Technical Data

**Model number:** INY360D-F99-2U2E2-V17

**Features**
- 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

**Electrical connection**

**Standard symbol/Connection:**

![Connection diagram]

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

**Functional safety related parameters**
- MTTFd: 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_D: 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

**Analogue output**
- Output type: 2 voltage outputs 0 ... 5 V (one output for each axis)
- Load resistor: ≥ 1 kΩ

**Compliance with standards and directives**
- Standard conformity: Shock and impact resistance 100 g according to DIN 60068-2-27
- IEC 60947-5-2:2007
- Approvals and certificates: UL approval cULus Listed, Class 2 Power Source
- CSA approval cCSAus Listed, General Purpose, Class 2 Power Source
- E1 Type approval 10R-04

**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:
  - 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
  - EN 61000-4-3: 30 V/m (80...2500 MHz)
  - EN 61000-4-4: 2 kV
  - EN 61000-4-6: 10 V (0.01...80 MHz)
  - EN 55011: Klasse A

---

**Technical Data**

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

**Functional safety related parameters**
- MTTFd: 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_D: 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

**Analogue output**
- Output type: 2 voltage outputs 0 ... 5 V (one output for each axis)
- Load resistor: ≥ 1 kΩ

**Compliance with standards and directives**
- Standard conformity: Shock and impact resistance 100 g according to DIN 60068-2-27
- IEC 60947-5-2:2007
- Approvals and certificates: UL approval cULus Listed, Class 2 Power Source
- CSA approval cCSAus Listed, General Purpose, Class 2 Power Source
- E1 Type approval 10R-04

**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:
  - 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
  - EN 61000-4-3: 30 V/m (80...2500 MHz)
  - EN 61000-4-4: 2 kV
  - EN 61000-4-6: 10 V (0.01...80 MHz)
  - EN 55011: Klasse A
**Sensor Orientation**

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

**X Orientation**

- \( X = 0^\circ \)
- \( X = 90^\circ \)
- \( X = \pm 180^\circ \)
- \( X = 270^\circ (-90^\circ) \)

**Y Orientation**

- \( Y = 0^\circ \)
- \( Y = 90^\circ \)
- \( Y = \pm 180^\circ \)
- \( Y = 270^\circ (-90^\circ) \)

**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.

**Pinout**

- **Wire colors**
  - 1: WH (white)
  - 2: BN (brown)
  - 3: GN (green)
  - 4: YE (yellow)
  - 5: GY (gray)
  - 6: PK (pink)
  - 7: BU (blue)
  - 8: RD (red)

**Accessories**

- **V17-G-2M-PUR**
  Female cordset, M12, 8-pin, shielded, PUR cable
- **V17-G-5M-PUR**
  Female cordset, M12, 8-pin, shielded, PUR cable
- **V17-G-10M-PUR**
  Female cordset, M12, 8-pin, shielded, PUR cable
- **V17-G-10M-PVC-ABG**
  Female cordset, M12, 8-pin, shielded, PVC cable

**Dimensions**

<table>
<thead>
<tr>
<th>Button</th>
<th>10</th>
<th>45</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>4 x ø 5.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>45</td>
</tr>
<tr>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Button</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
</tr>
<tr>
<td>64</td>
</tr>
<tr>
<td>4 x ø 5.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>37</th>
</tr>
</thead>
</table>
LED display

<table>
<thead>
<tr>
<th>Displays dependent on the operating state</th>
<th>LED green: Power</th>
<th>LED yellow out 1</th>
<th>LED yellow out 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teach-in of switching points (X-axis):</td>
<td>off</td>
<td>off</td>
<td>off</td>
</tr>
<tr>
<td>Teach-in of switching points (Y-axis):</td>
<td>off</td>
<td>off</td>
<td>off</td>
</tr>
<tr>
<td>Activate teach-in mode for analog limits:</td>
<td>off</td>
<td>flashes</td>
<td>off</td>
</tr>
<tr>
<td>Teach-in of analog limit (X-axis)</td>
<td>off</td>
<td>off</td>
<td>off</td>
</tr>
<tr>
<td>Teach-in of analog limit (Y-axis)</td>
<td>off</td>
<td>off</td>
<td>off</td>
</tr>
<tr>
<td>Normal operation</td>
<td>on</td>
<td>switching-state</td>
<td>switching-state</td>
</tr>
<tr>
<td>Reset to factory settings:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 s ... 10 s ... end of reset process</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 s ... 10 s ... end of reset process</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undervoltage</td>
<td>flashes</td>
<td>off</td>
<td>off</td>
</tr>
</tbody>
</table>

Axis definition

The definition of the X-axis and Y-axis is shown on the sensor housing by means of imprinted and labeled double arrows.

Teach-in of switching points (X-axis)

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 (Y-axis)

1. Press key T2 > 2 s (see LED display)
2. Move sensor to switching position 1
3. Press key T2 briefly. LED "out 2" lights for 1.5 s as confirmation. Switching point 1 has been taught
4. Move sensor to switching position 2
5. Press key T2 briefly. LED "out 2" 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.

See also the example, above.

Teach-in of analog limits (X-axis)

1. Activate the teach-in mode for the analog limits by simultaneously pressing keys T1 and T2 > 2 s (see LED display)
2. Press key T1 > 2 s (see LED display)
3. Move the sensor into the position of minimum evaluation limit
4. Press key T1 briefly. LED "out 1" lights for 1.5 s as confirmation. The minimum evaluation limit has been taught. In this position the analog output will provide its minimum output value.
5. Move the sensor into the position of maximum evaluation limit
6. Press key T1 briefly. LED "out 1" lights for 1.5 s as confirmation. The maximum evaluation limit has been taught. In this position the analog output will provide its maximum output value.
7. 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.

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

Teach-in of analog limits (Y-axis)

1. Activate the teach-in mode for the analog limits by simultaneously pressing keys T1 and T2 > 2 s (see LED display)
2. Press key T2 > 2 s (see LED display)
3. Move the sensor into the position of minimum evaluation limit
4. Press key T2 briefly. LED "out 2" lights for 1.5 s as confirmation. The minimum evaluation limit has been taught. In this position the analog output will provide its minimum output value.
5. Move the sensor into the position of maximum evaluation limit
6. Press key T2 briefly. LED "out 2" lights for 1.5 s as confirmation. The maximum evaluation limit has been taught. In this position the analog output will provide its maximum output value.
7. 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.

If the sensor inclination exceeds one of the analog limits, the last 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 exceeds a value of approx. 8 V, the sensor continues with normal operation.