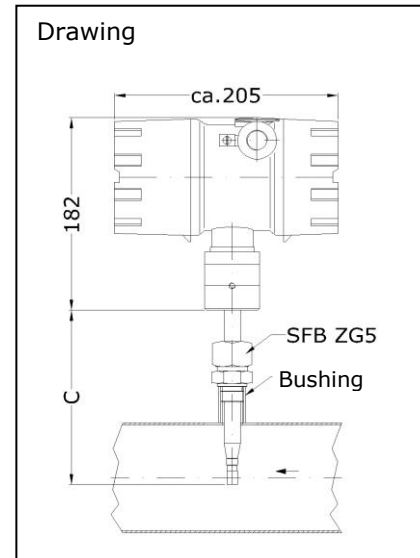


Thermal flow sensor TA10/15 ... ZG1 with integrated, configurable transducer UTA in a flameproof enclosure for applications in explosive atmospheres



Sensor TA10/15 ... ZG1



Connection on-site bushing with inside thread

Measured variables

- standard velocity N_v , standard flow rate NV/t , mass flow
- standard basis adjustable, default: temperature $t_n = +21\text{ °C}$, pressure $p_n = 1014\text{ hPa}$

Functional principle

- flow measurement according to the heat transfer method
- temperature-compensated measuring

Design

- probe with integrated transducer and flameproof enclosure
- thin film sensor element

Media

- pure gases, gas mixtures: air, nitrogen, methane, natural gas, hydrogen, argon, carbon dioxide, helium, sulphur hexafluoride, landfill gas, ...
- calibration can be carried out with a multitude of gases or gas mixtures to achieve the best measurement uncertainty

Advantages

- applications in explosive atmospheres: Category 1/2 G (Zone 0/1) and Category 1/2 D (Zone 20/21)
- high turndown (up to 1 : 1000)
- low measurement uncertainty, even at lowest flow velocities
- measuring range from 0.2 m/s
- mass flow of air/gases without additional pressure and temperature detection

- no moving parts
- stainless steel sensor housing
- wider temperature and pressure resistance ranges

- low installation costs
- marginal pressure loss
- high durability
- sterilisable (material-resistance of sensor allowing)
- easy adjustment of parameters with HART® interface

Examples of application

- measuring
 - in explosive atmospheres
 - air velocity
 - compressed air and gas consumption as well as leakage flow
 - laminar flow in safety cabinets or machines
 - in exhaust air and burner supply air
 - in air-conditioning applications
 - in air in low vacuum range with pressures higher than 200 hPa abs

Particles and humidity

- dust or fibre particles in the gas do not affect the measurement, as long as these are not abrasive or accumulate on the sensor
- deviations in values as a result of variable air humidity under normal atmospheric conditions are covered by the measurement uncertainty specifications

Model designation / order code (example)							
TA10/15	-165	G	E	140	p16	ZG1	Ex-d
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

Basic types		
Type	Article No.	
TA10/15- 165 GE 140 / p16 / ZG1 / Ex-d	B013/001	
TA10/15- 265 GE 140 / p16 / ZG1 / Ex-d	B013/002	
TA10/15- 365 GE 140 / p16 / ZG1 / Ex-d	B013/003	
TA10/15- 665 GE 140 / p16 / ZG1 / Ex-d	B013/004	
TA10/15- 965 GE 140 / p16 / ZG1 / Ex-d	B013/005	
TA10/15- 1465 GE 140 / p16 / ZG1 / Ex-d	B013/006	

(1) Sensor type / probe diameter	
Thermal flow sensor	
10/15 mm	

(2) Sensor length – measurement C (see Drawing 1, Page 1)	
Standard length (see Basic types)	165, 265, 365, 665, 965, 1465 mm
Determining probe length on the basis:	desired insertion depth in measurement cross-section, length of bushing, ball valve and probe guide piece (see Accessories). To avoid vibration additional support may be needed with higher flow velocities and greater insertion depths. Warning Due to the weight of the connection housing, the probe should not protrude more than 150 mm out of the probe guide piece without additional support!

(3) Media	
air, pure gases, gas mixtures with constant mix ratio	

(4) Materials in contact with the medium	
stainless steel 1.4571, 1.4305, glass, epoxy resin, silicone (silicone-free on request)	

Measuring ranges air/nitrogen	
Flow velocity Nv	Article No.
0.2 ... 60 m/s	V_TA10_3B_60
0.2 ... 120 m/s	V_TA10_3B_120
0.2 ... 150 m/s	V_TA10_3B_150
0.2 ... 180 m/s	V_TA10_3B_180
0.2 ... 200 m/s	V_TA10_3B_200

Measurement uncertainty / time constant	
measurement uncertainty for flow velocities Nv with 1014 hPa and +21 °C	
less than/equal to 40 m/s	: 2 % of measured value + 0.02 m/s
greater than 40 m/s	: 2.5 % of measured value
time constant	: in seconds

Storing a characteristic for application in other gases

based on	Article No.
calibration in air and conversion of the air characteristic for another gas, up to 60 Nm/s'	TA-TRANSFO (on request)
real gas calibration for achieving best measurement uncertainties	(on request)

