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The microprocessor design and the MEMS technology allows for a compact, precise inclinometer in a very robust, industrialized package. The inclinometer carries an IP68 rating for ingress protection, and can operate in temperatures from -30°C to +70°C (-22°F to +158°F), with the option for -40°C (-40°F). These sensors can be mounted up to a maximum of ±85° angle for dual axis models and 360° for single axis models.

WHERE CAN I USE AN INCLINOMETER?

Inclinometer sensors may be used in a wide variety of applications to solve unique feedback requirements where the customer needs to level platforms or control tilt angle. The device's small size lends itself to a multitude of applications, such as:

- Commercial machines: diggers, cranes, rotary tables, bulldozers, road construction machinery
- Dancer arm position for web tension control
- Solar plants: mirror and cell positioning
- Machine control: levers, pedals, flaps, mixing machines, hydraulic jacks
- Vertical and horizontal drills used in tunnel and road construction and immersion equipment
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WHY CHOOSE TURCK INCLINOMETERS?

High Accuracy and Repeatability
- ≤ 0.1% repeatable, after a warm-up time of 0.5 hours, ensures consistent outputs.
- Resolution as fine as ≤ 0.05° for Dual Axis analog family.
- Resolution as fine as ≤ 0.04° for CANopen Dual Axis family.
- Temperature compensated down to -40°C (-40°F) and up to +70°C (+158°F) on select versions. Temperature coefficients as low as 0.01°/K for analog models or 0.008°/K for CANopen models.

Rugged, reliable and compact
- Rated to 55 Hz (1 mm) vibration and 30 g (11 ms) shock for a wide variety of applications.
- Q20L60 analog and set point versions measure 20 mm x 30 mm x 60 mm, making them the most compact IP68/IP69K rated inclinometer on the market.
- Q42 CANopen inclinometer housing measures 42 mm x 42.5 mm x 68 mm, and incorporates bus-in and bus-out M12 eurofast® connectors for ease of use.
- IP68 rated according to TURCK’s stringent test protocol:
  - 24 hours continuous storage at +70 °C (+158°F)
  - 24 hours continuous storage at -25 °C (-13°F)
  - 7 days submerged at a depth of 1 meter
  - 10 thermal shock changes from +70 °C to -25 °C (+158°F to -13°F), 1 hour dwell cycle

Expanded line for an array of applications
- Dual axis with analog voltage or current outputs measuring up to -85° to 85°.
- Single axis with analog voltage or current outputs measuring from 1 to 360° of travel.
- 360° Single axis with configurable dual PNP set points.
- Dual axis with CANopen interface that can be used in a wide variety of industrial and mobile applications.
- Factory default measuring ranges.
- Non-standard measuring ranges available upon request. Contact factory for availability and specifications.

Easy to use
- Zero point offset on the Dual Axis Analog inclinometers can be field adjusted by applying a signal to the teach input pin or by using an optional teach pendant.
- Span of the Single Axis Analog inclinometers can be easily scaled by using the teach input pin to set the span in the field.
- Discrete outputs of the Single Axis Digital inclinometer can be independently set by using the teach input pin or by using an optional teach pendant.
- CANopen inclinometers come with CiA DS-301, profile CiA DSP-410 for ease of configuration.
**INCLINOMETER TECHNOLOGY**

**Dual Axis with Analog Output**

TURCK’s standard product is a low profile dual axis (X and Y) inclinometer with standard angular ranges of ±10°, ±45°, ±60° and ±85°, with additional ranges optional. Each axis has independent outputs. The 5 VDC version is a ratiometric design and the power is limited to 4.75 to 5.25 VDC. This means that the output is proportional to the supply voltage. The 10-30 VDC supply units are regulated and the output is fixed regardless.

**Single Axis 360° with Analog Output**

When a larger range is required or only one axis is necessary, the single axis 360° inclinometer has an adjustable measuring range and allows for programming a specified span within the 360°. The teach function is simple and can be done in seconds.

**Single Axis 360° with Two Discrete Switchpoints**

This version has dual discrete outputs that are programmable as either normally open or normally closed with an adjustable span within the full angular range 0° to 360°.

**Dual Axis with CANopen Interface**

A standard CANopen interface according to CiA DS-301/CiA DSP-410. All measured values and parameters are accessible via the object directory (OD).

