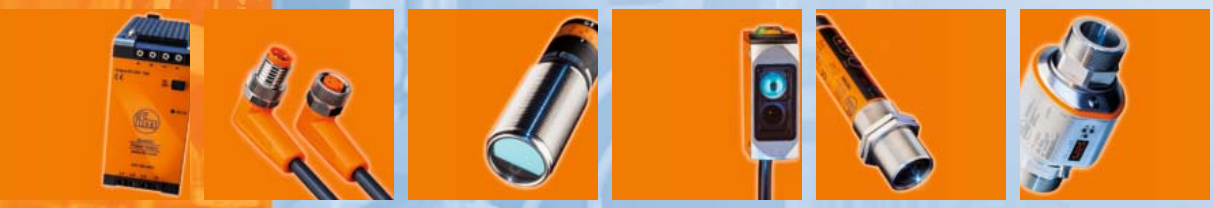
ifm electronic



# Innovations 2014

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TOP PRODUCT

## Position sensors



## Sensors for motion control



## Industrial imaging



## Process sensors

# See what is going on! Capacitive sensor for more transparency


## Precise evaluation of the application by visualisation of the process

- **Easy parameter setting via IO-Link before installation of the sensor**
- **Versatile data processing via IO-Link**
- **No new cabling necessary**
- **Clearly visible indication of the switching status**
- **Easy installation with mounting adapters and cable ties**

### See what the sensor is seeing

At last it is possible to integrate process values into the IT structure via an intelligent sensor interface and for easier indication, analysis and evaluation.
The application becomes transparent, and the process value allows effective further processing. At present this additional advantage is unique and offers solutions even for difficult applications.

### Application

Capacitive sensors detect bulk materials or liquids through non-metallic vessel walls. Typical applications for product detection can be found in the semiconductor, paper and wood industries.

### Parameter setting

The parameters can either be set via the buttons on the sensor or via IO-Link interface. This can be done using the USB interface E30396 or a memory plug E30398. The LINERECORDER SENSOR software also simplifies the monitoring of different types of sensors.

| Type [mm] | Output stage | Setting range [mm] | Communication interface | Housing material | Protection rating / class | Order no. |
|---|---|---|---|---|---|---|
| **M12 connector · 3 wires** | | | | | | |
| M18 x 1 | PNP / NPN* | 4...24 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, II | **KG5065** |
| M18 x 1 | PNP | 4...24 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, II | **KG5066** |
| M18 x 1 | PNP | 2...14 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, II | **KG5071** |
| M30 x 1.5 | PNP / NPN* | 5...40 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, II | **KI5082** |
| M30 x 1.5 | PNP | 5...40 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, II | **KI5083** |
| M30 x 1.5 | PNP / NPN* | 2...12 | IO-Link 1.1 | high-grade stainless steel (1.4404), TPE-U, PBT, PEI | IP 65, IP 67, III | **KI5084** |
| M30 x 1.5 | PNP | 2...12 | IO-Link 1.1 | high-grade stainless steel (1.4404), TPE-U, PBT, PEI | IP 65, IP 67, III | **KI5085** |
| M30 x 1.5 | PNP / NPN* | 3...26 | IO-Link 1.1 | high-grade stainless steel (1.4404), TPE-U, PBT, PEI | IP 65, IP 67, III | **KI5086** |
| M30 x 1.5 | PNP | 3...26 | IO-Link 1.1 | high-grade stainless steel (1.4404), TPE-U, PBT, PEI | IP 65, IP 67, III | **KI5087** |
| **Connection cable 2 m PVC· 3 wires** | | | | | | |
| M18 x 1 | PNP / NPN* | 2...14 | IO-Link 1.1 | PP, TPE-U | IP 65, IP 67, II | **KG5067** |
| M18 x 1 | PNP | 2...14 | IO-Link 1.1 | PP, TPE-U | IP 65, IP 67, II | **KG5069** |
| 48 x 20 x 14 | PNP / NPN* | 3...20 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, III | **KQ6001** |
| 48 x 20 x 14 | PNP | 3...20 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, III | **KQ6002** |
| **Connection cable with M8 connector · 3 wires** | | | | | | |
| 48 x 20 x 14 | PNP / NPN* | 3...20 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, III | **KQ6003** |
| 48 x 20 x 14 | PNP | 3...20 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, III | **KQ6004** |
| 48 x 20 x 14 | PNP | 3...20 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, III | **KQ6008** |
| 48 x 20 x 14 | PNP | 3...20 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, III | **KQ6010** |
| **Connection cable with M12 connector · 3-wire** | | | | | | |
| 48 x 20 x 14 | PNP | 3...20 | IO-Link 1.1 | PBT, PC, TPE-U | IP 65, IP 67, III | **KQ6005** |

* automatic detection of the load

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Mounting adapter for free-standing mounting, PBT | **E12153** |
| | Mounting adapter for pipe and tube mounting with cable ties, PA | **E12163** |
|  | Memory plug, parameter memory for IO-Link sensors | **E30398** |
| | | |
|  | IO-Link interface, current consumption from USB port | **E30396** |
| | | |
|  | LINERECORDER SENSOR, software for parameter setting and set-up of IO-Link sensors | **ZGS210** |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | M12 socket, 2 m black, PUR cable | **EVC001** |
| | M8 socket, 2 m black, PUR cable | **EVC150** |

## Accessories

| Type | Description | Order no. |
|---|---|---|
| **Power supplies** | | |
|  | Plastic housing, 24 V DC, 2.5 A | **DN1031** |
| | | |

# O6 miniature photoelectric sensors with high-performance


## Powerful photoelectric sensors in a plastic housing

- **Diffuse reflection sensors with reliable background suppression**
- **Intuitive setting via potentiometer and rotary switch (light/dark selection)**
- **Well-defined light spot for precise object detection, no scattered light**
- **Also available as through-beam or retro-reflective system**
- **Versions with M8 connector, M12 pigtail or PUR connection cable**



**Best optical performance**

The diffuse reflection sensors provide reliable background suppression, even in case of highly reflective backgrounds such as moving machine parts. The clearly defined consistent light spot ensures precise object detection. There is no scattered light which could interfere with other photoelectric sensors in close vicinity.

**Ideal for universal applications**

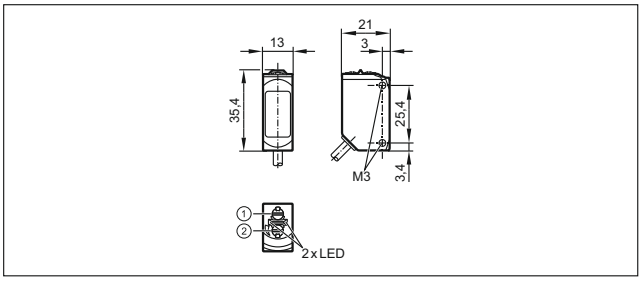
For connection the user can choose between potted cable, M12 pigtail or M8 metal connector on the housing.

The O6 range features a potentiometer for intuitive setting, and the light-on or dark-on mode is selected via rotary switch. The diffuse reflection, through-beam and retro-reflective sensors are distinguished by an excellent price/performance ratio. An extensive range of accessories completes the ifm range.

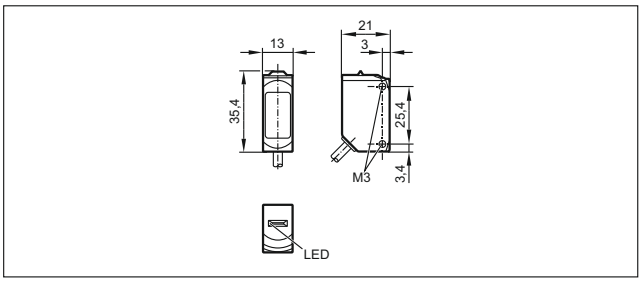
| Range [mm] | Light spot diameter [mm] | Connection | Current consumption [mA] | Order no. | Order no. |
|---|---|---|---|---|---|
| **Diffuse reflection sensor with background suppression · 3-wire DC** | | | | **NPN** | **PNP** |
| 2...200 | 8* | PUR cable, 2 m | 22 | **O6H204** | **O6H200** |
| 2...200 | 8* | M12 connector with 0.3 m PUR cable | 22 | **O6H205** | **O6H201** |
| **Diffuse reflection sensor · 3-wire DC** | | | | **NPN** | **PNP** |
| 5...500 | 15* | PUR cable, 2 m | 16 | **O6T204** | **O6T200** |
| 5...500 | 15* | M12 connector with 0.3 m PUR cable | 16 | **O6T205** | **O6T201** |
| **Retro-reflective sensor with polarisation filter · 3-wire DC** | | | | **NPN** | **PNP** |
| 50...5000 | 150** | PUR cable, 2 m | 12 | **O6P204** | **O6P200** |
| 50...5000 | 150** | M12 connector with 0.3 m PUR cable | 12 | **O6P205** | **O6P201** |
| **Through-beam sensor transmitter · 2-wire DC** | | | | | |
| 0...10000 | 300* | PUR cable, 2 m | 11 | **O6S200** | |
| 0...10000 | 300* | M12 connector with 0.3 m PUR cable | 11 | **O6S201** | |
| **Through-beam sensor receiver · 3-wire DC** | | | | **NPN** | **PNP** |
| 0...10000 | – | PUR cable, 2 m | 7 | **O6E204** | **O6E200** |
| 0...10000 | – | M12 connector with 0.3 m PUR cable | 7 | **O6E205** | **O6E201** |

* at maximum range
** referred to prismatic reflector Ø 80 mm

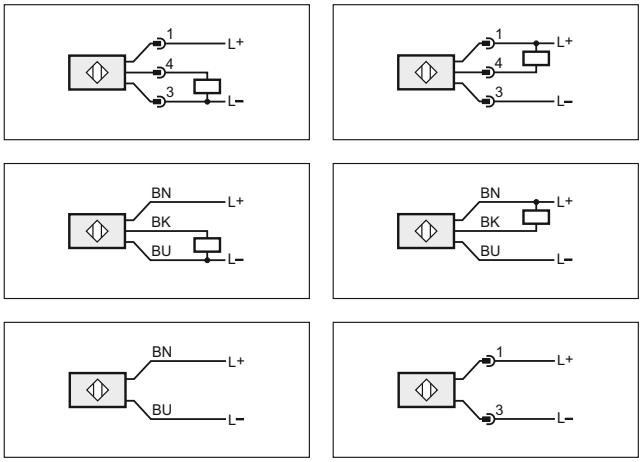
## Dimensions




1) Switch output function
2) Potentiometer sensitivity



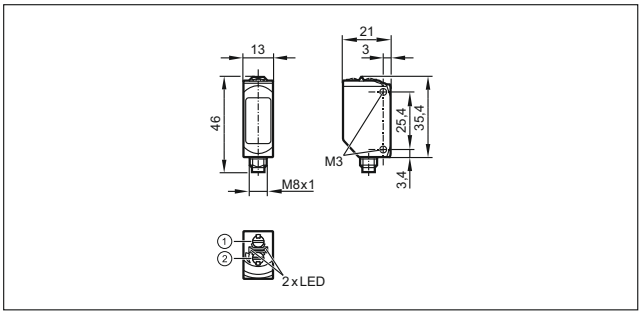

## Wiring diagram



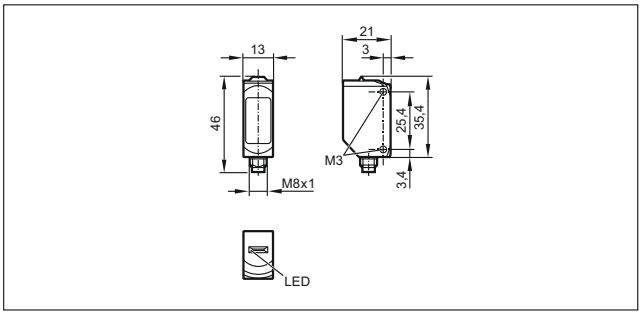
| Range [mm] | Light spot diameter [mm] | Connection | Current consumption [mA] | Order no. | Order no. |
|---|---|---|---|---|---|
| **Diffuse reflection sensor with background suppression · 3-wire DC** | | | | **NPN** | **PNP** |
| 2...200 | 8* | M8 connector, 3-pole | 22 | **O6H206** | **O6H202** |
| 2...200 | 8* | M8 connector, 4-pole | 22 | **O6H207** | **O6H203** |
| **Diffuse reflection sensor · 3-wire DC** | | | | **NPN** | **PNP** |
| 5...500 | 15* | M8 connector, 3-pole | 16 | **O6T206** | **O6T202** |
| 5...500 | 15* | M8 connector, 4-pole | 16 | **O6T207** | **O6T203** |
| **Retro-reflective sensor with polarisation filter · 3-wire DC** | | | | **NPN** | **PNP** |
| 50...5000 | 150** | M8 connector, 3-pole | 12 | **O6P206** | **O6P202** |
| 50...5000 | 150** | M8 connector, 4-pole | 12 | **O6P207** | **O6P203** |
| **Through-beam sensor transmitter · 2-wire DC** | | | | | |
| 0...10000 | 300* | M8 connector, 3-pole | 11 | **O6S202** | |
| 0...10000 | 300* | M8 connector, 4-pole | 11 | **O6S203** | |
| **Through-beam sensor receiver · 3-wire DC** | | | | **NPN** | **PNP** |
| 0...10000 | – | M8 connector, 3-pole | 7 | **O6E206** | **O6E202** |
| 0...10000 | – | M8 connector, 4-pole | 7 | **O6E207** | **O6E203** |

* at maximum range
** referred to prismatic reflector Ø 80 mm

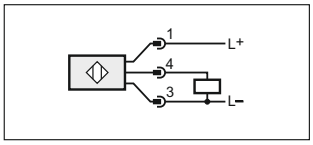
## Dimensions

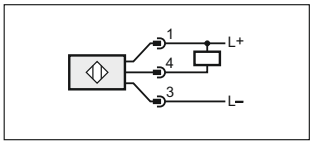


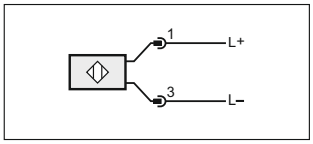

1) Switch output function
2) Potentiometer sensitivity




## Wiring diagram



TOP PRODUCTS

## Accessories

| Type | Description | Order no. |
|---|---|---|
| **Mounting accessories** | | |
|  | Mounting set for clamp mounting, stainless steel, Ø 10 mm | **E21272** |
| | Mounting set for clamp mounting, stainless steel, Ø 12 mm | **E21275** |
|  | Bracket for free-standing mounting, stainless steel | **E21271** |
| | | |
|  | Protective bracket, stainless steel | **E21273** |
| | | |
|  | Mounting rod, 120 mm, Ø 10 mm, M8 thread, stainless steel | **E21081** |
| | Mounting rod, 100 mm, Ø 12 mm, M10 thread, stainless steel | **E20938** |
|  | Cube for mounting on an aluminium profile, M8 thread, diecast zinc | **E20950** |
| | Cube for mounting on an aluminium profile, M10 thread, diecast zinc | **E20951** |
|  | Pinhole mask, Ø 0.5 mm | **E21277** |
| | | |
|  | Slot mask, 0.5 x 8 mm | **E21280** |
| | | |
| **Prismatic reflector** | | |
|  | Ø 50 mm, plastic | **E20956** |
| | Ø 80 mm, plastic | **E20005** |
|  | 48 x 48 mm, PMMA, ABS | **E20744** |
| | 95 x 95 mm, plastic | **E20454** |
| **Power supplies** | | |
|  | Plastic housing, 24 V DC, 2.5 A | **DN1031** |
| | | |
|  | Metal housing, 24 V DC, 3.3 A | **DN4011** |
| | | |

| Common technical data | | |
|---|---|---|
| Type of light | | red light 633 nm |
| Operating voltage | [V DC] | 10...30 |
| Protection rating, class | | IP 65 / IP 67, III |
| Switching frequency | [Hz] | 1000 |
| Switching status indication | LED | yellow |
| Indication of stable operation | LED | green |
| Light-on / dark-on mode | | adjustable |
| Current rating | [mA] | 100 |
| Voltage drop | [V] | < 2.5 |
| Short-circuit protection, pulsed | | • |
| Reverse polarity protection / overload protection | | • / • |
| Ambient temperature | [°C] | -25...60 |
| Materials | housing | ABS |
| | lens | PMMA |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC001** |
| | Socket, M12, 5 m black, PUR cable | **EVC002** |
|  | Socket, M8, 4-pole, 2 m black, PUR cable | **EVC153** |
| | Socket, M8, 4-pole, 5 m black, PUR cable | **EVC154** |
|  | Socket, M8, 4-pole, 2 m black, PUR cable | **EVC150** |
| | Socket, M8, 4-pole, 5 m black, PUR cable | **EVC151** |
|  | Socket, M8, 3-pole, 2 m black, PUR cable | **EVC144** |
| | Socket, M8, 3-pole, 5 m black, PUR cable | **EVC145** |
|  | Socket, M8, 3-pole, 2 m black, PUR cable | **EVC141** |
| | Socket, M8, 3-pole, 5 m black, PUR cable | **EVC142** |

# O6 WetLine miniature high-performance photoelectric sensors


## Powerful and robust sensors for the food industry

- **Stainless steel housing with protection rating IP 68 / IP 69K**
- **Easy adjustment via potentiometer**
- **Diffuse reflection sensors with reliable background suppression**
- **Object colour has no influence on the range**
- **Also available as through-beam or retro-reflective system**

product design award 2014


### Best optical performance

The diffuse reflection sensors distinguish themselves by reliable background suppression, even in case of highly reflective backgrounds. The sensing range is independent of the characteristics and colour of the object to be detected. A special feature is the automatic sensitivity compensation that guarantees reliable operation even in steam, smoke or highly reflective environments.

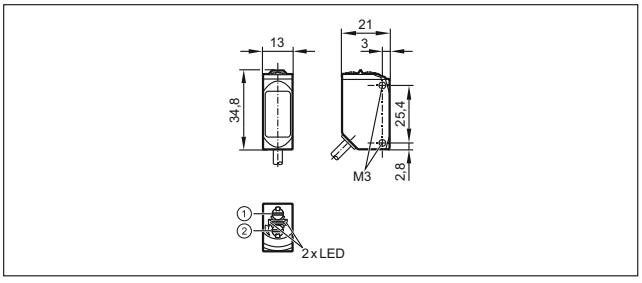
### Ideal for food applications

The potentiometers are provided with a double seal and are, like the front pane, embedded flush to allow residue-free cleaning. The transparent black housing cover ensures that, even in bright lighting conditions, the LEDs are highly visible. The coated front pane is made of resistant, shatterproof plastic.

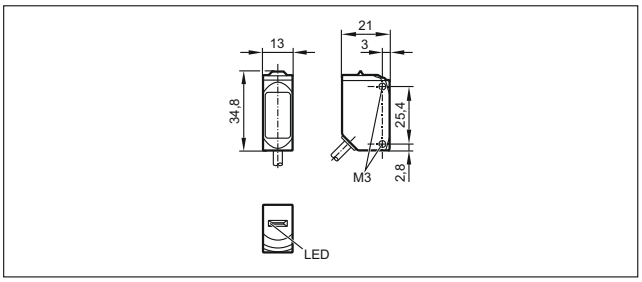
| Range [mm] | Light spot diameter [mm] | Connection | Current consumption [mA] | Order no. | Order no. |
|---|---|---|---|---|---|
| **Diffuse reflection sensor with background suppression · 3-wire DC** | | | | **NPN** | **PNP** |
| 2...200 | 8* | PVC cable, 2 m | 22 | **O6H304** | **O6H300** |
| 2...200 | 8* | M12 connector with 0.3 m PVC cable | 22 | **O6H305** | **O6H301** |
| **Diffuse reflection sensor · 3-wire DC** | | | | **NPN** | **PNP** |
| 5...500 | 15* | PVC cable, 2 m | 16 | **O6T304** | **O6T300** |
| 5...500 | 15* | M12 connector with 0.3 m PVC cable | 16 | **O6T305** | **O6T301** |
| **Retro-reflective sensor with polarisation filter · 3-wire DC** | | | | **NPN** | **PNP** |
| 50...5000 | 150** | PVC cable, 2 m | 12 | **O6P304** | **O6P300** |
| 50...5000 | 150** | M12 connector with 0.3 m PVC cable | 12 | **O6P305** | **O6P301** |
| **Through-beam sensor transmitter · 2-wire DC** | | | | | |
| 0...10000 | 300* | PVC cable, 2 m | 11 | **O6S300** | |
| 0...10000 | 300* | M12 connector with 0.3 m PVC cable | 11 | **O6S301** | |
| **Through-beam sensor receiver · 3-wire DC** | | | | **NPN** | **PNP** |
| 0...10000 | – | PVC cable, 2 m | 7 | **O6E304** | **O6E300** |
| 0...10000 | – | M12 connector with 0.3 m PVC cable | 7 | **O6E305** | **O6E301** |

* at maximum range
** referred to prismatic reflector Ø 80 mm

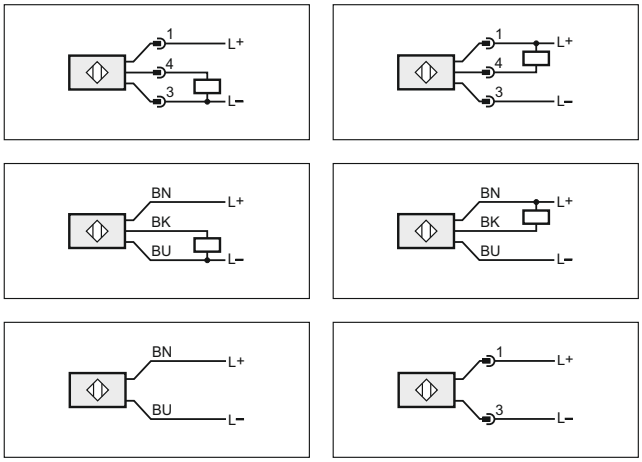
## Dimensions




1) Switch output function
2) Potentiometer sensitivity



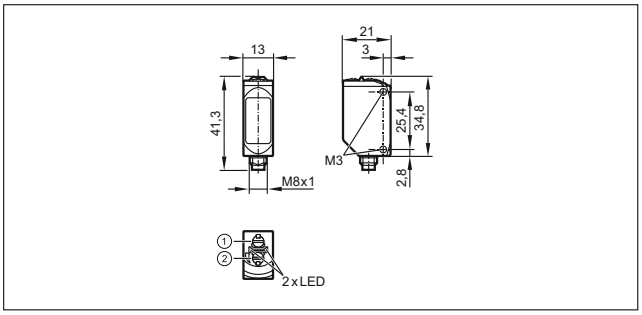

## Wiring diagram



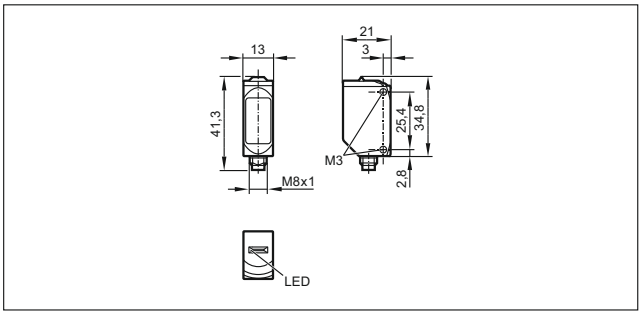
| Range [mm] | Light spot diameter [mm] | Connection | Current consumption [mA] | Order no. | Order no. |
|---|---|---|---|---|---|
| **Diffuse reflection sensor with background suppression · 3-wire DC** | | | | **NPN** | **PNP** |
| 2...200 | 8* | M8 connector, 3-pole | 22 | **O6H306** | **O6H302** |
| 2...200 | 8* | M8 connector, 4-pole | 22 | **O6H307** | **O6H303** |
| **Diffuse reflection sensor · 3-wire DC** | | | | **NPN** | **PNP** |
| 5...500 | 15* | M8 connector, 3-pole | 16 | **O6T306** | **O6T302** |
| 5...500 | 15* | M8 connector, 4-pole | 16 | **O6T307** | **O6T303** |
| **Retro-reflective sensor with polarisation filter · 3-wire DC** | | | | **NPN** | **PNP** |
| 50...5000 | 150** | M8 connector, 3-pole | 12 | **O6P306** | **O6P302** |
| 50...5000 | 150** | M8 connector, 4-pole | 12 | **O6P307** | **O6P303** |
| **Through-beam sensor transmitter · 2-wire DC** | | | | | |
| 0...10000 | 300* | M8 connector, 3-pole | 11 | **O6S302** | |
| 0...10000 | 300* | M8 connector, 4-pole | 11 | **O6S303** | |
| **Through-beam sensor receiver · 3-wire DC** | | | | **NPN** | **PNP** |
| 0...10000 | – | M8 connector, 3-pole | 7 | **O6E306** | **O6E302** |
| 0...10000 | – | M8 connector, 4-pole | 7 | **O6E307** | **O6E303** |

* at maximum range
** referred to prismatic reflector Ø 80 mm

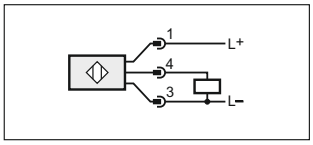
## Dimensions

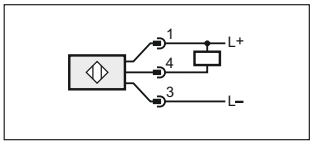


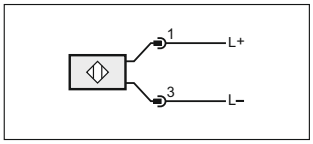

1) Switch output function
2) Potentiometer sensitivity




## Wiring diagram

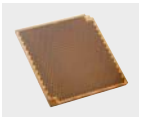


TOP PRODUCTS

## Accessories

| | Type | Description | Order no. |
|---|---|---|---|
| **Mounting accessories** | | | |
|  | | Mounting set for clamp mounting, stainless steel | **E21272** |
|  | | Bracket for free-standing mounting, stainless steel | **E21271** |
|  | | Protective bracket, stainless steel | **E21273** |
|  | | Mounting rod, 120 mm, Ø 10 mm, M8 thread, stainless steel | **E21081** |
|  | | Angle bracket for reflector E21269, stainless steel | **E20724** |
|  | | Mounting set for reflector E21270, clamp mounting, stainless steel | **E20935** |
| **Prismatic reflectors for the food industry (up to 140 °C)** | | | |
|  | | 18 x 18 mm, Solidchem plastic | **E21267** |
| | | 56 x 38 mm, Solidchem plastic | **E21268** |
|  | | 48 x 48 mm, Solidchem plastic | **E21269** |
| | | 96 x 96 mm, Solidchem plastic | **E21270** |
| **Power supplies** | | | |
|  | | Plastic housing, 24 V DC, 2.5 A | **DN1031** |
|  | | Metal housing, 24 V DC, 3.3 A | **DN4011** |

| Common technical data | | |
|---|---|---|
| Type of light | | red light 633 nm |
| Operating voltage | [V DC] | 10...30 |
| Protection rating, class | | IP 65, IP 67, IP 68, IP 69K, III |
| Switching frequency | [Hz] | 1000 |
| Switching status indication | LED | yellow |
| Operation | LED | green |
| Light-on / dark-on mode | | adjustable |
| Current rating | [mA] | 100 |
| Voltage drop | [V] | < 2.5 |
| Short-circuit protection, pulsed | | • |
| Reverse polarity protection / overload protection | | • / • |
| Ambient temperature | [°C] | -25...80 |
| Materials | housing | high-grade stainless steel (1.4404 / 316L) |
| | lens | PPSU PMMA |

## Connection technology

| | Type | Description | Order no. |
|---|---|---|---|
|  | | Socket, M8, 2 m orange, PVC cable | **EVT122** |
| | | Socket, M8, 5 m orange, PVC cable | **EVT123** |
|  | | Socket, M8, 2 m orange, PVC cable | **EVT126** |
| | | Socket, M8, 5 m orange, PVC cable | **EVT127** |
|  | | Socket, M8, 2 m orange, PVC cable, LED | **EVT130** |
| | | Socket, M8, 5 m orange, PVC cable, LED | **EVT131** |
|  | | Socket, M12, 4-pole, 5 m orange, PVC cable | **EVT001** |
| | | Socket, M12, 4-pole, 2 m orange, PVC cable | **EVT064** |

# PMD*Line* series – a new generation of photoelectric sensors


## O5D with display – first standard photocell with time of flight measurement (PMD)

- **Reliable background suppression and colour-independent detection**
- **Precise time of flight measurement in housing sizes of standard photoelectric sensors**
- **Shiny surfaces are detected reliably (e.g. stainless steel)**
- **Any sensor position, even an oblique angle to the object**
- **Switch point setting to the nearest centimetre via "+/-" buttons and display**


**Time of flight measurement for standard sensors**

The O5D with time of flight measurement (PMD = photonic mixer device) combines the following advantages: long ranges, reliable background suppression, visible red light and high excess gain. In the same price range as standard sensors, it is a clever alternative.

