



CANopen



### Model number

INY360D-F99-B16-V15

### Features

- Measuring range 0 ... 360°
- High shock resistance
- Extended temperature range -40 ... +85 °C
- CANopen interface
- e1-Type approval
- Raised EMC resistance 100 V/m

## Technical Data

### General specifications

|                       |                            |
|-----------------------|----------------------------|
| Type                  | Inclination sensor, 2-axis |
| Measurement range     | 0 ... 360 °                |
| Absolute accuracy     | ≤ ± 0.5 °                  |
| Response delay        | ≤ 25 ms                    |
| Resolution            | ≤ 0.1 °                    |
| Repeat accuracy       | ≤ ± 0.1 °                  |
| Temperature influence | ≤ 0.027 °/K                |

### Indicators/operating means

|                   |            |
|-------------------|------------|
| Operating display | LED, green |
|-------------------|------------|

### Electrical specifications

|                                      |                |
|--------------------------------------|----------------|
| Operating voltage $U_B$              | 10 ... 30 V DC |
| No-load supply current $I_0$         | ≤ 50 mA        |
| Time delay before availability $t_v$ | ≤ 2.5 s        |

### Interface

|                  |  |
|------------------|--|
| Interface type   | CANopen  |
| Device profile   | CiA410, Ver. 1.2   |
| Data output code | binary code  |
| Transfer rate    | 125 kBit/s , 250 kBit/s , 500 kBit/s , 1 MBit/s , programmable |
| Node ID          | 1 ... 127 , programmable                                       |
| Termination      | external   |

### Ambient conditions

|                     |                                |
|---------------------|--------------------------------|
| Ambient temperature | -40 ... 85 °C (-40 ... 185 °F) |
| Storage temperature | -40 ... 85 °C (-40 ... 185 °F) |

### Mechanical specifications

|                   |                          |
|-------------------|--------------------------|
| Connection type   | M12 x 1 connector, 5-pin |
| Housing material  | PA                       |
| Protection degree | IP68 / IP69K             |
| Mass              | 240 g                    |

### Factory settings

|               |            |
|---------------|------------|
| Node ID       | 1          |
| Transfer rate | 250 kBit/s |

### 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<br>IEC 60947-5-2:2007 |

### Approvals and certificates

|                  |  |
|------------------|--|
| CSA approval     | cCSAus Listed, General Purpose, Class 2 Power Source |
| e1 Type approval | 2006/28/EG   |

### EMC Properties

Emitted interference and interference immunity in accordance with motor vehicle directive 2006/28/EG (e1 Type approval)

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:

| Pulse             | 1   | 2a  | 2b  | 3a  | 3b  | 4   |
|-------------------|-----|-----|-----|-----|-----|-----|
| Severity level    | III | III | III | III | III | III |
| Failure criterion | C   | A   | C   | A   | A   | C   |

EN 61000-4-2: CD: 8 kV / AD: 15 kV

Severity level II III

EN 61000-4-3: 30 V/m (80...2500 MHz)

Severity level IV

EN 61000-4-4: 2 kV

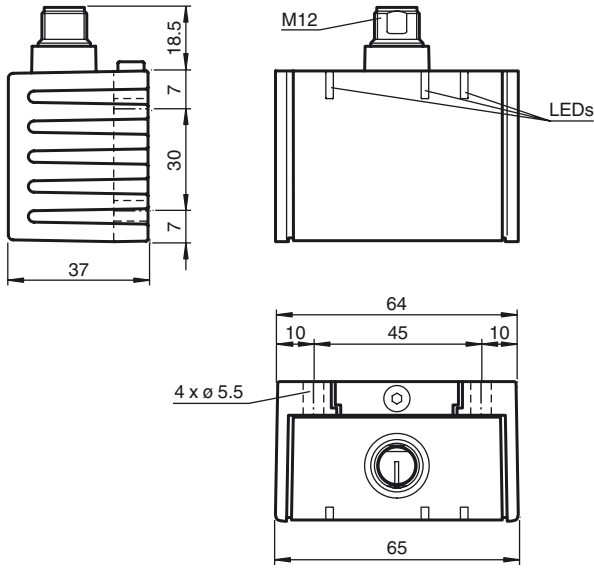
Severity level III

EN 61000-4-6: 10 V (0.01...80 MHz)

