

Ultrasonic Massflow Measuring System



ExactSonic P DN100 (above); ExactSonic P DN250 (below left); ExactSonic P DN50 (below right)

Functional principle

- non-invasive ultrasonic flow rate measurement based on transit time method

Application examples

- Test bench measurements for motors, filter, turbo charger, clima, valves, ...

Advantages

- marginal pressure loss
- short input and output sections

- low starting value
- high repeatability
- insensitive to contamination
- easy to maintain
- large number of nominal pipe sizes
- direction-sensing measuring
- correction „backflow“
- high turndown ratio (1:250)
- fast response time
- no separate evaluation unit necessary
- easy to install
- conform to e-CFR

Types	
Type	Artikel-No.
ExactSonic P DN50 ZG1	B015/871
ExactSonic P DN80 ZG1	B015/872
ExactSonic P DN100 ZG1	B015/873
ExactSonic P DN150 ZG1	B015/874
ExactSonic P DN200 ZG1	B015/875
ExactSonic P DN250 ZG1 (flat pipe ends)	B015/876
ExactSonic P DN250 ZG1	B015/877

other sizes on request

Design / Functional principle
 Measuring tube / transit time ultrasonic flowmeter with integrated flow-straightener combined with precision absolute pressure transmitter 0.25 ... 1.6 bar abs; 0.1 % FSO and 4-wire Pt100 temperature sensor, class B DIN EN 60751, optional with additional measurement of the relative humidity (rh); design according drawing 1 (ZG1) with integrated transducer SMART-UA

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 (turn-down ratio 1 : 250)				
Nominal diameter	Inside diameter [mm]	Actual flowrate [m ³ /h]	Massflow* [kg/h]	Massflow** [kg/h]
DN 50	58.3	1.0 ... 240	1.2 ... 290	3.0 ... 713
DN 80	80.0	1.8 ... 450	2.2 ... 540	5.5 ... 1340
DN 100	110.3	3.5 ... 860	4.0 ... 1030	10 ... 2550
DN 150	150.0	6.4 ... 1590	7.5 ... 1900	19 ... 4730
DN 200	200.0	11 ... 2830	14 ... 3400	33 ... 8400
DN 250	250.0	18 ... 4420	21 ... 5300	53 ... 13130

* Mass flow for example for = t_B +20 °C and p_B = 1013 hPa equates to a standard density of 1.204 kg/m³
 ** Mass flow for example for = t_B +20 °C and p_B = 2500 hPa equates to a standard density of 2.971 kg/m³

Initial value	± 0,1 m/s
Max. terminal value	± 25 m/s
Measurement accuracy	using the digital output: < 1 % of actual value using the analog output: < 1 % of actual value + < 0.1 % of actual value (in the measuring range 2-100 %)
Repeatability	< ± 0,5 % 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).

DAkKS Kalibrierung

Calibration Range	Description	Art.-No.
up to 1600 m ³ /h	incl. certificate	CQ-1600 DAKKS
up to 5500 m ³ /h	incl. certificate	CQ-5500 DAKKS

Medium

Air, gases and gas mixtures

Materials in contact with the medium

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

Working pressure

0.6 up to 1.6 bar (600 up to 1600 hPa) absolute pressure, alternatively up to 2.5 bar (2500 hPa) absolute pressure, higher working pressure possible (on request)

Working temperature ranges

Medium	-20 ... +60 °C
Permissible ambient	-20 ... +60 °C

Transducer SMART-UA in the AS102 housing

Sampling rate	resolution : 1 kHz
Input t : Pt100	resolution : 0.3 K
Input p : 0 ... 10 V	resolution : 1 hPa time constant : < 0.5 ms
Analog output	default : 4 ... 20 mA, load max. 500 Ohm 16-bit resolution alternative (on request): 0 ... 10 V, impedance 1 kOhm time constant : max. 1 kHz (1 ms), adjustable Output is not galvanically isolated Connection via 5-pin screw flange socket
TCP/IP	AK Protocol according VDA rule of 'Standardization exhaust gas measurement technology'; via RJ45 connection socket
USB	USB Interface for logging, safety access, factory reset, ...
Supply	24 V DC
Consumption	< 15 W
LCD display in housing cover	touch intelligence - illuminated and installed in the housing lid, display of various modes and parameter levels, multi-level security areas