**Easy handling**

The switch point is set easily to the nearest centimetre via "+/-" buttons and display or alternatively via IO-Link, which also allows read-out of the actual value.

**Any surface and any mounting position**

Shiny, matt, dark or light objects of any colour: the O5D features reliable background suppression. The unit allows any angle of incidence and thus flexible mounting positions. This simplifies installation and saves costs.

| Measuring range [mm] | Background suppression [m] | Switching frequency [Hz] | Hysteresis [%] | Spot Ø at max. range [mm] | Current consumption [mA] | Unit of measurement | Order no. |
|---|---|---|---|---|---|---|---|
| **Photoelectric distance sensor, laser protection class 2 · M12 connector, complementary** | | | | | | | |
| 30...2000 | ...20 | 11 | < 6* | < 5 | < 75 | cm | **O5D100** |
| 30...2000 | ...20 | 11 | < 6* | < 5 | < 75 | inch | **O5D101** |

* black (6 % remission) in case of max. range

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Mounting bracket for rod, complete set incl. clamp | **E21083** |
|  | Protective bracket for rod, complete set incl. clamp | **E21084** |
|  | Rod, 100 mm, Ø 12 mm, M10 thread, stainless steel | **E20938** |
|  | Cube for mounting on an aluminium profile, M10 thread, diecast zinc | **E20951** |
|  | Universal angle bracket | **E21085** |
|  | Bracket for free-standing mounting | **E21087** |
|  | Dovetail clamp | **E21088** |
|  | Memory plug, parameter memory for IO-Link sensors | **E30398** |
|  | IO-Link interface, current consumption from USB port | **E30396** |
|  | LINERECORDER SENSOR, software for parameter setting and set-up of IO-Link sensors | **ZGS210** |

| Common technical data | | |
|---|---|---|
| Type of light | | visible laser light 650 nm |
| Extraneous light on the object | [klx] | max. 8 |
| Dimensions | [mm] | 56 x 18,2 x 46,5 |
| Operating voltage | [V DC] | 10...30 |
| Switching status indication | LED | yellow |
| Operation | LED | green |
| Distance value | | 3-digit alphanumeric display |
| Output function | | OUT1: NO<br>OUT2: NC |
| Current rating | [mA] | 2 x 100 |
| Protection rating, protection class | | IP 65,IP 67<br>II |
| Short-circuit protection, pulsed | | • |
| Reverse polarity protection / overload protection | | • / • |
| Ambient temperature | [°C] | -25...60 |
| Material | housing / plug adapter<br>front pane / LED window<br>bezel<br>operator interface | PA<br>PMMA<br>stainless steel<br>TPU |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC001** |
| | Socket, M12, 5 m black, PUR cable | **EVC002** |
|  | Socket, M12, 2 m black, PUR cable | **EVC004** |
| | Socket, M12, 5 m black, PUR cable | **EVC005** |

## Power supplies

| Type | Description | Order no. |
|---|---|---|
|  | Metal housing, 24 V DC, 3.3 A | **DN4011** |

# PMD*Line* M30: This photoelectric sensor is all set


## OID with easy-turn concept – photoelectric sensor with time of flight measurement (PMD)

- **Reliable background suppression and colour-independent detection**
- **Simple switch point setting by rotatable setting ring (lock function)**
- **Shiny surfaces are detected reliably (e.g. stainless steel)**
- **Any sensor position, even an oblique angle to the object**
- **IO-Link integrated, e.g. for reading the actual value**


**Time of flight measurement for standard sensors**

The OID with time of flight measurement (PMD = photonic mixer device) combines the following advantages: long ranges, reliable background suppression, visible red light and high excess gain. In the same price range as standard sensors, it is a clever alternative.

**Easy handling**

The switch point can be set easily by turning the setting ring (easy turn). A scale shows the distance set. The switch point can thus be set before installation.

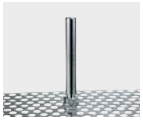
**Any surface and any mounting position**

Shiny, matt, dark or light objects of any colour: the OID features reliable background suppression. The unit allows any angle of incidence and thus flexible mounting positions. This simplifies installation and saves costs.

| Measuring range [mm] | Background suppression [m] | Switching frequency [Hz] | Hysteresis [%] | Spot Ø at max. range [mm] | Current consumption [mA] | Unit of measurement | Order no. |
|---|---|---|---|---|---|---|---|
| **Photoelectric distance sensor, laser protection class 2 · M12 connector, complementary** | | | | | | | |
| 30...2000 | ...20 | 11 | < 5* | < 5 | < 75 | cm / inch | **OID200** |
| 30...2000 | ...20 | 11 | < 5* | < 5 | < 75 | cm | **OID201** |

* black (6 % remission) in case of max. range

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Angle bracket for type M30, stainless steel | **E10737** |
|  | Mounting clamp, with end stop for types M30, PC | **E11049** |
|  | Mounting clamp for types M30, PTB | **E10077** |
|  | Mounting set Ø 30.2 mm, clamp mounting, aluminium profile | **E20875** |
|  | Mounting set Ø 30.2 mm, clamp mounting | **E20873** |
| | Mounting set Ø 30.2 mm, clamp mounting, high-grade stainless steel | **E20874** |
|  | Rod, 100 mm, Ø 12 mm, M10 thread, stainless steel | **E20938** |
|  | Cube for mounting on an aluminium profile, M10 thread, diecast zinc | **E20951** |
|  | Memory plug, parameter memory for IO-Link sensors | **E30398** |
|  | IO-Link interface, current consumption from USB port | **E30396** |
|  | LINERECORDER SENSOR, software for parameter setting and set-up of IO-Link sensors | **ZGS210** |

| Common technical data | | |
|---|---|---|
| Type of light | | visible laser light 650 nm |
| Extraneous light on the object | [klx] | max. 8 |
| Dimensions | | M30 x 90 mm |
| Operating voltage | [V DC] | 10...30 |
| Switching status indication | LED | yellow |
| Operation | LED | green |
| Switch point (setting) | | radial setting ring |
| Output function | | OUT1: NO<br>OUT2: NC |
| Current rating | [mA] | 2 x 100 |
| Protection rating, protection class | | IP 65,IP 67<br>III |
| Short-circuit protection, pulsed | | • |
| Reverse polarity protection / overload protection | | • / • |
| Ambient temperature | [°C] | -25...60 |
| Material | housing<br>front pane | stainless steel, PBT, PC, FPM<br>PMMA |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC001** |
| | Socket, M12, 5 m black, PUR cable | **EVC002** |
|  | Socket, M12, 2 m black, PUR cable | **EVC004** |
| | Socket, M12, 5 m black, PUR cable | **EVC005** |

## Power supplies

| Type | Description | Order no. |
|---|---|---|
|  | Metal housing, 24 V DC, 3.3 A | **DN4011** |

# Precision for all inclinations


## Sensor for precise measurement of angles of inclination on X and Y axes

- **High precision across the total angular range in two axes**
- **Zero point, counting direction and limit frequency adjustable**
- **Extremely low temperature drift (± 0.002 °/K)**
- **M12 connector, CAN in and CAN out**
- **Fully CAN-compatible**


**Precise in all positions**

The new ifm type JN inclination sensors provide high measurement accuracy across the whole angular range with angles of inclination in X and Y axes.

The 2-axis inclination sensors with CANopen interface and bus capability are designed for levelling of mobile machinery (2-axis position detection and zero-point levelling for mobile applications) or automatic adjustment of solar panels, for example.

## Flexible, precise, reliable

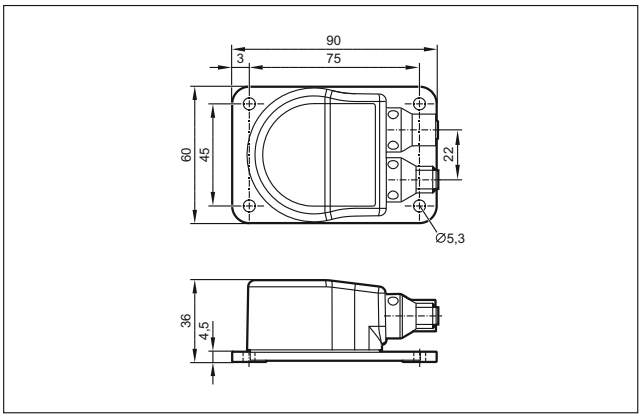
Since zero point, direction of counting (+/-180° or 0...360°) and limit frequency can be set for a stable output signal (20, 10, 5, 1, 0.5 Hz), this innovative product can be adapted precisely to your application. Very low temperature drift across the whole temperature range (-40...85 °C) provides unrivalled reliability.

## Ideal for different applications

The sensors allow complete CAN integration according to the CANopen CiA DS-301 communication profiles and profile CiA DSP-410.

They are connected via an M12 connector. The terminating resistor can be enabled.
The sensors provide the signals as angle to the vertical or Euler angle.

## Dimensions




## Technical data JN2100, JN2101

| | | | |
|---|---|---|---|
| Operating voltage | [V DC] | 10...30 DC | |
| Reverse polarity protection | | • | |
| | | JN2100 | JN2101 |
| Angular range | | ± 180° | ± 45° |
| Resolution | | 0.05° | 0.01° |
| Accuracy | | ≤ ± 0.5° | ± 0.1° |
| Repeatability | | ≤ ± 0.1° | ≤ ± 0.05° |
| Temperature coefficient | [°/K] | ≤ ± 0.002° | |
| Ambient temperature | [°C] | -40...85 | |
| Protection | | IP 65 / IP 68 / IP 69K | |
| Interface | | CANopen CiA DS 301 / device profile CiA DSP-410 | |
| Limit frequency | [Hz] | Adjustable: 20, 10, 5, 1, 0.5 | |
| Number of measurement axes | | 2 | |
| Housing material | | Diecast zinc nickel-plated | |
| Connection | | 2 x M12 connector | |

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Adapter cable for CAN devices with M12 connector (5 pole) | EC2062 |

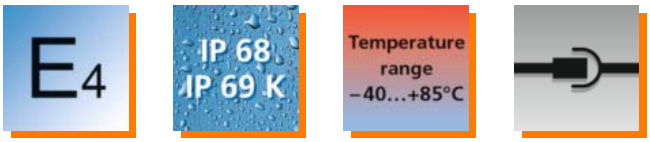
## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | EVM039 |
| | Socket, M12, 10 m black, PUR cable | EVM041 |
|  | Socket, M12, 2 m black, PUR cable | EVM036 |
| | Socket, M12, 10 m black, PUR cable | EVM038 |
|  | Jumper, M12, 5 m, black, PUR cable | EVC069 |
| | | |
|  | Jumper, M12, 5 m, black, PUR cable | EVC059 |
| | | |

# Robust camera system O2M for mobile machines


## For universal use with analogue video output

- **Encapsulated, weather-proof aluminium housing with IP 68 / IP 69K**
- **High shock and vibration resistance**
- **Temperature-controlled lens heating**
- **Automatic brightness adjustment**
- **E4 type approval**




**Heavy-duty universal cameras**

Work area and rear area monitoring are becoming more and more important for mobile machines. The O2M camera system with analogue video output (PAL) is designed for particularly difficult conditions and excels thanks to its pressure-resistant housing and a light sensitivity of < 0.25 lux.

The new O2M camera system can, for instance, be directly connected to the graphic PDM360 dialogue modules with colour display and analogue interface. This makes it possible to use the dialogue module not only to display machine information but also images of up to two cameras. Consequently, no separate monitor is needed.

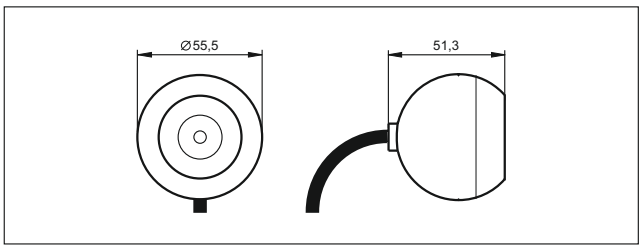
| Type | Type of sensor | Horizontal x vertical PAL resolution [pixels] | Angle of aperture [°] | Mirror function | Order no. |
|---|---|---|---|---|---|
| **CMOS camera · lens heating · 0.5 m connection cable with M16 connector** | | | | | |
|  | 1/4" 4:3 VGA CMOS Image sensor Color | 640 x 480 | 78 | – | **O2M200** |
| | 1/4" 4:3 VGA CMOS Image sensor Color | 640 x 480 | 78 | Integrated | **O2M201** |
| | 1/4" 4:3 VGA CMOS Image sensor Color | 640 x 480 | 115 | – | **O2M202** |
| | 1/4" 4:3 VGA CMOS Image sensor Color | 640 x 480 | 115 | Integrated | **O2M203** |

## Accessories

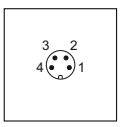
| Type | Description | Order no. |
|---|---|---|
| **Mounting accessories** | | |
|  | Protective metal cover | **E2M212** |
|  | Dome fixture | **E2M211** |
|  | Vibration damper set | **E2M213** |
|  | Replacement fixture | **E2M210** |
| **PDM360 NG, 7" colour display** | | |
|  | Touch screen, 9 function keys, navigation keys 2 x analogue video input | **CR1082** |
| | 9 function keys, navigation keys, 2 x analogue video input | **CR1085** |
|  | 8 function keys, 2 x analogue video input | **CR1083** |
| | 9 function keys, encoder, 2 x analogue video input | **CR1084** |
| **Connection cable** | | |
| | M16 plug to M16 socket, 5 m black, PVC cable | **E2M203** |
| | M16 plug to M16 socket, 11 m black, PVC cable | **E2M204** |
| | M16 plug to M16 socket, 16 m black, PVC cable | **E2M205** |
| **Adapter cables** | | |
| | M12 plug to M16 socket, black, PVC cable. To connect a camera to the PDM NG | **E2M200** |
| | M12 plug to 2 x M16 socket, black, PVC cable. To connect two cameras to the PDM NG | **E2M201** |

| Common technical data | | |
|---|---|---|
| Operating voltage | [V DC] | 8...32 |
| Current consumption | [mA] | < 150 (incl. lens heating) |
| Shock resistance | [g] | 50 |
| Vibration resistance | [Grms] | 15.3 |
| Light sensitivity | [lux] | < 0.25 |
| Dynamic range | [db] | > 70 |
| Image repetition rate | [fps] | 50 / interlaced PAL 25 |
| Protection | | IP 68 / IP 69K |
| Ambient temperature | [°C] | -40...85 |
| Storage temperature | [°C] | -40...125 |
| Housing material | Front pane | Aluminium, black anodised |
| Front lens material | | Float glass, chemically hardened, reinforced |
| Connection | | Connection cable 0.5 m with M16 connector |
| Standards and tests (extract) | | CE, E4 (RL 2009/19/EG) |

## Dimensions




## Wiring diagram




M16 connector
Pin 1: Coax cable core (video signal)
Pin 2: Coax screen (video GND)
Pin 3: U+
Pin 4: 0 V

# An update for the bestseller: PN pressure sensor with a new look


## Even easier to use and with improved visualisation

- **Clearly indicate the acceptable ranges: programmable red / green display**
- **The process connection can be rotated for optimum alignment**
- **Fast switch point setting by using three pushbuttons**
- **Visualisation of the switching states by clearly visible LEDs**
- **Can still be identified after many years: captive laser labelling on stainless steel housing**


**The overall package makes the difference**

After 20 years of successful ifm pressure sensor history, the new generation of PN sensors was developed in close coordination with the users. Its modern and user-friendly design stands out. High overload protection, IP 67 and the captive laser labelling make the new PN sensors your perfect partner even in the most harsh environments.

**Everything at a glance**

Although the housing size has remained unchanged, the display size has been increased once again and the two switching status LEDs on the sensor head can be clearly seen from all sides. The display can be switched from the indication of "red" to an alternating indication of "red - green". So, switching states can be highlighted or an independent colour window can be created.

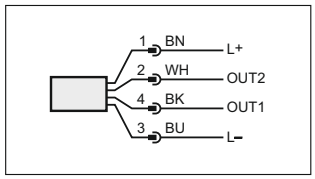
**Flexible**

Once fitted, rotate the sensor in any direction: The new PN allows free rotation as well as any mounting position using angle brackets as an accessory.

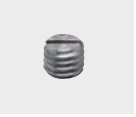
| Measuring range relative pressure [bar] | $P_{overload}$ max. [bar] | $P_{burst}$ min. [bar] | Set point SP1/SP2 [bar] | Reset point rP1/rP2 [bar] | Step increment | Order no. G 1/4 female | Order no. G 1/4 male |
|---|---|---|---|---|---|---|---|
| **M12 connector · output function 2 x NO/NC programmable** | | | | | | | |
| 0...400 | 800 | 1700 | 4...400 | 2...398 | 2 | **PN7070** | **PN7570** |
| 0...250 | 500 | 1200 | 2...250 | 1...249 | 1 | **PN7071** | **PN7571** |
| 0...100 | 300 | 650 | 1...100 | 0.5...99.5 | 0.5 | **PN7092*** | **PN7592*** |
| 0...25 | 150 | 350 | 0.2...25 | 0.1...24.9 | 0.1 | **PN7093** | **PN7593** |
| 0...10 | 75 | 150 | -0.9...10 | -0.95...9.95 | 0.05 | **PN7094** | **PN7594** |
| 0.2...5 | 20 | 50 | 0.02...2.5 | 0.1...2.49 | 0.01 | **PN7096** | **PN7596** |
| 0...1 | 10 | 30 | 0.01...1 | 0.005...0.995 | 0.005 | **PN7097** | **PN7597** |
| -1...1 | 20 | 50 | -0.97...1 | -0.98...0.99 | 0.01 | **PN7099** | **PN7599** |

*available from 07/2014

## Wiring diagram




## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Memory plug, parameter memory for IO-Link sensors | **E30398** |
|  | IO-Link interface, current consumption from USB port | **E30396** |
|  | Damping screw, G 1/4 female | **E30419** |
|  | Damping screw, G 1/4 male | **E30057** |

## Common technical data

| Type of pressure: relative pressure Liquids and gases | | |
|---|---|---|
| Operating voltage | [V DC] | 18...30 |
| Current rating | [mA] | 200 (up to 60 ° environment) |
| **Accuracy / deviation (in % of the span) turn down 1:1** | | |
| Deviation of the switch point | | < ± 0.5 |
| Linearity error | | < ± 0.25 (BFSL)<br>< ± 0.5 (LS) |
| Repeatability | | < ± 0.1 |
| **Temperature coefficients (TEMPCO) in the temperature range 0 ... 80 °C (in % of the span per 10 K)** | | |
| Greatest TEMPCO of zero | | < ± 0.2 |
| Greatest TEMPCO of the span | | < ± 0.2 |
| Switching frequency | [Hz] | ≤ 170 |
| Medium temperature | [°C] | -25...80 |
| Protection | | IP 67 |
| Shock resistance | [g] | 50 |
| Vibration resistance | [g] | 20 |
| Communication interface | | IO-Link 1.1 COM2 slave; 38.4 kbaud |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC001** |
| | Socket, M12, 5 m black, PUR cable | **EVC002** |
|  | Socket, M12, 2 m black, PUR cable | **EVC004** |
| | Socket, M12, 5 m black, PUR cable | **EVC005** |

# Small and cost-optimised: PT / PU pressure transmitters


## Generate a precise analogue signal even where space is at a premium

- **Compact design (AF19) with process connection G 1/4**
- **Fast reaction: 1 millisecond response time**
- **Measuring accuracy < ± 0.5 %, repeatability < ± 0.05 %**
- **Easy connection via M12 connector**
- **Robust low-cost solution with welded stainless steel housing**

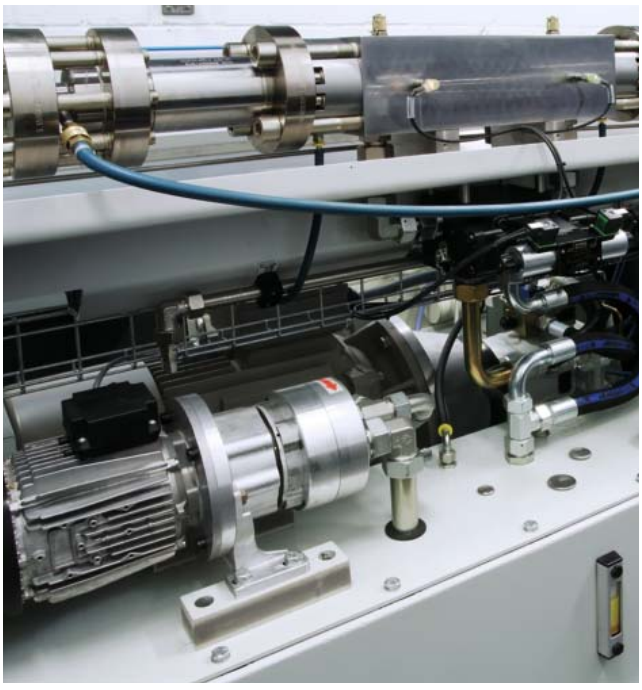

### Miniaturisation for industrial applications

The new PT/PU pressure sensors have a thin film measuring cell directly welded with the process connection. This technology guarantees high accuracy in a very compact housing with only 19 mm across flats at a cost-optimised price / performance ratio.

### Applications

With the sealless design of the process connection the sensors can be used not only in hydraulic applications but also in inert gases. In industrial applications the laser labelling on the housing is also advantageous. Even in adverse environmental conditions, the sensor remains permanently identifiable. Another advantage: the fast output – with analogue transmission, the signal follows the pressure value within one millisecond.

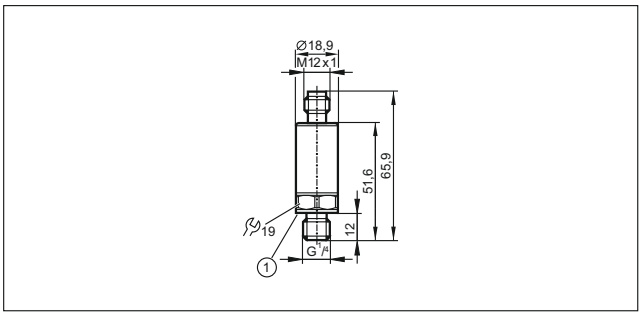
The high vibration and shock resistance as well as protection rating IP 67 or IP 69K complete the list of requirements for use in industrial applications.



