

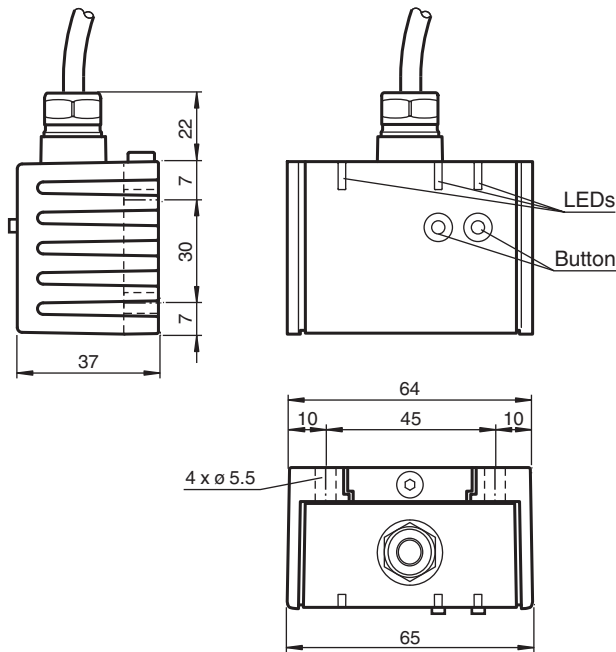


Inclination sensor INX360D-F99-U2E2-5M

- E1-Type approval
- Measuring range 0 ... 360°
- Analog output 0 V ... 5 V
- Evaluation limits can be taught-in
- 2 programmable switch outputs
- High shock resistance
- Increased noise immunity 100 V/m



Dimensions



Technical Data

General specifications

| | |
|-----------------------|----------------------------|
| Type | Inclination sensor, 1-axis |
| Measurement range | 0 ... 360 ° |
| Absolute accuracy | ≤ ± 0.5 ° |
| Response delay | ≤ 20 ms |
| Resolution | ≤ 0.1 ° |
| Repeat accuracy | ≤ ± 0.1 ° |
| Temperature influence | ≤ 0.027 °/K |

Functional safety related parameters

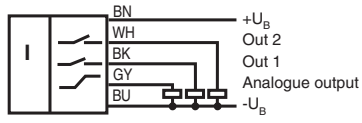
Release date: 2020-04-24 Date of issue: 2020-06-03 Filename: 206774_eng.pdf

Technical Data

| | | |
|---|----------------|---|
| MTTF _d | | 390 a |
| Mission Time (T _M) | | 20 a |
| Diagnostic Coverage (DC) | | 0 % |
| Indicators/operating means | | |
| Operation indicator | | LED, green |
| Teach-In indicator | | 2 LEDs yellow (switching status), flashing |
| Button | | 2 push-buttons (Switch points programming , Evaluation range programming) |
| Switching state | | 2 yellow LEDs: Switching status (each output) |
| Electrical specifications | | |
| Operating voltage | U _B | 10 ... 30 V DC |
| No-load supply current | I ₀ | ≤ 25 mA |
| Time delay before availability | t _v | ≤ 200 ms |
| Switching output | | |
| Output type | | 2 switch outputs PNP, NO , reverse polarity protected , short-circuit protected |
| Operating current | I _L | ≤ 100 mA |
| Voltage drop | | ≤ 3 V |
| Analog output | | |
| Output type | | 1 voltage output 0 ... 5 V |
| Load resistor | | ≥ 1 kΩ |
| Compliance with standards and directives | | |
| Standard conformity | | |
| Shock and impact resistance | | 100 g according to DIN EN 60068-2-27 |
| Standards | | EN 60947-5-2:2007 IEC 60947-5-2:2007 |
| Approvals and certificates | | |
| UL approval | | cULus Listed, Class 2 Power Source |
| CCC approval | | CCC approval / marking not required for products rated ≤36 V |
| E1 Type approval | | 10R-04 |
| Ambient conditions | | |
| Ambient temperature | | -40 ... 85 °C (-40 ... 185 °F) |
| Storage temperature | | -40 ... 85 °C (-40 ... 185 °F) |
| Mechanical specifications | | |
| Connection type | | 5 m, PUR cable 5 x 0.5 mm ² |
| Housing material | | PA |
| Degree of protection | | IP68 / IP69K |
| Mass | | 240 g |
| Factory settings | | |
| Switching output 1 | | -30 ° ... 30 ° |
| Switching output 2 | | -30 ° ... 30 ° |
| Analog output | | -45 ° ... 45 ° |

Connection

Standard symbol/Connection:



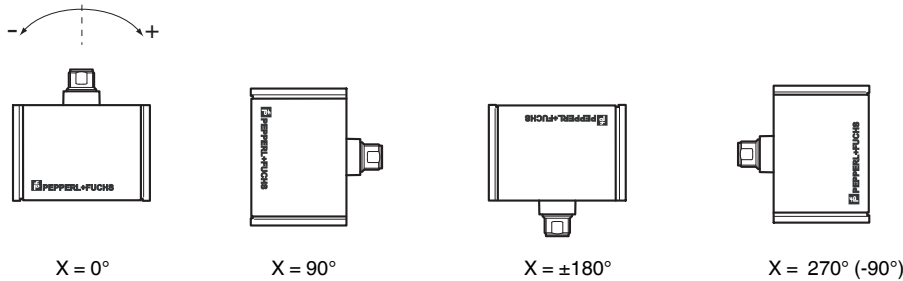
Release date: 2020-04-24 Date of issue: 2020-06-03 Filename: 206774_eng.pdf

Mounting

Sensor Orientation

In the default setting the zero position of the sensor is reached, when the electrical connection faces straight upwards.

