



perfect in sensors.

# positilt<sup>®</sup> PTM Series

Inclination Sensors

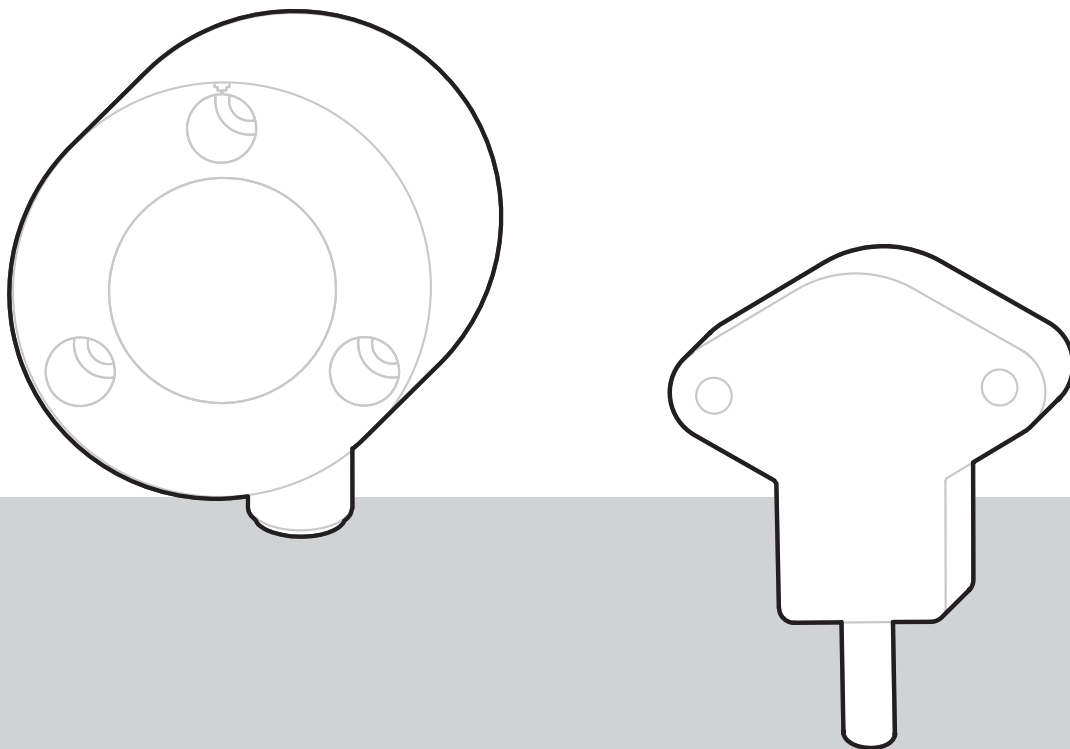
# positilt<sup>®</sup> PTK Series

Gyro-compensated Inclination Sensors

---

**Installation and operation manual**

**EN**



Please read carefully before installation and operation!

© ASM Automation Sensorik Messtechnik GmbH, 2020  
All rights reserved.

Am Bleichbach 18 - 24  
85452 Moosinning  
Germany



---

|  |           |
|--|-----------|
| <b>1 Safety instructions .....</b>                                   | <b>4</b>  |
| 1.1 Signal words and symbols .....                                   | 4         |
| 1.2 General safety instructions.....                                 | 4         |
| 1.3 Intended use.....  | 5         |
| <b>2 Transport and storage.....</b>                                  | <b>5</b>  |
| <b>3 Installation and initial operation.....</b>                     | <b>5</b>  |
| 3.1 Mechanical installation .....                                    | 5         |
| 3.2 Electrical connection .....                                      | 6         |
| 3.3 Operating temperature .....                                      | 7         |
| 3.4 Position of the inclination axis and output characteristics..... | 8         |
| <b>4 Maintenance and disposal .....</b>                              | <b>13</b> |
| 4.1 Maintenance and disposal .....                                   | 13        |
| 4.2 Disposal.....  | 13        |
| <b>5 Output specification.....</b>                                   | <b>14</b> |
| 5.1 Analog output (only PTM sensors).....                            | 14        |
| 5.2 Digital output .....   | 17        |

# 1 Safety instructions

## 1.1 Signal words and symbols



### **WARNING, Risk of Injury:**

Indicates a potentially hazardous situation, which, if not avoided, can result in serious injury or property damage.

**⚠ DANGER**

### **WARNING, Risk of Personal Injury or Death:**

Indicates a situation that can result in serious personal injury or death if not properly avoided.

**⚠ WARNING**

### **WARNING, Risk of Personal Injury or Death:**

Indicates a situation that can result in moderate personal injury or death if not properly avoided.

**⚠ CAUTION**

### **WARNING, Risk of Personal Injury:**

Indicates a situation that can result in minor personal injury if not properly avoided.

**NOTICE**

### **WARNING, Risk of Property Damage:**

Indicates a situation that can result in minor to major property damage if not properly avoided.

### **Product liability**

- Disregarding the following instructions may result in malfunction, damage to property and personal injury and releases the manufacturer from product liability.

### **Safety regulations**

- National safety regulations must be observed!