Examples of measurable flow rates

measuring tube inside diameter Di [mm]	profile factor PF* [-]	smallest measurable value [Nm ³ /h]	terminal value [Nm ³ /h] with sensor measuring range up to				
			60 Nm/s	120 Nm/s	150 Nm/s	180 Nm/s	200 Nm/s
40	0.810	0.73	220	440	550	660	730
50	0.840	1.2	356	713	890	1070	1180
60	0.840	1.7	513	1030	1280	1540	1710
80	0.840	3.0	912	1820	2280	2740	3040
100	0.840	4.8	1425	2850	3560	4280	4750
120	0.840	6.8	2050	4100	5130	6160	6840
150	0.840	11	3210	6410	8020	9620	10600
200	0.840	19	5700	11400	14250	17100	19000
300	0.840	43	12820	25650	32060	38480	42750
400	0.840	76	22800	45600	57000	68400	76000
500	0.840	120	35600	71200	89100	106900	118800
1000	0.840	480	142500	285000	356300	427600	475000

Standard flow rate measuring range specifications with centric positioning of the sensor, non-rotational inlet flow and amply dimensioned input/output sections (see Information for Use).

* 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.

(5) Permissible temperature

medium	-10 ... +140 °C
ambient	-20 ... +60 °C

Permissible ambient and media temperature ranges subject to the chosen temperature class. Ambient temperature (electronics) T_U, media temperature T_M

Category 1/2G equipment		
Temperature class	T _M	T _U
T4	- 10 °C ... +60 °C	- 20 °C ... +60 °C
T3	- 10 °C ... +60 °C	- 20 °C ... +60 °C
Category 2G equipment		
Temperature class	T _M	T _U
T4	- 10 °C ... +130 °C	- 20 °C ... +60 °C
T3	- 10 °C ... +140 °C	- 20 °C ... +60 °C
T2	- 10 °C ... +140 °C	- 20 °C ... +60 °C
T1	- 10 °C ... +140 °C	- 20 °C ... +60 °C
Category 1/2D or 2D equipment		
maximum surface temperature	T _U	
T 135 °C	- 20 °C ... +60 °C	

(6) Working pressure

max. 16 bar / 1.6 MPa overpressure
higher than 16 bar / 1.6 MPa on request

(7) Design

as in Drawing 1 (Page 1)

(8) ATEX protection

for gas : Ⓜ II 1/2 G Ex ia/d e [ia] IIC T4 Ga/Gb
for dust : Ⓜ II 1/2 D Ex ia/tb IIC T135°C Da/Db
sensor : Category 1 (Zone 0 or 20)
transducer housing : Category 2 (Zone 1 or 21)

Installation position

any positioning under atmospheric pressure, with overpressure inflow must not come from above

Ex-d transducer housing

Dimensions	outside diameter/length/height: approx. 110/205/182 mm
Material	aluminium cast alloy max. 0.5 % Mg, coated
Protection	IP68, IEC 529 and EN 60 529
Connection	glands for shielded cables with outside diameter 5 ... 9 mm, contacting of overall screen on the ground terminal in the housing
Alignment	rotatable by approx. 350 ° and lockable
Setup	dual chamber system consisting of: 1) electronics in Ex-d protection (flameproof enclosure) 2) connections in Ex-e protection (increased safety) with terminal block and cable glands

Electromagnetic Compatibility (EMC)

according to EN 61 000-6-2 and EN 61 000-6-4 / IEC77

Transducer UTA integrated in the connection housing

Analog output flow	4 ... 20 mA resistance max. 500 Ohm
Output limit value or quantity pulse	potential-free relay contact (normally-open) max. 300 mA / 27 VDC
Communication port	HART® via modem adapter for PC connection and UCOM software (see Accessories)
	output signals are electrically isolated from the power supply
Self-monitoring	parameter settings, sensor interface; in the case of error: analog output < 3.6 mA
Power supply	24 V DC (20 ... 27 V DC)
Power consumption	less than 5 W
Setting parameters	analog output, time constant, profile factor, tube inside diameter, limit value or quantity pulse (rating adjustable), 'working pressure' to zero correction (only relevant for $N_v < 1$ m/s), standard basis, standard density

Accessories (optional)		
	Description	Article No.
LCD display	1 st row: 'instantaneous value': flow rate or flow velocity 2 nd row: 'counter' or 'error code' 2 x 16-digit, character height 5.5 mm, working temperature range -20 ... +60 °C display rotatable in 90 °-stages on removing the Ex-d housing window cover	A010/520
Calibration certificate v/VA		KLB
HART® modem adapter	for changing setting parameters, for PC-USB connection	A010/101
PC software UCOM	for configuring the UTA via RS232	A010/052



Ex-d transducer housing with
optional LCD display

Accessories (optional) (cont'd)			
Probe guide piece	Description		Article No.
SFB 15 E-43 / G 3/4" according drawing 5	connection: max. pressure: temperature: materials: fixation: length: tightening torque:	outside thread G 3/4" 3 bar / 300 kPa -20 ... +240 °C stainless steel, FKM, PTFE clamping bush 43 mm min. 60 Nm at SW36	B004/515
SFK 15 E-42 / G 3/4" according drawing 2	connection: max. pressure: temperature: materials: fixation: length:	outside thread G 3/4" 16 bar / 1.6 MPa -20 ... +240 °C stainless steel, FKM clamp yoke 42 mm	B004/220

