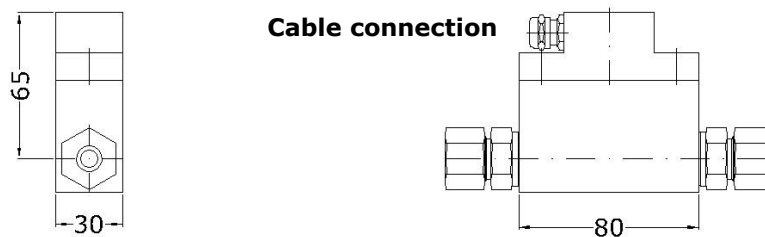


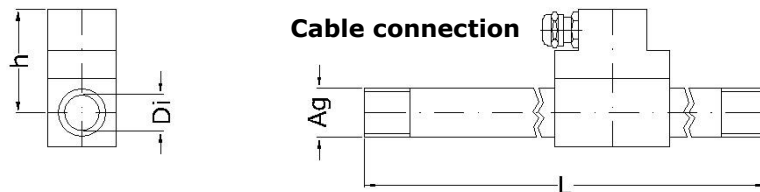
**Thermal flow sensor TA Di for separate evaluation units for measuring mass flow, standard flow rate and air or gas consumption**

**Drawing 4b**



Sensor TA Di 8

**Drawing 2b**



Sensor TA Di 16 ... 41.8

**Examples of application**

- measuring
  - compressed air and gas consumption of oxygen, nitrogen, argon, for example in technical welding applications
  - leakage flows
  - in exhaust air, burner supply air
  - for inertisation of nuclear processes
  - in air in low vacuum range with pressure greater than 200 hPa abs.

**Advantages**

- high measuring dynamics  
Nv (0.2 ... 150 m/s)
- measuring range from 0.04 Nm<sup>3</sup>/h (0.6 litre/min)
- low measuring uncertainty, even at lowest flow velocities
- direct air/gas mass flow proportional measuring; additional measurement of pressure and temperature is not necessary
- sensor has no moving parts
- stainless steel sensor housing
- greater temperature and pressure resistance ranges
- low installation costs
- negligible pressure drop thanks to virtually free passageway
- durable
- sterilisable (material-resistance of sensor allowing)
- optimal integration of associated transducer via PC software

### Functional principle

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

### Measurable variable

- standard flow rate [m<sup>3</sup>/h, l/min], mass flow [kg/h], standard velocity [m/s], standard basis adjustable, default:  
temperature  $t_n = +21$  °C, pressure  $p_n = 1014$  hPa
- temperature  $t$   
(hand-held units  
flowtherm Ex, flowtherm NT, HTA, HTA-EX)

### Design / Sensor

- Measuring tube for connection to suitable transducers and hand-held units
- thin film sensor element

### Gases

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

### Particles, humidity in the gas

- charges in the gas caused by particles such as dust and fibres do not affect the measurement, as long as abrasion and agglomeration do not occur on the sensor
- deviations in values as a result of variable air humidity in normal atmospheric conditions are covered by the measuring uncertainty specifications

### Model designation (example)

TA Di	8	G	E	60 m/s	140	p16	ZG4b
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