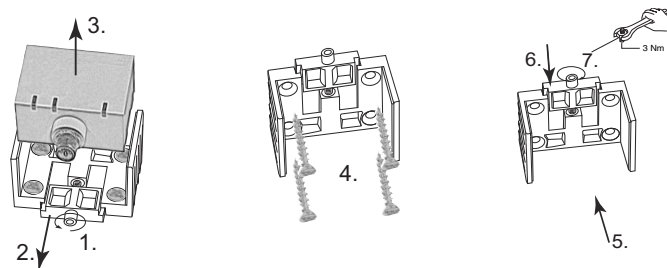
X Orientation



Mounting of the sensor

Sensors from the -F99 series consist of a sensor module and accompanying cast aluminum housing. Select a vertical surface with minimum dimensions of 70 mm x 50 mm to mount the sensor.

Mount the sensor as follows:



1. Loosen the central screw under the sensor connection.
 2. Slide back the clamping element until you are able to remove the sensor module from the housing.
 3. Remove the sensor module from the housing
 4. Position the housing at the required mounting location and secure using four countersunk screws. Make sure that the heads of the screws do not protrude.
 5. Place the sensor module in the housing.
 6. Slide the clamping element flush into the housing. Check that the sensor element is seated correctly.
 7. Finally tighten the central screw.
- The sensor is now mounted correctly.

Additional Information

LED display

| | | | |
|--|---------------------|---------------------|---------------------|
| Displays dependent on the operating state | LED green: Power | LED yellow out 1 | LED yellow out 2 |
| Teach-in of switching points (output S1): | off | flashes | off |
| Teach-in of switching points (output S2): | off | off | flashes |
| Activate teach-in mode for analog limits: | off | flashes | flashes |
| Teach-in of analog limits | off | flashes | off |
| Normal operation | on | switchings tate | switchings tate |
| Reset to factory settings: 2 s ... 10 s | off | flashes | flashes |
| > 10 s ... end of reset process | flashes | off | off |
| Followed by normal operation | | | |
| Undervoltage | flashes | off | off |

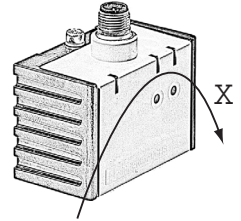
Factory settings

see Technical Data

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Axis definition

The definition of the X-axis is shown on the sensor housing by means of an imprinted and labeled double arrow. The figure shows the clockwise direction of rotation.

**Teach-in of switching points (output S1)**

1. Press key T1 > 2 s (see LED display)
2. Move sensor to switching position 1
3. Press key T1 briefly. LED "out 1" lights for 1.5 s as confirmation. Switching point 1 has been taught
4. Move sensor to switching position 2
5. Press key T1 briefly. LED "out 1" lights for 1.5 s as confirmation. Switching point 2 has been taught
6. Sensor returns to normal operation (see LED display)



The NC (active output state) is always defined in the range from the 1st configured position to 2nd configured position.

As an example :

Case #1: configure position #1 at +45degree, configure position #2 at +90 degree; NC is from +45 ' +90 in the CW direction

Case #2: configure position #1 at +90degree ; configure position #2 at +45 degree; NC is from +90 ' +45 in the CW direction

Teach-in of switching points (output S2)

Similar to the process for "Teach-in of switching points (output S1)", but with key T2 instead of key T1.

Teach-in of analog limits

1. Activate the teach-in mode for the analog limits by simultaneously pressing keys T1 and T2 until the green LED is extinguished and the two yellow LEDs flash. Then release the keys.
2. Press key T1 > 2 s (see LED display)
3. Move the sensor into the position of evaluation limit 0 V
4. Press key T1 briefly. LED "out 1" lights for 1.5 s as confirmation. Evaluation limit 0 V has been taught
5. Move the sensor into the position of evaluation limit 5 V
6. Press key T1 briefly. LED "out 1" lights for 1.5 s as confirmation. Evaluation limit 5 V has been taught
7. Sensor returns to normal operation (see LED display)



If the sensor inclination exceeds one of the analog limits, the last current value of the analog output is retained.

Resetting the sensor to factory settings

1. Press keys T1 and T2 > 10 s (see LED display)
2. The sensor has been reset when the green LED "Power" lights again after approx. 10 s.

Undervoltage detection

If the supply voltage falls below a value of approx. 7 V, all outputs and yellow LEDs are deactivated. The green "power" LED flashes rapidly. If the supply voltage falls below a value of approx. 8 V, the sensor continues with normal operation.

Technical Features

EMC Properties

Interference immunity in accordance with

DIN ISO 11452-2: 100 V/m

Frequency band 20 MHz up to 2 GHz

Mains-borne interference in accordance with ISO 7637-2:

Inclination sensor

INX360D-F99-U2E2-5M

| | | | | | | |
|-------------------|------------------------|---|-----------|---|---|---|
| Pulse | 1 | 2 | 2 | 3 | 3 | 4 |
| | | a | b | a | b | |
| Severity level | I | I | I | I | I | I |
| | I | I | I | I | I | I |
| | I | I | I | I | I | I |
| Failure criterion | C | A | C | A | A | C |
| EN 61000-4-2: | CD: 8 kV | | AD: 15 kV | | | |
| | / | | | | | |
| Severity level | IV | | IV | | | |
| EN 61000-4-3: | 30 V/m (80...2500 MHz) | | | | | |
| Severity level | IV | | | | | |
| EN 61000-4-4: | 2 kV | | | | | |
| Severity level | III | | | | | |
| EN 61000-4-6: | 10 V (0.01...80 MHz) | | | | | |
| Severity level | III | | | | | |
| EN 55011: | Klasse A | | | | | |