

# TF16

## Dual Channel Scattered Light Sensor

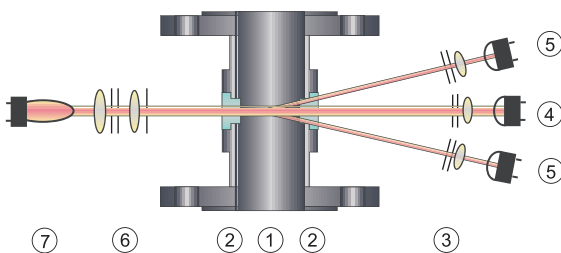


- Inline real-time process monitoring
- Dual channel color compensation
- Extremely low maintenance
- CIP/SIP-compatible
- Broad variety of line sizes, process connections and wetted materials
- Designed for high temperatures and pressures

The model TF16 is a precise dual channel, scattered light turbidimeter. This sensor is designed to provide inline control solutions for a variety of industrial processes, from sanitary CIP/SIP applications to high pressure, high temperature industrial applications.

The TF16 sensor uses light in the visible (VIS) and Near Infrared (NIR) range from 400 to 1100 nm. A precisely defined, constant light beam penetrates the process medium. Light scattered from particles (trace suspended solids, undissolved liquids or gas bubbles) in the medium is detected by eight hermetically sealed silicon photodiodes at an angle of 11°.

Simultaneously, the unscattered light is detected as a direct beam by a reference photodiode. This unique dual channel design compensates for disturbances such as background color or color changes of the carrier medium. The sensor can be calibrated in ppm, EBC or FTU and measures extremely low particle sizes and concentrations. The special optical window is made from a single crystal sapphire. This provides superior resistance to all abrasive and corrosive media. The TF16 is available with a broad variety of line sizes, process connections and wetted materials and can be adapted easily to the process. High temperature and flameproof options are also available.



- Type TF16**
- |                 |                              |
|-----------------|------------------------------|
| 1 Sensor body   | 4 Detector (direct light)    |
| 2 Windows       | 5 Detector (scattered light) |
| 3 Optics module | 6 Optics module              |
|                 | 7 Lamp                       |

# Technical Data

## Sensor TF16



### Material:

sensor body made of stainless steel  
SS 316 Ti, 1.4571 (standard)

### Special materials:

SS 316 L (1.4435), 1.4539, 1.4462, TFM 4215, Hastelloy® C4, Hastelloy® C22, Titanium, Tantalum, Monel® 400, Inconel® 625, PP, and others on request

### Line size:

¼" to 8", (DN 6 to DN 200)

### Process connections:

ASME Flange, DIN Flange, Varivent, JIS Flange, Tri-Clamp, BBS-Clamp, Female Thread NPT, Female Thread DIN ISO 228/1 G, Sanitary Thread (DIN 11851), and others on request

### Gaskets:

Viton®, EPDM (FDA), EPDM (USP Class VI), Kalrez®, Chemraz®, Fluoraz®, Buna (NBR), Silicone, Viton® /FEP (FDA), and others on request

### Windows:

Pyrex®, Sapphire

### Optical path length:

40 mm standard

### Process pressure:

10 mbar to 325 bar, (0.15 psi to 4713 psi),  
depending on process connection, material and design

### Process temperature:

values are only valid with appropriate material of sensor body and gaskets. No icing on sensor!

- permanent: 0 °C to +120 °C, (+32 °F to +248 °F)
- peak (15 min/day): 0 °C to +150 °C, (+32 °F to +302 °F)

### Ambient temperature:

- operation: 0 °C to +40 °C, (+32 °F to +104 °F)  
(elevated or reduced ambient temperatures may require restrictions to the operating temperatures stated above!)
- transport: -20 °C to +70 °C, (-4 °F to +158 °F)

### Air purge:

connectors available as standard

### Light source:

incandescent tungsten lamp: 5.0 V DC, 775 mA,  
typical life span 3 to 5 years

### Wavelengths:

400 nm - 1100 nm

### Detector:

silicon photodiodes, hermetically sealed

### Calibration:

basic calibration in ppm (DE), FTU, EBC

### Measuring range:

any measuring range between  
0 - 0.5 to 500 ppm (DE)  
0 - 0.2 to 200 FTU  
0 - 0.05 to 50 EBC

### Resolution:

< ± 0.05 % of respective measuring range

### Repeatability:

< ± 0.3 % of respective measuring range

### Linearity:

specific to application, < ± 1 % with standard solution

### Protection:

all optical parts protected according to IP65

### Cable lengths:

standard: 5, 10, 20, 35, 50 m, (16, 33, 66, 115, 164 ft.)  
maximum: 250 m, (820 ft.)

### VA-plug-protection:

special ultra-shielded cable sets,  
optional rigid stainless steel connector

### Certificates:

ISO 9001:2000, ATEX, FM, PED, CE, HPO

**Use with C4000 converter!**

## Options



Measuring cells for any application

### TF16-HT

high temperature model  
permanent:  
-20 °C to +240 °C, (-4 °F to +464 °F)  
periodic 15 min/day:  
-20 °C to +260 °C, (-4 °F to +500 °F)

### TF16-N / TF16-HT-N TF16-EX-N / TF16-EX-HT-N

with NIR filter for applications with  
light-sensitive process streams to avoid  
biofouling

### TF16-EX / TF16-EX-HT

ATEX and FM flameproof versions for safety  
and confidence in all hazardous area classification, Approval report:  
DMT ATEX E176, FMG J.I. 3013884  
Maximum cable length: 1000 m (3280 ft.)  
(please contact us for separate data sheet)