## 1.2 General safety instructions

**⚠ WARNING**

### **Danger of injury to the operator or damage to the property**

- Connection to power supply must be performed in accordance with safety instructions for electrical facilities and performed only by qualified personnel.
- Any alteration, reconstruction or extension of the sensor is not allowed!
  - The sensor must be operated only within values specified in the datasheet.
  - The danger of personal injury and danger of property damage due to a malfunction of the sensor in machines or systems must be excluded by additional safety measures.
  - In safety-relevant applications, additional facilities must be provided for maintaining safety and preventing damage.
  - Check whether the protection class of the sensor is suitable for the application.

**NOTICE**

### **Mechanical damage or destruction of the sensor**

- Do not open the sensor.
- Avoid impact and shock to the sensor.

## 1.3 Intended use

positilt® inclination sensors of **PTM series** measure inclination between  $\pm 15^\circ$  and  $\pm 180^\circ$  utilizing MEMS technology.

positilt® inclination sensors of **PTK series** measure inclination between  $\pm 15^\circ$  and  $\pm 180^\circ$  utilizing gyro-compensated MEMS technology.

For determining measuring range, environmental compatibility and connection data of the sensor, please note the data sheet. Use the sensor as intended by operating within its specified technical data and ambient conditions.

The installation and operating instructions supplied with the unit must be respected. All maintenance and service work must be carried out. The data sheet of the respective sensor is part of this instruction manual. If not yet available, it may be requested by stating the respective model number.

The sensor must not be improperly mounted, operated or serviced. In addition, operation of the sensor in faulty condition is prohibited.

## 2 Transport and storage

Observe storage and transport temperatures according to the temperatures specified in the data sheet.

Max. rel. humidity 60%, dew condensation must be prevented at all times.

The device must be secured against slipping and tipping during transport.

### Shipment damage

Check sensor immediately for shipment damage. In case of any damage or equipment not operating appropriately, please contact your supplier.

### Shipment content

- Sensor
- Installation and operation manual

## 3 Installation and initial operation

### 3.1 Mechanical installation

#### Torque for fixing screws

The specified torques and mounting methods are general recommendations and can differ according to application and operating conditions.

| Mounting method | Torque [Nm] |
|-----------------|-------------|
| Screws M4       | 1           |

## 3.2 Electrical connection

**NOTICE****Damage or destruction of the sensor due to excessive operating voltage or mounting error**

- The applied operating voltage must not exceed the value specified in the data sheet.
- Operate the sensor only within the limits specified in the data sheet.
- Connect to the power supply only by qualified personnel and in accordance with the applicable safety regulations for electrical equipment.
- Do not connect or disconnect the sensor under voltage!

**Corrosion in the sensor due to moisture penetration**

- Use the sensor only according to protection class.
- The mating connector should have the same protection class as the sensor, otherwise the lower protection class of the mating connector is valid.
- Avoid crossing the dew point.
- Cable outputs must be installed in such a way that no moisture can get into the cable.
- The protection class of sensors with connector output is valid only if the electrical plug is connected!

**Damage of the sensor cable due to mechanical stress**

- Do not twist the M12 connector inserts.
- It is important that the knurled nuts on the connectors are tightened to the correct torque for each different size of the connector:
  - M12-ASM connectors / couplings: 1.0 Nm
  - connectors / couplings of other manufacturers: according to manufacturer instruction.
- Use a torque wrench.
- Do not strain the connection cable.
- A separate cord grip is recommended.

## Electromagnetic Compatibility (EMC)

Electromagnetic compatibility of positilt® inclination sensors is influenced by the sensor wiring.

**NOTICE**

**Possible malfunction of the sensor when used in systems with highly interference-prone components such as frequency inverters**

**Recommended wiring:**

- Use single shielded sensor cable with twisted pair conductors for power supply and signal output.
- Connect the cable shield to ground on one side of the control cabinet. Connect the shield connection over a large area using cable clamps before or at the cable entry into the control cabinet. When preassembled cables are delivered, the screen is not connected to the housing on the sensor side.
- Do not install sensor cables close to power conductors such as motor or contactor control cables (use separate cable ducts for signal and power cables).
- Install the cables in metal cable ducts which are connected to ground.

## 3.3 Operating temperature

|                 |               |
|-----------------|---------------|
| positilt® PTM27 | -40 ... +85°C |
| positilt® PTM29 | -40 ... +85°C |
| positilt® PTK29 | -40 ... +85°C |
| positilt® PTK6  | -40 ... +85°C |
| positilt® PTK7  | -40 ... +85°C |

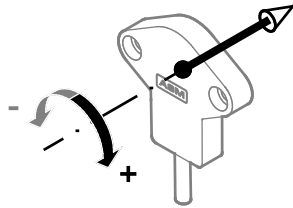
### 3.4 Position of the inclination axis and output characteristics

#### PTM27 - Output characteristic and axis orientation

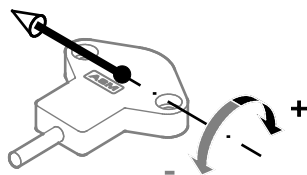
Sensor position as shown equals 0°.