Pressure monitoring on a high-speed pump

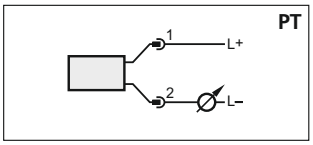
TOP PRODUCTS

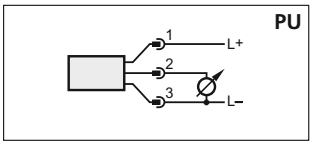
### Dimensions




1) FKM seal / DIN 3869-14

### Wiring diagram




### Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Adapters; G 1/4 - G 1/2, High-grade stainless steel (316Ti/1.4571) | E30135 |

### Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | EVC001 |
| | Socket, M12, 5 m black, PUR cable | EVC002 |
|  | Socket, M12, 2 m black, PUR cable | EVC004 |
| | Socket, M12, 5 m black, PUR cable | EVC005 |

| Measuring range Relative pressure [bar] | $P_{overload}$ max. [bar] | $P_{burst}$ min. [bar] | Order no. |
|---|---|---|---|
| **Output function 4...20 mA** | | | |
| 0...6 | 15 | 200 | PT5415 |
| 0...10 | 25 | 300 | PT5404 |
| 0...16 | 40 | 450 | PT5414 |
| 0...25 | 60 | 600 | PT5403 |
| 0...40 | 80 | 800 | PT5443 |
| 0...100 | 200 | 1000 | PT5402 |
| 0...160 | 320 | 1100 | PT5412 |
| 0...250 | 500 | 1200 | PT5401 |
| 0...400 | 800 | 1700 | PT5400 |
| 0...600 | 1200 | 2400 | PT5460 |
| **Output function 0...10V** | | | |
| 0...6 | 15 | 200 | PU5415 |
| 0...10 | 25 | 300 | PU5404 |
| 0...16 | 40 | 450 | PU5414 |
| 0...25 | 60 | 600 | PU5403 |
| 0...40 | 80 | 800 | PU5443 |
| 0...100 | 200 | 1000 | PU5402 |
| 0...160 | 320 | 1100 | PU5412 |
| 0...250 | 500 | 1200 | PU5401 |
| 0...400 | 800 | 1700 | PU5400 |
| 0...600 | 1200 | 2400 | PU5460 |

| Common technical data | | |
|---|---|---|
| Operating voltage | PT [V DC]<br>PU [V DC] | 8.5...36<br>16...36 |
| Reverse polarity protection | | • |
| **Accuracy / deviation (in % of the span)** | | |
| Linearity error | | < ± 0.5 |
| Linearity | | < ± 0.1 BFSL / < ± 0.2 LS |
| Hysteresis | | < ± 0.2 |
| Repeatability | | < ± 0.05 |
| Long-term stability | | < ± 0.1 |
| **Temperature coefficients (TEMPCO) in the temperature range -40 ... 90 °C (in % of the span per 10 K)** | | |
| TEMPCO of zero + span | | < ± 0.1 (-25...90°C)<br>< ± 0.2 (-40...25°C) |
| Medium temperature | [°C] | -40...90 |
| Protection | | IP 67 / IP 69K |
| Materials wetted parts | | FKM, high-grade stainless steel (17-4 PH/1.4542) |
| Step response time | [ms] | 1 |

# A quantum leap in flow rate measurement technology


## Inline flow sensor for precise measurement of liquids up to 600 l/min

- **Suited for liquids with a conductivity from 20 µS/cm**
- **Variable use for different flow directions**
- **With integrated empty pipe detection and simulation mode**
- **Also available with EPDM seal for drinking water applications**
- **With indication of volumetric flow quantity, total quantity and temperature**

efector® mid

MID Technology | IO-Link | KTW | Broad measurement dynamics

### Compact and low cost

ifm makes it possible: efector mid – a volumetric flow sensor up to 600 l/min, with electronics and evaluation unit in one of the most compact housings. It is not only more compact but also less expensive than comparable sensors.

### Three functions

The user monitors the volumetric flow quantity, the total quantity as well as the temperature with only one unit.

### Easy handling

During set-up, the efector mid scores with easy, intuitive handling via three buttons directly on the unit or via the IO-Link interface. This allows direct use of the sensor in the field.

### Data processing

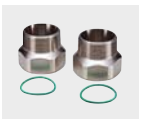
Analogue, binary and pulse and frequency outputs offer various options to process the measured data.

Magnetic-inductive volumetric flow sensor for measuring the water quantity in a filtration system.

**Application: Machine tools, solar and water industries.**
**For conductive liquids (conductivity: ≥ 20 µS/cm / viscosity: < 70 mm²/s at 40 °C)**

| Measuring range Flow [l/min / gpm] | Pulse value [l...m³] | Response time Flow [s] | Accuracy Flow | Process connection | Order no. |
|---|---|---|---|---|---|
| **M12 connector · electrical design DC PNP/NPN · FKM seal** | | | | | |
| 5...300 | 0.1...300,000 | < 0.3 (dap = 0) | ± (0.8 % MV + 0.5 % VMR) | G 2 | **SM9000** |
| 5...600 | 0.1...600,000 | < 0.3 (dap = 0) | ± (0.8 % MV + 0.5 % VMR) | G 2 | **SM2000** |
| **M12 connector · electrical design DC · output function 2 x analogue (4...20 mA) · FKM seal** | | | | | |
| 5...300 / 1.3...79.3 | – | < 0.3 (dap = 0) | ± (0.8% MW + 0.5% MEW) | G 2 | **SM9004** |
| 5...600 / 1.3...158.5 | – | < 0.3 (dap = 0) | ± (0.8% MW + 0.5% MEW) | G 2 | **SM2004** |
| **M12 connector · electrical design DC PNP/NPN · EPDM seals** | | | | | |
| 5...300 | 0.1...300,000 | < 0.3 (dap = 0) | ± (0.8 % MV + 0.5 % VMR) | G 2 | **SM9100** |
| 5...600 | 0.1...600,000 | < 0.3 (dap = 0) | ± (0.8 % MV + 0.5 % VMR) | G 2 | **SM2100** |

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Memory plug, parameter memory for IO-Link sensors | **E30398** |
|  | Adapter, G 2 – Victaulic 1,5", stainless steel (316Ti/1.4571) | **E40227** |
| | Adapter, G 2 – 1½" NPT, stainless steel (316Ti/1.4571) | **E40229** |
| | Adapter, G 2 – G 1½, stainless steel (316Ti/1.4571) | **E40230** |
|  | Adapter, G 2 – 2" NPT, stainless steel (316Ti/1.4571) | **E40228** |
| | Adapter, G 2 – R 2" male, stainless steel (316Ti/1.4571) | **E40231** |
|  | Flange adapter, G 2, stainless steel (304/1.4301) / (316Ti/1.4571) | **E40240** |
|  | Grounding clamp, stainless steel (316L/1.4404) | **E40234** |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | M12 socket, 2 m black, PUR cable | **EVC001** |
| | M12 socket, 5 m black, PUR cable | **EVC002** |
|  | M12 socket, 2 m black, PUR cable | **EVC004** |
| | M12 socket, 5 m black, PUR cable | **EVC005** |

## Further technical data

| Type SM | | |
|---|---|---|
| Operating voltage | [V] | 18...32 DC |
| Current consumption | [mA] | < 150 |
| Measuring range temperature | [°C] | -20...80 |
| Short-circuit protection, pulsed | | • |
| Reverse polarity / overload protection | | • / • |
| Current rating SM9000, SM2000 SM9100, SM2100 | [mA] | 2 x 250 |
| **Output function** SM9000, SM2000 SM9100, SM2100 | OUT1 | normally open / normally closed programmable or pulse or frequency or empty pipe monitoring or IO-Link |
| | OUT2 | normally open / normally closed programmable or analogue (4...20 mA / 0...10 V, scalable) or empty pipe monitoring |
| Protection | | IP 65, IP 67 |
| Ambient temperature | [°C] | -10...60 |
| Medium temperature | [°C] | -10...70 |
| Pressure resistance | [bar] | 16 |
| Housing materials | | high-grade stainless steel (316L/1.4404); PC (polycarbonate); FKM; PBT-GF20 |
| Materials (wetted parts) | | PEEK Victrex 150 GL30, stainless steel (316Ti/1.4571), Hastelloy (2.4610), FKM, Centellen |
| Dimensions (H x W x D) | [mm] | 116,8 x 200 x 102,8 |

# Hygienic point level sensor perfectly suppresses deposits


## Reliable and fast alternative to tuning forks

- **Flexible installation independent of the orientation**
- **Shock and vibration resistant in a robust stainless steel housing**
- **Factory set for simple “plug & play”**
- **Differentiation of media by switch point setting**
- **Hygienic design with maintenance-free sealing concept**

**Level under control**

The LMT family reliably monitors the level in storage tanks or protects pumps against running dry. The different lengths and process connections allow application-specific and orientation-independent installation.

**Versatile sensor for all media**

The LMT can be set to almost any liquid or viscous media and bulk materials.

The distinction of two media is possible due to the two switching outputs which can be set independently. The parameters can be set via IO-Link and USB interface accessory E30396.

**Food-grade**

The sensor with its high-quality housing materials such as high-grade stainless steel (316L / 1.4404) and PEEK meets all requirements for hygienic areas. This includes approvals such as EHEDG, 3A and also FDA.

The LMT point level sensor protects the pump from running dry.

| Process connection | Installation length [mm] | Approval | Medium temperature water-based media [°C] | Medium temperature oils, fats, bulk materials [°C] | Order no. |
|---|---|---|---|---|---|
| **Medium: Aqueous media<br>M12 connection · output function 2 x NO/NC programmable · 4-wire DC PNP · IO-Link 1.1** | | | | | |
| G 1/2 | 12 | EHEDG, FDA, 3A | 0...85 | 0...100 | **LMT100** |
| G 1/2 | 38 | EHEDG, FDA, 3A | -20...85 | -20...100 | **LMT102** |
| G 3/4 | 28 | EHEDG, FDA | -20...85 | -20...100 | **LMT202** |
| G 1 | 38 | EHEDG, FDA | -20...85 | -20...100 | **LMT302** |
| G 1/2 | 153 | EHEDG, FDA | -20...85 | -20...100 | **LMT104** |
| G 1/2 | 253 | EHEDG, FDA | -20...85 | -20...100 | **LMT105** |
| **Medium: Oils, fats, powders<br>M12 connection · output function 2 x NO/NC programmable · 4-wire DC PNP · IO-Link 1.1** | | | | | |
| G 1/2 | 12 | EHEDG, FDA, 3A | 0...85 | 0...100 | **LMT110** |
| **Medium: Sugary media with low water content<br>M12 connection · output function 2 x NO/NC programmable · 4-wire DC PNP · IO-Link 1.1** | | | | | |
| G 1/2 | 12 | EHEDG, FDA, 3A | -40...85 | -40...100 | **LMT121** |

## Accessories

| Type | Description high-grade stainless steel | Order no. |
|---|---|---|
|  | Clamp adapter<br>G 1/2 female – Clamp 1"– 1.5" | **E33401** |
| | Clamp adapter<br>G 1/2 female – Clamp 2" | **E33402** |
|  | Welding adapter ball, G 1/2 | **E30055** |
| | Welding adapter collar, G 1/2 | **E30056** |
|  | T-piece, DN 25 | **E43316** |
| | T-piece, DN 40 | **E43317** |
| | T-piece, DN 50 | **E43318** |
|  | Welding adapter, cylindrical,<br>for tanks, G 1/2 | **E43300** |
| | Welding adapter, cylindrical,<br>for pipes, G 1/2 | **E4330** |
|  | Screw-in adapter<br>G 1/2 female – G 3/4 male | **E43302** |
| | Screw-in adapter<br>G 1/2 female – G 1 male | **E43303** |
| | Screw-in adapter<br>G 1/2 female – 3/4 NPT | **E43313** |
|  | Clamp adapter,<br>G 1/2 female – Varivent D50 | **E43306** |
| | Clamp adapter,<br>G 1/2 female – Varivent D68 | **E43307** |
|  | Clamp adapter with leakage port,<br>G 1/2 female – Clamp 1"– 1.5" (3-A) | **E43311** |
| | Clamp adapter with leakage port,<br>G 1/2 female – Clamp 1"– 2" (3-A) | **E43312** |
|  | Welding adapter G 1/2, long design for deeper installation | **E43319** |
| | | |

| Further technical data | | |
|---|---|---|
| Operating voltage | [V] | 18...30 DC |
| Current rating | [mA] | 100 |
| Medium temperature | [°C] | 150 (max. 1 h) |
| Housing materials | | PEEK,<br>high-grade stainless steel (316L/1.4404),<br>PA12, FPM |
| Materials wetted parts | | PEEK,<br>high-grade stainless steel (316L/1.4404), FPM |
| Protection | | IP 68 / IP 69K, III |
| Shock resistance | [g] | 50 |
| Vibration resistance | [g] | 20 |
| Ambient temperature | [°C] | -40...85 |
| EMC<br>Closed tanks:<br>Open tanks: | | EN 6100-6-2:2005<br>EN 6100-6-3:2006<br>EN 6100-6-4:2006 |

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | IO-Link interface for parameter setting and analysis of units with DTM specification, current consumption via USB port: max. 500 mA | **E30396** |
|  | Memory plug, parameter memory for IO-Link sensors | **E30398** |
|  | LINERECORDER SENSOR,<br>software for parameter setting and set-up of IO-Link sensors | **ZGS210** |

# Small but effective: temperature transmitter in compact housing


## Compact temperature transmitter with excellent response time and IO-Link 1.1

- **Space-saving in all installation positions**
- **LED for visualisation of the operating status**
- **Fast response time: T05 / T09 = 1 s / 3 s**
- **Pressure resistant up to 400 bar**
- **Different installation lengths from 25...150 mm**


**Versatile**

The TA type temperature sensor is a universal transmitter with a 4...20 mA current output which can be scaled over the -50 to 150 °C measuring range. Scaling is done simply via the integrated IO-Link interface

**Flexible**

The compact design, the integrated process connections and a multitude of probe lengths enable particularly simple installation.

**Transparent**

An integrated LED clearly signals the readiness for operation.

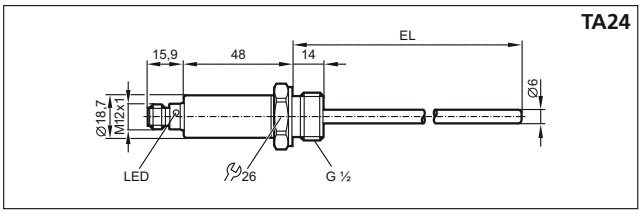
**Fast and precise**

A high level of accuracy is achieved using a class A accuracy Pt1000 sensor and factory calibration.
In addition, ifm's tried and tested film technology ensures excellent dynamic response times. So this sensor is suited for all highly precise and rapid processes.

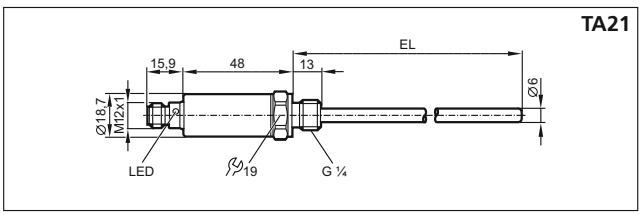
TOP PRODUCTS

## Dimensions

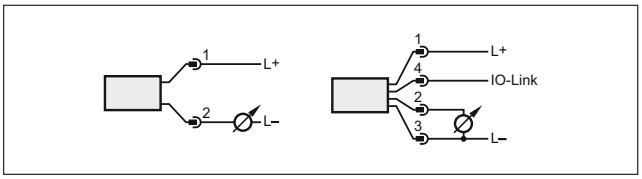
TA24




TA21




## Wiring diagram




## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | IO-Link interface for parameter setting and analysis of units with DTM specification, current consumption via USB port: max. 500 mA | **E30396** |
|  | Memory plug, parameter memory for IO-Link sensors | **E30398** |
|  | LINERECORDER SENSOR, software for parameter setting and set-up of IO-Link sensors | **ZGS210** |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC001** |
| | Socket, M12, 5 m black, PUR cable | **EVC002** |
|  | Socket, M12, 2 m black, PUR cable | **EVC004** |
| | Socket, M12, 5 m black, PUR cable | **EVC005** |

| Nominal length [mm] | Pressure resistance [bar] | Order no. |
|---|---|---|
| **Process connection G ½ Temperature range (scaled 4...20 mA) -50...150 °C** | | |
| 30 | 300 | **TA2405** |
| 50 | 300 | **TA2415** |
| 100 | 160 | **TA2435** |
| 150 | 160 | **TA2445** |
| **Process connection G ¼ Temperature range (scaled 4...20 mA) -50...150 °C** | | |
| 25 | 400 | **TA2105** |
| 50 | 400 | **TA2115** |
| 100 | 160 | **TA2135** |
| 150 | 160 | **TA2145** |

| Further technical data | | |
|---|---|---|
| Operating voltage | [V DC] | 18...32 |
| Reverse polarity / overload protection | | • / • |
| Measuring element | | Pt1000, class A |
| Response dynamics T05 / T09 | | 1 s / 3 s |
| Protection | | IP 67, IP 68, IP 69K / III |
| Measuring range | [°C] | -50...150 |
| Accuracy | [K] | ± 0.3 + (± 0.1 % MS) |
| Ambient temperature | [°C] | -25...80 |
| IO-Link revision | | 1.1 |
| Materials (wetted parts) | | high-grade stainless steel (316L/1.4404) |

# Robust infrared temperature sensors for hot objects


## Precise and reliable measurement, with display and operating keys

- **4 to 20 mA and switching output, freely programmable**
- **Adjustable for different target materials**
- **Scratch-resistant precision lenses**
- **Easy handling via buttons and display**
- **Test function: activated on the sensor or remotely**


**Non-contact temperature measurement**

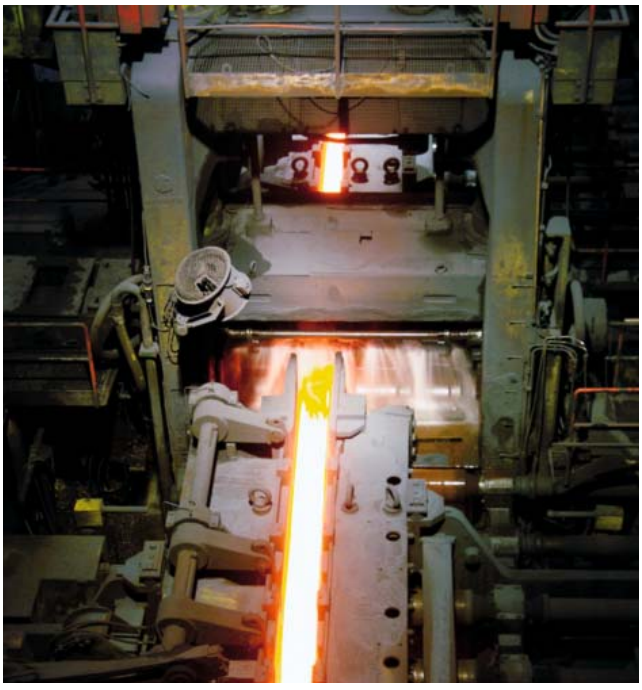
For the precise temperature measurement of particularly hot objects or objects which are difficult to access, e.g. in the steel, plastics or glass industries. The measured value is provided via the analogue output. In addition, a switching output is available.

**Robust and precise**

All four variants feature a high-quality precision lens – the prerequisite for precise measurement. The lens withstands the rough environments for example in steelworks and reduces the influence of external light to a minimum.

**Easy setting and handling**

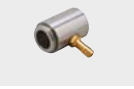
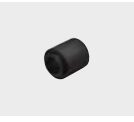
To enable precise temperature measurement, the degree of emission can be quickly and easily set using the pushbuttons and display. The current temperature of the object to be measured is displayed during operation.



Temperatures must be precisely measured when pressing rails.

| Design | Measuring range [°C] | Wave length range [µm] | Measurement uncertainty (for e = 1, Tu = 23 °C) | Lens material | Response time [ms] | Order no. |
|---|---|---|---|---|---|---|
| **M30, 1 x analogue, 1 x switching output, NO / NC programmable** | | | | | | |
| IR temperature sensor | 0…1000 | 8...14 | 1 % of the measured value, minimum 2 K | crystal lens with anti-reflex coating | < 100 | **TW2000** |
| IR temperature sensor | 250...1600 | 1.0...1.7 | 0.5 % of the measured value, minimum 4 K | tempered optical glass | < 2 | **TW2001** |
| IR temperature sensor | 500...2500 | 0.78...1.06 | 0.3 % of the measured value, minimum 4 K | tempered optical glass | < 2 | **TW2002** |
| IR temperature sensor with fibre optic and measuring head | 300...1600 | 1.0...1.7 | 0.5 % of the measured value, minimum 4 K | tempered optical glass | < 2 | **TW2011** |

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Air purge | **E35063** |
|  | Cooling jacket | **E35064** |
|  | Mounting bracket | **E35065** |
|  | Protective tube | **E35066** |
|  | Heat insulation | **E35067** |

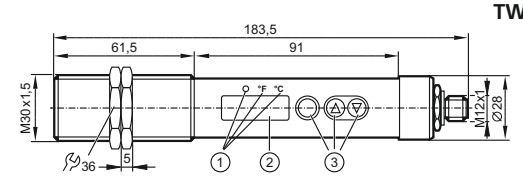
## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | M12 socket, shielded, 2 m black, PUR cable | **EVC547** |
| | M12 socket, shielded, 5 m black, PUR cable | **EVC548** |
|  | M12 socket, shielded, 2 m black, PUR cable | **EVC544** |
| | M12 socket, shielded, 5 m black, PUR cable | **EVC545** |

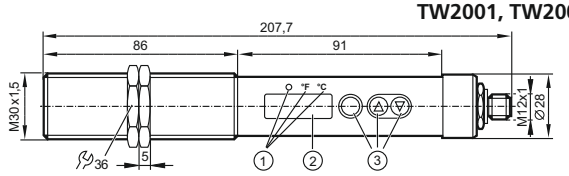
| Common technical data | | |
|---|---|---|
| Operating voltage | [V DC] | 18...32 |
| Current consumption | [mA] | ≤ 50 |
| Ambient temperature | [°C] | 0...65 |
| Protection | | IP 65 |
| Reverse polarity protection | | • |
| Short-circuit protection | | • |

## Dimensions

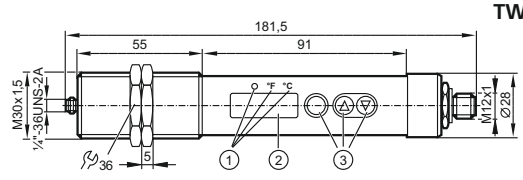
**TW2000**




**TW2001, TW2002**




**TW2011**




1) LEDs (display unit / switching status)
2) 7-segment LED display (4 digits)
3) Programming buttons

# Temperature transmitter with display and IO-Link


## First transmitter with display and IO-Link for food applications

- **Bright 4-digit LED display for optimum readability**
- **Fast response time T05/09 = 1/3 s**
- **Pre-scaled measuring ranges, IO-Link 1.1 programmable**
- **Available in various probe lengths from 30...250 mm**
- **Hygienic and robust design: high-grade stainless steel (316L / 1.4404) and IP 69K**

### TD temperature transmitters

The TD series temperature transmitters are distinguished by a compact, hygienic design with integrated process connections and a display for local indication of the temperature.

### Easy installation and set-up

The integrated Tri-Clamp® and G1/2" process connections allow quick and easy installation. No complex set-up is required because the transmitters are supplied with a pre-scaled measuring range. For special applications the temperature range can be scaled via IO-Link 1.1.

### Robust and durable

Protected to IP 69K standards and featuring a fully welded stainless steel housing, the transmitters are designed to operate in particularly harsh applications.

| Nominal length | Order no. Factory setting | |
|---|---|---|
| [mm] | 0...100 °C | -10...150 °C |
| **Process connection 1.5" Tri-clamp • 3A, FDA** | | |
| 30 | TD2807 | TD2801 |
| 50 | TD2817 | TD2811 |
| 100 | TD2837 | TD2831 |
| 150 | TD2847 | TD2841 |
| **Process connection 2" Tri-clamp • 3A, FDA** | | |
| 30 | TD2907 | TD2901 |
| 50 | TD2917 | TD2911 |
| 100 | TD2937 | TD2931 |
| 150 | TD2947 | TD2941 |
| **Process connection G 1/2 BSPP hygienic • EHEDG, FDA** | | |
| 30 | TD2507 | TD2501 |
| 50 | TD2517 | TD2511 |
| 100 | TD2537 | TD2531 |
| 150 | TD2547 | TD2541 |
| **Process connection Ø 6 mm • EHEDG, FDA** | | |
| 50 | TD2217 | TD2211 |
| 100 | TD2237 | TD2231 |
| 150 | TD2247 | TD2241 |
| 250 | TD2267 | TD2261 |

### Accessories

| Type | Description | Order no. |
|---|---|---|
|  | IO-Link interface for parameter setting and analysis of units with DTM specification, current consumption via USB port: max. 500 mA | E30396 |
|  | Memory plug, parameter memory for IO-Link sensors | E30398 |
|  | LINERECORDER SENSOR, software for parameter setting and set-up of IO-Link sensors | ZGS210 |

### Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 4-pole, 5 m orange, PVC cable | EVT001 |
| | Socket, M12, 4-pole, 2 m orange, PVC cable | EVT064 |
|  | Socket, M12, 4-pole, 5 m orange, PVC cable | EVT004 |
| | Socket, M12, 4-pole, 2 m orange, PVC cable | EVT067 |

| Further technical data | | |
|---|---|---|
| Operating voltage | [V DC] | 18...32 |
| Accuracy analogue output | [K] | ± 0.3 + (± 0.1 % MS) |
| Ambient temperature | [°C] | -25...80 |
| Maximum measuring range | [°C] | -50...150 |
| Programmable | | IO-Link |
| Housing material | | high-grade stainless steel (1.4404 / 316L) fully welded |
| Protection | | IP 69K |
| Dynamic response | [s] | 1/3 (to DIN EN 60751) |

### Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Welding adapter ball, G 1/2 | E30055 |
|  | Welding adapter collar, G 1/2 | E30056 |
|  | Pipe fitting, G1/2 – DN25 SMS, high-grade stainless steel (1.4404 / 316L) | E33430 |
|  | Pipe fitting, G 1/2 I – DIN 11851 DN25 | E43304 |
| | Pipe fitting, G 1/2 I – DIN 11851 DN40 | E43305 |
|  | Clamp adapter, G 1/2 I – Varivent D50 | E43306 |
| | Clamp adapter, G 1/2 I – Varivent D68 | E43307 |
|  | Sealing plug, G1/2, high-grade stainless steel (1.4435 / 316L) | E43308 |
|  | Welding adapter, G 1/2, high-grade stainless steel (1.4435 / 316L) | E43319 |
|  | Welding adapter, 6 mm, high-grade stainless steel (1.4435 / 316L) | E30407 |

## Position sensors



## Sensors for motion control



## Industrial imaging



## Process sensors

## Industrial communication



## Identification systems



## Condition monitoring systems



## Systems for mobile machines



## Connection technology

# One for all – a single inductive sensor for three applications

## Suitable for industrial, mobile, cooling and lubricating applications

- **Large temperature range of -40...85 °C for greater flexibility**
- **Protection rating IP 65 to IP 69K for increased machine uptime**
- **Reliable detection due to improved sensor tolerances**
- **Reduced stock-keeping – one sensor for many applications**


**New standard**

This newly developed generation of inductive sensors is the first to present one sensor that can be used for three different applications. Whether in factory automation, in applications with coolants and lubricants or in mobile applications – the new ifm technology platform distinguishes itself with universal and permanent usability while guaranteeing high performance, temperature stability and higher sensing ranges.

