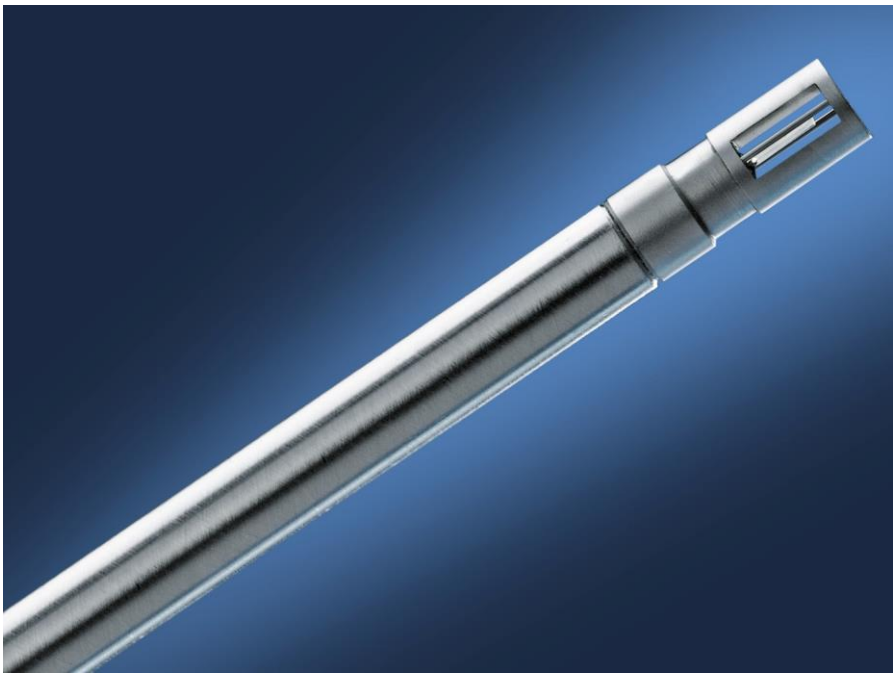
Thermal Flow Sensor TA

höntzsch
flow measuring technology



Sensor TA (left) for use with transducer U10a (above right) and hand-held flowtherm NT, HTA and HTA-Ex (below right)

Measurable variable
- standard velocity Nv, standard volume flow NV/t, mass flow proportional
- standard basis adjustable, default:
  temperature t_n = +21 °C,
  pressure p_n = 1014 hPa
- temperature t
  (hand-held flowtherm NT, HTA, HTA-Ex)

Functional principle
- measurement of flow according to the thermal measuring method (heat transfer method)

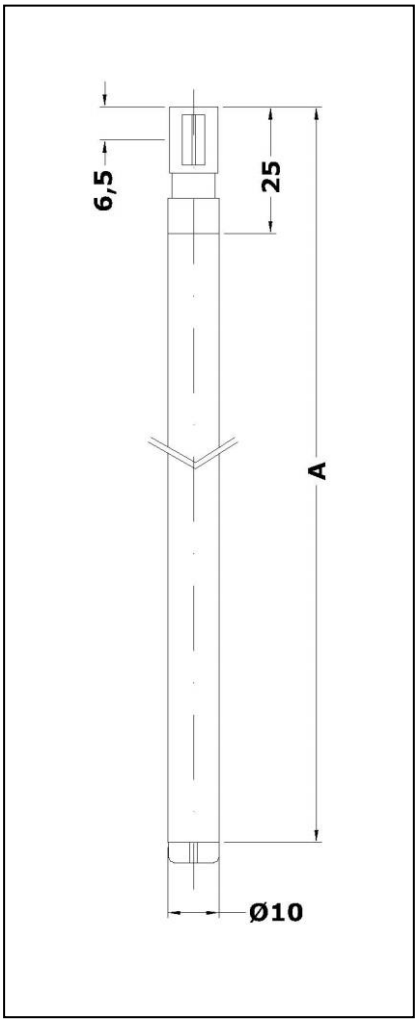
Design
- probe

Advantages
- high measuring dynamics Nv (up to 1 : 1000)
- small starting value: 0.2 m/s
- minimum reaction time
- low measuring uncertainty, even at lowest flow velocities
- direct air/gas mass flow-proportional measuring, largely irrespective of working pressure and temperature
- sensor has no moving parts
- greater working temperature and pressure ranges
- high time yield
- corrosion resistant
- lower pressure drop due to small dimensions

Medium
- clean gases, gas mixtures: air, nitrogen, methane, natural gas, argon, carbon dioxide, helium, sulphur hexafluoride, landfill gas ...