Electromagnetic compatibility (EMC)

According EN 61 000-6-2 and EN 61 000-6-4

Transducer and connection housing

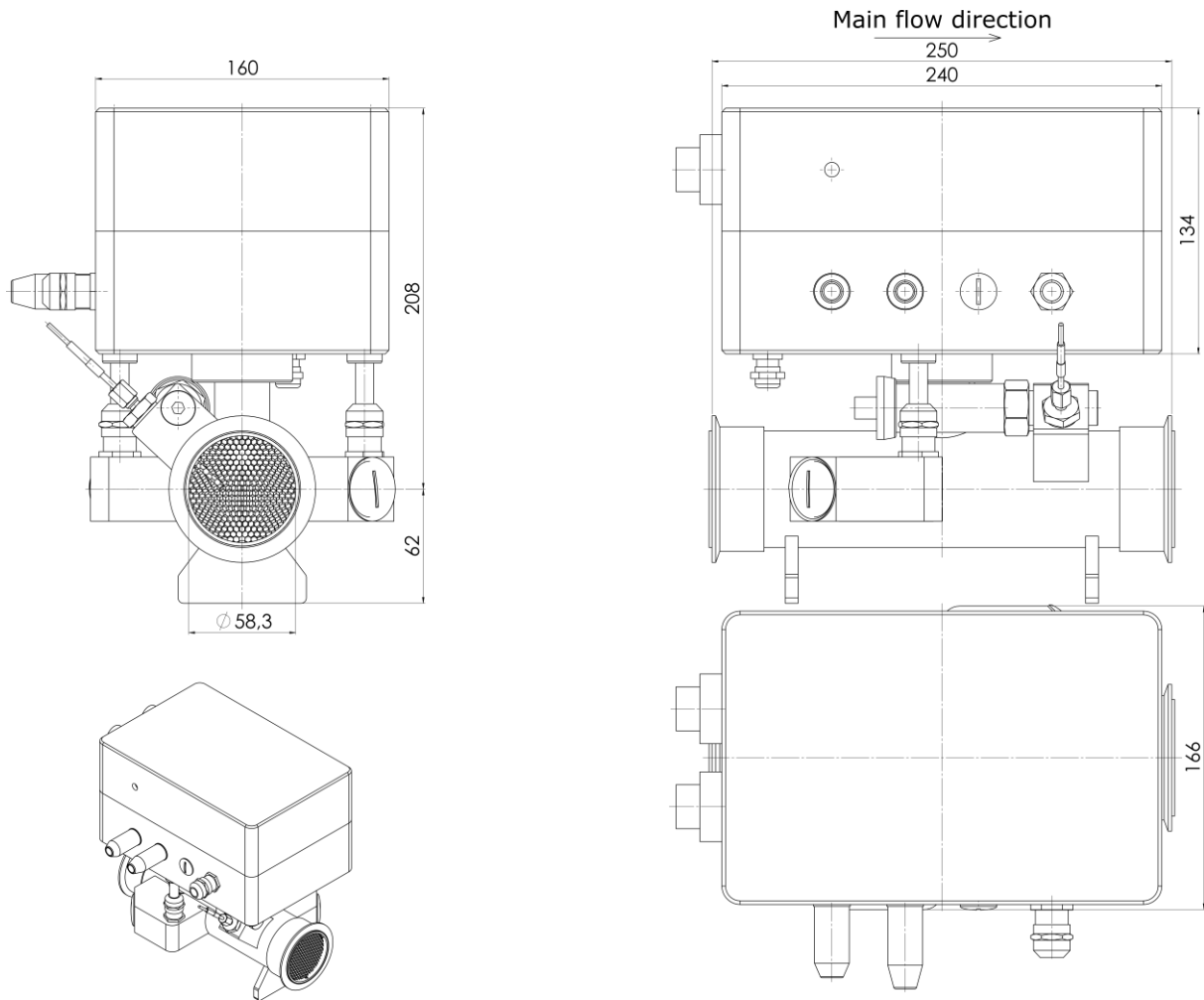
Dimensions	240 / 160 / 134 mm (B / H / T)
Connection	Different plug connectors for power supply, analog output, TCP/IP, USB, ...