##### 1 Measuring axis

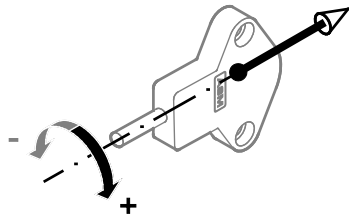
Axis orientation  
**1A**



Axis orientation  
**1B**

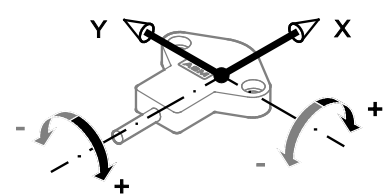


Axis orientation  
**1C**

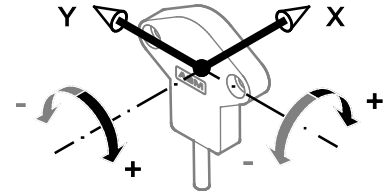


##### 2 Measuring axes

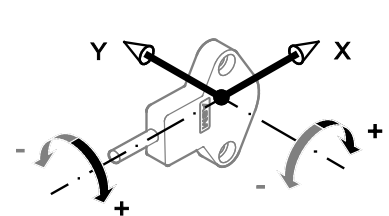
Axis orientation  
**2A**



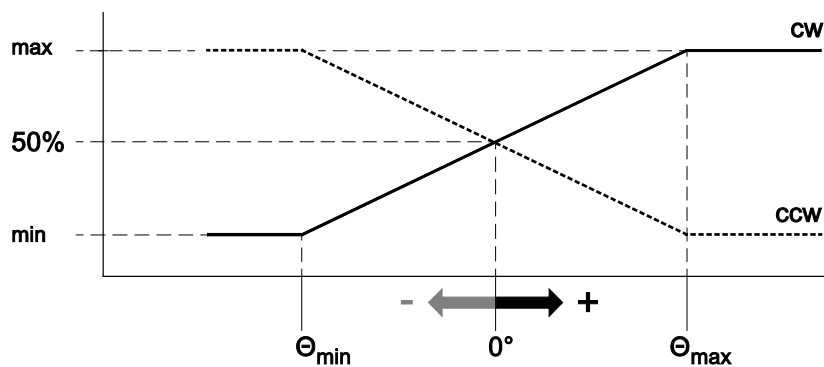
Axis orientation  
**2B**



Axis orientation  
**2C**



##### Output signal



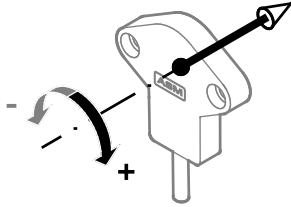


**PTM29 - Output characteristic and axis orientation**

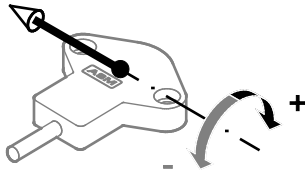
Sensor position as shown equals 0°.

**1 Measuring axis**

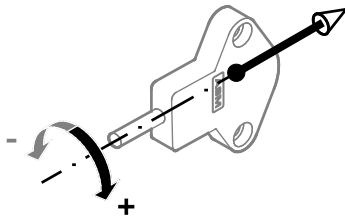
Axis orientation  
**1A**



Axis orientation  
**1B**

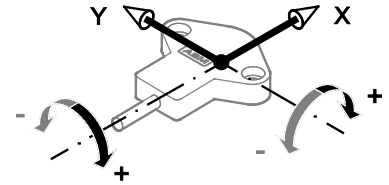


Axis orientation  
**1C**

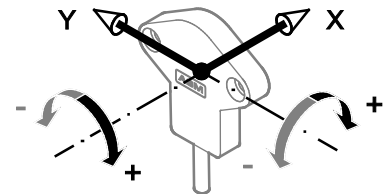


**2 Measuring axes**

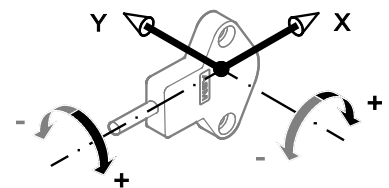
Axis orientation  
**2A**



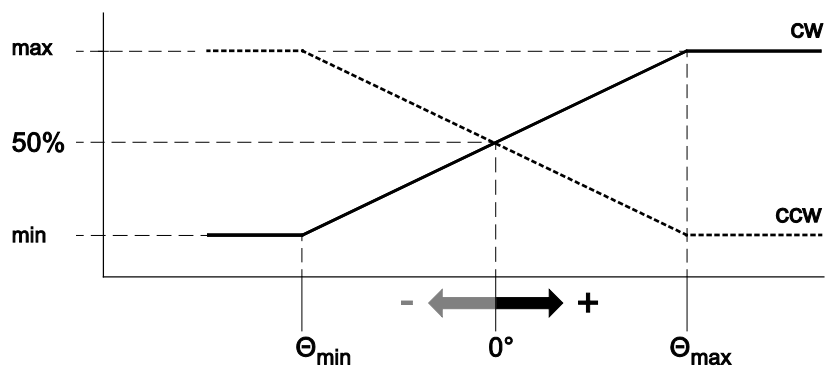
Axis orientation  
**2B**



Axis orientation  
**2C**



**Output signal**

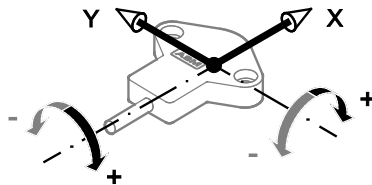


**PTK29 - Output characteristic and axis orientation**

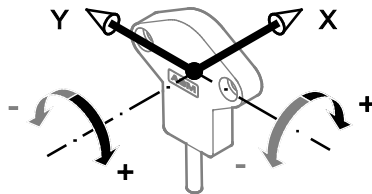
For CAN output, the axis orientation can be set by the user via software.  
 Sensor position as shown equals 0°.