### Basic types

	Artikel-Nr.
TA Di 8 GE 60 m/s / 140 / p16 ZG4b	B016/555
TA Di 8 GE 120 m/s / 140 / p16 ZG4b	B016/555-120M/S
TA Di 8 GE 150 m/s / 140 / p16 ZG4b	B016/555-150M/S
TA Di 16 GE 60 m/s / 140 / p16 ZG2b	B016/550
TA Di 16 GE 120 m/s / 140 / p16 ZG2b	B016/550-120M/S
TA Di 16 GE 150 m/s / 140 / p16 ZG2b	B016/550-150M/S
TA Di 21.6 GE 60 m/s / 140 / p16 ZG2b	B016/551
TA Di 21.6 GE 120 m/s / 140 / p16 ZG2b	B016/551-120M/S
TA Di 21.6 GE 150 m/s / 140 / p16 ZG2b	B016/551-150M/S
TA Di 27.2 GE 60 m/s / 140 / p16 ZG2b	B016/552
TA Di 27.2 GE 120 m/s / 140 / p16 ZG2b	B016/552-120M/S
TA Di 27.2 GE 150 m/s / 140 / p16 ZG2b	B016/552-150M/S
TA Di 35.9 GE 60 m/s / 140 / p16 ZG2b	B016/553
TA Di 35.9 GE 120 m/s / 140 / p16 ZG2b	B016/553-120M/S
TA Di 35.9 GE 150 m/s / 140 / p16 ZG2b	B016/553-150M/S
TA Di 41.8 GE 60 m/s / 140 / p16 ZG2b	B016/554
TA Di 41.8 GE 120 m/s / 140 / p16 ZG2b	B016/554-120M/S
TA Di 41.8 GE 150 m/s / 140 / p16 ZG2b	B016/554-150M/S

**(1) Sensor type / design**

Thermal flow sensor TA Di designed as measuring tube

**(2) Dimensions**

measuring tube inside Ø Di [mm]	installation length L [mm]	installation height h [mm]	tube connection on both sides
8.0	80 mm + SRV *	65	with on-site tubes 12 x 2 mm
16.0	480	45	Ag R 1/2" **, Gg RP 1/2"
21.6	650	50	Ag R 3/4" **, Gg RP 3/4"
27.2	820	50	Ag R 1" **, Gg RP 1"
35.9	1080	40	Ag R 1 1/4" **, Gg RP 1 1/4"
41.8	1250	45	Ag R 1 1/2" **, Gg RP 1 1/2"

\* **SRV** : cutting ring tube fitting on both sides  
 \*\* **Ag** : Whitworth tapered pipe thread according to DIN 2999  
**Gg** : counter thread

**Input / output section**

for TA Di 8 provided on site: tubes 12 x 2, 160 mm (input) / 80 mm (output) running straight;  
 for all other measuring tubes no additional on site input/output section necessary; length of the  
 input section 2/3 of the installation length L, length of the output section 1/3 of L

**(3) Gases**

air, pure gases, gas mixtures with constant mix ratio

**(4) Materials in contact with the medium**

stainless steel, glass, epoxy resin, Viton®

## (5) Measuring ranges\* air/nitrogen

Basic type / measuring range	in m <sup>3</sup> /h	in kg/h	in litre/min	in m/s	1 m <sup>3</sup> /h equivalent to [m/s]
<b>TA Di 8 ...</b>					
... 60 m/s ...	0.04 ... 11	0.05 ... 13	0.6 ... 181	0.2 ... 60	5.53
... 120 m/s ...	0.04 ... 22	0.05 ... 26	0.6 ... 362	0.2 ... 120	5.53
... 150 m/s ...	0.04 ... 27	0.05 ... 33	0.6 ... 452	0.2 ... 150	5.53
<b>TA Di 16 ...</b>					
... 60 m/s ...	0.15 ... 43	0.18 ... 52	2.4 ... 729	0.2 ... 60	1.38
... 120 m/s ...	0.15 ... 86	0.18 ... 104	2.4 ... 1448	0.2 ... 120	1.38
... 150 m/s ...	0.15 ... 109	0.18 ... 130	2.4 ... 1810	0.2 ... 150	1.38
<b>TA Di 21.6 ...</b>					
... 60 m/s ...	0.27 ... 79	0.32 ... 95	4.4 ... 1319	0.2 ... 60	0.758
... 120 m/s ...	0.27 ... 158	0.32 ... 158	4.4 ... 2638	0.2 ... 120	0.758
... 150 m/s ...	0.27 ... 198	0.32 ... 238	4.4 ... 3298	0.2 ... 150	0.758
<b>TA Di 27.2 ...</b>					
... 60 m/s ...	0.42 ... 125	0.50 ... 151	7.0 ... 2092	0.2 ... 60	0.478
... 120 m/s ...	0.42 ... 250	0.50 ... 251	7.0 ... 4184	0.2 ... 120	0.478
... 150 m/s ...	0.42 ... 314	0.50 ... 314	7.0 ... 5230	0.2 ... 150	0.478
<b>TA Di 35.9 ...</b>					
... 60 m/s ...	0.73 ... 219	0.88 ... 263	12.1 ... 3644	0.2 ... 60	0.274
... 120 m/s ...	0.73 ... 438	0.88 ... 526	12.1 ... 7288	0.2 ... 120	0.274
... 150 m/s ...	0.73 ... 547	0.88 ... 657	12.1 ... 9110	0.2 ... 150	0.274
<b>TA Di 41.8 ...</b>					
... 60 m/s ...	1.0 ... 296	1.2 ... 356	16.5 ... 4949	0.2 ... 60	0.202
... 120 m/s ...	1.0 ... 592	1.2 ... 712	16.5 ... 9880	0.2 ... 120	0.202
... 150 m/s ...	1.0 ... 741	1.2 ... 890	16.5 ... 12350	0.2 ... 150	0.202