Installation position /orientation

Any	In general, the best result is achieved by calibrating and adjusting the measuring devices as close to the real application.
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Nominal pipe size 50

Type	Artikel-No.
ExactSonic P DN50 ZG1	B015/871

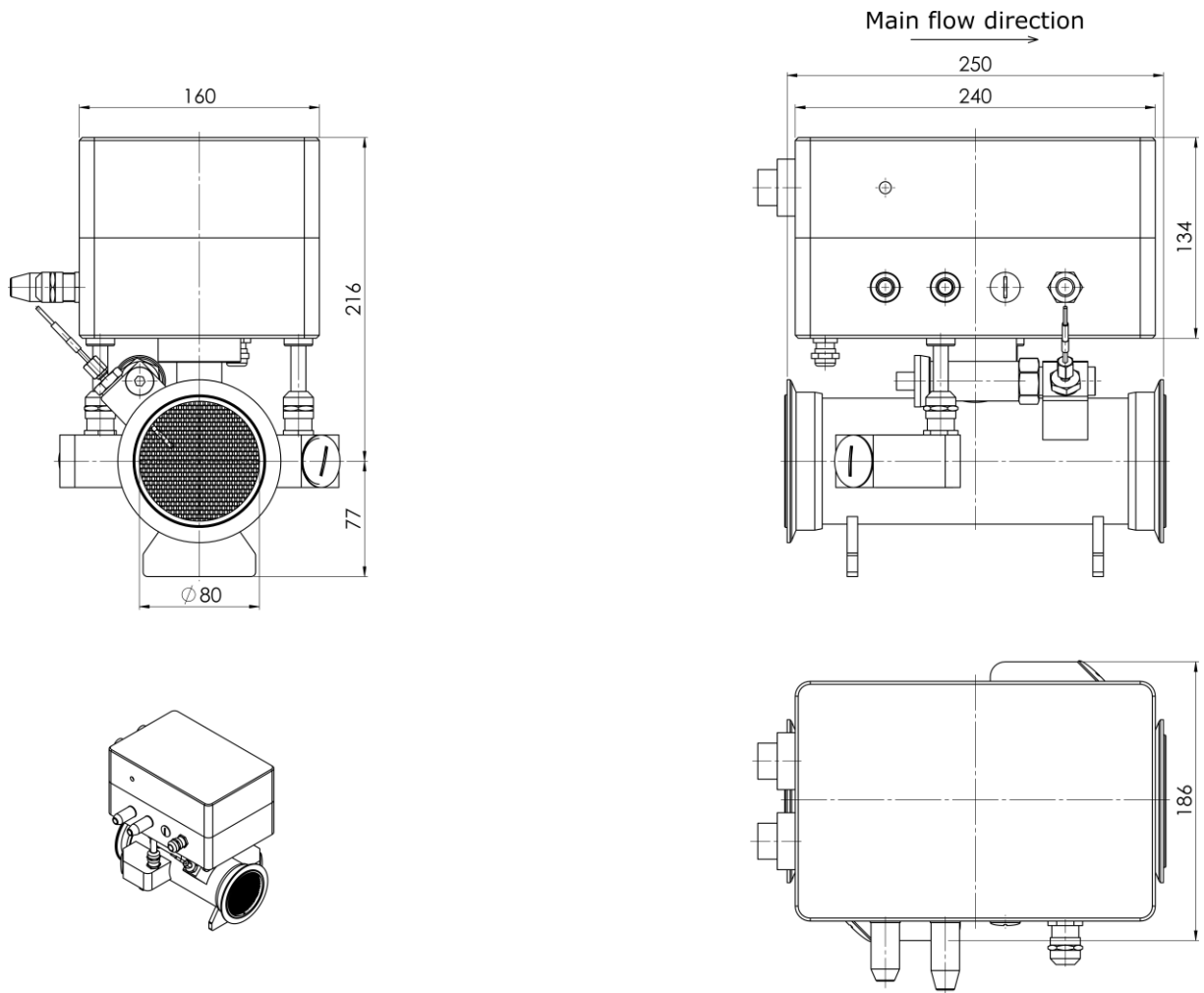


(1) Nominal pipe size / Inside pipe diameter / Dimensions / Weight

Nominal pipe size [mm]	Inside pipe diameter \varnothing I [mm]	Sensor length C [mm]	Width B [mm]	Height H [mm]	Weight [kg]
50	58.3	250	220	270	7.1