---

*Technical Specifications – Q42:*

<table>
<thead>
<tr>
<th>Angular Range</th>
<th>Resolution</th>
<th>Absolute Accuracy</th>
<th>Calibration</th>
<th>Drift</th>
<th>Temperature Range</th>
<th>Load Resistance</th>
<th>Dimensional Drawings</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>±10°, ±45°, ±60°, ±85°</td>
<td>±0.05°</td>
<td>±0.1°</td>
<td>±0.3°</td>
<td>N/A</td>
<td>N/A</td>
<td>0.008°/K</td>
<td>N/A</td>
<td>2 6</td>
</tr>
<tr>
<td>Current 4-20 mA, 10-30 VDC</td>
<td>Voltage output 0.1-4.9 V, 10-30 VDC</td>
<td>Voltage output 0.1-4.9 V @ 5 VDC</td>
<td>Teachable zero point up to ±15% with teach adapter VB2-SP4</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### INCLINOMETER TECHNOLOGY

**Dual Axis – Analog Output, 4-20 mA**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>ID Number</th>
<th>Angular Range</th>
<th>Resolution</th>
<th>Absolute Accuracy</th>
<th>Zero Point Calibration</th>
<th>Temperature Drift</th>
<th>Temperature Coefficient</th>
<th>Lead Resistance</th>
<th>Dimensional Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2N10H-Q20L60-2L2-H1151</td>
<td>M1534012</td>
<td>±10°</td>
<td>&lt; 0.04°</td>
<td>±0.3°</td>
<td>±5°</td>
<td>≤ ±0.05° K</td>
<td>0.01°/K</td>
<td>200 Ω</td>
<td>1</td>
<td>1</td>
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<tr>
<td>B2N45H-Q20L60-2L2-H1151</td>
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<td>±45°</td>
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<td>±0.5°</td>
<td>±15°</td>
<td>≤ ±0.025° K</td>
<td>0.03°/K</td>
<td>200 Ω</td>
<td>1</td>
<td>1</td>
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<tr>
<td>B2N60H-Q20L60-2L2-H1151</td>
<td>M1534014</td>
<td>±60°</td>
<td>&lt; 0.14°</td>
<td>±0.5°</td>
<td>±15°</td>
<td>≤ ±0.025° K</td>
<td>0.03°/K</td>
<td>200 Ω</td>
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<td>1</td>
</tr>
<tr>
<td>B2N60H-Q20L60-2L2-H1151/S97</td>
<td>M1534046</td>
<td>±60°</td>
<td>&lt; 0.14°</td>
<td>±0.5°</td>
<td>±15°</td>
<td>≤ ±0.025° K</td>
<td>0.03°/K</td>
<td>200 Ω</td>
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<td>1</td>
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<tr>
<td>B2N85H-Q20L60-2L2-H1151</td>
<td>M1534032</td>
<td>±85°</td>
<td>&lt; 0.14°</td>
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<td>±15°</td>
<td>≤ ±0.025° K</td>
<td>0.03°/K</td>
<td>200 Ω</td>
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**Dual Axis – Analog Output, 0.1-4.9 V**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>ID Number</th>
<th>Angular Range</th>
<th>Resolution</th>
<th>Absolute Accuracy</th>
<th>Zero Point Calibration</th>
<th>Temperature Drift</th>
<th>Temperature Coefficient</th>
<th>Lead Resistance</th>
<th>Dimensional Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2N10H-Q20L60-2LU3-H1151</td>
<td>M1534006</td>
<td>±10°</td>
<td>&lt; 0.04°</td>
<td>±0.3°</td>
<td>±5°</td>
<td>≤ ±0.05° K</td>
<td>0.01°/K</td>
<td>40 kΩ</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>B2N45H-Q20L60-2LU3-H1151</td>
<td>M1534007</td>
<td>±45°</td>
<td>&lt; 0.1°</td>
<td>±0.5°</td>
<td>±15°</td>
<td>≤ ±0.025° K</td>
<td>0.03°/K</td>
<td>40 kΩ</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>B2N45H-Q20L60-2LU3-H1151/S97</td>
<td>M1534039</td>
<td>±45°</td>
<td>&lt; 0.1°</td>
<td>±0.5°</td>
<td>±15°</td>
<td>≤ ±0.025° K</td>
<td>0.03°/K</td>
<td>40 kΩ</td>
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<td>2</td>
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<tr>
<td>B2N60H-Q20L60-2LU3-H1151</td>
<td>M1534008</td>
<td>±60°</td>
<td>&lt; 0.14°</td>
<td>±0.5°</td>
<td>±15°</td>
<td>≤ ±0.025° K</td>
<td>0.03°/K</td>
<td>40 kΩ</td>
<td>1</td>
<td>2</td>
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<td>B2N60H-Q20L60-2LU3-S97</td>
<td>M1534060</td>
<td>±60°</td>
<td>&lt; 0.14°</td>
<td>±0.5°</td>
<td>±15°</td>
<td>≤ ±0.025° K</td>
<td>0.03°/K</td>
<td>40 kΩ</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>B2N85H-Q20L60-2LU3-H1151</td>
<td>M1534027</td>
<td>±85°</td>
<td>&lt; 0.14°</td>
<td>±0.5°</td>
<td>±15°</td>
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<td>0.03°/K</td>
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<tr>
<td>B2N85H-Q20L60-2LU3-S97</td>
<td>M1534040</td>
<td>±85°</td>
<td>&lt; 0.14°</td>
<td>±0.5°</td>
<td>±15°</td>
<td>≤ ±0.025° K</td>
<td>0.03°/K</td>
<td>40 kΩ</td>
<td>1</td>
<td>2</td>
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</tbody>
</table>

