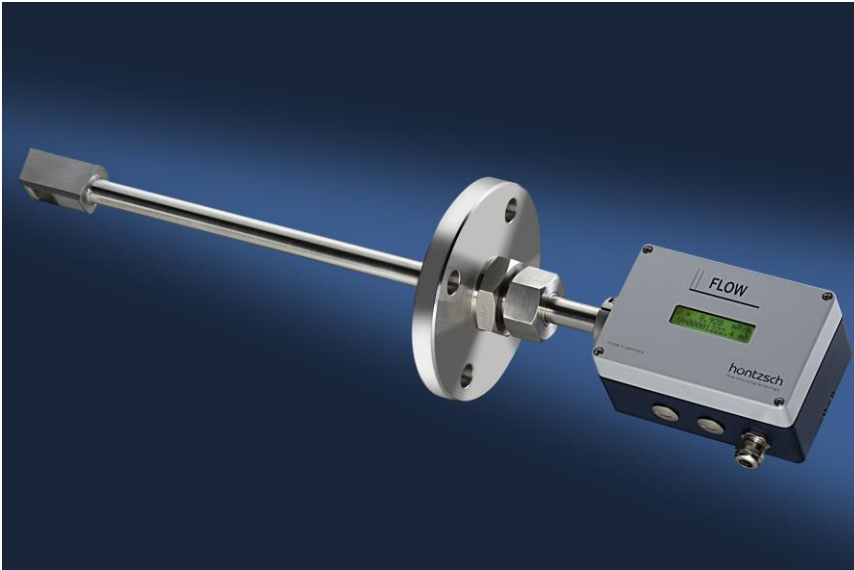




Probe VA(T) with flange probe guide piece SFB

Functional principle

- vortex meter for measuring flow velocity, flow rate and volume
- ultrasonic measurement of the vortex shedding



Kármán vortex street

Design

- insertion probe with probe guide piece and AS102 housing; optional with integrated transducer

Measured variables

- actual flow velocity v [m/s]
- actual flow rate [m³/h]
- conversion to standard velocity/standard volume flow with input parameters pressure and temperature

Measuring range

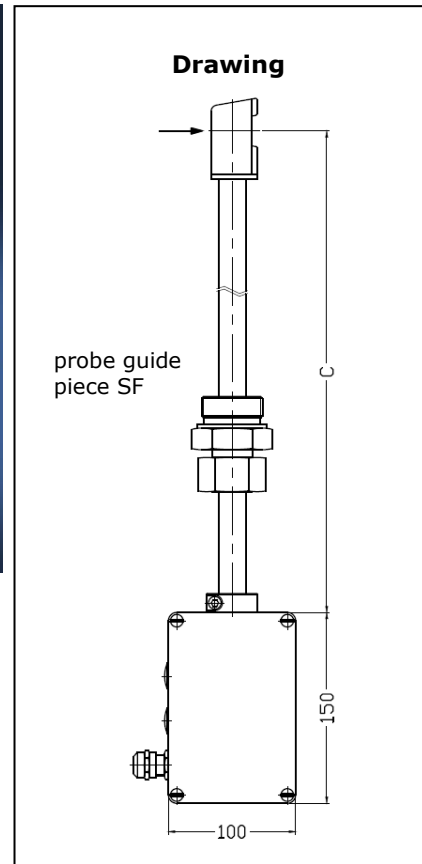
- 0.5 ... 40 m/s

Medium

- primarily single-phase gas mixtures with air, nitrogen, oxygen, methane, natural gas, ammonia, argon, carbon monoxide, superheated steam, ... as dominant components; biogas. Other gases and gas mixtures on request.

Advantages

- compact unit with optional integrated transducer
- optional with LCD-display in non-hazardous area
- also connectable to different separate transducers
- optional with integrated temperature measurement
- modular design with different sensor- and sealing materials
- various probe guide pieces usable
- with isolation/supply unit for use in category 1 (zone 0 and zone 20)
- low starting value (0.5 m/s)
- high turndown ratio (1 : 80)
- long-term stability
- no moving parts
- easy to clean
- high durability
- corrosion-resistant
- largely unaffected by gas composition
- marginal pressure loss



Probe with screw thread probe guide piece SF

Range and examples of application

- flow measurement in explosive atmospheres: air, outlet air, sludge activation air, engine intake air, natural gas, exhaust gas, process gas, biogas, car exhaust emissions, flare gas, overheated steam, ...