Nominal pipe size 80

Type	Artikel-No.
ExactSonic P DN80 ZG1	B015/872

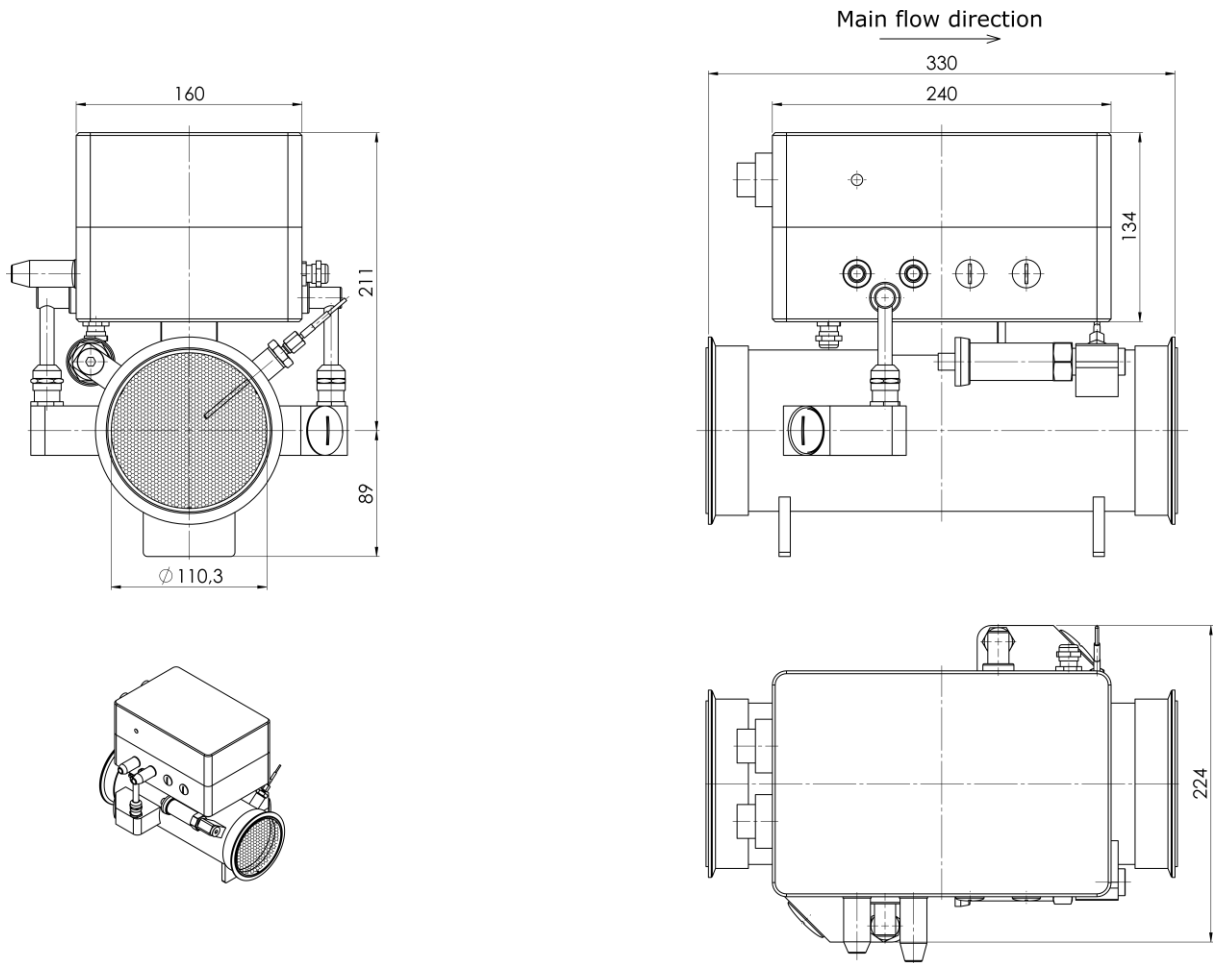


(1) Nominal pipe size / Inside pipe diameter / Dimensions / Weight

Nominal pipe size [mm]	Inside pipe diameter Ø I [mm]	Sensor length C [mm]	Width B [mm]	Height H [mm]	Weight [kg]
80	80.0	250	220	293	7.5