Range and examples of application
- mobile and stationary application
- compressed air and gas consumption and leakage measurements
- measuring
  – laminar flows in clean rooms or machines
  - in outgoing air, burner supply air and draughts
  - in climatic applications
  - in air in the rough vacuum range with pressures greater than 200 hPa abs.

Particles, condensation, humidty in the gas
- Charges in the gas caused by particles such as dust and fibres do not affect the measurment, as long as abrasion and agglomeration do not occur on the sensor
- relative gas humidty of less than 100 % does not affect the measuring uncertainty if the working temperatures are less than +40 °C



Probe TA
(Meas. A see Page 2)

Model designation / Order code (example)						
Thermal	Flow sensor	ta60	-C185			
Thermal	Flow sensor	ta60	-C385	-Ex		

Basic types	
Type	Probe lenghs
Thermal Flow Sensor ta**xx**-C**185**	HB13-a300
Thermal Flow Sensor ta**xx**-C2**85**	HB13-a301
Thermal Flow Sensor ta**xx**-C3**85**	HB13-a302
Thermal Flow Sensor ta**xx**-C6**85**	HB13-a303

(1) Sensor type / Probe diameter
Thermal flow sensor, epoxy resin coated thin-film sensor element
Probe diameter 10 mm

(2) Sensor length measurement A	
Standard length (see Basic types)	185, 285, 385, 685 mm
Fix sensor length based on	required insertion depth in the measurement cross section, sleeve or muff length, length of ball valve and length of probe guide piece (see Accessories)

(3) Medium
Air, clean gases, gas mixtures with ratio of mixture consistent
When calibrating/justifying sensor and evaluation unit for gases other than air the slightest possible measuring uncertainty is only achievable by ensuring fixed allocation of sensor to evaluation unit.

(4) Materials in contact with the medium
Stainless steel 1.4571, 1.4305, glass, epoxy resin

Measuring ranges taxx	
	Article No.
0.2 ... 30 m/s	V_TA_ta30
0.2 ... 60 m/s	V_TA_ta60
0.2 ... 120 m/s	V_TA_ta120
0.2 ... 150 m/s	V_TA_ta150
0.2 ... 180 m/s	V_TA_ta180
0.2 ... 200 m/s	V_TA_ta200

Examples – measurable volume flows

meas. tube inside diameter Di [mm]	profile factor PF* [-]	smallest measur-able value [Nm³/h]	measuring range terminal values [Nm3/h] sensor measuring range '30 m/s'	'60 m/s'	'120 m/s'	'150 m/s'	'180 m/s'	'200 m/s'
25	0.725	0.26	39	77	154	192	231	256
40	0.810	0.73	110	220	440	550	660	730
50	0.840	1.2	178	356	713	890	1070	1180
60	0.840	1.7	257	513	1030	1280	1540	1710
80	0.840	3.0	456	912	1820	2280	2740	3040
100	0.840	4.8	713	1425	2850	3560	4280	4750
120	0.840	6.8	1026	2050	4100	5130	6160	6840
150	0.840	11	1600	3210	6410	8020	9620	10600
200	0.840	19	2850	5700	11400	14250	17100	19000
300	0.840	43	6410	12820	25650	32060	38480	42750
400	0.840	76	11400	22800	45600	57000	68400	76000
500	0.840	120	17800	35600	71200	89100	106900	118800
1000	0.840	480	71200	142500	285000	356300	427600	475000

Standard volume flow measuring range specifications with centric positioning of the sensor, irrotational afflux and amply-dimensioned input and output section (see Instruction Manual).

* 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 afore-mentioned operating conditions apply.

Measuring uncertainty / Time constant

Measuring uncertainty for flow velocity Nv
less than/equal to 40 m/s : 2 % of test value + 0.02 m/s
greater than 40 m/s : 2.5 % of test value

Time contstant : in seconds

(5) Permissible temperature of the medium

-10 ... +140 °C

(6) Maximum working pressure

up to 16 bar / 1.6 MPa above atmospheric

higher working pressures on request

(7) Option Ex-protection Ex

Design		Article No.
Ex ia IIC T4 necessary when using with HTA-Ex	Category 2G (Zone 1)	TA_1B_EX1
Ex ia IIC T4 necessary when using with U15-Ex	Category 1/2G (Zone 0)	TA_1B_EX0
Ex nA IIC T4 Gc X in combination with U10a and flowtherm NT Ex tc IIIC T135°C Dc X in combination with U10a	Category 3G (Zone 2) Category 3D (Zone 22)	TA_1B_EX2

(8) Design

Probe; as in Drawing ZG1b (see Page 1)