Particles, humidity and condensation

- dust or fibre particles in the gas do not affect the measurement, as long as these are not abrasive or accumulate on the sensor
- measurement uncertainty remains unaffected by a relative gas humidity of less than 100 % and a slight accumulation of condensate on the sensor

Model designation (example)

VA Flow Sensor	/UVA	-AS102	E	T100	C250
VAT Flow Sensor	/UVA	-AS102	E	T240	C1500

Types

Type	Article No.
VA Flow Sensor /UVA-AS102 E T--- C---	HB09-a400
VA Flow Sensor /UVA-AS102 H T--- C---	HB09-a406
VA Flow Sensor /UVA-AS102 T T--- C---	HB09-a410
VAT Flow Sensor /UVA-AS102 E T--- C---	HB09-a450
VAT Flow Sensor /UVA-AS102 H T--- C---	HB09-a456
VAT Flow Sensor /UVA-AS102 T T--- C---	HB09-a460

(1) Sensor type / Sensor diameter

VA 40	Vortex flow sensor VA40 with sensor head width across corners 40 mm and shaft Ø 21.3 mm for insertion in openings with a diameter greater than 40 mm
VAT 40	like above, but with additional integrated PT100 temperature sensor

(2) Transducer

... UVA-AS102 ...	Transducer UVA, integrated in the sensor connection housing AS102
-------------------	---

(3) Materials in contact with the medium

Design	Material
... E ...	stainless steel, sensor housing 1.4581 connection tube 1.4404, ceramics VITON® seals, silicone-free sensor
... H ...	Hastelloy 2.4610 / HC4, ceramics VITON® seals, silicone-free sensor
... T ...	titanium 3.7035 (grade 2), ceramics VITON® seals, silicone-free sensor

Measuring range

Design	Measuring range
... 40 m/s ...	0.5 ... 40 m/s
Measurement uncertainty	< 1.0 % of measured value + 0.03 m/s
Repeatability	± 0.2 % of measured value + 0.025 % FS

Examples of measurable flow rates (s. also under '(4) Measuring range', Page 2)

measuring tube inside diameter Di [mm]	profile factor PF* [-]	smallest measurable value [m³/h]	terminal value [m³/h]
80	0.719	6.5	520
100	0.738	10.4	835
120	0.761	15.5	1240
150	0.796	26	2030
200	0.842	48	3810
300	0.845	108	8600
400	0.850	193	15400
500	0.850	300	24000
750	0.850	680	54100
1000	0.850	1200	96100
1250	0.850	1880	150000
1500	0.850	2700	216000

Flow rate measuring range specifications with centric positioning of sensor, non-rotational (vortex-free) inlet flow and amply dimensioned input/output sections (see 'Information for use VA Probes' U206).

- * The profile factor PF describes the ratio of average flow velocity in the measurement cross section and the flow velocity measured from the sensor. The aforementioned operating conditions apply.

(4) Working temperature / seal material

Temperature class of the sensor	Material	working temperature range of medium	Article No.
100 °C	VITON® (standard)	-20 ... +100 °C	HB09-a080
	Silicone	-40 ... +100 °C	HB09-a081
	EPDM	-40 ... +100 °C	HB09-a082
	KALREZ® 4079	0 ... +100 °C	HB09-a083
	KALREZ® 6375	0 ... +100 °C	HB09-a085
	PFA	-20 ... +100 °C	HB09-a084
180 °C	VITON® (standard)	-20 ... +180 °C	HB09-a090
	Silicone	-40 ... +180 °C	HB09-a091
	EPDM	-40 ... +160 °C	HB09-a093
	KALREZ® 4079	0 ... +180 °C	HB09-a092
	KALREZ® 6375	0 ... +180 °C	HB09-a095
	PFA	-20 ... +180 °C	HB09-a094
240 °C	VITON® (standard)	-20 ... +240 °C	HB09-a097
	PFA	-20 ... +240 °C	HB09-a098