**2 measuring axes**

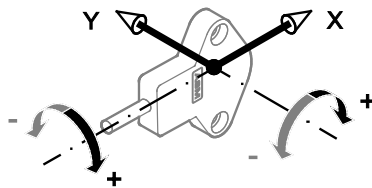
Axis orientation **2A**



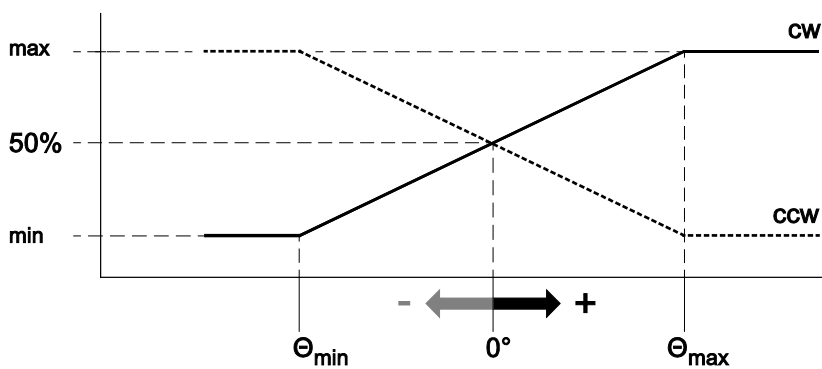
Axis orientation **2B**



Axis orientation **2C**



**Output signal**

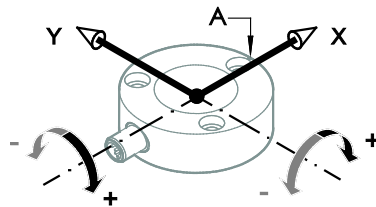


**PTK6 - Output characteristic and axis orientation**

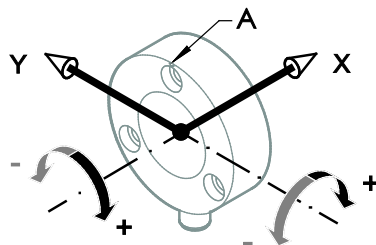
For CAN output, the axis orientation can be set by the user via software.  
Sensor position as shown equals 0°.

**2 measuring axes**

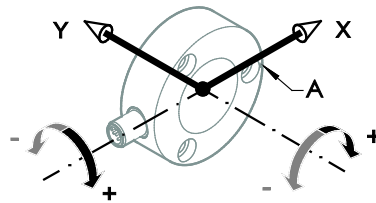
Axis orientation **2A**



Axis orientation **2B**

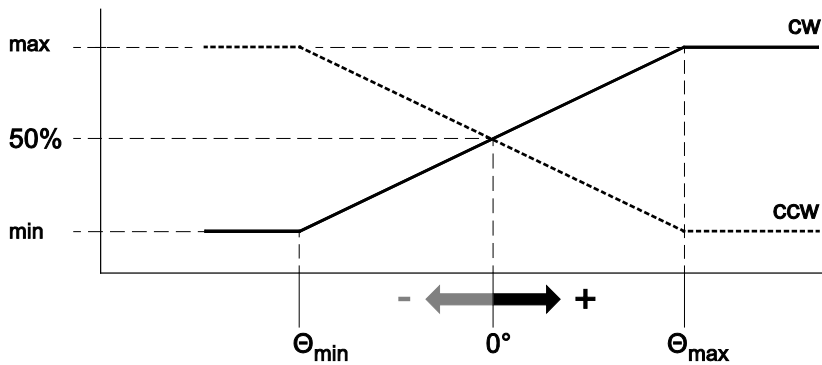


Axis orientation **2C**



A = Marking

**Output signal**

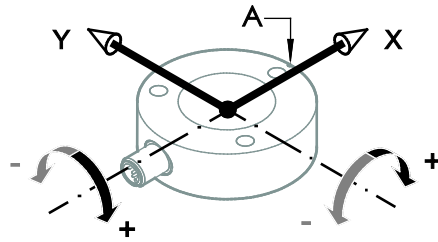


**PTK7 - Output characteristic and axis orientation**

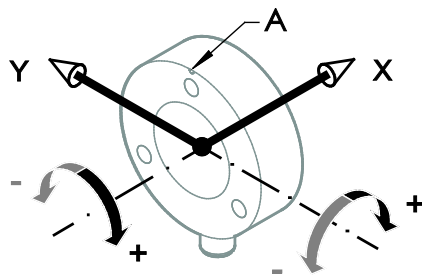
For CAN output, the axis orientation can be set by the user via software.  
Sensor position as shown equals 0°.