Connection cable / Connection

standard sensor connection cable length 3 m, direct outlet, resistant up to +140 °C,
other cable lengths on request.
If cable lengths deviate from the norm the smallest possible measuring uncertainty is only available, if sensor and evaluation unit have a fixed allocation.

connection (IP67) for
transducer U10a, hand-held flowtherm NT, HTA : plug 423-5 with gilded contacts
transducer U15-Ex, hand-held HTA-Ex : plug 423-8 with gilded contacts

Ingress protection / Fitting position

Ingress protection: Sensor IP68; cable outlet IP65

Any fitting position with atmospheric pressure,
with pressures above atmospheric direction of flow not from above

Elektromagnetic compatibility (EMC)

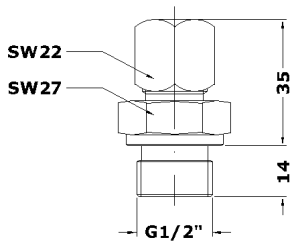
IEC 1000-4, EN 50081, EN61000

Necessary compatible, separate evaluation units

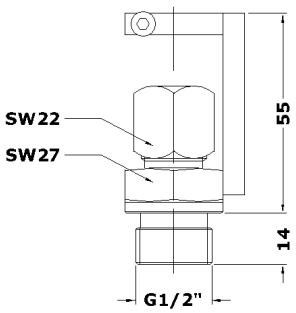
for non-Ex applications	• transducer U10a • hand-held HTA • flowtherm NT
for Ex applications	• transducer U15-Ex Ex ia IIC T4 Category 1 (Zone 0) • hand-held HTA-Ex Ex ia IIC T4 Category 2 (Zone 1)

Accessories		
	Description	**Article No.**
Calibration certificate	min. 6 standard calibration values	KLB
Drawing 5 probe guide piece SFB- G ½"	for any repeated positioning with lower overpressure (max. 3 bar) / underpressure for connecting to screw socket or ball valve with inside thread G 1/2", threaded height 22 mm, working temperature range -20 ... +240 °C, installation length 35 mm, materials: stainless steel, VITON®, PTFE clamping bush	HB04-b503
Drawing 6 probe guide piece SFB- G ½" with clamp clip and anti-twist device	for any repeated positioning with higher overpressure / underpressure, clamping device for safeguarding the probe attachment, for connecting to screw socket or ball valve with inside thread G 1/2", working temperature range -20 ... +240 °C, installation length 55mm, materials: stainless steel, VITON®, PTFE clamping bush	HB04-b600
Drawing 7 probe guide piece SFB- G ½" with chain guard, clamp clip and anti-twist device	for any repeated positioning with higher overpressure / underpressure, clamping device for safeguarding the probe attachment and chain guard, for connecting to screw socket or ball valve with inside thread G 1/2", working temperature range -20 ... +240 °C, installation length 55mm, materials: stain-less steel, VITON®, PTFE clamping bush	HB04-b601

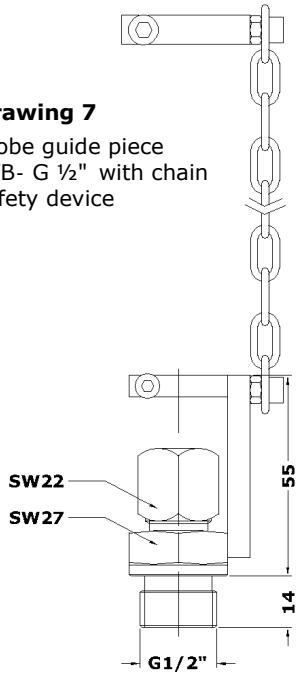
Drawing 5
Probe guide piece
SFB- G ½"



Drawing 6
Probe guide piece
SFB- G ½" with
clamping yoke



Drawing 7
Probe guide piece
SFB- G ½" with chain
safety device



Accessories (cont.)

	Description	Article No.
Direction indicator RZ10	for recognition of direction of flow and insertion depth, adjustable, suitable for sensor TA with 10 mm diameter	HB99-a948
HG10/18A-130	handle with collet chuck suitable for TA...ZG1b as well as extion tubes VS18, not impervious	HB99-a947
VS18A-350	aluminium extension rod, with screw thread, Ø 18 mm, 350 mm long, O-ring seal VITON®, working temperature range -25 ... +240 °C	HB99-a010
Direction indicator RZ18	for recognition of direction of flow and insertion depth, adjustable, suitable for extension rods with 18 mm diameter	HB99-a951
Ball valve	installation length 60 mm, through hole 15 mm, material stainless steel 1.4408, seal PTFE, working temperature range max. +200 °C, max. working pressure 64 bar/6.4 MPa rel., inside connection thread G 1/2" (DIN/ISO 228)	HB04-a900

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