\* all standard flow rate and standard flow velocity specifications relating to a standard atmospheric pressure  $p_N = 1014 \text{ hPa}$  and a standard temperature  $t_p = +21 \text{ °C}$  (294.15 K)

## Measurement uncertainty / time constant

measurement uncertainty for flow rates NV/t 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 in the associated evaluation unit for application in other gases (on request)

based on	Article No.
calibration in air and conversion of the air characteristic for another gas, up to '60 m/s'	TA_TRANSFO (on request)
real gas calibration for achieving lowest measurement uncertainties	(on request)

**(6) Permissible temperature**

medium	-10 ... +140 °C
ambient	-25 ... +140 °C

**(7) Max. working pressure**

max. 16 bar / 1.6 MPa above atmospheric
greater than 16 bar / 1.6 MPa on request

**(8) Design**

TA Di 8	measuring tube as in Drawing 4b
TA Di 16 ... 41.8	measuring tube as in Drawing 2b

**Option Ex-protection**

Type	Article No.
Ex ib IIC T4 Gb Category 2G (Zone 1) required for hand-held unit HTA-EX and flowtherm Ex	TA10_1B_EX1
Ex ia IIC T4 Ga/Gb Category 1/2G (Zone 0/1) required for transducer U15-Ex	TA10_1B_EX0
Ex nA IIC T4 Gc X Category 3G (Zone 2) in combination with suitable transducer or hand-held unit Ex tc IIIC T135°C Dc X Category 3D (Zone 22) in combination with suitable transducer	TAEX2

**Connector cable / connection**

Standard sensor connector cable 3 m long, direct exit, resistant up to +140 °C, other lengths on request. With cable lengths other than standard, a minimal measurement uncertainty arises only in the case of fixed allocation of sensor and evaluation unit.	
connection (IP67) for transducer U10a and hand-held units HTA, flowtherm Ex, flowtherm NT	: plug 423-5 with gold-plated pins
transducer U15-Ex, hand-held unit HTA-Ex	: plug 423-8 with gold-plated pins

**Type of protection / mounting attitude**

sensor IP68; at cable exit point IP65
any fitting position with atmospheric pressure, with pressures above atmospheric direction of flow not from above

**Electromagnetic Compatibility (EMC)**

IEC 1000-4, EN 61000
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<b>Requisite compatible, separate evaluation unit</b>	
for non-Ex applications	<ul style="list-style-type: none"> <li>• transducer U10a</li> <li>• hand-held unit HTA</li> <li>• hand-held unit flowtherm NT</li> </ul>
for Ex-applications	<ul style="list-style-type: none"> <li>• transducer U15-Ex Ex nA [ia] IIC T4 Gc Category 3(1)G</li> <li>• hand-held unit HTA-Ex Ex ia IIC T4 Gb Category 2G (Zone 1)</li> <li>• hand-held unit flowtherm Ex Ex ib IIC T4 Gb Category 2G (Zone 1)</li> </ul>

<b>Accessories</b>	
	<b>Article No.</b>
Calibration certificate	KLB