**Resistant and reliable**

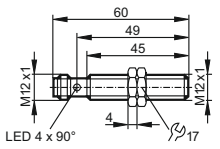
A large temperature range of -40...85 °C and protection ratings IP 65, IP 66, IP 67, IP 68 and IP 69K guarantee maximum reliability. This new generation meets the user's increased machine uptime requirements while offering a reliable switching function that assures the avoidance of standstills. All in all, a universal sensor for permanent use.

| Connection | Sensing range [mm] | Electrical design | Switching frequency [Hz] | Order no. Output function normally open | | Order no. Output function normally closed | |
|---|---|---|---|---|---|---|---|
| **Type M12 · Dimensions: length [mm]** | | | | **60** | **45** | **60** | **45** |
| M12 connector | 4 f | DC PNP | 700 | **IFS240** | **IFS244** | **IFS248** | **IFS260** |
| | 7 nf | DC PNP | 700 | **IFS241** | **IFS245** | **IFS250** | **IFS261** |
| | 4 f | DC NPN | 700 | **IFS242** | **IFS246** | **IFS249** | **IFS262** |
| | 7 nf | DC NPN | 700 | **IFS243** | **IFS247** | **IFS251** | **IFS263** |
| **Type M18 · Dimensions: length [mm]** | | | | **60** | **45** | **60** | **45** |
| M12 connector | 8 f | DC PNP | 400 | **IGS232** | **IGS236** | **IGS240** | **IGS252** |
| | 12 nf | DC PNP | 300 | **IGS233** | **IGS237** | **IGS242** | **IGS253** |
| | 8 f | DC NPN | 400 | **IGS234** | **IGS238** | **IGS241** | **IGS254** |
| | 12 nf | DC NPN | 300 | **IGS235** | **IGS239** | **IGS243** | **IGS255** |
| **Type M30 · Dimensions: length [mm]** | | | | **60** | **50** | **60** | **50** |
| M12 connector | 15 f | DC PNP | 100 | **IIS226** | **IIS230** | **IIS234** | **IIS246** |
| | 22 nf | DC PNP | 100 | **IIS227** | **IIS231** | **IIS236** | **IIS247** |
| | 15 f | DC NPN | 100 | **IIS228** | **IIS232** | **IIS235** | **IIS248** |
| | 22 nf | DC NPN | 100 | **IIS229** | **IIS233** | **IIS237** | **IIS249** |

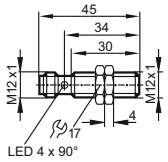
Installation: f = flush / nf = non flush

## Dimensions

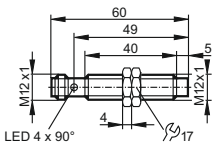
**IFS240**



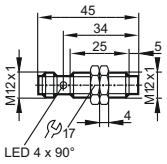

**IFS244**



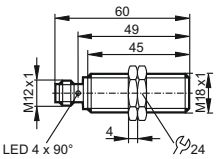

**IFS241**



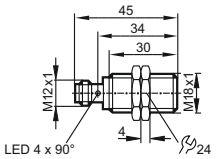

**IFS245**



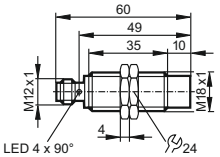

**IGS232**



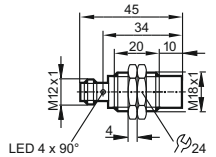

**IGS236**



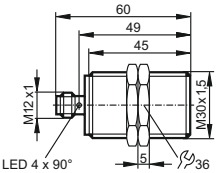

**IGS233**



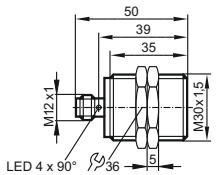

**IGS237**



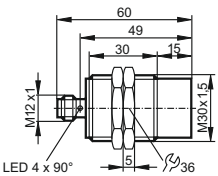

**IIS226**



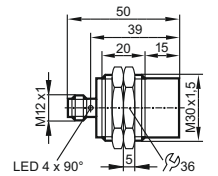

**IIS230**




**IIS227**




**IIS231**

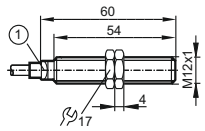


| Connection | Sensing range [mm] | Electrical design | Switching frequency [Hz] | Order no. Output function normally open | |
|---|---|---|---|---|---|
| **Type M12 · Dimensions: length [mm]** | | | | **60** | **40** |
| PUR cable 2m | 4 b | DC PNP | 700 | **IFS252** | **IFS256** |
| | 7 nb | DC PNP | 700 | **IFS253** | **IFS257** |
| | 4 b | DC NPN | 700 | **IFS254** | **IFS258** |
| | 7 nb | DC NPN | 700 | **IFS255** | **IFS259** |
| **Type M18 · Dimensions: length [mm]** | | | | **60** | **40** |
| PUR cable 2m | 8 b | DC PNP | 400 | **IGS244** | **IGS248** |
| | 12 nb | DC PNP | 300 | **IGS245** | **IGS249** |
| | 8 b | DC NPN | 400 | **IGS246** | **IGS250** |
| | 12 nb | DC NPN | 300 | **IGS247** | **IGS251** |
| **Type M30 · Dimensions: length [mm]** | | | | **60** | **45** |
| PUR cable 2m | 15 b | DC PNP | 100 | **IIS238** | **IIS242** |
| | 22 nb | DC PNP | 100 | **IIS239** | **IIS243** |
| | 15 b | DC NPN | 100 | **IIS240** | **IIS244** |
| | 22 nb | DC NPN | 100 | **IIS241** | **IIS245** |

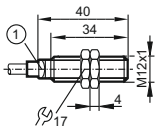
Installation: f = flush / nf = non flush

## Dimensions

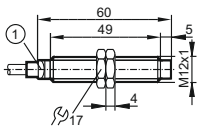
**IFS252**



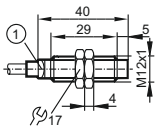

**IFS256**



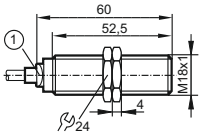

**IFS253**



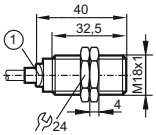

**IFS257**



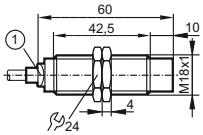

**IGS244**



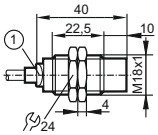

**IGS248**



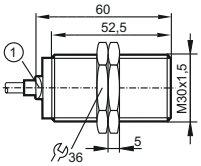

**IGS245**



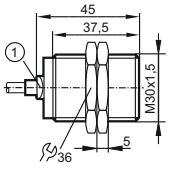

**IGS249**



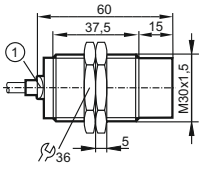

**IIS238**



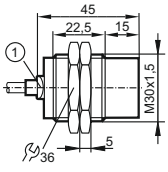

**IIS242**




**IIS239**




**IIS243**




1) LED (yellow)

## Accessories

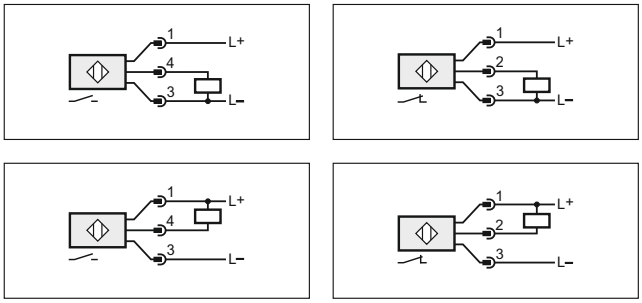
| Type | Description | Order no. |
|---|---|---|
| **Mounting accessories** | | |
|  | Angle bracket for type M12, stainless steel | **E10735** |
| | Angle bracket for type M18, stainless steel | **E10736** |
| | Angle bracket for type M30, stainless steel | **E10737** |
|  | Mounting clamp, with end stop for types M12, PC | **E11994** |
| | Mounting clamp, with end stop for types M18, PC | **E11995** |
| | Mounting clamp, with end stop for types M30, PC | **E11996** |
|  | Mounting sleeve, M16 x 1 - Ø 12 mm, 34 mm | **E10806** |
| | Mounting sleeve, M24 x 1.5 - Ø 18 mm, 36 mm | **E10807** |
| | Mounting sleeve, M36 x 1.5 - Ø 30 mm, 36 mm | **E10808** |
| **Power supplies** | | |
|  | Plastic housing, 24 V DC, 2.5 A | **DN1031** |
| | | |
|  | Metal housing, 24 V DC, 3.3 A | **DN4011** |
| | | |

## Connection technology

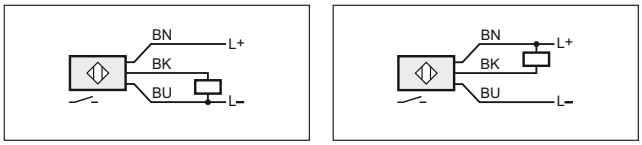
| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC001** |
| | Socket, M12, 5 m black, PUR cable | **EVC002** |
|  | Socket, M12, 2 m black, PUR cable | **EVC004** |
| | Socket, M12, 5 m black, PUR cable | **EVC005** |

| Further technical data | | |
|---|---|---|
| Operating voltage | [V DC] | 10...30 DC; "supply class 2" to cULus |
| Current consumption | [mA] | < 10 |
| Reverse polarity protection | | • |
| Short-circuit protection | | • |
| Overload protection | | • |
| Voltage drop | [V] | < 2.5 |
| Current rating | [mA] | 100 |
| Ambient temperature | [°C] | -40...85 |
| Protection | | IP 65 / IP 66 / IP 67 / IP 68 / IP 69K |
| EMC<br>EN 61000-4-2 ESD:<br>EN 61000-4-3 HF radiated:<br>EN 61000-4-4 Burst:<br>EN 61000-4-6 HF conducted:<br>EN 55011: | | 4 kV CD / 8 kV AD<br>10 V/m (80...1000 MHz)<br>2 kV<br>10 V (0.15...80 MHz)<br>class B |
| Switching status indication | LED | yellow |
| Housing materials | | Brass<br>white bronze coated,<br>PBT; PEI |
| Accessories (supplied) | | 2 lock nuts, brass |

### Wiring diagram M12 connector



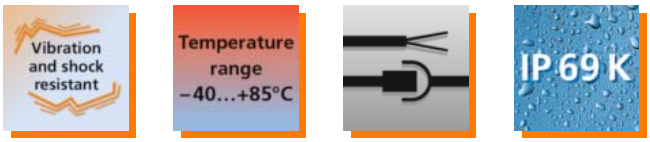

### Wiring diagram PUR cable 2m



# Touch sensor – start, stop and acknowledge


## Capacitive touch sensors in compact cylindrical design

- **Dynamic, static function, preset**
- **High IP 69K protection rating and wide temperature range -40...85 °C**
- **Symbols on the sensing face can be selected separately**
- **Easy installation into housing with Ø 22.5 mm bore thanks to M22 x 1.5 thread**
- **Wear-free and maintenance-free thanks to switching without any mechanical pressure**




### Functions and technology

Capacitive touch sensors can be used, for example, as start and stop function on machines, as enable switch and for opening and closing gates. Compared to mechanical switches the sensors operate without wear. Dynamic touch sensors detect an approaching human hand and suppress interference such as water, layers of ice or foreign bodies to a large extent. However, a gloved hand will still trigger them.

Static touch sensors detect hands and objects even through glass for as long as the sensing face is covered which provides, for example, protection against vandalism. With the latching operating principle it is possible to switch the sensor on by touching briefly and to switch it off again by touching briefly again. Furthermore, the housing is resistant to oils and it is also impact and scratch resistant. It offers the protection rating IP 69K. LEDs for optical feedback signal that the sensor has been activated. The green LEDs can be controlled separately and, for example, be used to indicate the status of plant and machinery.

| Type | Evaluation principle | Connection | Housing material | Protection | Current rating [mA] | Order no. |
|---|---|---|---|---|---|---|
| **Output function NO · DC PNP** | | | | | | |
| M22 | dynamic | 0.3 m PUR cable | PA | IP65, IP67, IP69K | 500 | **KT5101** |
| M22 | dynamic | 0.3 m PUR cable with M12 plug | PA | IP65, IP67, IP69K | 500 | **KT5102** |
| M22 | dynamic | 0.3 m PUR cable | Stainless steel | IP65, IP67, IP69K | 500 | **KT5301** |
| M22 | static | 0.3 m PUR cable | Stainless steel | IP65, IP67, IP69K | 500 | **KT5305** |
| M22 | static | 0.3 m PUR cable | PA | IP65, IP67, IP69K | 500 | **KT5105** |
| M22 | static | 0.3 m PUR cable with M12 plug | PA | IP65, IP67, IP69K | 500 | **KT5106** |
| **Output function NO · DC PNP · green LED can be controlled separately** | | | | | | |
| M22 | dynamic | 0.3 m PUR cable | PA | IP65, IP67, IP69K | 500 | **KT5109** |

Symbol disc must be ordered separately

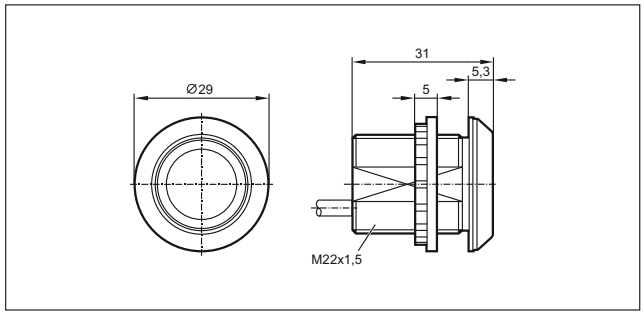
### Mounting options

The sensor can be installed in all housings with a Ø 22.5 mm hole. The supplied lock nut is used for fixing.

Thanks to the M22 thread the sensor can be used for screw mounting without lock nut. Installation alignment of the sensor is not necessary since the clip showing the symbol for the sensing face is snapped in as the last step.

Wiring is done via the tried-and-tested 3- or 4-wire technology.

### Dimensions




### Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC001** |
| | Socket, M12, 5 m black, PUR cable | **EVC002** |
|  | Socket, M12, 2 m black, PUR cable | **EVC004** |
| | Socket, M12, 5 m black, PUR cable | **EVC005** |

| Common technical data | | |
|---|---|---|
| Operating voltage | [V DC] | 24 (12...30) |
| Current consumption | [mA] | 45 |
| Ambient temperature | [°C] | -40...85 |

### Accessories

| Description | Order no. |
|---|---|
| Symbol disc, lettering: START | **E12377** |
| Symbol disc, lettering: STOP | **E12378** |
| Symbol disc, symbol: on | **E12379** |
| Symbol disc, symbol: off | **E12380** |
| Symbol disc, transparent | **E12386** |

| Type | Description | Order no. |
|---|---|---|
| **Power supplies** | | |
|  | Plastic housing, 24 V DC, 2.5 A | **DN1031** |

# Flush-mount cylinder sensors for weld-field detection

## Only T-slot sensors with stable signal, independent of the welding duration time

- **Flush in the T-slot, no protruding structures**
- **With non-stick coating on the M8 or M12 connectors**
- **PTFE conduit on the cable**
- **Convenient: Easy fit “drop from the top” into a slot**
- **A short, 25 mm sensor for different cylinder profiles**


**Intelligent cylinder sensor**

The sensor detects the alternating field of the weld current and holds the output signal during this time, independently of the welding duration time. Then the sensor resumes normal switching operation (piston or no piston).

**GMR cell**

The GMR cell used works as a semiconductor element according to the magnetoresistive principle and reacts to magnetic fields of the permanent magnet in the pneumatic cylinder.

**Adapters for almost any cylinder profile**

Thanks to the wide selection of optional adapters the T-slot sensor can be fixed to almost any clean-line, tie rod, integrated profile or trapezoidal slot cylinder.

Online configuration for ifm cylinder sensors:
**www.ifm.com/gb/cylinder-sensors**

| Type / Dimensions [mm] | Electrical design | f [Hz] | Protection rating/ protection class | Ambient temperature [°C] | $I_{load}$ [mA] | Order no. |
|---|---|---|---|---|---|---|
| **Connection cable 0.3 m with M8 connector rotatable · 3-wire · PUR** | | | | | | |
| 25 x 5 x 5.1 | DC PNP | > 3000 | IP 67, III | -25...85 | 100 | **MK5215** |
| **Connection cable 0.3 m with M12 connector rotatable · 3-wire · PUR** | | | | | | |
| 25 x 5 x 5.1 | DC PNP | > 3000 | IP 67, III | -25...85 | 100 | **MK5214** |

## Accessories

| Type | Description | Order no. |
|---|---|---|
| **Trapezoidal slot cylinder** | | |
|  | Adapters, aluminium alloy, stainless steel | **E11988** |
| **T-slot cylinder** | | |
|  | Memorisation block, PA, stainless steel | **E11798** |
|  | Protective adapter against weld spatter Coated diecast zinc, stainless steel | **E12259** |
| **Adapter for tie rod / integrated profile cylinders** | | |
|  | Ø clamping range 5...11 mm, aluminium / stainless steel | **E12231** |
| | Ø clamping range 9...13.5 mm, aluminium / stainless steel | **E12232** |
|  | Ø clamping range 9...17 mm, aluminium / stainless steel | **E12233** |
| **Clean line cylinder** | | |
|  | Fixing strap, Ø piston 10...16 mm | **E11975** |
| | Fixing strap, Ø piston 20...25 mm | **E11976** |
| | Fixing strap, Ø piston 32 mm | **E11977** |
| | Fixing strap, Ø piston 40 mm | **E11978** |
| | Fixing strap, Ø piston 50 mm | **E11979** |
| | Fixing strap, Ø piston 63 mm | **E11980** |
| | Fixing strap, Ø piston 80 mm | **E11981** |
| | Fixing strap, Ø piston 100 mm | **E11982** |

| Common technical data | | |
|---|---|---|
| Operating voltage | [V] | 10...30 DC |
| Short-circuit protection, pulsed | | • |
| Protected against reverse polarity / overload protected | | • / • |
| LED display | | yellow |
| Repeatability | [mm] | < 0.2 |
| Hysteresis | [mm] | typ. 1 |
| Travel speed | [m/s] | < 10 |
| Response sensitivity | [mT] | 2 |
| Power-on delay time | [ms] | < 30 |
| Housing material | | PA, stainless steel |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M8, 3-pole 5 m, PUR cable | **EVW069** |
| | Socket, M8, 3-pole 10 m, PUR cable | **EVW070** |
|  | Socket, M12, 4-pole, 2 m, PUR cable | **EVW001** |
| | Socket, M12, 4-pole, 5 m, PUR cable | **EVW002** |

## Power supplies

| Type | Description | Order no. |
|---|---|---|
|  | Plastic housing, 24 V DC, 2.5 A | **DN1031** |
|  | Metal housing, 24 V DC, 3.3 A | **DN4011** |

INNOVATIONS

# Valve feedback in ATEX zones

## Intrinsically safe valve open/closed sensor for ATEX areas

- **Easy access terminal chamber**
- **Removable terminal block for easy wiring**
- **Robust and resistant housing**
- **Permanently legible lasered type label**
- **Actuator interface connection: M20 x 1 connector or M12 connector**


**Direct fit on valve actuators**

Two sensors built-in; one sensor provides a signal when the valve is open, the other when it is closed. These type IND inductive sensors are intrinsically safe and consist of two inductive sensors in a potted and robust housing with IP 67 protection rating. They are equipped with connection for solenoids.

**Fast and easy connection**

The solenoid connection is optionally a standardised M20 x 1 connector or an M12 connection. The terminal chamber is easy to open and close. Since the terminal block can be removed, no new wiring is required if the sensor is replaced. The units are approved to ATEX categories 1D/1G and 2G.

| Connection sensor / valve | $U_b$ [V] | Ambient temperature [°C] | Output function | Protection class | Protection | Order no. |
|---|---|---|---|---|---|---|
| **2 x 2-wire Namur** | | | | | | |
| M20 x 1.5 / M20 x 1.5 | 8.2 DC | -25...70 | 2 x NC | III | IP65, IP67 | **NN504A** |
| M20 x 1.5 / M12 | 8.2 DC | -25...70 | 2 x NC | III | IP65, IP67 | **NN505A** |

## Accessories

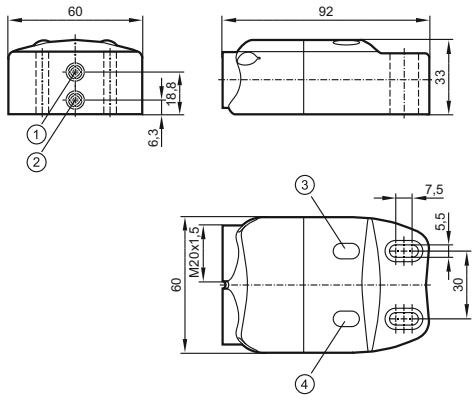
| Type | Description | Order no. |
|---|---|---|
|  | Switching amplifier, dual channel, transistor | **N0534A** |
| | Switching amplifier, dual channel, relay | **N0533A** |
| | Switching amplifier, dual channel, optocoupler | **N0532A** |
|  | Target puck, Ø 53 mm | **E17320** |
| | Target puck, Ø 65 mm | **E17327** |
| | Target puck, Ø 102 mm | **E17328** |
|  | Plug for covering the oblong holes, EPDM | **E12212** |
| | | |
|  | Screw plugs, PA 6.6 | **E12209** |
| | | |
|  | Cable gland, M20 x 1.5, PA 6.6 | **E12208** |
| | | |

| Marking of the unit | Approval |
|---|---|
| Ⓔx II 1G Ex ia IIB T4 Ga Ta: -25...70 °C<br>Ⓔx II 2G Ex ia IIC T4 Gb Ta: -25...70 °C<br>Ⓔx II 1D Ex ia IIIB T135 °C Da Ta: -25...70 °C | BVS 14 ATEX E 005 X<br>IECEx BVS 14.0005X |

| Further technical data | | |
|---|---|---|
| Switching frequency | [Hz] | 500 |
| Sensing range | [mm] | 4 |
| Electrical design | | Wiring to certified intrinsically safe circuits with the max. values:<br>Ui = 15 V /<br>Ii = 50 mA /<br>Pi = 120 mW |
| Housing material | | PA |

## Dimensions

**Example NN505A**




1) Sensor 1
2) Sensor 2
3) LED OUT 2
4) LED OUT 1

# New absolute encoders

## Cost-optimised absolute encoders – more functions and bus interfaces

- **Single and multiturn encoders**
- **Easy wiring and programming**
- **Solid and hollow shafts**
- **Optional stainless steel version**
- **Profibus DPV1/2, ProfiNet and CANopen interface EtherNet/IP, DeviceNet or Modbus**

PROFI BUS | PROFI NET | CAN open | Temperature range –40...+85°C

### More functions at a favourable price

The new photoelectric absolute encoders with bus interface detect position, angle, speed and distance in automated plant and machinery.
They complement the ifm product family and do not only offer extended functionality and additional interfaces but also a convincing price/performance ratio. They are also available in stainless steel versions.

### Easy implementation

These single and multiturn encoders are available with solid or hollow shaft. The additional interfaces and the removable bus connection cap ensure easy wiring and programming.
All common bus interfaces such as Profibus DPV1/2, ProfiNet and CANopen interface, EtherNet/IP, DeviceNet or Modbus are provided.

The multiturn encoder monitors the material feed of steel sheet rollers

| Ø shaft [mm] | Resolution [Bit] | Interface | Operating voltage [V DC] | Protection class | Housing material | Connection | Order no. |
|---|---|---|---|---|---|---|---|
| **Multiturn encoder · solid shaft** | | | | | | | |
| 6 | 25 | Profibus | 10...30 | IP 65, IP 66, IP 67 | Aluminium | Bus cap | **RM3006** |
| 10 | 25 | Profibus | 10...30 | IP 65, IP 66, IP 67 | Aluminium | Bus cap | **RM3007** |
| 10 | 25 | ProfiNet | 10...30 | IP 65, IP 66, IP 67 | Aluminium | Bus cap | **RM3011** |
| 6 | 25 | CANopen | 10...30 | IP 65, IP 66, IP 67 | Aluminium | Bus cap | **RM7011** |
| 10 | 25 | CANopen | 10...30 | IP 65, IP 66, IP 67 | Aluminium | Bus cap | **RM7012** |
| **Singleturn encoder · solid shaft** | | | | | | | |
| 10 | 13 | Profibus | 10...30 | IP 65, IP 66, IP 67 | Aluminium | Bus cap | **RN3001** |
| 6 | 13 | CANopen | 10...30 | IP 65, IP 66, IP 67 | Aluminium | Bus cap | **RN7011** |
| 10 | 13 | CANopen | 10...30 | IP 65, IP 66, IP 67 | Aluminium | Bus cap | **RN7012** |
| **Multiturn encoder · hollow shaft** | | | | | | | |
| 12 | 25 | Profibus | 10...30 | IP 64, IP 65, IP 66, IP 67 | Aluminium | Bus cap | **RM3008** |

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Spring disc coupling, Ø 6 mm / 10 mm, die-cast zinc; PA | **E60117** |
| | Spring disc coupling, Ø 10 mm / 10 mm, die-cast zinc; PA | **E60118** |
|  | Plastic beam coupling with stainless steel hub, Ø 10 mm / 10 mm | **E60193** |
| | | |
|  | Flexible coupling with clamp connection, Ø 6 mm / 10 mm, aluminium | **E60066** |
| | Flexible coupling with clamp connection, Ø 10 mm / 10 mm, aluminium | **E60067** |
| | Flexible coupling with adjusting screws, Ø 10 mm / 10 mm, aluminium | **E60022** |
| | Flexible coupling with adjusting screws, Ø 6 mm / 10 mm, aluminium | **E60028** |
|  | Measuring wheel, Ø 159.15 mm / 10 mm, Hytrel TPE-E | **E60110** |
| | Measuring wheel, Ø 159.16 mm / 10 mm, aluminium, PU | **E60076** |
| | Measuring wheel, Ø 63.66 ± 0.1 mm / 10 mm, Hytrel TPE-E | **E60138** |
| | Measuring wheel, Ø 63.6 mm, 10 mm, aluminium | **E60095** |
| | Measuring wheel, Ø 63.66 ± 0.1 mm / 6 mm, aluminium | **E60137** |
| | Measuring wheel, Ø 63.6 mm / 6 mm, aluminium | **E60006** |
|  | Angle bracket, aluminium, black anodised | **E60035** |
| | | |

| Further technical data | | |
|---|---|---|
| Housing diameter | [mm] | 58 |
| Ambient temperature | [°C] | -40...85 |
| Maximum mechanical rotational speed | [1/min] | 12.000 |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | EtherNet jumper, M12 plug / M12 plug 2 m, PVC cable | **E21138** |
|  | EtherNet, screened patch cable, 2 m, PUR cable, M12 / RJ45 | **E12090** |

# Speed sensors for drives and axes

## Magnetic measuring principle for non-contact detection of speed and direction of rotation

- **Switching frequencies up to 15,000 Hz**
- **Precise detection and reduced phase shift**
- **Wide temperature range: -32…125 °C**
- **Installation within seconds thanks to flanged housing**
- **Flexible combinations of housings, connections and signals**


**Advantages and customer benefits**

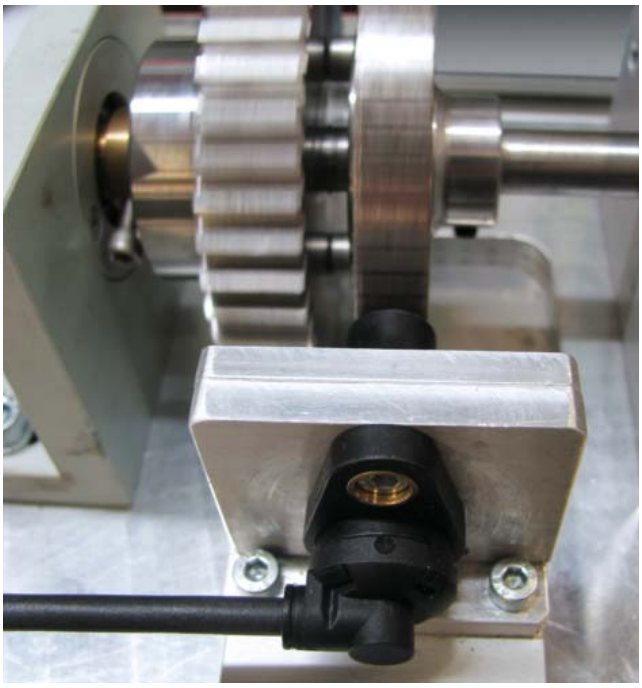
The high switching frequency of 15,000 Hz as well as the extended temperature range of -32...125 °C make ifm's new magnetic MX5 type speed sensors your ideal partner for the detection of speed and direction of rotation on drives, axes and shafts.