Nominal pipe size 100

Type	Artikel-No.
ExactSonic P DN100 ZG1	B015/873

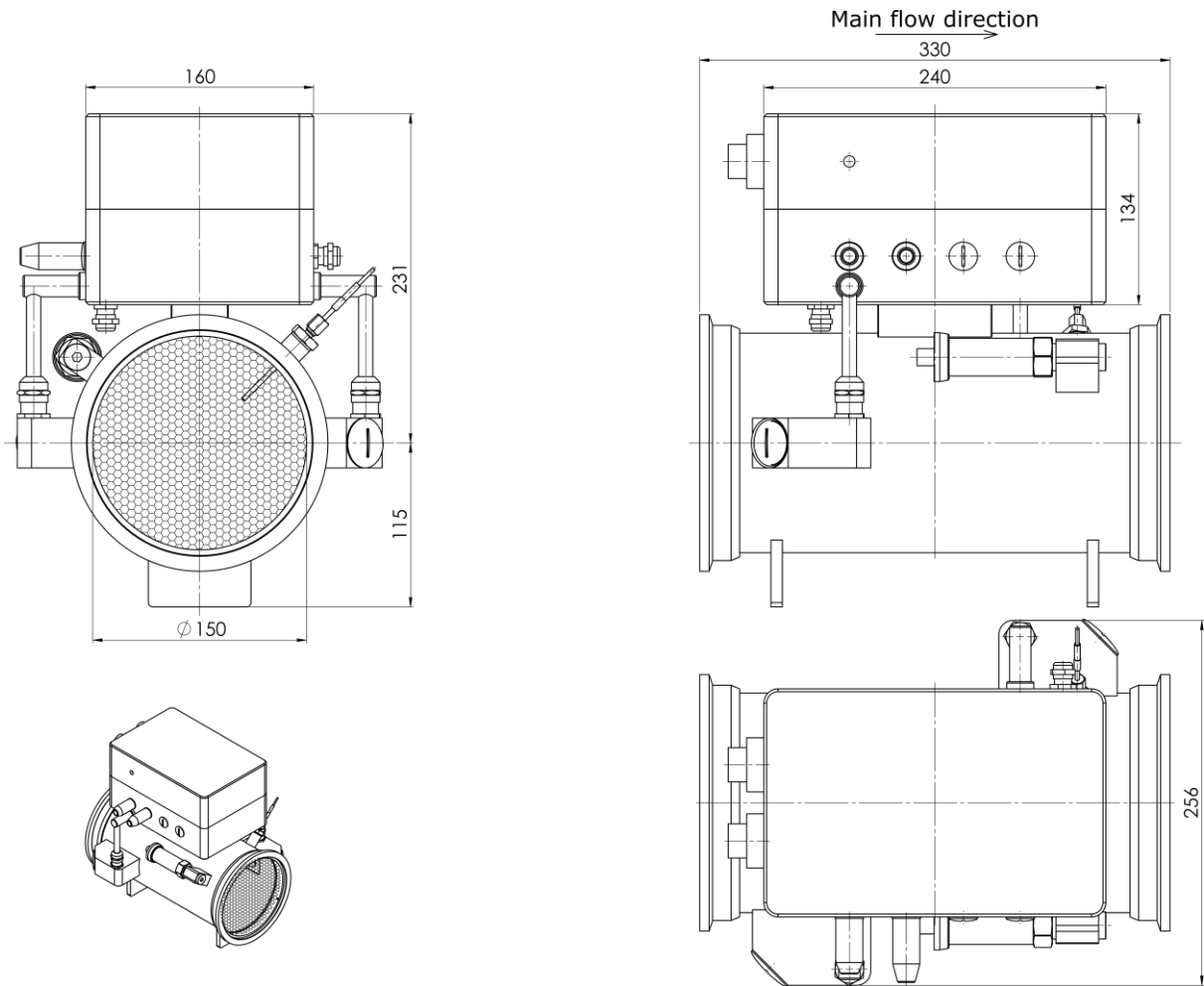


(1) Nominal pipe size / Inside pipe diameter / Dimensions / Weight

Nominal pipe size [mm]	Inside pipe diameter \varnothing I [mm]	Sensor length C [mm]	Width B [mm]	Height H [mm]	Weight [kg]
100	110.3	330	250	300	9.2

Nominal pipe size 150

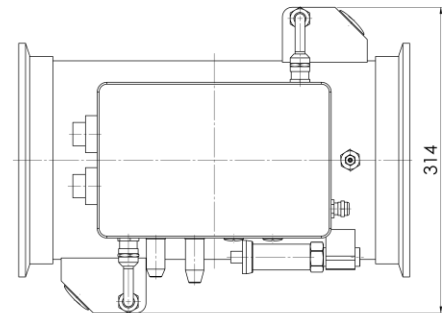