**Single Axis 360° – Analog Output, Adjustable Measuring Range 4-20 mA**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>ID Number</th>
<th>Angular Range</th>
<th>Resolution</th>
<th>Absolute Accuracy</th>
<th>Zero Point Calibration</th>
<th>Temperature Drift</th>
<th>Temperature Coefficient</th>
<th>Lead Resistance</th>
<th>Dimensional Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2N10H-Q20L60-2L2-H1151</td>
<td>M1534045</td>
<td>360°</td>
<td>&lt; 0.14°</td>
<td>±0.5°</td>
<td>N/A</td>
<td>N/A</td>
<td>0.03°/K</td>
<td>200 Ω</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

**Single Axis 360° – Analog Output, Adjustable Measuring Range 0.1-4.9 V**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>ID Number</th>
<th>Angular Range</th>
<th>Resolution</th>
<th>Absolute Accuracy</th>
<th>Zero Point Calibration</th>
<th>Temperature Drift</th>
<th>Temperature Coefficient</th>
<th>Lead Resistance</th>
<th>Dimensional Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2N1360V-Q20L60-2LU3-H1151</td>
<td>M1534009</td>
<td>360°</td>
<td>&lt; 0.14°</td>
<td>±0.5°</td>
<td>N/A</td>
<td>N/A</td>
<td>0.03°/K</td>
<td>40 Ω</td>
<td>1</td>
<td>4</td>
</tr>
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</table>

**Single Axis 360° – Digital Output, PNP, N.C./N.O. Programmable, Adjustable Switchpoints**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>ID Number</th>
<th>Angular Range</th>
<th>Resolution</th>
<th>Absolute Accuracy</th>
<th>Zero Point Calibration</th>
<th>Temperature Drift</th>
<th>Temperature Coefficient</th>
<th>Lead Resistance</th>
<th>Dimensional Drawing</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2N1360V-Q20L60-2UP6X3-H1151</td>
<td>M1534051</td>
<td>360°</td>
<td>&lt; 0.14°</td>
<td>±0.5°</td>
<td>N/A</td>
<td>≤ ±0.03° K</td>
<td>0.03°/K</td>
<td>500 mA</td>
<td>1</td>
<td>5</td>
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</table>

**Dual Axis – Analog Output, CANopen Interface**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>ID Number</th>
<th>Angular Range</th>
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</tr>
</thead>
<tbody>
<tr>
<td>B2N10H-Q42-CNX2-2HL150</td>
<td>M1534061</td>
<td>±10°</td>
<td>≤ 0.05°</td>
<td>±0.1°</td>
<td>N/A</td>
<td>N/A</td>
<td>0.008°/K</td>
<td>N/A</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>B2N45H-Q42-CNX2-2HL150</td>
<td>M1534062</td>
<td>±45°</td>
<td>≤ 0.1°</td>
<td>±0.1°</td>
<td>N/A</td>
<td>N/A</td>
<td>0.008°/K</td>
<td>N/A</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>B2N60H-Q42-CNX2-2HL150</td>
<td>M1534063</td>
<td>±60°</td>
<td>≤ 0.1°</td>
<td>±0.1°</td>
<td>N/A</td>
<td>N/A</td>
<td>0.008°/K</td>
<td>N/A</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

### Technical Specifications – Q20L60:

- **Voltage:** 10-30 VDC / Ratiometric: 4.75-5.25 VDC
- **Protection:** IP68
- **Operating Temperature: -30° to +70°C (-22° to +158°F) / 597 Option: -40° to +70°C (-40° to +158°F)
- **Housing:** Polycarbonate
- **Shock Resistance:** 30 g (11 ms)
- **Vibration:** 55 Hz (1 mm)
- **Repeatability:** ≤ 0.2% of measuring range |A-B|
- ≤ 0.1% after warm-up time of 0.5 h

### Technical Specifications – Q42:

- **Voltage:** 10-30 VDC
- **Protection:** IP68
- **Operating Temperature:** -40° to +70°C (-40° to +158°F)
- **Housing:** PA12
- **Shock Resistance:** 30 g (11 ms)
- **Vibration:** 55 Hz (1 mm)
- **Max. Linear Deviation:** ±0.2°(10°) / ±0.3°(45°) / ±0.4°(60°)
- **Baud Rate:** 10 kBit/s to 1 MBit/s
- **Interface:** CANopen
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* Length in meters. Standard cable lengths are 2, 5, 10 and 15 meters. Consult factory for other lengths.