Material	permissible ambient temperature range		
	with separate transducer	with integrated transducer	with integrated LCD
VITON® (standard)	-20 ... +80 °C	-20 ... +50 °C	-20 ... +50 °C
Silicone	-40 ... +80 °C	-25 ... +50 °C	-20 ... +50 °C
EPDM	-40 ... +80 °C	-20 ... +50 °C	-20 ... +50 °C
KALREZ® 4079	-20 ... +80 °C	-20 ... +50 °C	-20 ... +50 °C
KALREZ® 6375	-20 ... +80 °C	-20 ... +50 °C	-20 ... +50 °C
PFA	-20 ... +80 °C	-20 ... +50 °C	-20 ... +50 °C

Maximum working pressure

up to 3 bar / 300 kPa overpressure

Design

as in drawing (Page 1)

(5) Installation length (see Drawing , Page 1)

Measurement C	für Sensor in Ausführung		
	stainless steel ' ... E ... '	Hastelloy ' ... H ... '	titanium ' ... T ... '
	Article No.	Article No.	Article No.
250 mm	HB09-a050	HB09-a060	HB09-a070
500 mm	HB09-a051	HB09-a061	HB09-a071
750 mm	HB09-a052	HB09-a062	HB09-a072
1000 mm	HB09-a053	HB09-a063	HB09-a073
1250 mm	HB09-a054	HB09-a064	HB09-a074
1500 mm	HB09-a055	HB09-a065	HB09-a075
1750 mm	HB09-a056	HB09-a066	HB09-a076
2000 mm	HB09-a057	HB09-a067	HB09-a077

Select the installation length so that the surface temperature of the transducer housing does not exceed +50 °C!

Connection housing AS102

Dimensions	L/W/H: 100/80/150 mm
Material	die-cast aluminium G Al Si12 / DIN 1725
Protection class	IP65, IEC 529 and EN 60 529
Connection	bush for shielded cables with external diameter 5 ... 10 mm, contacting of the overall copper shielding by the metallic screwed cable glands

Electromagnetic Compatibility (EMC)

according to EN 61 000-6-2 / IEC77

Installation position

any	horizontal positioning is recommended if condensate on the sensor cannot be ruled out
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Option ATEX-protection

type of protection	Comment	Article No.
for gas: Ex ia IIC T6 Ga/Gb Category 1/2G (zone 0/1) for dust: Ex ia IIIC TX Da/Db Category 1/2D (zone 20/21)	only in conjunction with: - Isolation/supply unit LDX2 and 'non-Ex evaluation unit' or - compatible separate evaluation unit with Ex-input (see below) - temperature range of the medium as electrical apparatus for category 1/2G -20...+60°C; 2G -40...+180°C; 1/2D, 2D -40...+180°C	VAEX0 excluded are: - VAT-sensors - temperature of medium less than -20 °C - titanium sensors

Option ATEX-protection (cont'd)

type of protection	Comment	Article No.
Ex nA IIC T6 Gc X Ex tc IIIC TX Dc X	Category 3G (zone 2) Category 3D (zone 22)	VAEX2

Output v/VA, v/VA-Ex, 4-20 mA or 0-10 V

output sensor v/VA	Höntzsch evaluation unit ** with v/VA input is necessary for signal interpretation
output sensor v/VA-Ex, (sensor mit 'type of protection Ex-i', see above)	Höntzsch evaluation unit** with intrinsically safe input v/VA-Ex or an evaluation unit with input v/VA together with a series connection isolation/supply unit LDX2 is necessary for signal interpretation
output 4-20 mA <u>or</u> 0-10 V	with transducer UVA integrated in the connection housing (see below)