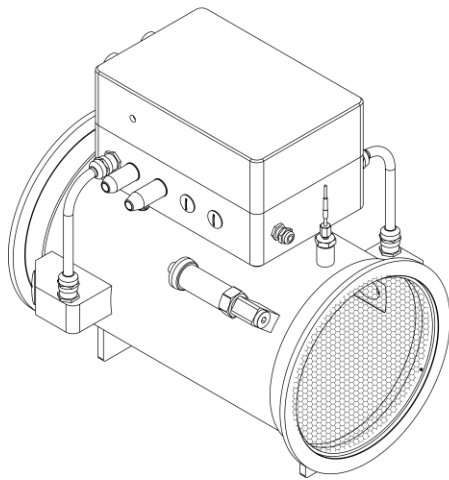
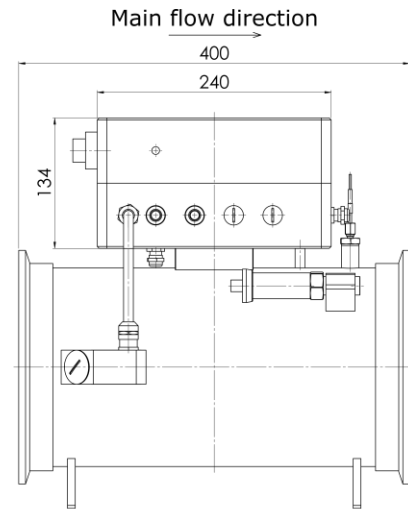
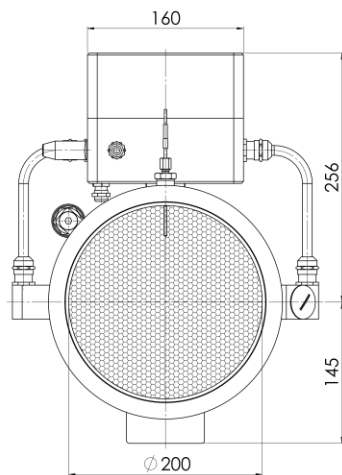
Type	Artikel-No.
ExactSonic P DN150 ZG1	B015/874



(1) Nominal pipe size / Inside pipe diameter / Dimensions / Weight					
Nominal pipe size [mm]	Inside pipe diameter Ø I [mm]	Sensor length C [mm]	Width B [mm]	Height H [mm]	Weight [kg]
150	150.0	330	256	346	11.2