The sensors use Hall measuring cells, so that they function reliably and without contact even in cases of heavy soiling.

**Quickly integrated everywhere**

The sophisticated housing concept offers different combinations of housing lengths, connections, such as straight or angled cable outlet and AMP connectors. These are available on request.

Toothed wheel modules made of metal are standardised and have a defined tooth width and distance.



| Installation length [mm] | f [kHz] | $I_{load}$ [mA] | Connection | Ambient temperature sensor [°C] | Protection rating housing | Order no. |
|---|---|---|---|---|---|---|
| **Speed sensors · magnetic measuring principle** | | | | | | |
| 30 | 0.005...15 | < 50 | radial, pigtail AMP Junior Timer | -32...+140 | IP 69K | **MX5015** |
| 35 | 0.005...15 | < 50 | connector, AMP Junior Timer | -32...+140 | IP 69K | **MX5004** |
| 35 | 0.005...15 | < 50 | axial, pigtail 0.15 m | -32...+140 | IP 69K | **MX5017** |
| 45 | 0.005...15 | < 50 | connector, AMP Junior Timer | -32...+140 | IP 69K | **MX5000** |

Moreover, the sensors can be used to select one or two-channel speed detection. Besides speed, the direction of rotation can also be detected using two channels.

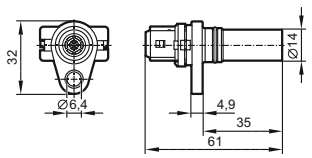
Also, apart from an NPN or PNP switching output the speed sensor family covers various module sizes of toothed wheels.

The new sensors are adjusted to module 1.25.

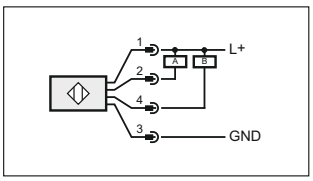
The flanged housing offers quick mounting and accurate adjustment of the sensor with only one screw. This reduces phase shift and guarantees precise detection of the toothed wheel.

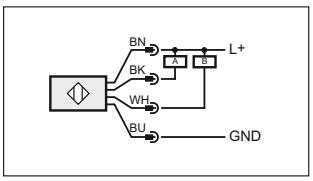
### Dimensions

**Example MX5004**




### Wiring diagram




| Further technical data | | |
|---|---|---|
| Operating voltage | [V DC] | 7...30 |
| Sensing range | [mm] | 0.4...1.5 |
| Module (toothed wheel) | | 1.25 |
| Phase shift | [°] | 90 ± 20 |
| Output | | 2 x open collector |

### Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Connection cable, AMP socket, 10 m | **E60303** |

INNOVATIONS

# Safe monitoring of speeds

## Safe speed monitor uses standard sensors as pick-ups

- **Easy parameter setting via rotary switch**
- **No restrictions for the design of the cam disc**
- **Monitoring functions can be enabled / disabled**
- **Reliable operation at extreme ambient temperatures down to -40 °C**
- **Housing width only 25 mm**


### Applications

The speed monitors DD110S and DD111S have been developed for safety-related maximum-speed monitoring as used in carousels or centrifuges. The DD111S is specially designed for the low rotational speed of wind turbines.

Both speed monitors can also be used for the operating mode “reduced speed” e.g. on machine tools.

### Special features

The speed monitor is certified to EN 62061 / SIL 3 and EN ISO 13849-1 cat. 4 / PL e – even though non-safety-related sensors are used as pulse pick-ups.

When the safety output has been triggered, it can be reset again manually or automatically.

## Easy setting of the limit speed

The speed is determined via the interval measurement on the inputs where for example two inductive sensors are used as pulse pick-ups.

The user can set the limit speed easily and effectively via three rotary switches (DD110S: x 1, x 10, multiplier / DD111S: x 10, x 1, x 0.1) – either in rpm or Hz. It was decided not to use any complicated setting menus.

An easy and intuitive setting algorithm prevents unintentional change or manipulation of the set values.

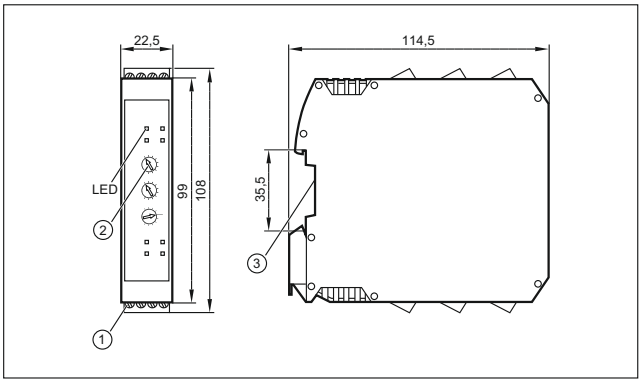
## More functions

Automatic or manual reset of overspeed is possible. This function is set via wire links.

The monitoring function can be enabled and disabled via a switching input.

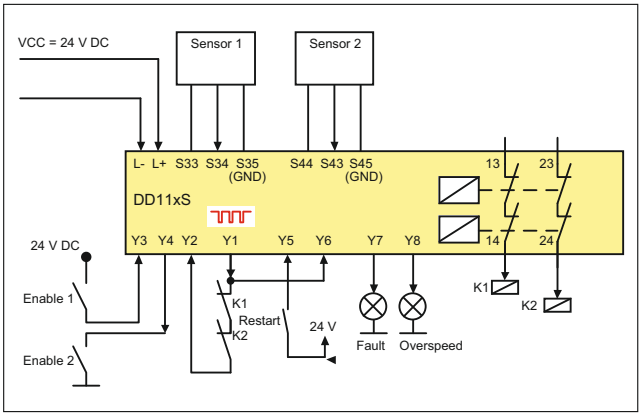
Besides the 2-pole safety relay, transistor outputs can also be used as output for the status and error indication.

## Dimensions




1) Screw terminals
2) Rotary switch
3) DIN rail mounting

## Wiring diagram



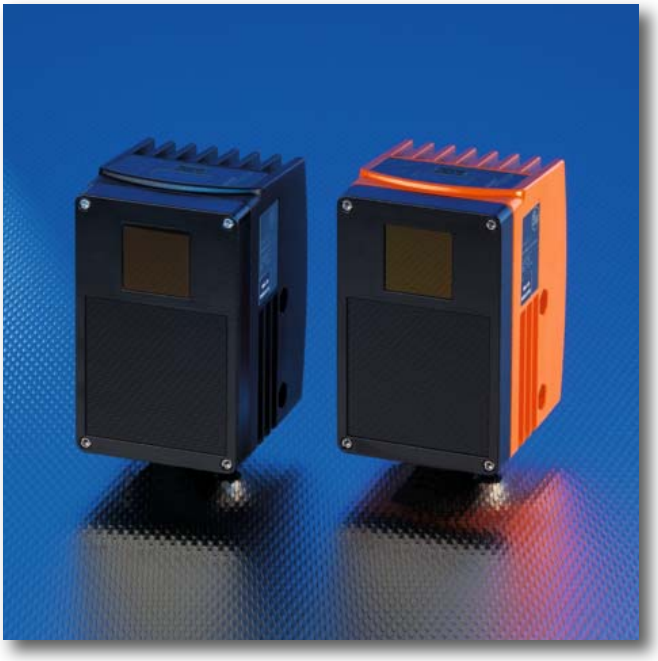

## Technical data

| Safety speed monitor DD110S, DD111S Evaluation system for safe speed monitoring | | |
|---|---|---|
| Operating voltage | [V DC] | 19.2...28.8; incl. 5 % residual ripple |
| Nominal voltage | [V DC] | 24 |
| Current consumption | [mA] | ≤ 125 |
| Sensor supply | | 24 V DC / ≤ 70 mA |
| Protection | | IP 20 / II |
| Input characteristics | | Pulse inputs S34, S43: "1": 6 mA / 24 V DC |
| Adjustable speed range | [rpm] DD110S | 1...49500 |
| Adjustable frequency range | DD110S [Hz] DD111S [Hz] | 0.5...990 0.1...99.9 |
| Max. input frequency | [Hz] | ≤ 2000 |
| Output function | | 2 safety-related switching outputs (floating contacts) 1 fault output "Fault" (positive switching) 1 diagnostic output "Overspeed" (positive switching) |
| Output characteristics | | Fault output "Fault" Y7 and diagnostic output "Overspeed" Y8 ≤ 20 mA, 24 V DC, voltage drop ≤ 2 V DC, short-circuit proof, non safe |
| Contact rating | | 6 A, 250 V AC / 24 V DC (≥ 6 mA); resistive load |
| Ambient temperature | [°C] | -40...55 |
| Storage temperature | [°C] | -40...75 |
| Max. permissible relative humidity | [%] | 95, non condensing |
| Housing materials | | PA (polyamide) |
| Mounting | | Rail TH35 (according to EN 60715) |
| Connection | | Screw terminals; 0.5...2.5 mm² (AWG 12...30) |

## Accessories

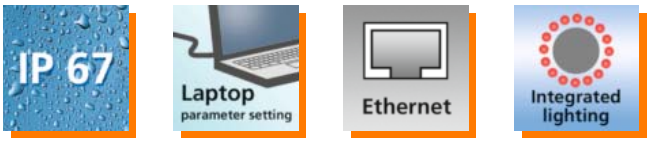
| Type | Description | Order no. |
|---|---|---|
| **Power supplies** | | |
|  | Plastic housing, 24 V DC, 2.5 A | **DN1031** |
| | | |
|  | Metal housing, 24 V DC, 3.3 A | **DN4011** |
| | | |

# Even more at a glance: 3D vision sensor



## Visual assessment of distance, level or volume

- **Wide-angle version with an angle of aperture of 64° x 48°**
- **Operating principle: Time-of-flight measurement based on pmd technology**
- **Illumination, time-of-flight measurement and evaluation in one housing**
- **3,072 distance values per measurement for the detailed assessment of the application**
- **4...20 mA / 0...10 V analogue output or 2 switching outputs for providing the result**




**Object detection in three dimensions – efector *PMD* 3d**

efector pmd 3d is the first industrial 3D sensor that can detect objects in three dimensions at a glance. The new wide-angle version provides a wider angle of aperture of 64° x 48°.

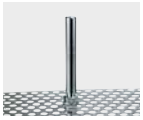
The time-of-flight measurement in three dimensions enables the assessment of different applications, for example the detection of volume, distance or level.

Special feature: The time-of-flight measurement and evaluation are integrated on one chip. The sensor chip has 64 x 48 pixels. Each pixel of this chip matrix evaluates its distance to the object. This results in 3,072 distance values at the same time.

The image of the object on the chip matrix and the respective distance values correspond to a 3D image. These values enable the detailed assessment of the object's or scene's characteristics up to a range of 5.5 m with an unambiguous range up to 48 m.

| Type | Type of sensor | Resolution pixels [pixels] | Angle of aperture horizontal x vertical [°] | Illumination | Max. sampling rate [Hz] | Order no. |
|---|---|---|---|---|---|---|
| **PMD 3D sensor · Type O3D · M12 connector** | | | | | | |
|  | PMD 3D chip | 64 x 48 | 64 x 48 | Infrared LED (850 nm) | 20 (adjustable) | **O3D222** |
| **PMD 3D camera · Type O3D · M12 connector** | | | | | | |
|  | PMD 3D chip | 64 x 48 | 64 x 48 | Infrared LED (850 nm) | 20 (adjustable) | **O3D223** |

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Operating software for 3D sensor | **E3D200** |
|  | Mounting set for clamp mounting, Ø 14mm / stainless steel | **E3D103** |
|  | Rod, 100 mm, Ø 14mm, M12 thread, stainless steel | **E20939** |
|  | Rod, 200 mm, Ø 14mm, stainless steel | **E21228** |
| | Rod, 300 mm, Ø 14mm, stainless steel | **E21229** |
| | Rod, 500 mm, Ø 14mm, stainless steel | **E21232** |
|  | Switched-mode power supply 24 V DC, primary, output current 3.3 A, regulated | **DN4011** |
| | Switched-mode power supply 24 V DC, primary, output current 2.5 A, regulated | **DN1031** |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Ethernet, cross-over patch cable, 2 m, PUR cable, M12 / RJ45 | **E11898** |
| | Ethernet, cross-over patch cable, 10 m, PUR cable, M12 / RJ45 | **E12204** |
| | Ethernet, cross-over patch cable, 20 m, PUR cable, M12 / RJ45 | **E12205** |
|  | Socket, M12, 2 m, PUR cable, 8 poles | **E11950** |
| | Socket, M12, 5 m, PUR cable, 8 poles | **E11807** |
| | Socket, M12, 10 m, PUR cable, 8 poles | **E11311** |

| Technical data O3D222, O3D223 | | |
|---|---|---|
| Function display | LED | 4 x yellow, 4 x green |
| Result display / dialogue | | 4-digit 10-segment display |
| Operating voltage | [V] | 24 DC (± 10 %) |
| Current consumption | [mA] | < 1000 (max. 2500) |
| Current rating | [mA] | 100 (per switching output) |
| Short-circuit protection, pulsed | | • |
| Overload protection | | • |
| Ambient temperature | [°C] | -10...50 |
| Storage temperature | [°C] | -40...85 |
| Protection rating, protection class | | IP 67, III |
| Material | Housing<br>Front lens<br>Display window | Diecast aluminium<br>PMMA<br>PC |
| Trigger | | External: 24V PNP acc. to IEC 61131-2 type 2, internal |
| Switching inputs | | Max: 2 (configurable), 24 V PNP to. IEC 61131-2 type 2 |
| Switching outputs | | Max: 2 (configurable) 24 V PNP |
| Analogue output<br>configurable<br><br>scalable | | 4...20 mA to IEC 61131-2, Max. load current 300 Ω<br><br>0...10 V to IEC 61131-2, Min. load 10 kΩ |
| Parameter setting options | | Via PC / notebook or 10-segment display and 2 pushbuttons |
| Parameter setting interface | | Ethernet 10Base-T / 100 Base-TX |

# Vision sensors in the right light

## External LED illumination for sophisticated object recognition

- **Homogeneous and virtually shadow-free illumination of the object**
- **Permanent light or pulse operation with the option of additional high light intensity**
- **White light, red light and infrared versions**
- **Compact design and robust, industrially compatible housing**
- **Combination with a diffuser attachment possible for “cloudy day” illumination**


**Sophisticated object recognition**

The high-quality LED illumination creates homogeneous light – either for virtually shadow-free object illumination or for emphasising surface characteristics such as dot-peened codes, scratches or nicks.

They are available as M12 connector versions with visible white, red or invisible infrared light.

**Practical accessories**

A diffuser attachment made of high-quality glass for the ring lights additionally ensures homogeneous illumination without disturbing reflections in applications with reflective surfaces in the close range.

The optional angle bracket and the tried-and-tested ifm mounting system facilitate the alignment of the different types of additional illumination.

| Dimensions [mm] | Active lighting source size [Ø mm] | Current consumption [mA] | Angle of aperture | Protection | Pigtail, 0.3 m | Order no. |
|---|---|---|---|---|---|---|
| **Ring light, red light 617 nm** | | | | | | |
| Ø 122 × 20.5 | Ø 106 / Ø 66 | 800 / 1300* | 60° | IP 65 | • | **O2D915** |
| **Ring light, infrared light 875 nm** | | | | | | |
| Ø 122 × 20.5 | Ø 106 / Ø 66 | 800 / 1400* | 50° | IP 65 | • | **O2D917** |
| **Ring light, white light 5600 K** | | | | | | |
| Ø 122 × 20.5 | Ø 106 / Ø 66 | 800 / 1200* | 120° | IP 65 | • | **O2D919** |
| **Bar illumination unit red light 617 nm** | | | | | | |
| 116 x 18 x 13 | 10 x 75 | 225 / 375* | 60° | IP 65 | • | **O2D921** |
| 200 x 18 x 13 | 10 x 150 | 460 / 700* | 60° | IP 65 | • | **O2D924** |
| **Bar illumination unit infrared light 875 nm** | | | | | | |
| 116 x 18 x 13 | 10 x 75 | 185 / 325* | 50° | IP 65 | • | **O2D922** |
| 200 x 18 x 13 | 10 x 150 | 415 / 640* | 50° | IP 65 | • | **O2D925** |
| **Bar illumination unit white light 5600 K** | | | | | | |
| 116 x 18 x 13 | 10 x 75 | 165 / 275* | 120° | IP 65 | • | **O2D923** |
| 200 x 18 x 13 | 10 x 150 | 265 / 475* | 120° | IP 65 | • | **O2D926** |
| **Dark field illumination red light 617 nm** | | | | | | |
| 155 x 130 x 10 | Ø 90 | 400 | – | IP 54 | • | **O2D920** |

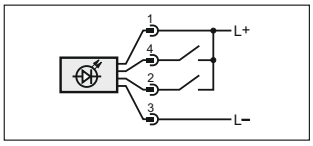
Automatic deactivation at a housing temperature of 65 °C.
* current consumption at high light intensity

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Diffuser for ring light | **E2D202** |
|  | Mounting kit for ring light | **E2D201** |
|  | Mounting kit for bar illumination unit | **E2D114** |
|  | Mounting kit for 4 bar illumination units 10 x 75 mm | **E2D116** |
|  | Mounting kit for dark field illumination | **E2D115** |

| Common technical data | | |
|---|---|---|
| Light source | | LED |
| Operating voltage | [V] | 24 DC |
| Ambient temperature | [°C] | -10...55 |
| Material housing | | aluminium anodised |
| Material optical area | | glass |
| Trigger | [V] | 5...24, PNP |
| Protected against reverse polarity | | • |
| Short-circuit proof | | • |
| Fixing | | M4 screws |
| Eye safety | | IEC 62471 |

## Wiring diagram




Pigtail: 4 trigger
2 high light intensity

No high light intensity for O2D920

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC001** |
| | Socket, M12, 5 m black, PUR cable | **EVC002** |

INNOVATIONS

# Hygienic pressure sensor for high temperatures

## Hygienic pressure sensor with diaphragm seal for high temperature applications

- **Pressure monitoring in the temperature range from -25 to 200 °C**
- **Integrated 1.5" or 2" clamp diaphragm seal with stainless steel membrane**
- **All wetted parts made of stainless steel**
- **Programmable analogue output in 2-wire operation and display**
- **6-point factory calibration certificate supplied**

FDA IO-Link EHEDG CIP/SIP

### Application

The PI22/PI23 series pressure sensors are designed for high-temperature applications as can among others be found in UHT plants (ultra high temperature).

### Flexible: 2, 3 or 4 wires

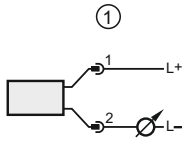
The pressure sensors with clearly visible LED display can not only be connected as 3- or 4-wire units but also as loop-powered 2-wire units. This reduces the wiring complexity in new installations and facilitates exchange in existing 2-wire connections.

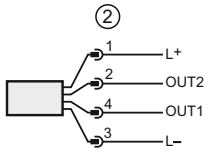
### Parameter setting

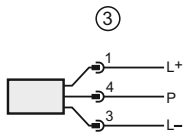
The parameters can either be set via the buttons on the sensor or via IO-Link interface: via USB IO-Link master, PLC or memory plug.

| Relative pressure measuring range [bar] | $P_{overload}$ max. [bar] | Analogue start point [bar] | Analogue end point [bar] | Set point SP1 [bar] | Reset point rP1 [bar] | Step increment [bar] | Order no. |
|---|---|---|---|---|---|---|---|
| **Clamp 1.5" · output function switching output PNP/NPN programmable + analogue output programmable** | | | | | | | |
| -1...25 | 80 | -1.00...18.74 | 5.24...25.00 | -0.96...25.00 | -1.00...24.96 | 0.02 | **PI2203** |
| -1...10 | 50 | -1.0...7.5 | 1.5...10.00 | -0.98...10.00 | -1.00...9.98 | 0.01 | **PI2204** |
| -1...4 | 30 | -1.00...3.00 | 0.00...4.00 | -0.990...4.000 | -1.000...3.990 | 0.005 | **PI2205** |
| -0.124...2.5 | 20 | -0.124...1.880 | 0.500...2.500 | -0.120...2.500 | -0.124...2.496 | 0.002 | **PI2206** |
| -0.05...1 | 10 | -0.05...0.75 | 0.2...1.00 | -0.048...1.00 | -0.05...0.998 | 0.001 | **PI2207** |
| -1...1 | 10 | -1...0.5 | -0.5...1 | -0.998...1 | -1...0.998 | 0.001 | **PI2209** |
| **Clamp 2" · output function switching output PNP/NPN programmable + analogue output programmable** | | | | | | | |
| -1...25 | 80 | -1.00...18.74 | 5.24...25.00 | -0.96...25.00 | -1.00...24.96 | 0.02 | **PI2303** |
| -1...10 | 50 | -1.0...7.5 | 1.5...10.00 | -0.98...10.00 | -1.00...9.98 | 0.01 | **PI2304** |
| -1...4 | 30 | -1.00...3.00 | 0.00...4.00 | -0.990...4.000 | -1.000...3.990 | 0.005 | **PI2305** |
| -0.124...2.5 | 20 | -0.124...1.880 | 0.500...2.500 | -0.120...2.500 | -0.124...2.496 | 0.002 | **PI2306** |
| -0.05...1 | 10 | -0.05...0.75 | 0.2...1.00 | -0.048...1.00 | -0.05...0.998 | 0.001 | **PI2307** |
| -1...1 | 10 | -1...0.5 | -0.5...1 | -0.998...1 | -1...0.998 | 0.001 | **PI2309** |

## Wiring diagram




1) connection for 2-wire operation
2) connection for 3-wire operation
3) connection for IO-Link parameter setting (P = communication via IO-Link)

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Memory plug, parameter memory for IO-Link sensors | **E30398** |
|  | IO-Link interface, current consumption from USB port | **E30396** |
|  | LINERECORDER SENSOR, software for parameter setting and set-up of IO-Link sensors | **ZGS210** |
|  | USB IO-Link master for parameter setting and analysis of units | **E30390** |

| Further technical data | | |
|---|---|---|
| Operating voltage | [V DC] | 20...32 (2-wire), 18...32 (3-wire) |
| Current rating | [mA] | 250 (3-wire) |
| Current consumption | [mA] | 3.6...21 (2-wire), < 45 (3-wire) |
| **IO-Link Device** type of transmission | | COM2 (38.4 kbaud), IO-Link 1.0 |
| **Accuracy / deviation (in % of the span) turn down 1:1** | | |
| Deviation of the switch point | | < ± 0.2 |
| Linearity error | | < ± 0.2 |
| Linearity | | < ± 0.15 |
| Hysteresis | | < ± 0.15 |
| Repeatability | | < ± 0.1 |
| Long-term stability | | < ± 0.1 |
| **Temperature coefficients (TEMPCO) in the temperature range 0...70°C (in % of the span per 10 K)** | | |
| Greatest TEMPCO of zero | | < ± 0.05 |
| Greatest TEMPCO of the span | | < ± 0.15 |
| Medium temperature | [°C] | -25...200 |
| Ambient temperature | [°C] | -25…80 (< 160 °C), -25…60 (< 200 °C) |
| Protection | | IP 68 / IP 69K |
| Wetted parts | | stainless steel (1.4435 / 316L) |

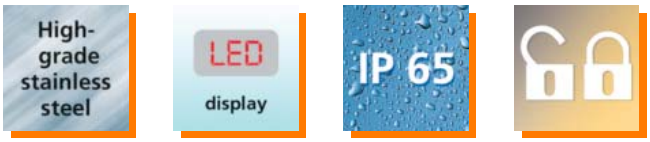
## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 4-pole, 5 m orange, PVC cable | **EVT004** |
| | Socket, M12, 4-pole, 2 m orange, PVC cable | **EVT067** |

# Compressed air meter independent of pipe size

## For inside pipe diameters of 38 mm to 254 mm

- **Can be used for consumption measurement and leakage monitoring**
- **Final value of the measuring range from 548 $Nm^3/h$ to 29,560 $Nm^3/h$**
- **Exact flow rate and temperature measurement of compressed air**
- **Binary, analogue and pulse outputs**
- **Flow rate measurement in standard cubic metres**

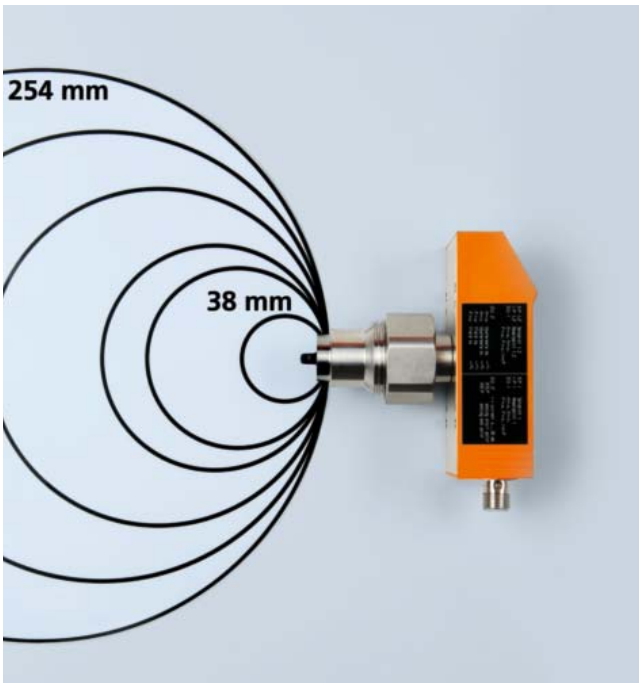



### Calorimetric measuring principle

Measuring, display and setting ranges of the compressed air meter refer to the standard volume flow according to DIN ISO 2533. This makes a correction using the temperature and the pressure unnecessary. The fast response time and the high response sensitivity of the system also allow the reliable detection of small volumetric flow quantities.