**2 measuring axes**

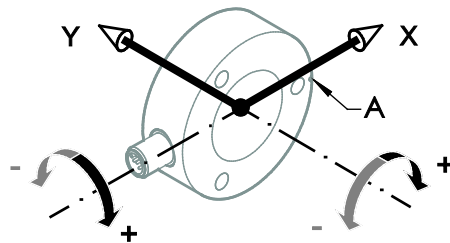
Axis orientation **2A**



Axis orientation **2B**

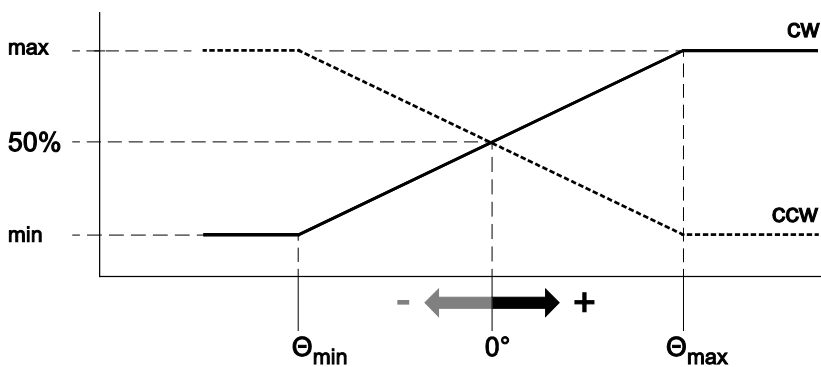


Axis orientation **2C**



A = Marking

**Output signal**



## 4 Maintenance and disposal

### 4.1 Maintenance and disposal

#### ⚠ CAUTION

Opening all the positilt® PTM and PTK sensors will cause damage and void the warranty

- Do not open the sensor.
- Due to possible risk of injury by improper handling, we strongly advise against repair attempts.

#### Maintenance interval

Proper maintenance comprises the visual examination of parts (e.g. integrity of housing, connectors and cables). Maintenance intervals depend on the specific application and should be defined by the user in dependence of operating conditions. Damaged sensors must be shut down immediately and sent to the factory for repair.

Check sensor regularly for possible damage. The following maintenance steps are recommended:


|                  | Integrity of housing, connector, cable   | Mounting elements   |
|------------------|--|---|
| PTM27            | X  | X   |
| PTM29            | X  | X   |
| PTK29            | X  | X   |
| PTK6             | X  | X   |
| PTK7             | X  | X   |
| <b>Maßnahmen</b> | Damaged parts: Put sensor out of service and replace damaged parts resp. send sensor to ASM for repair | Loose mounting parts: Screw tight mounting parts with recommended torque, if applicable use bolt adhesive |


### 4.2 Disposal


Disposal according to applicable government regulations.


## 5 Output specification

### 5.1 Analog output (only PTM sensors)

|  |                         |   |
|--|-------------------------|---|
| <b>U2</b><br>Voltage output<br>0.5 ... 10 V<br> | Excitation voltage      | 8 ... 36 V DC                               |
|  | Excitation current      | typical 12 mA<br>max. 16 mA                 |
|  | Output voltage          | 0.5 ... 10 V DC                             |
|  | Output current          | 2 mA max.                                   |
|  | Measuring rate          | 1 kHz standard                              |
|  | Stability (temperature) | $\pm 50 \times 10^{-6}$ / °C f.s. (typical) |
|  | Protection              | Reverse polarity, short circuit             |
|  | Operating temperature   | -40 ... +85 °C                              |
|  | EMC                     | DIN EN 61326-1:2013                         |

|   |                         |   |
|---|-------------------------|---|
| <b>U8</b><br>Voltage output<br>0.5 ... 4,5 V<br> | Excitation voltage      | 8 ... 36 V DC                               |
|   | Excitation current      | typical 12 mA<br>max. 16 mA                 |
|   | Output voltage          | 0.5 ... 4,5 V DC                            |
|   | Output current          | 2 mA max.                                   |
|   | Measuring rate          | 1 kHz standard                              |
|   | Stability (temperature) | $\pm 50 \times 10^{-6}$ / °C f.s. (typical) |
|   | Protection              | Reverse polarity, short circuit             |
|   | Operating temperature   | -40 ... +85 °C                              |
|   | EMC                     | DIN EN 61326-1:2013                         |

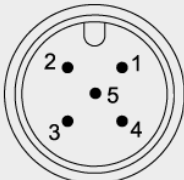
|   |                         |   |
|---|-------------------------|---|
| <b>U6</b><br>Voltage output<br>0.5 ... 4.5 V<br> | Excitation voltage      | 5 V DC $\pm 10$ %                           |
|   | Excitation current      | typical 13 mA<br>max. 16 mA                 |
|   | Output voltage          | 10 ... 90 % of the excitation voltage       |
|   | Output current          | 2 mA max.                                   |
|   | Measuring rate          | 1 kHz standard                              |
|   | Stability (temperature) | $\pm 50 \times 10^{-6}$ / °C f.s. (typical) |
|   | Protection              | Reverse polarity, short circuit             |
|   | Operating temperature   | -40 ... +85 °C                              |
|   | EMC                     | DIN EN 61326-1:2013                         |