Nominal pipe size 200

Type	Artikel-No.
ExactSonic P DN200 ZG1	B015/875

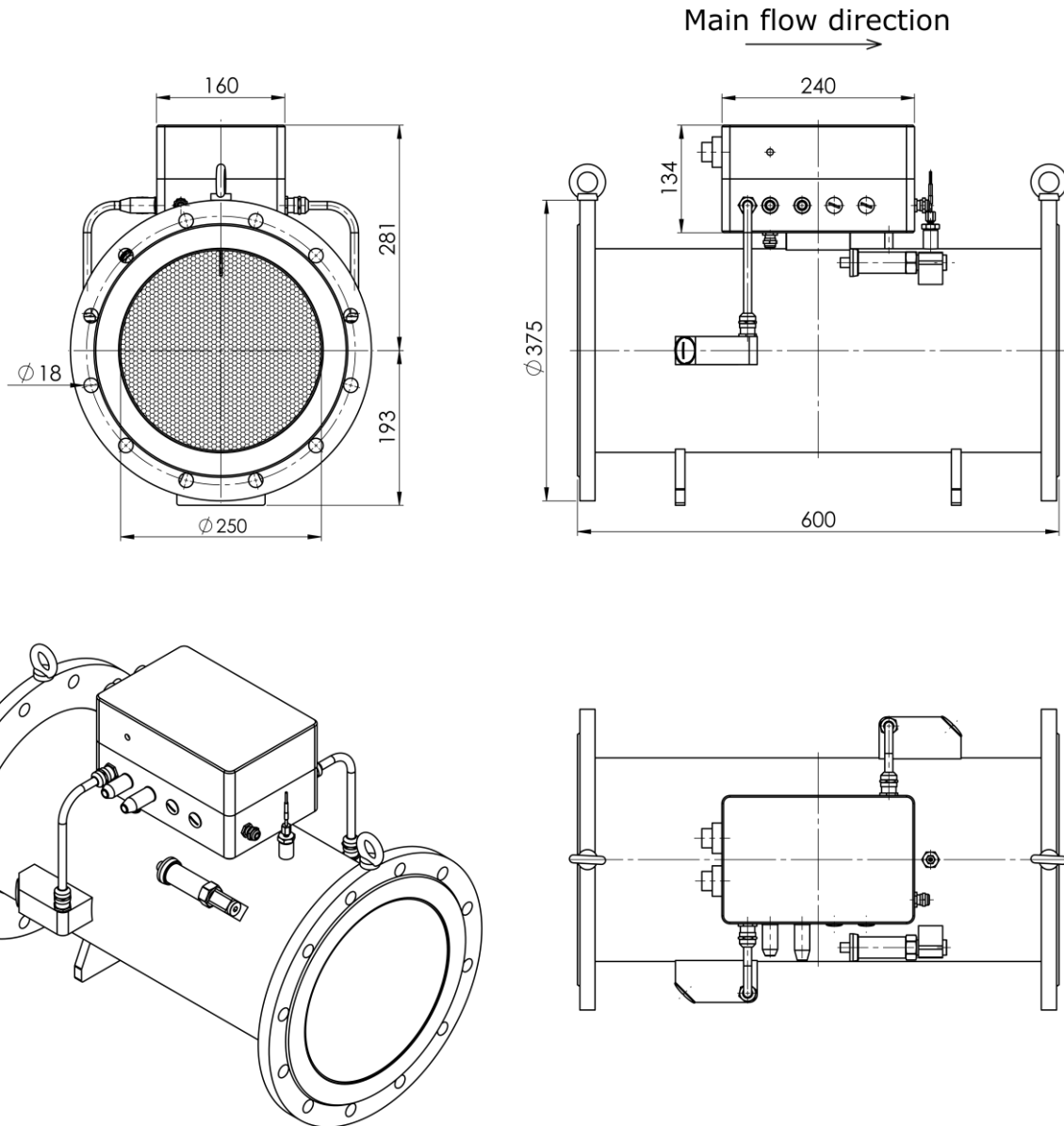


(1) Nominal pipe size / Inside pipe diameter / Dimensions / Weight

Nominal pipe size [mm]	Inside pipe diameter Ø I [mm]	Sensor length C [mm]	Width B [mm]	Height H [mm]	Weight [kg]
200	200.0	400	314	401	15.6

