/100

Pipe sections for input/output sections for tension ring/chain assembly					
Stainless steel 1.4301 or 1.4571					
			Installation length [mm]	Article No.	
Input section	ZF/KF	DN 50	506	B015/611-S01	
Output section	KF/ZF	DN 50	256	B015/611-S02	
Output section	KF/flat	DN 50	254	B015/611-S04	
Input section	ZF/KF	DN 80	806	B015/612-S01	
Output section	KF/ZF	DN 80	406	B015/612-S02	
Output section	KF/flat	DN 80	404	B015/612-S04	
Input section	ZF/KF	DN 100	1006	B015/613-S01	
Output section	KF/ZF	DN 100	506	B015/613-S02	
Output section	KF/flat	DN 100	504	B015/613-S04	
Input section	ZF/KF	DN 150	1518	B015/614-S01	
Output section	KF/ZF	DN 150	768	B015/614-S02	
Output section	KF/flat	DN 150	759	B015/614-S04	
Input section	ZF/KF	DN 200	2018	B015/615-S01	
Output section	KF/ZF	DN 200	1018	B015/615-S02	
Output section	KF/flat	DN 200	1009	B015/615-S04	

Pipe connection
with tension ring or chain
Flange on both sides for quick connectors.
DIN or ANSI integral flange connection, on request.

Installation position
any
to ensure that the sensor remains operative in horizontal pipeline ducts, even with moderate condensate, it should be so installed that the connection housing points sideways

Air filter / flow rectifier with cone flange (KF) connection for tension ring / chain assembly*

		Air filter open	Flow rectifier	
		Article No.	Article No.	Weight [kg]
Air filter	DN 50	B015/611-S05	B015/611-S06	9.5
Air filter	DN 80	B015/612-S05	B015/612-S06	12.8
Air filter	DN 100	B015/613-S05	B015/613-S06	18.0
Air filter	DN 150	B015/614-S05	B015/614-S07	22.6
Air filter	DN 200	B015/615-S05	B015/615-S07	21.4

* Due to the weight, support the air filter / flow rectifier if necessary.

Tension rings/chains for cone and intermediate flange (ZF) connection

each with silicone flat seal ring

		Article No.
Ring	DN 50	B015/611-S03
Ring	DN 80	B015/612-S03
Ring	DN 100	B015/613-S03
Chain	DN 150	B015/614-S03
Chain	DN 200	B015/615-S03

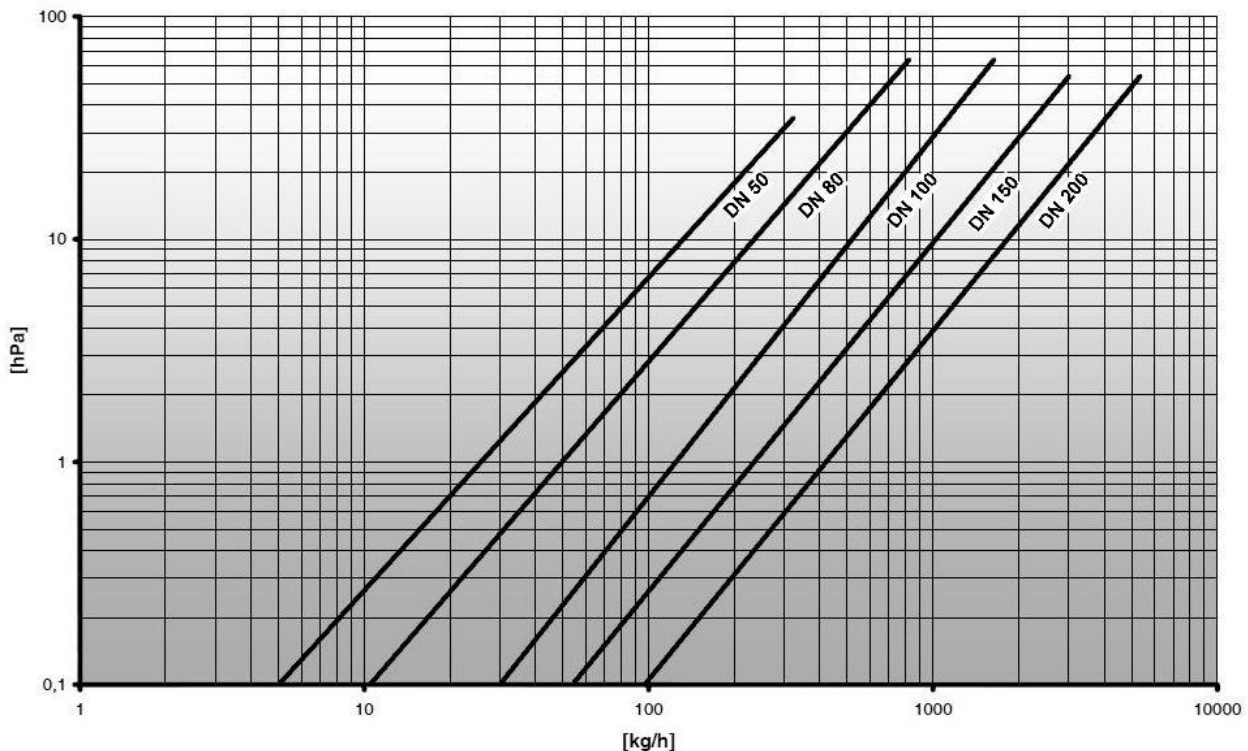
Cone flanges (KF) for welding on for customer adaptations

each with FKM O-ring seal

		Article No.
Cone flange	DN 50	B015/611-S10
Cone flange	DN 80	B015/612-S10
Cone flange	DN 100	B015/613-S10
Cone flange	DN 150	B015/614-S10
Cone flange	DN 200	B015/615-S10

Pressure drop

via the measuring tube under atmospheric conditions



Transducer connection diagram

with added raw signal output via BNC connector 5 V (TTL) optional