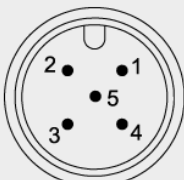
|  |                         |  |
|--|-------------------------|--|
| <b>I1</b><br>Current output<br>4 ... 20 mA, 3 wires<br> | Excitation voltage      | 8 ... 36 V DC                              |
|  | Excitation current      | typical 32 mA<br>max. 36 mA                |
|  | Load R <sub>L</sub>     | 500 Ω max.                                 |
|  | Output current          | 4 ... 20 mA                                |
|  | Measuring rate          | 1 kHz standard                             |
|  | Stability (temperature) | ±50 x 10 <sup>-6</sup> / °C f.s. (typical) |
|  | Protection              | Reverse polarity, short circuit            |
|  | Operating temperature   | -40 ... +85 °C                             |
|  | EMC                     | DIN EN 61326-1:2013                        |

| Signal wiring | Output signals                       | Cable color |
|---------------|--------------------------------------|-------------|
| <b>1 axis</b> | +U <sub>B</sub> (excitation voltage) | brown       |
|               | Output X                             | white       |
|               | GND                                  | blue        |
|               | Do not connect!                      | grey        |

| Signal wiring | Output signals                       | Cable color |
|---------------|--------------------------------------|-------------|
| <b>2 axes</b> | +U <sub>B</sub> (excitation voltage) | brown       |
|               | Output X                             | white       |
|               | GND                                  | blue        |
|               | OUTPUT Y                             | black       |
|               | Do not connect!                      | grey        |

**Analog output (connector and cable output, only PTM sensors)**

| Signal wiring 1 axis<br>Connector M12, 5 pin  | Output signals                       | Connector pin no. | Cable color |
|---|--------------------------------------|-------------------|-------------|
|  <p>View to the sensor connector</p> | +U <sub>B</sub> (excitation voltage) | 1                 | brown       |
|   | Analog output X axis                 | 2                 | white       |
|   | GND                                  | 3                 | blue        |
|   | Do not connect!                      | 4                 | black       |
|   | Do not connect!                      | 5                 | grey        |

| Signal wiring 2 axes<br>Connector M12, 5 pin  | Output signals                       | Connector pin no. | Cable color |
|---|--------------------------------------|-------------------|-------------|
|  <p>View to the sensor connector</p> | +U <sub>B</sub> (excitation voltage) | 1                 | brown       |
|   | Analog output X axis                 | 2                 | white       |
|   | GND                                  | 3                 | blue        |
|   | Analog output Y axis                 | 4                 | black       |
|   | Do not connect!                      | 5                 | grey        |



## 5.2 Digital output

|  |                               |   |
|--|-------------------------------|---|
| <b>CANOP</b><br>CANopen<br> | Communication profile         | CANopen CiA 301, Slave  |
|  | Encoder profile               | CiA 410, Profile „Inclinometer“                                   |
|  | Configuration services        | LSS, CiA Draft Standard 305 (Transmission rate, node ID)          |
|  | Error Control                 | Node guarding, Heartbeat, Emergency message                       |
|  | Node ID                       | Adjustable via LSS or SDO, default: 127                           |
|  | PDO                           | 1 TxPDO, 0 RxPDO, no linking, static mapping                      |
|  | PDO Modes                     | Event-/Time triggered, Remote-request, Sync cyclic/acyclic        |
|  | SDO                           | 1 Server, 0 Client  |
|  | Certified                     | yes   |
|  | Transmission rate             | 125 kBit ... 1 Mbit, adjustable via LSS or SDO, default: 125 kBit |
|  | Bus connection                | M12 connector, 5 pin  |
|  | Bus, galvanic isolated        | no  |
|  | Error Control Baudrate        | 50 kBit/s ... 1 MBit/s configurable                               |
|  | Transceiver                   | 24V-compliant, not isolated                                       |
|  | Internal termination resistor | 120 Ohm configurable  |

|                       |                         |   |
|-----------------------|-------------------------|---|
| <b>Specifications</b> | Excitation voltage      | 8 ... 36 V DC   |
|                       | Excitation current      | 15 mA typical at 24 V DC<br>30 mA typical at 12 V DC<br>100 mA max. |
|                       | Measuring rate          | 0.5 kHz standard  |
|                       | Stability (temperature) | ± 0,2° (-20 ... +40 °C)<br>± 0,4° (-40 ... +85 °C)                  |
|                       | Repeatability           | 1 LSB   |
|                       | Operating temperature   | -40 ... +85 °C  |
|                       | Protection              | Reverse polarity, short circuit                                     |
|                       | EMC                     | DIN EN 61326-1:2013   |

| Signal wiring  | Output signals | Connector pin no. |
|--|----------------|-------------------|
| <b>Connector M12, 5 pin</b><br><br>View to the sensor connector | Shield         | 1                 |
|  | Excitation +   | 2                 |
|  | GND            | 3                 |
|  | CAN-H          | 4                 |
|  | CAN-L          | 5                 |