### Adaptation to variable pipe sizes

The measuring ranges for different pipe sizes are stored as reference values in the sensor and can be called and set via the programming buttons.

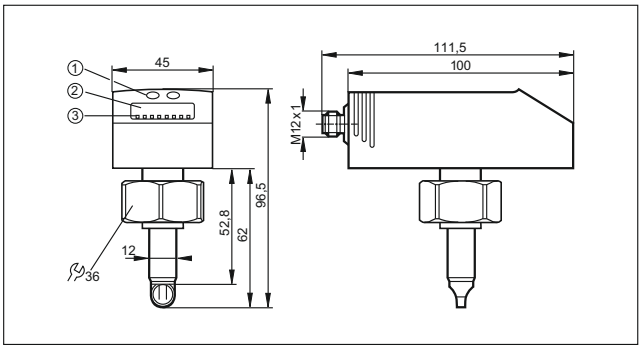



Compressed air meter for installation in variable pipe sizes using adapters.

| Final value of the measuring range [Nm³/h] | Repeatability [% of the measured value] | Measuring accuracy [% of the final value] | Process connection | Order no. |
|---|---|---|---|---|
| **Application: compressed air in industrial use, air quality (DIN 8573-1)** | | | | |
| 548...29,560 | ± 1.5 | ± (6 % MV + 0.6 % VMR) * | G 1 female | **SD0523** |

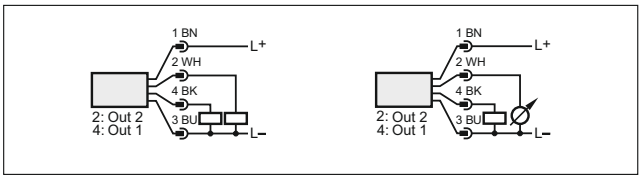
*) For D = 72 mm, T = 22 °C and standard volume flows of 50...850 Nm³/h

## Dimensions




1) Programming buttons
2) 4-digit alphanumeric display
3) Status LEDs

## Wiring diagram




## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Welding adapter, G 1 female – Ø 20 mm | **E40195** |

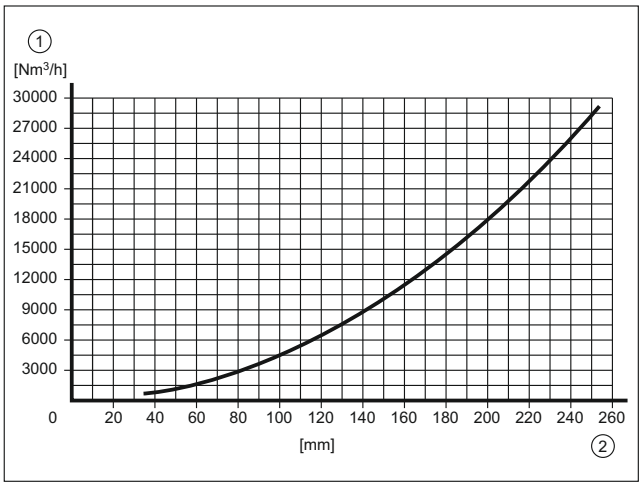
## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC004** |
| | Socket, M12, 5 m black, PUR cable | **EVC005** |
| | Socket, M12, 10 m black, PUR cable | **EVC006** |

## Further technical data

| Type SD0523 | | |
|---|---|---|
| Operating voltage | [V] | 18...30 DC |
| Current rating | [mA] | 2 x 250 |
| Analogue output | [mA] | 4...20 |
| Short-circuit protection, pulsed | | • |
| Reverse polarity / overload protection | | • / • |
| Medium temperature | [°C] | 0...60 |
| Ambient temperature | [°C] | 0...60 |
| Response time | [s] | < 0.1 (dAP = 0) |
| Pressure resistance | [bar] | 16 |
| Protection rating, protection class | | IP 65, III |
| Connection | | M12 connector |
| Housing materials | | PBT-GF 20; PC (polycarbonate); stainless steel (304/1.4301); FPM |
| Materials wetted parts | | High-grade stainless steel (316/1.4401), ceramics; glass passivated; PEEK (polyether-etherketone); polyester; FPM; aluminium; anodised |

## Measuring / setting range




Final value of the measuring range (1) referred to the internal pipe diameter (2)

INNOVATIONS

# Robust mechatronic flow sensor

## Binary and analogue volumetric flow sensors for liquids

- **Volumetric flow quantities: 15 l/min, 25 l/min, 50 l/min, 100 l/min, 200 l/min**
- **Fast response time ≤ 10 ms**
- **Easy handling: Switch points can be (pre)set continuously**
- **Variable R or G process connection**
- **Pressure ranges up to 25 bar, medium temperature up to 180 °C**


**Mechatronic flow sensor**

The flow sensor works to the principle of spring-supported piston: The piston, located in the valve seat in the housing, is lifted by the flowing medium against the spring resistance.
For binary signal output the piston position is detected by an inductive sensor. Analogue sensors however detect the position by means of a magnetic-field sensor.

The spring resistance forces the piston to return to its original position with decreasing flow. This ensures position-independent installation of the flow sensor preventing backflow.

The switch points can be easily set and fixed via a setting screw. The robust mechanical design ensures use in harsh environments. The units are maintenance-free.

Mechatronic sensor in the coolant circuit of an induction furnace.

## Application: liquids

| Measuring range [l/min] | Hysteresis [l/min] | Response time [s] | Medium temperature [°C] | Pressure loss [bar] | Process connection | Order no. |
|---|---|---|---|---|---|---|
| **M12 connector · output function NO · electrical design DC pnp · binary** | | | | | | |
| 1...15 | 0.2...1 | ≤ 0.01 | 0...85 | 0.05...0.24 | Rp 3/4 | **SBY332** |
| 1...25 | 0.5...2 | ≤ 0.01 | 0...85 | 0.04...0.44 | Rp 3/4 | **SBY333** |
| 2...50 | 1...3 | ≤ 0.01 | 0...85 | 0.05...0.72 | Rp 3/4 | **SBY334** |
| 5...100 | 3...6 | ≤ 0.01 | 0...85 | 0.05...1.05 | Rp 1 | **SBY346** |
| 20...200 | 5...10 | ≤ 0.01 | 0...85 | 0.05...0.31 | Rp 1 1/2 | **SBY357** |
| **M12 connector · electrical design DC PNP · analogue 4...20 mA** | | | | | | |
| 1...25 | – | ≤ 0.01 | -10...100 | 0.02...0.22 | Rp 3/4 | **SBY433** |
| 2...50 | – | ≤ 0.01 | -10...100 | 0.06...0.29 | Rp 3/4 | **SBY434** |
| 4...100 | – | ≤ 0.01 | -10...100 | 0.1...0.5 | Rp 1 | **SBY446** |
| 8...200 | – | ≤ 0.01 | -10...100 | 0.14...0.52 | Rp 1 1/2 | **SBY457** |
| **Silicone cable with M12 connector · electrical design DC · analogue 4...20 mA** | | | | | | |
| 0.3...25 | – | ≤ 0.01 | 10...180 | 0.02...0.22 | Rp 3/4 | **SBT633** |
| 0.3...50 | – | ≤ 0.01 | 10...180 | 0.06...0.29 | Rp 3/4 | **SBT634** |

All data refer to water.

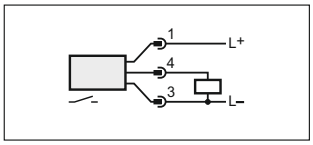
## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | M12 socket, 2 m black, PUR cable | **EVC001** |
| | M12 socket, 5 m black, PUR cable | **EVC002** |
|  | M12 socket, 2 m orange, PVC cable | **EVT064** |
| | M12 socket, 5 m orange, PVC cable | **EVT001** |

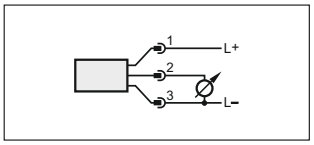
## Common technical data

| Type SBY, SBT | | |
|---|---|---|
| Operating voltage | [V] | 24 DC (-15 % / +10 %) |
| Accuracy | [% of the final value] | ± 5 |
| Short-circuit protection | | • |
| Reverse polarity / overload protection | | • / • |
| Protection rating, protection class | | IP 65 / IP 67, III |
| Ambient temperature | [°C] | 0...60 |
| Materials (wetted parts) | SBY3 | stainless steel (301/1.4310), nickel-plated brass, PPS, PP, O-ring: FPM |
| Materials (wetted parts) | SBT6 | stainless steel (316/1.4401), nickel-plated brass, PPS, O-ring: FPM |
| Materials (wetted parts) | SBY4 | stainless steel (316/1.4401), nickel-plated brass, PPS, PP, O-ring: FPM |

## Wiring diagram



SBY3



SBY4, SBT6

INNOVATIONS

# Flow sensor with Germanischer Lloyd approval

## Two switching outputs programmable

- **High repeatability across the extended measuring range**
- **Simple setting mode for quick set-up**
- **Variable process connection using adapters**
- **Reliable monitoring of liquids**
- **Electronic locking of the setting values**


**Simple, fast and flexible installation**

Thanks to a broad selection of process adapters, the SI0521 flow sensor can easily be integrated in almost any application.
The robust stainless steel housing provides high reliability even in cases of harsh environmental conditions.

The unit is unaffected by the orientation of the sensing face with respect to the direction of flow, providing increased flexibility of installation.

**Easy handling and high functionality**

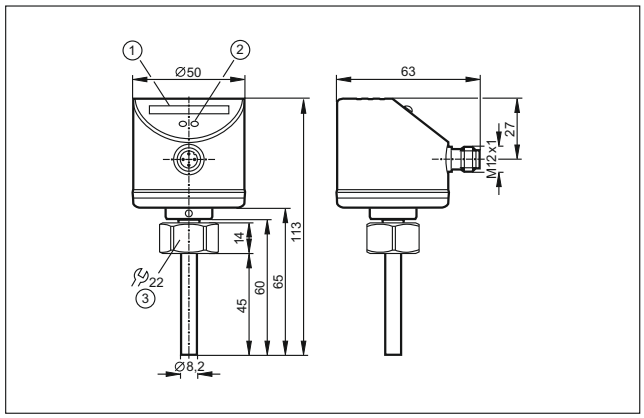
A pushbutton is used to set the flow range and adjust the switch. Current flow and switch point are indicated locally by multi-coloured LEDs.

Electronic locking of the settings and factory reset of the parameters provide additional safety.


Flow sensor in a cooling water monitoring application.

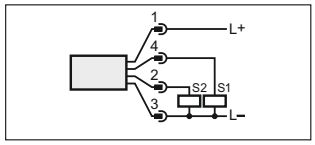
| Setting range liquids [cm/s] | Largest sensitivity [cm/s] | Medium temperature [°C] | Response time [s] | $U_b$ [V] | $I_B$ [mA] | Order no. |
|---|---|---|---|---|---|---|
| **M12 connector · 2 x normally open / normally closed programmable** | | | | | | |
| 3...300 | 3...100 | -15...70 | 1...10 | 18...32 DC | 2 x 250 | **SI0521** |

## Dimensions




1) LED bar display
2) Set button
3) Tightening torque 25 Nm

## Wiring diagram




## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Adapter M18 x 1.5 - L18 for mounting in T pieces | **E40104** |
|  | Adapter, M18 x 1.5 - G 1/2 | **E40096** |
|  | Adapter, M18 x 1.5 - G 1/4 | **E40099** |
|  | Welding adapter, M18 x 1.5 - Ø 24 mm | **E40124** |

## Further technical data

| | | Type SI0521 |
|---|---|---|
| Nominal pressure | [bar] | 75 |
| Power-on delay time | [s] | 10 |
| Repeatability (% of the measured value) | | 1...5 (5...100 cm/s) |
| Short-circuit protection, pulsed | | • |
| Reverse polarity protection / overload protection | | • / • |
| Protection rating / protection class | | IP 67, III |
| Ambient temperature | [°C] | -25...80 |
| Switch point setting | | Via pushbutton |
| Optical function indication | LED | 10 |
| Sensor material / housing | | High-grade stainless steel (316L/1.4404) / stainless steel (1.4301/304) |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket, M12, 2 m black, PUR cable | **EVC001** |
| | Socket, M12, 5 m black, PUR cable | **EVC002** |
|  | Socket, M12, 2 m black, PUR cable | **EVC004** |
| | Socket, M12, 5 m black, PUR cable | **EVC005** |

# Great value for money – the TS series temperature sensors

## Screw-in, bolt-on and cylindrical Pt100 temperature sensors

- **Cylindrical design Ø 6 mm or Ø 10 mm**
- **M5 and M6 screw-in sensors, bolt-on sensors for M6 screws**
- **Simple and 100 % sealed connection via ecolink M12 connector**
- **PUR cable for lower cost**
- **Different cable lengths from 2 to 5 m**


**Suits many different requirements**

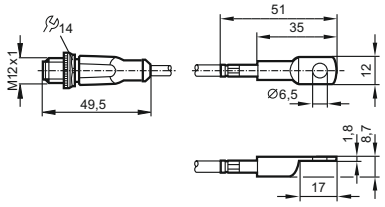
Every application has its own requirements as regards the temperature sensors to be used. Criteria such as basic and housing material or design are as important as the connection to control monitors.
The new ifm electronic screw-in and bolt-on sensors are designed to cover a large range of applications in various industries (machine tools, etc.).

Pt100 temperature sensor attached to an oil tank to monitor the housing temperature.

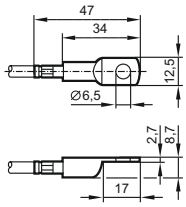
| Type | Measuring range [°C] | Housing material | Connection | Response dynamics T05 / T09 [s] | Order no. |
|---|---|---|---|---|---|
| **Measuring element Pt100** | | | | | |
| Bolt-on sensor 12 x 35 for M6 | -25...90 | stainless steel (1.4303 / 304) | PUR cable, 2 m M12 connector | 9 / 15 | **TS2229** |
| Bolt-on sensor 12.,5 x 34 for M6 | -25...90 | stainless steel (1.4303 / 304) | PUR-Kabel, 2 m | 12 / 39 | **TS2239** |
| Screw-in sensor M5 | -30...90 | high-grade stainless steel (1.4404 / 316L) | PUR cable, 2 m M12 connector | 3 / 8 | **TS2789** |
| Screw-in sensor M6 | -40...90 | high-grade stainless steel (1.4404 / 316L) | PUR cable, 2 m M12 connector | 3 / 9 | **TS2689** |
| Cylindrical Ø 10 mm, l 50 mm | -40...90 | high-grade stainless steel (1.4404 / 316L) | PUR cable, 2 m M12 connector | 6 / 25 | **TS2089** |
| Cylindrical Ø 6 mm, l 45 mm | -40...90 | high-grade stainless steel (1.4404 / 316L) | PUR cable, 2 m M12 connector | 3 / 10 | **TS2289** |
| Cylindrical Ø 10 mm, l 50 mm | -40...90 | high-grade stainless steel (1.4404 / 316L) | PUR cable, 5 m M12 connector | 6 / 25 | **TS5089** |
| Cylindrical Ø 6 mm, l 45 mm | -40...90 | high-grade stainless steel (1.4404 / 316L) | PUR cable, 5 m M12 connector | 3 / 10 | **TS5289** |
| Cylindrical Ø 6 mm, l 45 mm | -40...90 | high-grade stainless steel (1.4404 / 316L) | PUR cable, 2.5 m M12 connector | 3 / 10 | **TS9289** |

## Dimensions

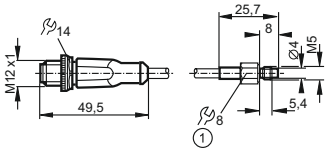
**TS2229**




**TS2239**

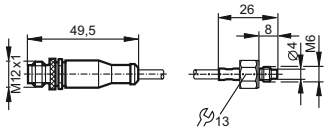



**TS2789**




1) tightening torque 1.5 Nm

**TS2689**

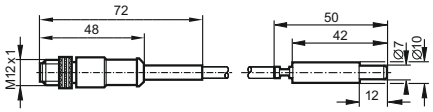



## Evaluation electronics

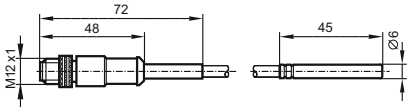
| Description | Order no. |
|---|---|
| Control monitor, 1 x analogue output, 1 x PNP/NPN | **TR2432** |
| Control monitor 2 x PNP/NPN | **TR7432** |
| Measured signal converter, Pt100 / Pt1000 in 4...20 mA, scaling 0...100 °C | **TP3237** |
| Measured signal converter, Pt100 / Pt1000 in 4...20 mA, scaling 50...150 °C | **TP3231** |
| Measured signal converter, Pt100 / Pt1000 in 4...20 mA, scaling 50...300 °C | **TP3232** |
| Measured signal converter, Pt100 / Pt1000 in 4...20 mA, scaling 0...300 °F | **TP3233** |
| Measured signal converter, Pt100 / Pt1000 in 0...10 mA, scaling 0...100 °C | **TP9237** |

## Dimensions

**TS2089, TS5089**



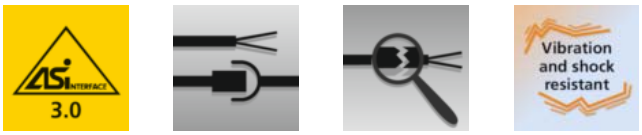

**TS2289, TS5289, TS9289**



# Small but effective – robust and flexible AS-i miniature module


## Quick connection of illuminated pushbuttons in the smallest of spaces

- **Cut-to-size wires or pluggable screw terminals**
- **AS-i connection for four control and signalling devices**
- **Short-circuit proof and overload-protected**
- **Particularly compact AS-i module**




**Extremely compact**

The miniature module can be integrated in small surface mounting housings. Four illuminated pushbuttons can be connected to it at a time. Since AS-i can also be used with round and spiral cables, the module for suspended pushbuttons is the perfect solution: The 2-wire cable is used for LED triggering and pushbutton query without requiring any auxiliary voltage.

**Well stowed**

There is often not much space in control boxes. The full potting protects the robust module ideally against mechanical damage during installation.

**Quick contact**

The connecting wires can be used for direct connection of illuminated pushbuttons in a surface mounting housing. No further auxiliary material is needed. The plug-in version is available as an alternative. The connectors are supplied with the unit.

### Advantages and customer benefits

- **Energy and data on one cable**
  The AS-i cable supplies the connected LEDs and pushbuttons with up to 150 mA without requiring further auxiliary voltage. All inputs and outputs are short-circuit proof.
- **A/B addressing saves addresses**
  Up to 62 participants can be connected. 248 inputs and 248 outputs are possible for one AS-i network.
- **On-site diagnosis**
  The module indicates the condition of all inputs and outputs as well as the energy supply and the communication status by means of LEDs.

### Products

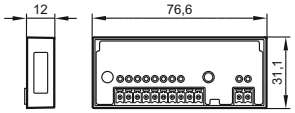
| Type | Description | Order no. |
|---|---|---|
| **Connection: PVC strand; 12 x 0.2 m** | | |
|  | Active AS-i module:<br>4 inputs / 4 outputs,<br>AS-i profile: S-7.A.7 | **AC2750** |
| | Active AS-i module:<br>4 inputs / 3 outputs,<br>AS-i profile: S-7.A.E | **AC2751** |
| **Connection: Screw terminals** | | |
|  | Active AS-i module:<br>4 inputs / 4 outputs,<br>AS-i profile: S-7.A.7 | **AC2752** |
| | Active AS-i module:<br>4 inputs / 3 outputs,<br>AS-i profile: S-7.A.E | **AC2753** |

### Common technical data

| Installation module<br>digital inputs, digital outputs | | |
|---|---|---|
| Operating voltage (AS-i) | [V DC] | 18...31.6 |
| Total current consumption from AS-i | [mA] | < 180 |
| Current rating per module | [mA] | 150 |
| Short-circuit protection | | • |
| Overload protection | | • |
| Ambient temperature | [°C] | -25...55 |
| AS-i specification | | 2.11 + 3.0 |
| Extended addressing mode | | • |
| Housing material | | Potted PC |

### Dimensions

**Example AC2752**



# Simple, low price and flexible: RFID for machine control

## Wide range of interfaces
## New: TCP/IP version

- **Integrated web server for device setup, diagnosis and monitoring**
- **Connection of RFID antennas, sensors or actuators**
- **Robust M30 RFID antennas with long writing / reading distance**
- **RFID antennas for flush and non-flush installation**
- **Simple connection of the antennas via cables up to 20 m**

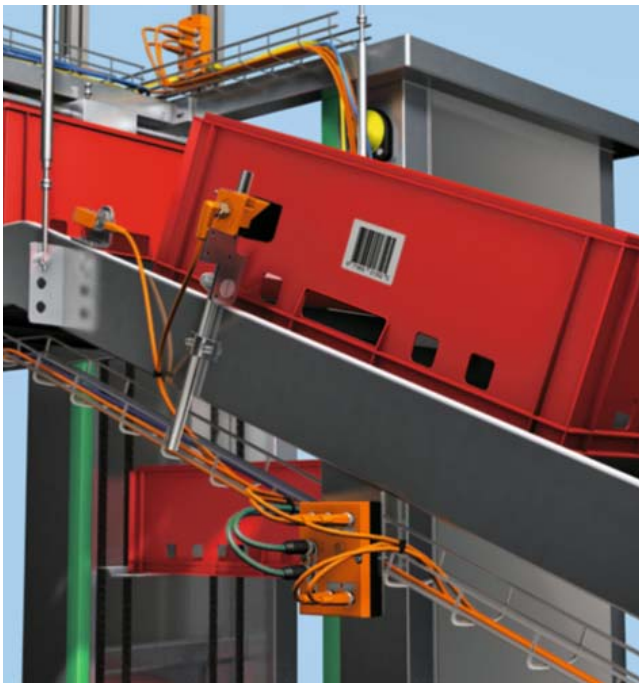
**Always know what's going on**

ifm electronic has placed RFID systems on the market that are unbeatable with regard to
- Price / performance ratio,
- Ease of installation and
- Robustness

This product line has now been extended by the EtherNet TCP/IP version.

**New M30 RFID antennas**

Another novelty are the robust M30 antennas for automation and conveying technology. Industrially compatible M12 plugs and connection technology from ifm electronic guarantee quick and simple connection of antennas and sensors without complicated wiring.



## Different interfaces

### New: DTE104 with TCP/IP

These new RFID evaluation unit is ideal for direct connection to PCs, industrial PCs or PLCs that have no standardised fieldbus interface. Users can access all connected antennas, sensors and actuators via TCP/IP protocol.

### DTE100 with Profibus DP

RFID evaluation unit with integrated Profibus DP interface.

### DTE101 with Profinet

This evaluation unit is in particular intended for customers with a Siemens controller

### DTE102 with EtherNet/IP

This version is optimised for controllers from Schneider Electric or Rockwell Automation.

## Easy integration

Data access to the transponders is fast and simple via the provided function blocks as well as directly via the process image of the controller.

## Integrated web server

All evaluation units have an integrated web server. Users can log in via an HTTP address to fully access the device.

Advantages: For parameter setting, the evaluation unit neither has to be connected to a fieldbus, nor does a controller already have to be present in the system. This makes it possible to carry out tests already before installation.

## Antennas, digital I/O and sensors

Each evaluation unit offers four sockets to connect up to four RFID antennas. Optionally, unused RFID antenna inputs can also be used to control outputs or to detect digital input signals. Two digital sensors can be connected to each socket set as an input; and an actuator to each output.

## Products

| | Description | Order no. |
|---|---|---|
| **RFID evaluation unit** | | |
|  | RFID evaluation unit, EtherNet TCP/IP interface | **DTE104** |
| | RFID evaluation unit, EtherNet/IP interface | **DTE102** |
| | RFID evaluation unit, Profinet interface | **DTE101** |
|  | RFID evaluation unit, Profibus DP interface | **DTE100** |
| **RFID antennas** | | |
|  | RFID antenna 13.56 MHz, M12 design, flush | **ANT410** |
|  | RFID antenna 13.56 MHz, M30 design, flush | **ANT430** |
|  | RFID antenna 13.56 MHz, M12 design, non flush | **ANT411** |
|  | RFID antenna 13.56 MHz, M30 design, non flush | **ANT431** |
|  | RFID antenna 125 KHz | **ANT512** |
| | RFID antenna 13.56 MHz, ISO 15693 | **ANT513** |
| **RFID transponders for ANT512** | | |
|  | ID-TAG/30X2.5/05 – 125 KHz 256 bits | **E80360** |
| | ID-TAG/30X2.5/05 – 125 KHz 2048 bits | **E80361** |
| **RFID transponders for ANT513, ANT410, ANT411, ANT430, ANT431** | | |
|  | ID-TAG/30X2.8/03 – 13.56 MHz, 16 Kbits – FRAM | **E80370** |
| | ID-TAG/30X2.5/06 – 13.56 MHz, 896 bits | **E80371** |
| | ID-TAG/R20X2.5/06 – 13.56 MHz, 896 bits | **E80377** |
| | ID-TAG/30X2.8/03 – 13.56 MHz, 64 Kbits | **E80380** |
| | ID-TAG/4,35X3,6/03 – 13.56 MHz, 896 bits, 10 pcs | **E80381** |
| | ID-TAG/Label 65X30/03 – 13.56 MHz, 896 bits, 500 pcs | **E80382** |
| | ID-TAG/Label 80X50/03 – 13.56 MHz, 896 bits, 500 pcs | **E80379** |

# Vibration monitoring in ATEX applications

## Vibration transmitter for the ATEX categories 3D/3G

- **Permanent vibration monitoring according to ISO 10816**
- **True RMS monitoring of overall velocity**
- **2-wire loop powered**
- **Robust stainless steel housing**

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II3D/3G ATEX

ISO 10816

IP 67
IP 69 K

### Monitoring of machine health

The vibration transmitter type VT monitors machines and equipment according to ISO 10816. The sensor measures the true RMS velocity to evaluate the overall machine health.