**** e. g. UVA, µP Vortex, VT-VA, VP-VA or VTP-VA**

optional transducer UVA, integrated in the sensor connection housing

(please select)	Description	Article No.
UVA / 4-20 mA / 24 VDC	analog output flow 4 ... 20 mA resistance max. 400 Ohm	HB16-b002-S01
UVA / 0-10 V / 24 VDC	analog output flow 0 ... 10 V impedance max. 1 kOhm	HB16-b005-S01
output limit value or quantity pulse	potential-free relay contact (normally open contact), max. 300 mA / 27 VDC	
PC interface	RS232	
	output signals are electrically isolated from the power supply	
self-monitoring	parameter settings, sensor interface; in case of error: analog output less than 3.6 mA or <-0.2 V	
connection	'push in' PCB terminals; no tools necessary for strand connection; disconnect strands by applying pressure with a pen or screwdriver; for strands with cross-section 0.14 ... 1.5 mm ²	
power supply	24 V DC (20 ... 27 V DC)	
power consumption	less than 5 W	
setting parameter	analog output, time constant, profile factor, tube inside diameter, limit value or quantity pulse (quality rating adjustable), switch from actual/standard flow with setting parameters 'working pressure' and 'working temperature'	
setting parameter with PC software UCOM and PC connection cable (see Accessories) alterable		

**compatible separate evaluation units
(necessary in conjunction with sensors VA40/21,3...ZG4 and VAT40/21,3...ZG4 without integrated transducer UVA)**

for non-Ex applications	UVA, µP-Vortex, VT-VA, VP-VA, VTP-VA
for Ex applications	isolation/supply unit LDX2 in LDG16 housing in combination with evaluation units UVA, µP-Vortex, VT-VA, VP-VA, VTP-VA in LDG housings (additional requirement: Ex-input t, p)

Accessories (optional)		
	description	Article No.
LCD in housing cover*°	row 1: 'instantaneous value': flow rate or flow velocity row 2: 'quantity counter' or 'error code'; 2 x 16 digit, character height 5.5 mm working temperature range -20 ... +50 °C	HB10-b016
Calibration certificate		KLB
PC software UCOM*°	for configuring transducers UFA and UVA via RS232 interface, PC connection cable RJ22 / sub-D 9-pin additional requirement	HB10-b052
PC connection cable RJ22 / sub-D 9-pin*°	for configuring transducers UFA and UVA in LDG16 or AS102 housing via RS232 interface together with UCOM software; transducer connection: RJ22 PC connection: sub-D 9-pin	HB10-b051
Interface converter*° USB / RS232	for connecting PC to USB port and Höntzsch programming adapter to RS232 interface; PC connection: USB plug type A prog. adapter connection: sub-D 9-pin	HB10-b100
*° only in conjunction with integrated transducer UVA (see above)		

Probe guide pieces* (see also Page 8)						
Model designation (examples)						
SFB	21.3		E	53	G1 1/2"	ZG5
SFK	21.3	/42	E	150	F-DN50PN16	ZG3
(S1)	(S2)	(S3)	(S4)	(S5)	(S6)	(S7)

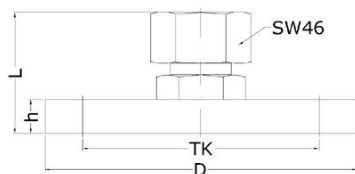
(S1) Type	
SFB	SF with clamping bush
SFK	SF with clamping yoke
SFZ	SF with collet
(S2) Diameter through hole [mm]	
... 21.3 ...	21.3 mm through hole
(S3) Diameter insertion opening for probe	
(S4) Material	
... E ...	stainless steel
... H ...	Hastelloy
(S5) Installation length L [mm]	
(S6) Process connection	
... G ...	thread
... F ...	flange
(S7) Design as in Drawing (ZG)	

Probe guide pieces* (cont'd)		
Type	Description	Article No.
with screw thread connection		
SFB 21.3 E-53 / G 1½" ZG5 Drawing 5, Page 8	VITON® seal, TEFLON® clamping bush, working temperature range -20 ... +240 °C, max. working pressure 3 bar/300 kPa, thread length GL 22 mm	HB04-b504
SFB 21.3 E-53 / G 1½" ZG5 with metallic sealing edge, Drawing 5, Page 8	metallic sealing edge, TEFLON® clamping bush, working temperature range -40 ... +240 °C, max. working pressure 3 bar/300 kPa, thread length GL 22 mm	HB04-b511
SFB 21.3 E-53 / NPT 1½" ZG5 Drawing 5, Page 8	VITON® seal, PTFE clamping bush, working temperature range -20 ... +240 °C, max. working pressure 3 bar/300 kPa, according to ANSI/ASME B1.20.1-1983, thread length GL approx. 26 mm	HB04-b509
with flange connection		
SFB 21.3 E-70 / F-DN50 PN16 ZG1 Drawing 1, Page 8	seal TEFLON® clamping bush, working temperature range -20 ... +240 °C, max. working pressure 3 bar/300 kPa	HB04-b103
SFB 21.3 H-70 / F-DN50 PN16 ZG1 Drawing 1, Page 8	seal TEFLON® clamping bush, working temperature range -40 ... +240 °C, max. working pressure 3 bar/300 kPa	HB04-b105
SFB 21.3 E-70 / F-ANSI B16.5 2" 150 lbs ZG1 Drawing 1, Page 8	seal TEFLON® clamping bush, working temperature range -40 ... +240 °C, max. working pressure 3 bar/300 kPa, flange according to ANSI Standard B16.5	HB04-b512