### CANopen – Set up (MCANOP)



#### Download


- A detailed specification of this interface can be downloaded from the ASM website:

**[www.asm-sensor.com/en/downloads.html](http://www.asm-sensor.com/en/downloads.html) > Configuration files**

#### **⚠ WARNING**

#### **Risk of injury by unexpected machine movement**

- Change parameters only when machine is in a safe condition!
- Changing parameters may cause unexpected machine movement.
- Changing parameters may influence dependent parameters e.g. changing the resolution may have influence on position of CAM switches.
- Precautions have to be taken to avoid damage to human and machine parts!

|   |                               |  |
|---|-------------------------------|--|
| <b>CANJ1939</b><br>SAE J1939<br> | CAN Specification             | ISO 11898, Basic and Full CAN 2.0 B extended message format with 29-bit identifier |
|   | Transceiver                   | 24V-compliant, not isolated  |
|   | Communication profile         | SAE J1939, 29-bit identifier   |
|   | Transmission rate             | 250 kBit/s   |
|   | Internal termination resistor | 120 Ω  |
|   | Address                       | Default 247d, configurable   |

| NAME - Unique device identifier | Name Fields               | Remark            | Field value | Size [Bit] | Byte order   | Byte value |            |
|---------------------------------|---------------------------|-------------------|-------------|------------|--------------|------------|------------|
|                                 | Arbitrary Address Capable | No                | 0           | 1          | Byte 8 (MSB) | 00h        |            |
|                                 | Industry Group            | Global            | 0           | 3          |              |            |            |
|                                 | Vehicle System instance   |                   | 0           | 4          |              |            |            |
|                                 | Vehicle System            | Non specific      | 7Fh         | 7          | Byte 7       | FEh        |            |
|                                 | Reserved                  |                   | 0           | 1          |              |            |            |
|                                 | Function                  | Non specific      | FFh         | 8          | Byte 6       | FFh        |            |
|                                 | Function Instance         |                   | 0           | 5          | Byte 5       | 00         |            |
|                                 | ECU Instance              |                   | 0           | 3          |              |            |            |
|                                 | Manufacturer              | Manufacturer Code | 145h        | 11         | Byte 4       | 28h        |            |
|                                 |                           |                   |             |            |              | Byte 3     | A0h+n<br>n |
|                                 |                           | Identity Number   | n..nh       | 21         |              | Byte 2     | nnh        |
|                                 |                           |                   |             |            |              | Byte 1     | nnh        |

|  |                    |           |  |
|--|--------------------|-----------|--|
| <b>Proprietary PGN - Manufacturer specific Parameter Group Numbers</b> | Configuration data | PGN EFddh | Proprietary-A (PDU1 peer-to-peer)                                    |
|  | Process data       | PGN FFnnh | Proprietary-B (PDU2 broadcast); nn Group Extension (PS) configurable |

| Specifications |                         |   |
|----------------|-------------------------|---|
|                | Excitation voltage      | 8 ... 36 V DC   |
|                | Excitation current      | 15 mA typical at 24 V DC<br>30 mA typical at 12 V DC, 100 mA max. |
|                | Measuring rate          | 0.5 kHz (asynchronous)  |
|                | Stability (temperature) | ± 0,2° (-20 ... +40 °C)<br>± 0,4° (-40 ... +85 °C)                |
|                | Repeatability           | 1 LSB   |
|                | Operating temperature   | -40 ... +85 °C  |
|                | Protection              | Reverse polarity, short circuit                                   |
|                | EMV                     | DIN EN 61326-1:2013   |

| Signal wiring   | Output signals | Connector pin no. |
|---|----------------|-------------------|
| <b>Connector M12, 5 pin</b><br><br>View to the sensor connector | Shield         | 1                 |
|   | Excitation +   | 2                 |
|   | GND            | 3                 |
|   | CAN-H          | 4                 |
|   | CAN-L          | 5                 |

**SAE J1939 – Set up (MCANJ1939)**



**Download**

- A detailed specification of this interface can be downloaded from the ASM website:

[www.asm-sensor.com/en/downloads.html](http://www.asm-sensor.com/en/downloads.html) > **Configuration files**

**⚠ WARNING**

**Risk of injury due to unexpected machine movement**

- Change parameters only when machine is in a safe condition!
- Changing parameters may cause unexpected machine movement.
- Changing parameters may influence dependent parameters e.g. changing the resolution may have influence on position of CAM switches.
- Precautions have to be taken to avoid damage to human and machine parts!