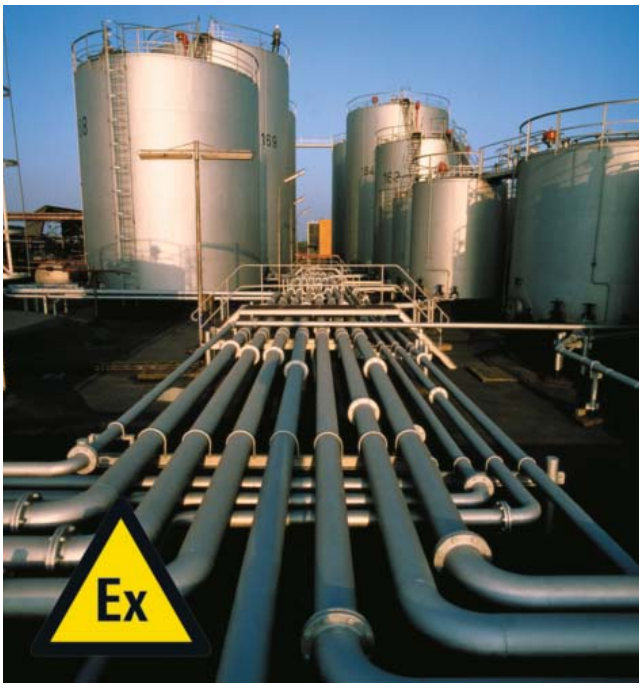
The values are then transmitted as an analogue signal (4...20 mA) directly to the PLC.

### Use in hazardous areas

Permanent vibration monitoring protects plant and equipment in hazardous areas ATEX category 3D/3G from consequential damages which can be caused for example by unbalance conditions of rotating components.

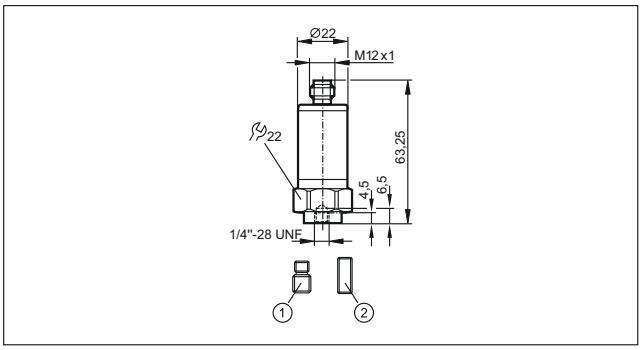
### Quick and easy installation

No extra parameter software is required.



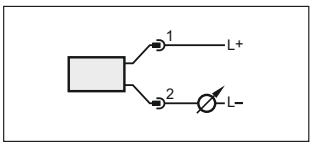

Overall vibration monitoring of rotating equipment such as fans, centrifuges etc.

## Dimensions




1) threaded adapter 1/4"-28 UNF / M8 x 1.25 mm
2) threaded adapter 1/4"-28 UNF
tightening torque 8 Nm

## Wiring diagram




## Technical data

| Vibration transmitter VTV12A | | |
|---|---|---|
| **Monitoring of overall velocity of machines and equipment according to ISO 10816 in ATEX area category 3D/3G** | | |
| Marking of the unit | | Ex II 3D Ex tc IIIC T110°C Dc X<br>Ex II 3G Ex nA IIC T4 Gc X |
| Operating voltage | [V] | 9.6...32 DC |
| Analogue output | [mA] | 4...20 |
| Load for analogue output | [Ω] | max. (Ub - 9.6 V) x 50;<br>720 at Ub = 24V |
| Protection | | IP 67;<br>for use outside EX area<br>IP 69K |
| Ambient temperature | [°C] | -20...60 |
| Housing material | | high-grade stainless steel<br>316L (1.4404) |
| Shock resistance | [g] | 400 |
| Frequency range | [Hz] | 10...1000 |
| Accuracy | [%] | < ± 3 |
| Repeatability | [%] | < 0.5 |
| Non-linearity | [in % of the span] | 0.25 |
| Measuring range | [mm/s] | 4 mA = 0; 20 mA = 25 |
| Measurand | | vibration velocity<br>true RMS |
| Connection | | M12 connector |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
| **ATEX approval, group II, category 3G/2D** | | |
|  | Connection cable,<br>M12 socket / M12 coupling,<br>5 m black, PUR cable | **EVC12A** |
| | Connection cable,<br>M12 socket / M12 coupling,<br>10 m black, PUR cable | **EVC13A** |

# From process monitoring to vibration analysis

## Diagnostic electronics type VSE with extended functionality

- **Flexible connection of IEPE or vibration sensors to all 4 dynamic channels**
- **Different filters for real-time peak monitoring**
- **Reaction times of < 1 ms and variable alarm levels for machine protection**
- **Increased accuracy and improved internal memory function**
- **32 run-time and performance counters**

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**High performance diagnostic electronics**

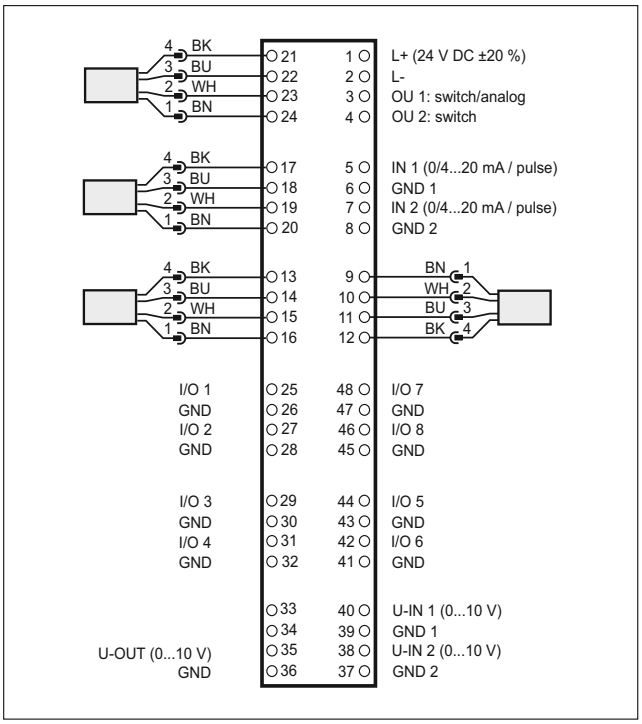
Vibration analysis protects machine components, tools and workpieces during machining against costly consequential damage and avoids scrap.

In addition to the proven MEMS-based accelerometers from ifm electronic (type VSA), accelerometers, microphones, or force sensors which are based on the IEPE standard can also be connected to the revised diagnostic electronics.

Using the higher accuracy it is now possible to increase the resolution of large measuring ranges.

It is also possible to select different filters for process monitoring and machine protection. Up to 32 counters provide vibration characteristics, performance and run-time information which can be used to optimise production.

## Wiring diagram



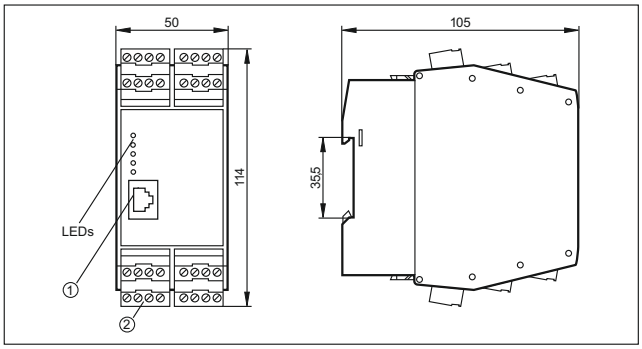

## Vibration sensors

| Type | Description | Order no. |
|---|---|---|
| **For connection to external diagnostic electronics type VSE** | | |
|  | Measuring range ± 25 g; IP 69K; Frequency range 0...6,000 Hz; Connection: M12 connector | **VSA001** |
| | Measuring range ± 250 g; IP 69K; Frequency range 0...10,000 Hz; Connection: M12 connector | **VSA201** |
| | Measuring range ± 3.3 g; IP 69K; Frequency range 0...1,000 Hz; Connection: M12 connector | **VSA101** |
|  | Measuring range ± 25 g; IP 67; Frequency range 0...10,000 Hz; Connection: PUR cable with, M12 connector, 0.6m | **VSA002** |
|  | Measuring range ± 25 g; IP 67; Frequency range 0...10,000 Hz; Connection: PUR cable, 3 m | **VSA004** |
| | Measuring range ± 25 g; IP 67; Frequency range 0...10,000 Hz; Connection: PUR cable, 10 m | **VSA005** |

## Technical data

| Diagnostic electronics VSE100 | | |
|---|---|---|
| Operating voltage | [V] | 24 DC ± 20 % |
| Ambient temperature | [°C] | 0...70 |
| Protection | | IP 20, III |
| Housing | | DIN rail 2" |
| Inputs | | 4 dynamic inputs (16 bits), IEPE or sensor type VSA for use in any combination<br>2 speed inputs (0/4...20 mA or 0...10 V or pulse 24 V)<br>8 x digital inputs / outputs (freely configurable) (PNP 100 mA) |
| Outputs | | 2 x digital alarm outputs (PNP 100 mA) or:<br>1 x digital alarm output + 1 x analogue output 0/4...20 mA / 0...10 V<br>8 x digital outputs / inputs (freely configurable) (PNP 100 mA) |
| History function | | integrated |
| Data interface | | Ethernet TCP/IP, (10 / 100 MBits) |
| Counter function | | integrated |

## Dimensions

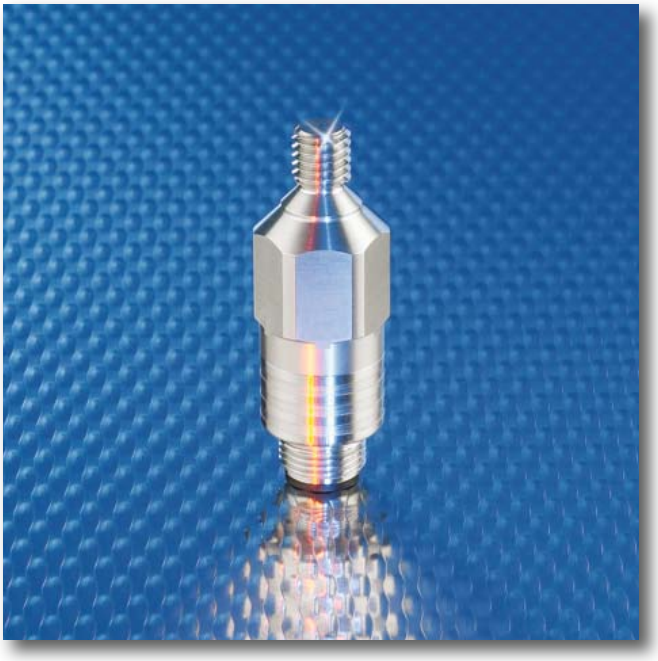



1) Ethernet interface
2) Combicon connector with screw connectors (optional)

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Parameter software | **VES003** |
| | octavis OPC Server Software<br>No. connections:<br>25, 50, 75, 100, 1000<br>German / English | **VOS001**<br>**VOS002**<br>**VOS003**<br>**VOS004**<br>**VOS005** |
|  | Connection cable<br>Ethernet cross-over patch cable<br>2 m, PVC cable,<br>RJ45 plug / RJ45 plug | **EC2080** |

# Vibration sensor for high acceleration



## For process monitoring with high peak accelerations

- **Wide measurement range up to 250 g**
- **Saturation-free behaviour in case of overload**
- **Calibration free due to integrated self-test**
- **M12 standard connector**
- **High protection rating IP 69K**

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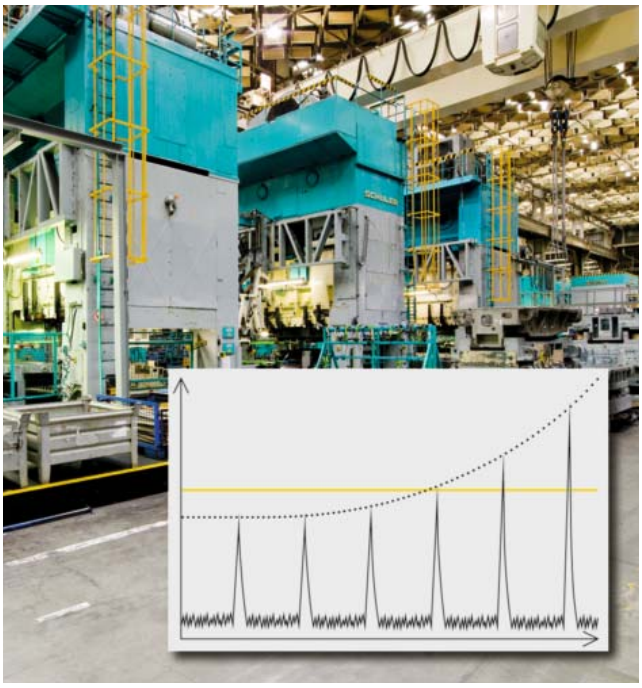
**High measuring range for extreme acceleration values**

Particularly during the process monitoring of presses, stamping and other machine tools high peak accelerations occur which have to be monitored.

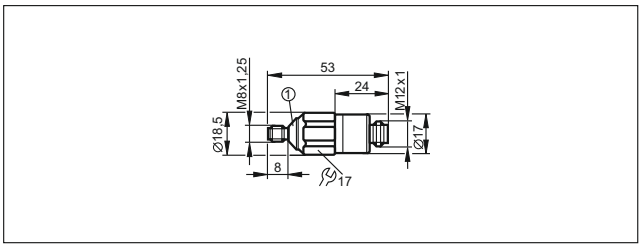
VSA201 is the ideal sensor for the interference-free monitoring of acceleration behaviour in processes within wide amplitude and frequency ranges.

Due to the proven ifm MEMS technology the sensor is not influenced by saturation or bent cables under overload conditions.

The integrated self-test in combination with the relevant diagnostic electronics VSE enables reliable process and machine monitoring.

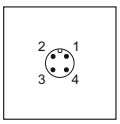


## Dimensions




1) Conical angle = 90°

## Wiring diagram




Pin 1: L+ (+9 V)
Pin 2: I out
Pin 3: GND
Pin 4: Test

## Technical data

| Vibration sensor VSA201 for connection to external diagnostic electronics type VSE | | |
|---|---|---|
| Measuring range | [g] | ± 250 |
| Frequency range | [Hz] | 0...10000 |
| Protection | | IP 68 / IP 69K |
| Ambient temperature | [°C] | -30...125, for UL applications: max. 70 °C |
| Housing material | | high-grade stainless steel 316L (1.4404) |
| Connection | | M12 connector |

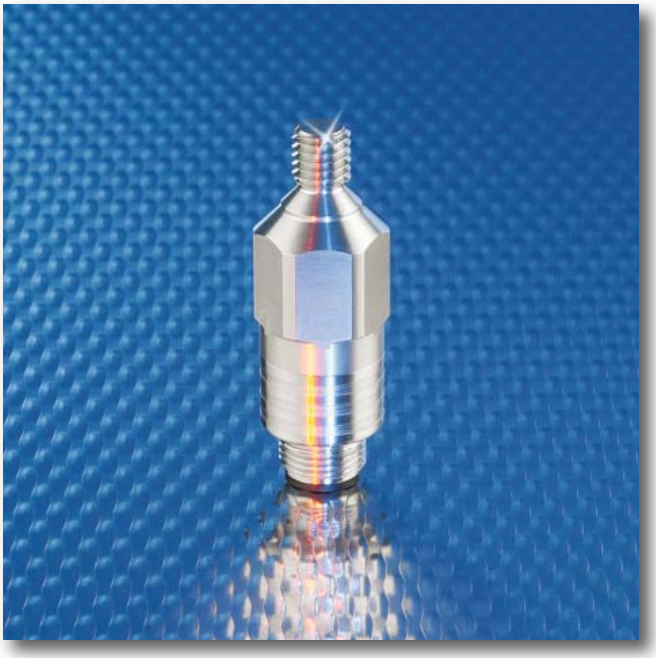
## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | PEEK adapter, M8 – M8, galvanic isolation | E30132 |
|  | Conical washers packing quantity: 5 pcs | E30115 |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket M12 screened, 5 m black, PUR cable, 5-pole | EVC533 |
| | Socket M12 screened, 10 m black, PUR cable, 5-pole | EVC534 |
| | Socket M12 screened, 30 m black, PUR cable, 5-pole | EVC561 |

# Vibration sensor with high resolution



## For structural vibrations with low acceleration

- **Low noise up to 3.3 g**
- **Saturation-free behaviour in case of overload**
- **Calibration free due to integrated self-test**
- **M12 standard connector**
- **High protection rating IP 69K**

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**Reliable monitoring of structural vibrations**

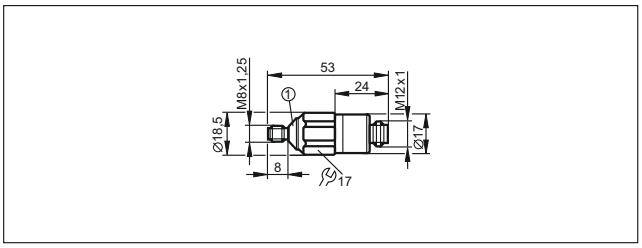
The monitoring of structural vibrations and movements requires a high resolution within a small measuring range.

VSA101 is the ideal sensor to detect vibratons on stationary or moving structures.

Due to the proven ifm MEMS technology the sensor is not influenced by saturation or bent cables under overload conditions.

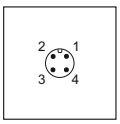
The integrated self-test in combination with the relevant diagnostic electronics VSE enables reliable and highly accurate monitoring of structural vibrations, e.g. for wind turbines, rotor blades, bridges or buildings.

## Dimensions




1) Conical angle = 90°

## Wiring diagram




Pin 1: L+ (+9 V)
Pin 2: I out
Pin 3: GND
Pin 4: Test

## Technical data

| Vibration sensor VSA101 for connection to external diagnostic electronics type VSE | | |
|---|---|---|
| Measuring range | [g] | ± 3.3 |
| Frequency range | [Hz] | 0...10000 |
| Protection | | IP 68 / IP 69K |
| Ambient temperature | [°C] | -30...125, for UL applications: max. 70 °C |
| Housing material | | high-grade stainless steel 316L (1.4404) |
| Connection | | M12 connector |

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | PEEK adapter, M8 – M8, galvanic isolation | E30132 |
|  | Conical washers packing quantity: 5 pcs | E30115 |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | Socket M12 screened, 5 m black, PUR cable, 5-pole | EVC533 |
| | Socket M12 screened, 10 m black, PUR cable, 5-pole | EVC534 |
| | Socket M12 screened, 30 m black, PUR cable, 5-pole | EVC561 |

# Continuous oil condition monitoring


## Particle monitor LDP100 monitors the contamination of oils

- **Analysis of particle concentration for trend monitoring**
- **Displays the cleanliness levels according to ISO 4406:99 or SAE AS4059E**
- **Robust aluminium die-cast housing for operating with pressures of up to 420 bar**
- **Intensely illuminated graphic display, intuitive push-button set-up**
- **CAN-Bus, analogue and switching outputs**


### Recognising contamination

LDP100 monitors the degree of cleanliness or the level of contamination in fluids. Compatible media are mineral oils, ester oils and biodegradable oils.

The integrated data memory allows data recording over a longer period. The LCD display indicates the cleanliness level.

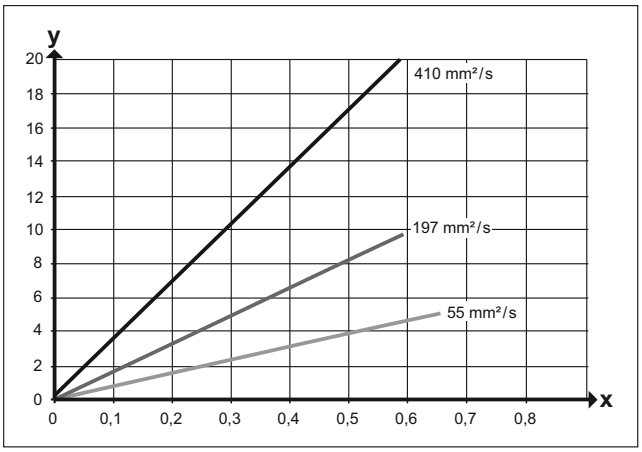
### Measuring principle

The optical particle monitor LDP100 operates according to the light extinction principle. The changes to light intensity of a laser beam caused by particles in the medium flowing through the measurement cell are detected by a photo detector. The calibration is made in accordance with ISO 11943.

### Connection

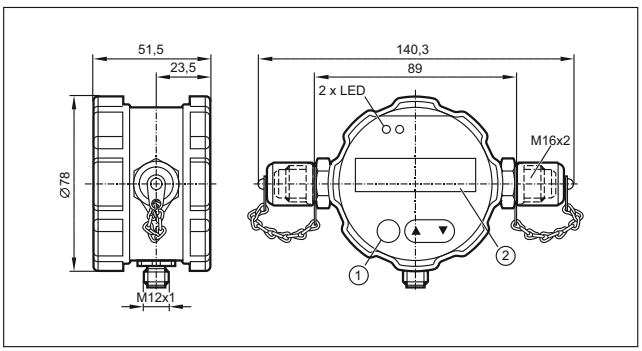
On the fluid side the LDP100 is equipped with two Minimess connections with which the unit can be mounted in the off-line circuit of the oil cycle.
The electrical connection is installed using an 8-pole M12-plug.

## Δp-Q-characteristics for different viscosities




x: Volume flow in [l/min]
y: Δ p in [bar]

## Dimensions




1) Setbutton
2) LCD display

## Accessories

| Type | Description | Order no. |
|---|---|---|
|  | Screw coupling, 0.18 mm | **E43330** |
| | Screw coupling, 0.3 mm | **E43331** |
|  | CAN adapter cable | **E43332** |
| | | |
|  | BasicDisplay | **CR0451** |
| | | |

## Technical data

| Particle monitor LDP100 | | |
|---|---|---|
| Operating voltage | [V DC] | 9...33 |
| Current consumption | 9 V<br>30 V | 180 mA<br>65 mA |
| Pressure range | [bar] | up to 420, dynamic |
| Flow | [ml / min] | 50...400 |
| Display | | Cleanliness level according to ISO 4406:99 and SAE AS4059E |
| Size channels | [µm] | 4, 6, 14, 21 |
| Concentration limit | | ISO 4...25 at 10 % optical coincidence |
| Temperature range | [°C]<br>Oil<br>Ambient<br>Storage | <br><br>-10...80<br>-10...60<br>-20...60 |
| Fluid compatibility | | Mineral oils (e.g. HLP), ester oils (e.g. HEES) and biodegradable oils (e.g. HETG), phosphate ester optionally |
| Protection rating | | IP 67<br>(with display IP 65) |
| Interface | | analogue output 4...20 mA configurable, digital alarm output, digital input to start and stop readings |
| Data memory | | 3000 data records |
| Setting | | Via push buttons or digital I/O |
| Electrical connection | | M12 x 1, 8-pole |
| Process connection | | Minimess M16 x 2 |
| Wetted materials, sealing materials | | High grade stainless steel, sapphire, NBR |

## Connection technology

| Type | Description | Order no. |
|---|---|---|
|  | M12 socket,<br>5 m, PUR cable, 8-pole | **E12166** |
| | | |
|  | M12 socket,<br>5 m, PUR cable, 8-pole | **E12168** |
| | | |

# Many inputs and outputs for little money

## SmartController XL with 64 multifunctional inputs and outputs

- **Analogue and digital I/O with diagnostic function for mobile applications**
- **For complex control functions in mobile machines**
- **3 CAN interfaces with CANopen and SAE J 1939 protocol**
- **Freely programmable with CODESYS 2.3 to IEC 61131-3**
- **E1 type approval of the Kraftfahrtbundesamt (German Federal Motor Transport Authority)**


ecomat® mobile

### SmartController for mobile machines

ifm electronic has launched the SmartController XL in response to market demand for a low-cost compact controller for mobile applications. Offering 64 inputs and outputs, it can be used as a main controller for small machines or in applications for processing of analogue and digital sensor and actuator signals. The SmartController XL was developed particularly for use in off-highway and mobile machines on the basis of the current standards and long-term experience.

### Flexible networking

Networking of the modules with the CANopen protocol on the powerful CAN bus allows quick implementation of the application. Three integrated CANopen interfaces serve for the flexible and powerful extension of the system with further I/O or control modules. Also, the exchange of SAE J 1939 engine data is easy to carry out via these interfaces.

## Functions and advantages

- **Mechanical design**

  The two-part control electronics integrated into a compact metal housing provides all necessary connections for the inputs and outputs, communication and programming via the reverse-polarity protected central plugs suitable for mobile applications.

- **Powerful electronics**

  The integrated 32-bit processor and the electronics are optimised for mobile applications. The inputs and outputs distributed over two device units can be adapted to the application via the user program. The two-colour status LED displays the most important system messages.

- **Configurable inputs / outputs**

  The inputs / outputs can be freely configured by the user. Digital inputs, analogue inputs for current or voltage, inputs with diagnostic capability and fast pulse inputs are available. The outputs can be set as digital outputs, PWM and current-controlled outputs.

- **Programming to IEC 61131-3 with CODESYS**

  The CODESYS software enables clear and easy creation of the application software for the user. The SmartController XL supports all common CODESYS programming languages. Simple and clearly structured function libraries are available for communication and special device functions.

- **CAN-interfaces with CANopen protocol**

  The SmartController XL is equipped with three CAN interfaces to ISO 11898. Using these, data can for example be exchanged with the connected display, further I/O modules or an engine controller. The interfaces support, among other things, the CANopen and the J 1939 protocol.

  The CAN interfaces are also used for programming. To do so, the device electronics are directly and conveniently activated via the powerful PC interface CANfox. This enables users to load the operating system and the application program or to change parameters.
  The basic unit of the controller is linked directly to the integrated, pre-configured I/O extension via a CAN connection.