Severity level III

EN 55011: Klasse A

**Dimensions**

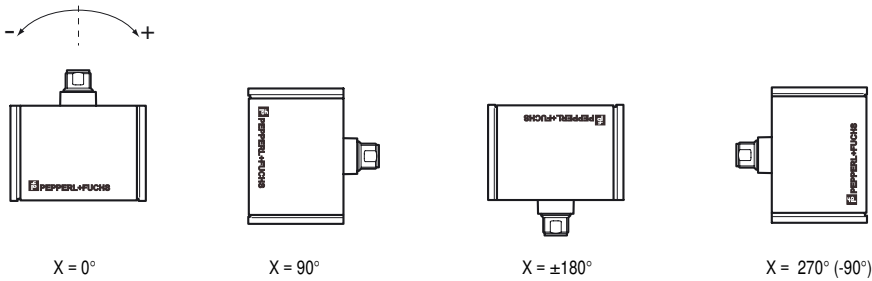


**Sensor Orientation**

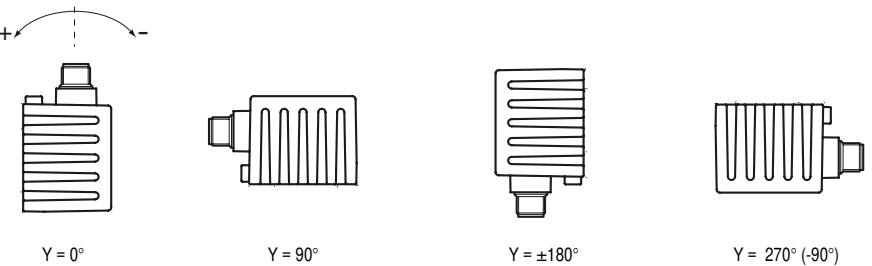
In the default setting the zero position of the sensor is reached, when the electrical connection faces straight upwards.

- On request, all required mounting positions can be preset at the factory.  
For example: X = 0 if the electrical connection points straight downwards.

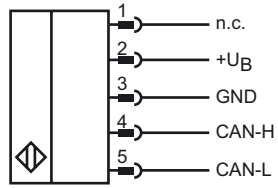
**X Orientation**



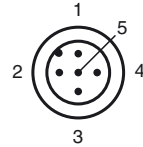
**Y Orientation**



**Electrical connection**



**Pinout**



Wire colors in accordance with EN 60947-5-2

|   |    |
|---|----|
| 1 | BN |
| 2 | WH |
| 3 | BU |
| 4 | BK |
| 5 | GY |

**Accessories**

**V15-G-2M-PUR-CAN-V15-G**  
Connection cable

**V15-G-5M-PUR-CAN-V15-G**  
Connection cable

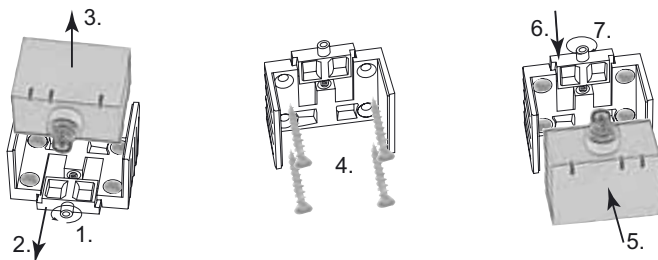
**V15-G-10M-PUR-CAN-V15-G**  
Connection cable

**V15S-T-CAN/DN-V15**  
T-Distributor

**ICZ-TR-CAN/DN-V15**  
Terminal resistor

**Mounting of the sensor**

Inclination sensors from the -F99 series consist of a sensor module and accompanying cast aluminum housing. Select a flat 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 inclination sensor is now mounted correctly.

**Baud rate setting**

Inclination sensors by Pepperl+Fuchs are supplied with a baud rate of 250 kbit/s. To change the baud rate, write the new baud rate to object 2001h "Baud rate." If a "Reset sensor" command is issued via an NMT message or the power supply is interrupted, the sensor operates at the new baud rate. The inclination sensor supports the baud rates 125 kbit/s, 250 kbit/s, 500 kbit/s and 1 Mbit/s. Invalid values are not adopted. In this case, the current setting is retained.

**Example of modifying the baud rate from 250 kbit/s to 1 Mbit/s:**

|        |             |              |             |             |               |             |             |             |
|--------|-------------|--------------|-------------|-------------|---------------|-------------|-------------|-------------|
| 601h   | 2Fh         | 01h          | 20h         | 00h         | 08h           | xxh         | xxh         | xxh         |
| CAN-ID | Com-mand    | Object index |             | Subindex    | New baud rate | not used    |             |             |
|        | Data byte 1 | Data byte 2  | Data byte 3 | Data byte 4 | Data byte 5   | Data byte 6 | Data byte 7 | Data byte 8 |

**CAN ID: 601h**, SDO1 channel of node 1

**Command: 2Fh**, write object, 1 byte of usable data

**Object index: 2001h**, note: low byte first, then high byte!

**Subindex: 00h**

**New baud rate: 08h**, for 1 Mbit/s

**New baud rate: 04h**, for 500 kbit/s

**New baud rate: 02h**, for 250 kbit/s

**New baud rate: 01h**, for 125 kbit/s

**LED displays**

The inclination sensor has three indicator LEDs that allow rapid visual monitoring.

- The green **power** LED indicates the state of the power supply
- The yellow **run** LED indicates the bus and sensor status
- The red **err** LED indicates an error

| power (green)       | run (yellow)            | err (red)   | Meaning                                |
|---------------------|-------------------------|-------------|--|
| Off                 | Off                     | Off         | No power supply                        |
| On                  | Flashing constantly     | Off         | Pre-operational                        |
| On                  | 1x flashing             | Off         | Stopped                                |
| On                  | On                      | Off         | Operational                            |
| On                  | Off                     | On          | CAN bus off                            |
| On                  | depending on bus status | 1x flashing | Warning, e.g., outside measuring range |
| On                  | depending on bus status | 2x flashing | Error, e.g., EEPROM checksum incorrect |
| Flashing constantly | Off                     | On          | Undervoltage                           |

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