Nominal pipe size 250

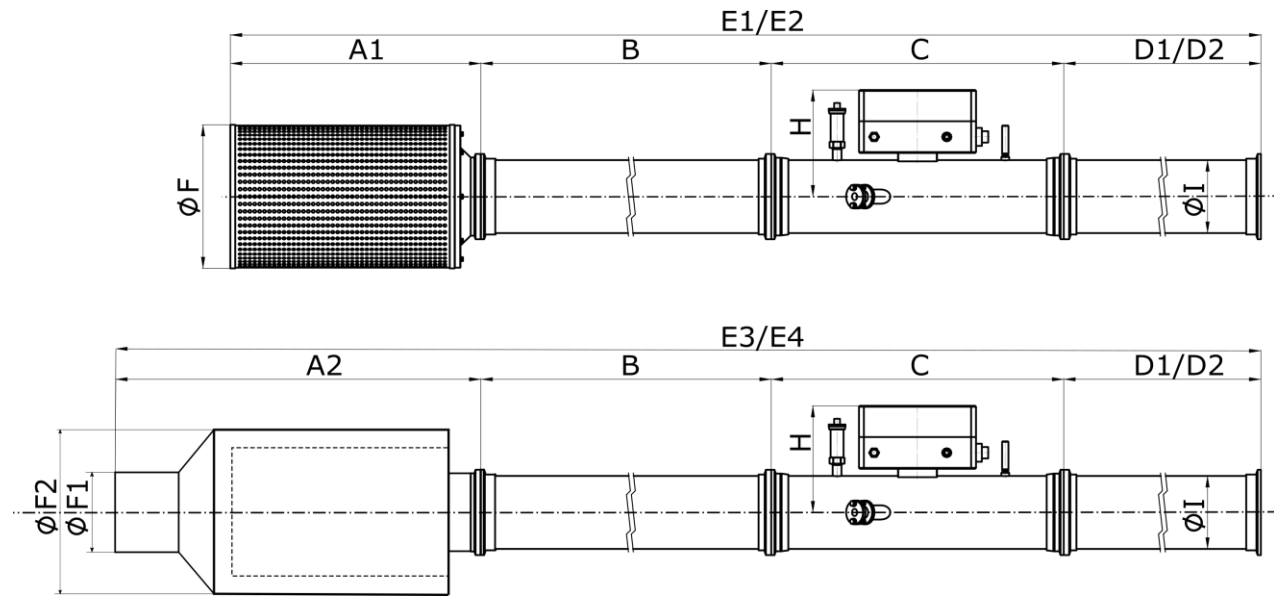
Type	Artikel-No.
ExactSonic P DN250 ZG1 (flat pipe ends)	B015/876
ExactSonic P DN250 ZG1	B015/877



(1) Nominal pipe size / Inside pipe diameter / Dimensions / Weight

Nominal pipe size [mm]	Inside pipe diameter Ø I [mm]	Sensor length C [mm]	Width B [mm]	Height H [mm]	Weight [kg]
250*	250.0	600	400	474	32.9

* Design DN 250: with DIN flanges (as in the drawing) or with flat pipe ends



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* [mm]
DN 50	58.3	356	773	506	250	256
DN 80	80.0	401	773	806	250	406
DN 100	110.3	526	843	1006	330	506
DN 150	150.0	513	903	1518	330	768
DN 200	200.0	513	783	2018	400	1018
DN 250	250.0	513	on request	2018	600	1018

Nominal pipe size	Output section D2** [mm]	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]
DN 50	254	1368/1366	1785/1783	150	80	203
DN 80	404	1863/1861	2235/2233	198	103	253
DN 100	504	2368/2366	2685/2683	243	153	303
DN 150	759	3129/3120	3519/3510	303	203	353
DN 200	1009	3949/3940	4219/4210	303	253	353
DN 250	1009	4149/4140	on request	303	on request	on request

* with flange at the end of the output section (D1, E1 and E3)

** with flat pipe ends on the output section (D2, E2 and E4)

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
Air filter	DN 250	on request	on request	on request

* If installed horizontally, the flow conditioner must be supported due to its weight!

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
Input section DN 250	tbd	tbd
Output section DN 250	tbd	tbd

Pipe connection

with tension ring or chain

Flange on both sides for quick connectors.

DIN or ANSI integral flange connection, on request.

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

Höntzsch GmbH & Co. KG

Gottlieb-Daimler-Straße 37

D-71334 Waiblingen

Telefon +49 7151 / 17 16-0

E-Mail info@hoentzsch.com

Internet www.hoentzsch.com

Subject to change