## Applications:

- Compact construction machines
- Agricultural machines
- Municipal vehicles

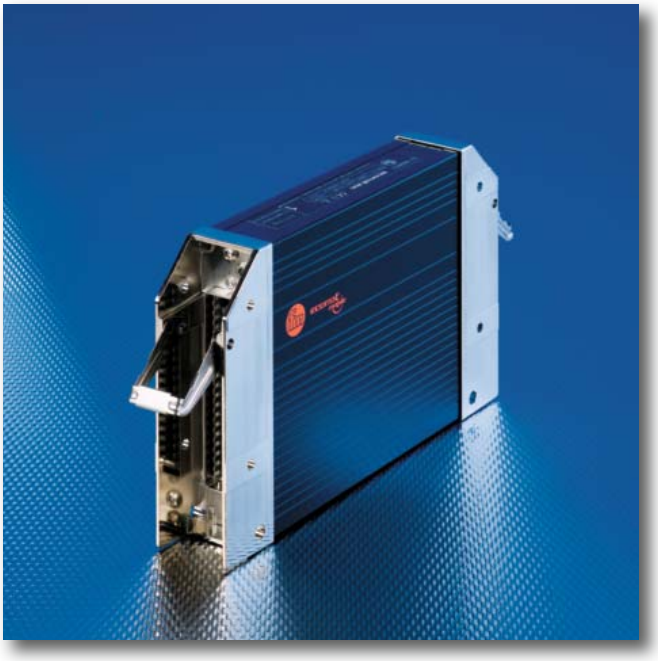
## Products

| Description | Order no. |
|---|---|
| SmartController XL, 32 bits, 16 I / 16 O | **CR2532** |
| Connector, 55 poles (wirable) | **EC2013** |
| Cable with connector 55 poles, 1.2 m | **EC2086** |
| Programming cable with USB adapter, 2 m | **EC2096** |
| Programming software CODESYS, German V2.3 | **CP9006** |
| Programming software CODESYS, English V2.3 | **CP9008** |

## Technical data

| | | SmartController XL<br>CR2532 |
|---|---|---|
| Housing | | closed metal housing<br>with flange fastening |
| Device connection | | AMP connector<br>55 poles latched, protected against reverse polarity |
| Protection | | IP 67 |
| Operating voltage | [V DC] | 8...32 |
| Current consumption | [mA] | ≤ 100 |
| Temperature range | [°C] | -40...85 |
| Indicators | LED | red / green |
| Controller | | Freescale PowerPC |
| Number of inputs (configurable)<br>Digital (positive / negative sensor signals), Diagnosis, analogue (0...10 / 32 V, 0...20 mA, ratiometric)<br>Digital (positive sensor signals), diagnosis Resistance measurement (16 Ω...30 kΩ)<br>Digital (positive sensor signals) Frequency (≤ 30 kHz)<br>Digital (positive sensor signals) | | 32<br>8<br>4<br>8<br>12 |
| Number of outputs (configurable)<br>Digital, positive-switching, PWM output (2 A)<br>Digital, positive-switching, PWM output (2 A) Current-controlled (2 A)<br>Digital, positive-switching, PWM output (4 A) (alternative 2x analogue output 0...10 V)<br>Digital, positive-switching (2 A) | | 32<br>16<br>4<br>8<br>8 |
| Interfaces | | 3 x CAN |
| Supported CAN protocols | | CANopen<br>(CiA DS 301 V4),<br>SAE J 1939 |
| Program memory | [kB] | 1536 |
| Data memory RAM | [kB] | 592 |
| Data memory non-volatile | [kB] | 2 |
| Programming software | | CODESYS V 2.3 |
| Standards and tests (extract) | | CE,<br>E1 (UN-ECE R10)<br>EN50155 / EC50121 |

# Robust controller for more mobility on wheels and tracks



ecomat® mobile

## 32-bit ExtendedController with 64 multifunctional inputs and outputs

- **Analogue and digital I/Os with diagnostic function for mobile applications**
- **For complex control functions in mobile machines**
- **5 CAN interfaces with CANopen and SAE J1939 protocol**
- **Freely programmable with CODESYS 2.3 to IEC 61131-3**
- **E1 type approval of the Kraftfahrtbundesamt (German Federal Motor Transport Authority)**

E1 | IP 67 | Vibration and shock resistant | CAN open®

### ExtendedController for mobile machines

The mobile controller meets the requirements of modern electronics. The large number of inputs and outputs allows to simultaneously process sensor signals and proportional functions. The controller was developed particularly for use in off-highway and mobile machines on the basis of the current standards and long-term experience.

### Connection and interfaces

Besides the multifunctional inputs and outputs each control module is equipped with 5 CAN interfaces. They support all important bus protocols, different baud rates and also the transparent and preprocessed data exchange. Programming to IEC 61131-3 ensures that all control functions can be easily integrated in the application program.

## Functions and advantages

- **Mechanical design**

  The control electronics integrated into a compact metal housing provides all necessary connections for the inputs and outputs, communication and programming via the reverse-polarity protected central plugs suitable for mobile applications. The RGB status LED displays the most important system messages.

- **Powerful electronics**

  The core of the controller designed according to the applicable standards for electronics for mobile applications is a modern 32-bit processor. Monitoring and protection functions enable safe operation even under extreme operating conditions.
  The input / output extension is connected to the main controller via a CANopen interface.

- **Configurable inputs and outputs**

  By means of the application software the inputs and outputs can be configured to adapt to the respective application.

  Depending on the type of input, a configuration as digital, frequency or analogue input with diagnostic function or as digital input or input for resistance measurement is possible. In addition some of the inputs support the evaluation of positive and negative digital input signals. The analogue inputs enable both current and voltage measurement.

  Most outputs provide a configuration as digital or PWM output with diagnostic capabilities, with and without current control.

  **Programmable to IEC 61131-3 with CODESYS**

  Programming with the standardised IEC 61131-3 languages enables the user to create clear and easy application software.
  In addition, libraries are available for special functions of the controller.

- **CAN-interfaces with CANopen protocol**

  The controller is equipped with five CAN interfaces to ISO 11898. The data is exchanged with all connected bus participants via these interfaces. The CANopen protocol enables quick and flexible connection to the bus. For communication with the motor and the power train all interfaces can be reconfigured to the J1939 protocol.

**Applications:**

Complex construction machines, agricultural machines, municipal vehicles

| Technical data ExtendedController CR0133 | | |
|---|---|---|
| Housing | | Closed metal housing with flange fastening |
| Device connection | | AMP connector 55 poles latched, protected against reverse polarity |
| Protection | | IP 67 |
| Operating voltage | [V DC] | 8...32 |
| Current consumption | [mA] | ≤ 210 |
| Temperature range | [°C] | -40...85 |
| Indication | | RGB LED |
| Controller | | Infineon TriCore 1796 |
| Number of inputs (configurable)<br>Digital (positive / negative sensor signals)<br>Analogue (0...10 / 32 V, 0...20 mA, ratiometric)<br>Frequency (≤ 30 kHz)<br>Digital (positive / negative sensor signals)<br>Analogue (0...10 / 32 V, 0...20 mA, ratiometric)<br>Digital (positive sensor signals)<br>Resistance measurement (3...690 Ω / 16 Ω...30 kΩ)<br>Digital (positive sensor signals)<br>Frequency (≤ 30 kHz)<br>Digital (positive sensor signals) | | <br>12<br><br><br>4<br><br>6<br><br>4<br><br>6 |
| Number of outputs (configurable)<br>Digital, positive / negative switching<br>PWM output (2/4 A, 3 A, H-bridge)<br>Current-controlled (2/4 A, 3 A)<br>Digital, positive-switching,<br>PWM output (2 A)<br>Current-controlled (2 A)<br>Digital, positive-switching,<br>PWM output (2 A)<br>(2 of which analogue output 0...10 V)<br>Digital, positive-switching,<br>PWM output (4 A)<br>Digital, positive-switching (2 A) | | <br>16<br><br><br>2<br><br>8<br><br>2<br><br>4 |
| Sensor supply<br>5 / 10 V DC, 400 mA | | 1 |
| Interfaces | | 5 x CAN, 1 x RS232<br>1 x virt. COM port (USB) |
| Supported CAN protocols | | CANopen<br>(CiA DS 301 V4)<br>SAE J 1939 |
| Program memory | [MB] | 1,2 |
| Data memory RAM | [kB] | 256 |
| Data memory FRAM | [kB] | 48 |
| Data memory non-volatile | [kB] | 4 |
| Data memory auto-save | [kB] | 4 |
| Programming software | | CODESYS V2.3 |
| Standards and tests (extract) | | CE,<br>E1 (UN-ECE R10)<br>EN50155 / EC50121 |

# Looking for a bigger size? ecomat*mobile* BasicDisplay XL

## Visualisation for mobile machines – easy and cost-optimised

- **Easy installation thanks to a coordinated mechanical concept**
- **Indication of system messages and visualisation of machine functions**
- **High-performance CAN interface for various communication tasks**
- **Programmable to IEC 61131-3 with CODESYS**
- **E1 type approval of the Kraftfahrtbundesamt (German Federal Motor Transport Authority)**

**ecomat*mobile* Basic**

In many small and compact mobile applications, the requirements on control tasks are increasing. The cost-optimised and modular mini controller ecomat*mobile* solves these tasks.

The BasicDisplay XL complements the existing components BasicRelay, BasicController and BasicDisplay.

Thanks to its electrical and mechanical features it can optimally be integrated in the existing ecomat*mobile* Basic family.

Free programming and the easy set-up of the visualisation screens with CODESYS to IEC 61131-3 ensure independent operation in different applications.

## Functions and advantages

The high-resolution colour display replaces conventional analogue displays and, in part, the rudimentary operating elements of machines.

- **High-resolution display**

  Protected by a continuous membrane, the modern display, which can even be read in sunlight, provides a resolution of 480 x 272 pixels with an aspect ratio of 16:9. Graphics can be shown with a colour depth of up to 256 colours.

- **Mechanical design**

  The BasicDisplay XL has a sealed plastic housing with protection rating IP 67. The integrated M12 connector provides all important connections for supply and communication. The display can be mounted directly on the operator panel using a centralised fixing nut or it can be snapped into the mounting support.

- **Powerful electronics**

  The integrated 32-bit processor and the electronics tailored to the applications are optimally adapted to the application area. A status LED indicates the current operating status of the display.
  Thanks to the integrated watchdog, stand-alone operation of the BasicDisplay XL is possible.

- **Programming according to IEC 61131-3**

  The CODESYS software enables clear and easy creation of the application software for the user. Function libraries are available for the special functions of the BasicDisplay XL. The graphic elements are created and animated via the integrated visualisation.

- **Communication interfaces**

  The BasicDisplay XL is fitted with a CAN interface to ISO 11898. These interfaces are for example used to exchange data between the connected controller, the decentralised input/output modules or the engine controller.
  To perform these tasks the interface supports the CANopen and the J1939 protocol. With the master functionality of the CANopen protocol, networks can be built via decentralised input/output modules.

**Applications:**

**Mobile construction equipment and building material machines, compact municipal vehicles, machines and equipment for market gardening and landscape gardening.**

## The products

| Description | Order no. |
|---|---|
| BasicDisplay XL, 4.3", 480 x 272 pixels | **CR0452** |
| Mounting plate for panel mounting BasicDisplay XL | **EC0404** |
| Mounting support for surface mounting (RAMmount) | **EC0406** |
| Connection cable BasicDisplay XL, 5 m – BasicController with CAN terminating resistors | **EC0454** |
| Connection cables BasicDisplay XL, 5 m – 2 BasicControllers, 50 cm with CAN terminating resistors | **EC0455** |
| Programming software CODESYS, German version | **CP9006** |
| Programming software CODESYS, English version | **CP9008** |
| CAN programming interface CANfox | **EC2112** |
| Adapter set CAN/RS232 for CANfox | **EC2113** |

## Technical data

| BasicDisplay XL CR0452 | | |
|---|---|---|
| Housing | | Plastic with M52 screw connection |
| Device connection | | M12 connector |
| Protection | Front<br>Back | IP 67<br>IP 65 |
| Operating voltage | [V DC] | 8...32 |
| Current consumption | [mA] | ≤ 100 |
| Temperature range | Operation [°C]<br>Storage [°C] | -20...65<br>-30...80 |
| 4.3" TFT LCD display | | 480 x 272<br>256 colours |
| Processor | | PowerPC<br>50 MHz |
| Indication | | LED (red/green) |
| Data memory SRAM | [kB] | 592 |
| Program / data memory Flash | [kB] | 1536 |
| Data memory (retain) | [kB] | 1 |
| Function keys with softkey function, backlit | | 6 |
| Navigation key with cursor function, backlit | | 1 |
| Interfaces | | 1 x CAN |
| Supported CAN protocols | | CANopen (DS 301 V4.1)<br>SAE J 1939 |
| Programming software | | CODESYS V2.3 |
| Standards and tests (extract) | | CE,<br>E1 (UN-ECE R10) |

# ecolink – the reliable connection even with strong noise field interference

## For users in factory automation and the machine tool industry

- **Connection technology meets the M12 standard (EN 61076)**
- **The mechanical end stop protects the O-ring against destruction**
- **Permanent vibration protection with saw tooth contour**
- **Continuously high EMC interference protection**

IP 67
IP 68
IP 69 K

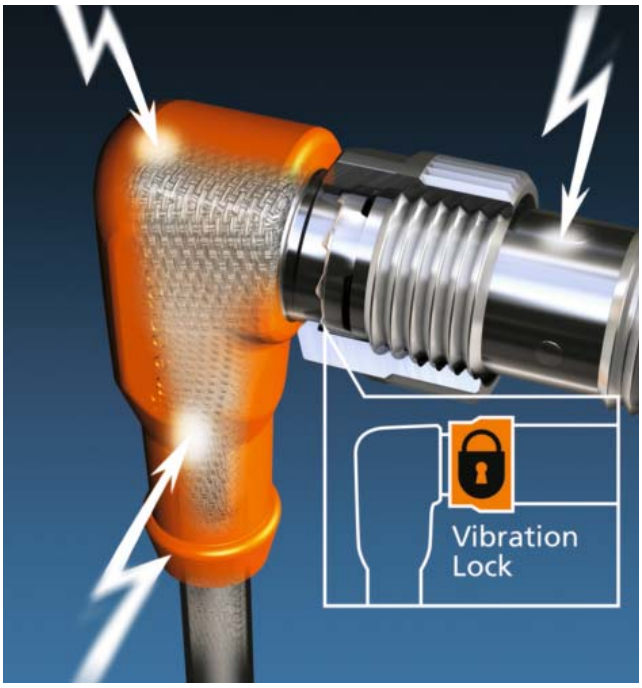
Vibration and shock resistant

**ecolink M12 for standard applications**

Most applications require special solutions. Only reliable production processes and faultless assembly lead to success in the long run.

The integrated end stop protects the O-ring against destruction caused by over-tightening the nut. No tools needed for installation and removal.

The asymmetrically acting vibration protection holds the coupling nut tight in its position ensuring a low contact resistance between the nut of the connector and the housing of the connected device.
This is extremely important for permanently high protection against strong noise interference.




**ecolink –**
The new dimension in connection technology.

### Technical data:

Operating voltage:
**4 poles:** 50 V AC / 60 V DC
**5 poles:** 30 V AC / 36 V DC

Nominal current: 4 A

Protection:
Screen not connected: IP 65, IP 67, IP 68, IP 69K / III
Screen connected: IP 65, IP 67 / III
In locked condition with the matching counterpart.

Tightening torque nut: 0.6...1.5 Nm
Note the maximum value of the counterpart.

Ambient temperature:
-25...90 °C, cable firmly laid
-25...90 °C, cable moved

Cable characteristics:
Drag chain, 2 million cycles

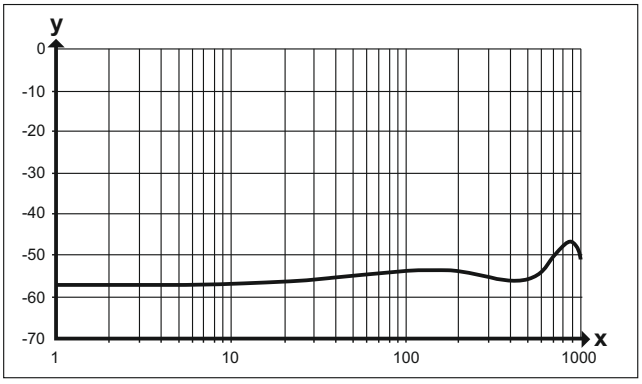
### Materials:

Housing / moulded body: TPU
Contact carrier: TPU
Coupling nut: Nickel-plated brass
Contacts: Gold-plated
Sealing ring: Viton
Cable: PUR halogen-free, shielded,
4 x 0.34 mm², Ø 4.9 mm
5 x 0.25 mm², Ø 4.9 mm

### Approvals:

cRUus in preparation

### Shielding characteristics

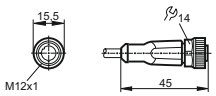



x: Frequency in [MHz]
y: Shielding characteristics in [dB]

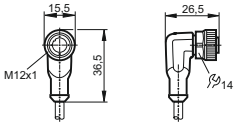
| Type | Connection / cable | Number of poles | Order no. |
|---|---|---|---|
| **Screen not connected** | | | |
|  | 2.0 m | 4 | **EVC526** |
| | 5.0 m | 4 | **EVC527** |
| | 10.0 m | 4 | **EVC528** |
|  | 2.0 m | 4 | **EVC529** |
| | 5.0 m | 4 | **EVC530** |
| | 10.0 m | 4 | **EVC531** |
|  | 2.0 m | 5 | **EVC532** |
| | 5.0 m | 5 | **EVC533** |
| | 10.0 m | 5 | **EVC534** |
|  | 2.0 m | 5 | **EVC535** |
| | 5.0 m | 5 | **EVC536** |
| | 10.0 m | 5 | **EVC537** |
| **Screen connected** | | | |
|  | 2.0 m | 4 | **EVC538** |
| | 5.0 m | 4 | **EVC539** |
| | 10.0 m | 4 | **EVC540** |
|  | 2.0 m | 4 | **EVC541** |
| | 5.0 m | 4 | **EVC542** |
| | 10.0 m | 4 | **EVC543** |
|  | 2.0 m | 5 | **EVC544** |
| | 5.0 m | 5 | **EVC545** |
| | 10.0 m | 5 | **EVC546** |
|  | 2.0 m | 5 | **EVC547** |
| | 5.0 m | 5 | **EVC548** |
| | 10.0 m | 5 | **EVC549** |

### Dimensions

**Example EVC526**

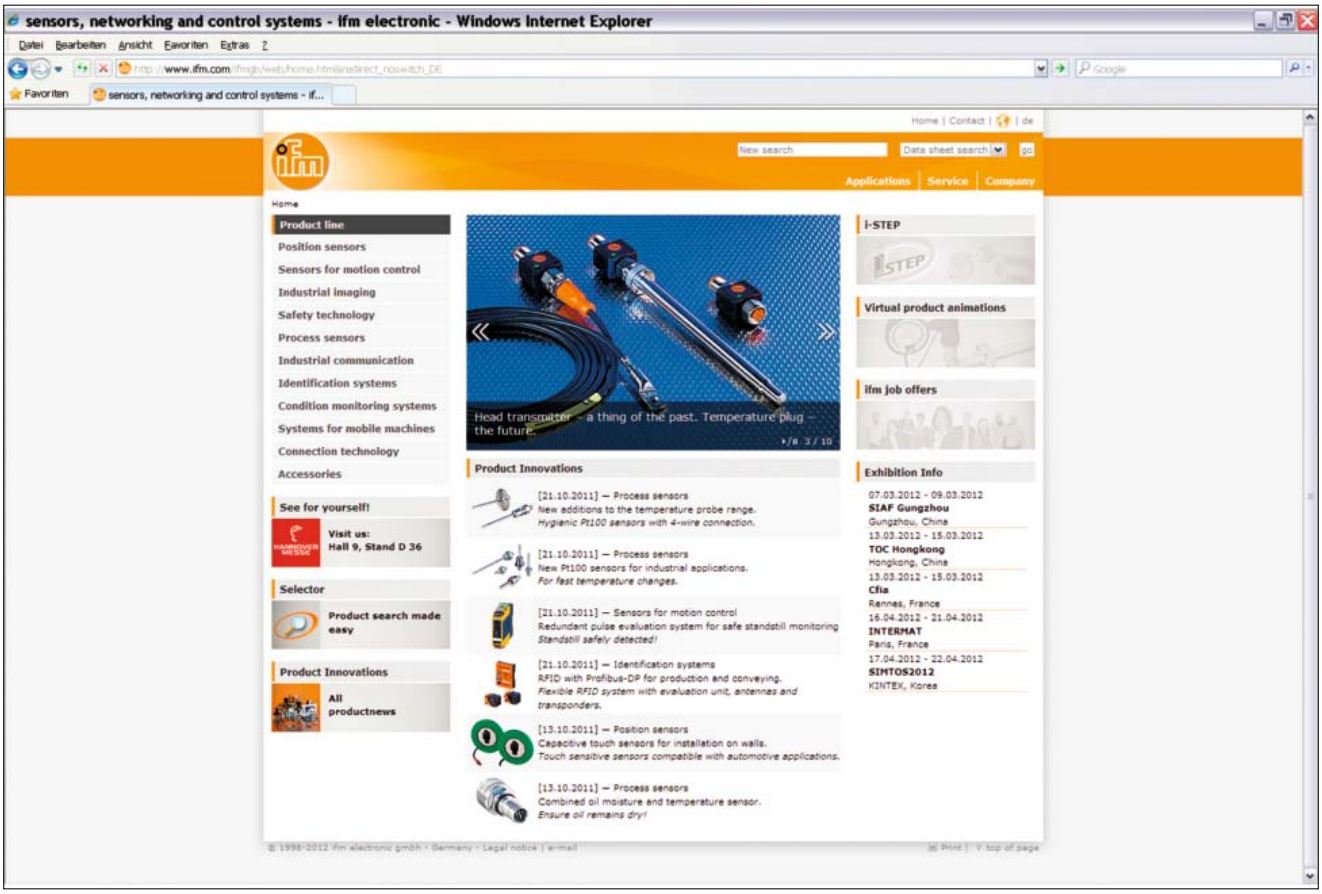



**Example EVC529**




INNOVATIONS

# www.ifm.com
# Information around the clock and around the globe in 23 languages on the internet.




**• Information**
- product innovations
- company news
- exhibition info
- locations
- jobs

**• Documentation**
- data sheets
- operating instructions
- manuals
- approvals
- CAD data

**• Communication***
- request for documents
- recall service
- live advice
- newsletter

**• Selection**
- interactive product selection aids
- configuration tools
- data sheet direct

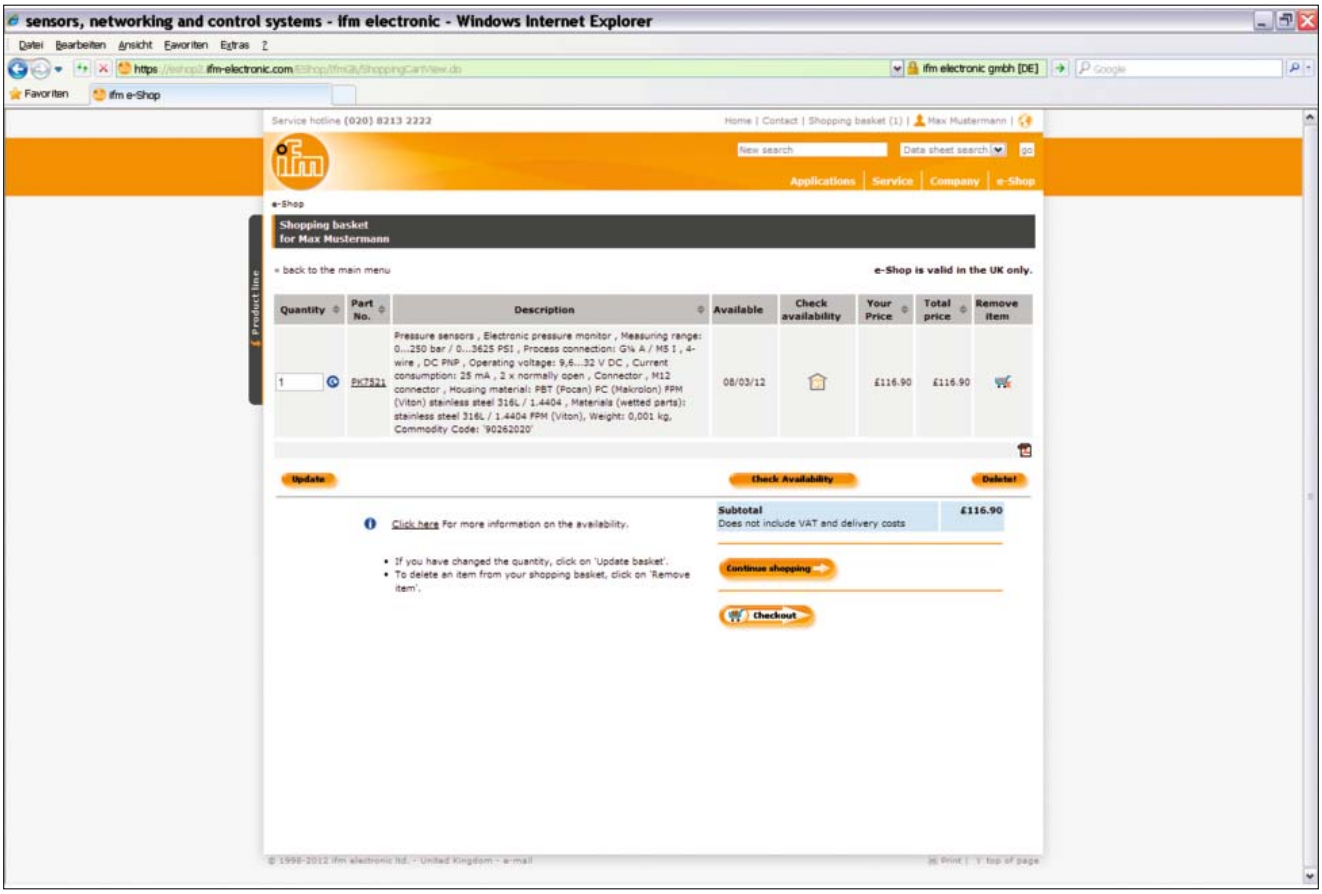
**• Animation**
- virtual product animations
- flash movies (video sequences)

**• Application**
- applications
- product recommendations
- calculation aids

**• Transaction***
- e-shop processing
- e-procurement catalogues

** Some offered information is available country-specific.*

# Convenient order processing via the e-shop** on the internet.




- Secured authentication
- Customer-related price indication
- Real time availability check
- Personal product favourites
- Online parcel tracking
- Individual order history
- Convenient quick input form
- Simple order processing
- Management of shipping addresses
- Confirmations by e-mail

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