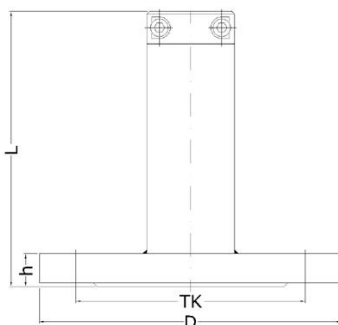
Probe guide pieces* (cont'd)		
Type	Description	Article No.
SFK 21.3 E-150 / F-DN50 PN16 ZG3 Drawing 3, Page 8	VITON® O-ring, working temperature range -20 ... +240 °C, max. working pressure 6 bar/600 kPa, incl. hexagon cranked wrench key SW5	HB04-b304
SFK 21.3 / 42 E-150 / F-DN50 PN16 ZG3 with ball valve Drawing 3, Page 8	2 VITON® O-rings, working temperature range -20 ... +240 °C, max. working pressure 6 bar/600 kPa, with ball valve, installation length ball valve 150 mm, incl. hexagon cranked wrench key SW5. The probe guide piece can be retracted into the probe to close the ball valve.	HB04-b313

* Probe guide pieces are obligatory for process connection via screw socket or flange connector. They are adjustable, rotatable and permanently attached to the probe shaft. It is to be ensured that sensor length, screw socket or flange connector height as well as probe insertion depth match up. Other probe guide pieces are available on request.

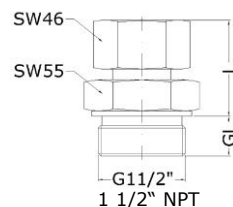
Drawing 1



Drawing 3

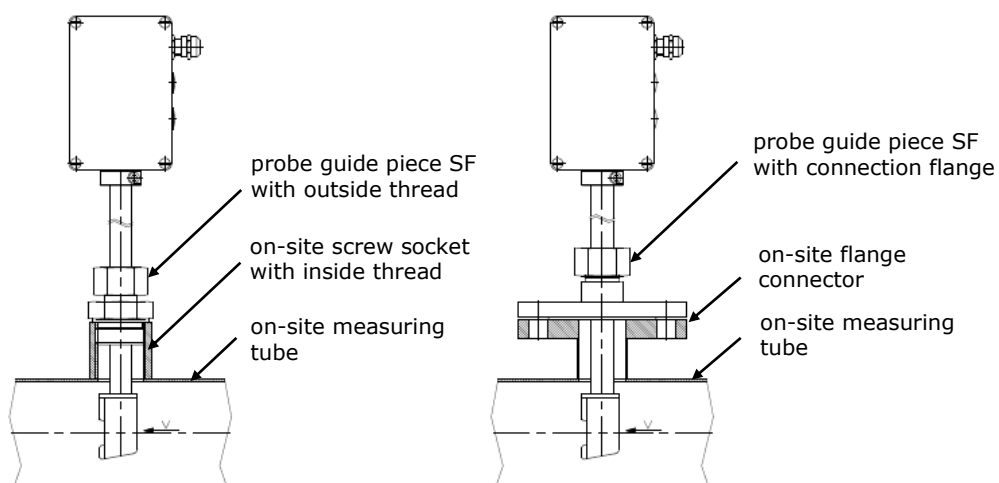


Drawing 5



Probe guide pieces SF

Probe installation



Probe installation with screw thread probe guide piece (left) and flange probe guide piece

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