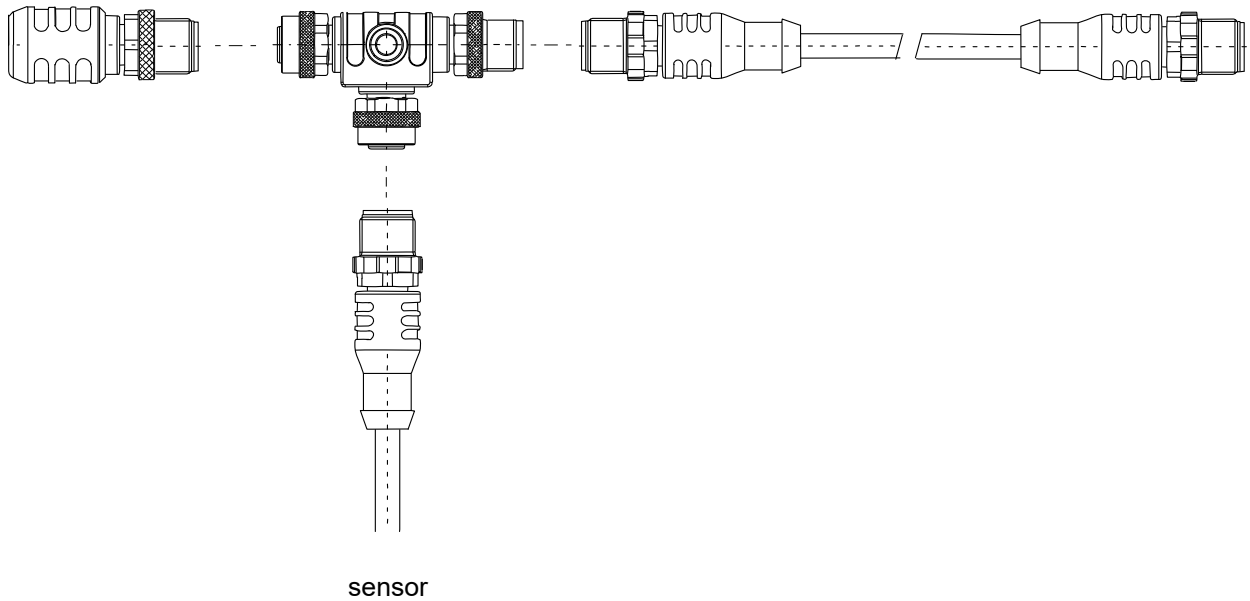
### CAN-Bus wiring

Connect the device by a T-connector to the CAN trunk line. Total length of stubs should be minimized. Do not use single stub lines longer than 0.5 m. Connect terminating resistors 120 Ohm at both ends of the trunk line.

Termination resistor

T piece

CAN cable



## Reliability Parameters

|                               |   |                                 |
|-------------------------------|---|---------------------------------|
| <b>Models</b>                 | <b>PTM27, PTM29</b>                             |                                 |
| <b>Interface</b>              | <b>U2</b>                                       | Voltage interface 0.5 ... 10 V  |
|                               | <b>U8</b>                                       | Voltage interface 0.5 ... 4.5 V |
|                               | <b>I1</b>                                       | Current interface 4 ... 20 mA   |
| <b>Reliability Parameters</b> | Device type                                     | B                               |
|                               | Probability of failure PFH ( $\lambda_{DU}$ )   | 1000 Fit                        |
|                               | Life period electronics MTTF <sub>D</sub>       | 110 years                       |
|                               | Working life                                    | 20 years                        |
|                               | Service and calibration interval                | annually                        |
| <b>Standards</b>              | Failure rate of electronic components (Siemens) | SN29500 (Siemens)               |
| <b>Models</b>                 | <b>PTM27, PTM29, PTK29, PTK6, PTK7</b>          |                                 |
| <b>Interface</b>              | <b>CANOPEN</b>                                  | CANopen                         |
|                               | <b>CANJ1939S</b>                                | CAN SAEJ1939                    |
| <b>Reliability Parameters</b> | Device type                                     | B                               |
|                               | Probability of failure PFH ( $\lambda_{DU}$ )   | 750 Fit                         |
|                               | Life period electronics MTTF <sub>D</sub>       | 150 years                       |
|                               | Working life                                    | 20 years                        |
|                               | Service and calibration interval                | annually                        |
| <b>Reference conditions</b>   | Temperature $\vartheta$                         | 60°C                            |
|                               | Supply voltage $U_B$                            | 24V±10%                         |
| <b>Standards</b>              | Failure rate of electronic components (Siemens) | SN29500                         |

**positilt®**

Inclination Sensors PTM series

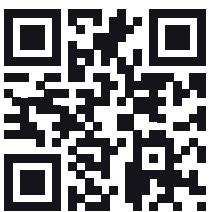
Gyro-compensated Inclination Sensors PTK series

---





perfect in sensors.



[www.asm-sensor.com](http://www.asm-sensor.com)

**ASM Automation Sensorik  
Messtechnik GmbH**  
Am Bleichbach 18 - 24  
85452 Moosinning  
**Germany**  
Tel. +49 8123 986-0  
Fax +49 8123 986-500  
[info@asm-sensor.com](mailto:info@asm-sensor.com)

**ASM Sensors, Inc.**  
650 W. Grand Ave., Unit 205  
Elmhurst, IL 60126  
**USA**  
Tel. +1 630 832-3202  
Fax +1 630 832-3204  
[info@asmsensors.com](mailto:info@asmsensors.com)

**ASM Sales Office UK**  
Tanyard House, High Street  
Measham, Derbs DE12 7HR  
**United Kingdom**  
Tel. +44 845 1222-123  
Fax +44 845 1222-124  
[info@asm-sensor.com](mailto:info@asm-sensor.com)