

## Series HTI25 – singleturn, incremental output

### Key features HTI25:

- Channels: A, B and index signal Z
- TTL, Push-Pull or Open Collector electronics
- Maximum number of pulses per channel 10,000 pulses per revolution
- Option: ex works programmable number of pulses in pulse step width 1

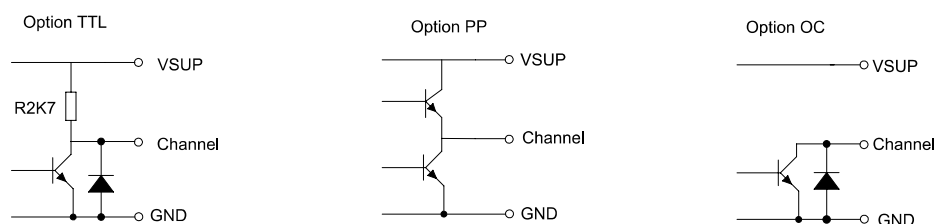


## Electrical data HTI25 – singleturn, incremental output, not redundant

| Output Signal               | TTL                     | Push-Pull               | Open Collector |
|-----------------------------|-------------------------|-------------------------|----------------|
| Number of pulses            |                         | 1 to 10,000 ppr.        |                |
| Limit frequency             |                         | 250 kHz                 |                |
| Switch-on delay             |                         | 20 ms                   |                |
| Supply voltage              | 3.3 or 5 VDC $\pm 10\%$ | 5 to 30 V               | 5 to 30 V      |
| Power consumption (no load) | $\leq 15$ mA            | $\leq 50$ mA            | $\leq 25$ mA   |
| Output load                 |                         | $\geq 5$ kOhm           |                |
| Max. pull-up voltage        |                         | -                       | 30 VDC         |
| Insulation voltage 1.)      |                         | 1000 VAC @ 50 Hz, 1 min |                |
| Insulation resistance 1.)   |                         | 2 MOhm @ 500 VDC, 1 min |                |

1.) According to IEC 60393

## Output circuit HTI25 per channel



**For details on zero point definition and output programming see page 29.**

**Order code HTI25 – singleturn, incremental output**

| Description   | Selection: standard= <b>black/bold</b> , possible options= <i>grey/italic</i> |   |  |   |
|---|---|---|--|---|
| <b>Series</b>   | <b>HTI25</b>  |   |  |   |
| <b>Shaft diameter, shaft length:</b><br><b>Shaft diameter Ø 6 mm, shaft length 12 mm</b><br><i>Shaft diameter Ø 4 mm, shaft length 10 mm</i><br><i>Custom shaft dimensions [mm] Ø ≤ 6.35 mm</i>   |   | <b>6x12</b><br><i>4x10</i><br><i>XxXX</i> |  |   |
| <b>Number of pulses (ppr):</b><br>32<br>64<br>128<br>256<br>512<br><b>1024</b><br><i>User-defined number of pulses 1 to 10000, increment 1 pulse</i>  |   |   | 32<br>64<br>128<br>256<br>512<br><b>1024</b><br>XXXX |   |
| <b>Supply voltage / output signal:</b><br><b>Push-pull A, B, Z / V<sub>SUP</sub> = 5 to 30 V</b><br><b>TTL A, B, Z / V<sub>SUP</sub> = 3,3 V or 5 V ± 10%</b><br><b>Open collector A, B, Z / V<sub>SUP</sub> = 5 to 30 V</b>  |   |   | <b>BZPP</b><br><b>BZTTL</b><br><b>BZOC</b>           |   |
| <b>Electrical connection, cable length:</b><br><b>1 m round cable, axial</b><br><b>1 m round cable, radial</b><br><b>Connector M8, 8 pol., radial*</b><br><i>Connector M8, 8 pol., axial</i><br><i>Round cable, customer-specific cable length [X.XX m], axial</i><br><i>Round cable, customer-specific cable length [X.XX m], radial</i> |   |   |  | <b>PG</b><br><b>PGR</b><br><b>M8R</b><br><i>M8</i><br><i>PGX,XX</i><br><i>PGRX,XX</i> |

**Order example HTI25 – singleturn, incremental output**
**Requirement:**

Shaft Ø 6.00 mm, shaft length 12 mm, number of pulses 1024 TTL output, VSUP=5 V/TTL, round cable 1 m

**Example for order code:**

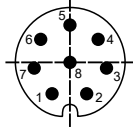
HTA25 6x12 1024 05BZTTL PG

**Cable and pin assignments – single outputs**

| Option M8(R), 8 pin |          | Option PG(R), round cable |          |
|---------------------|----------|---------------------------|----------|
| Pin-No.             | Function | Wire colour               | Function |
| Pin 1               | GND      | red                       | VSUP     |
| Pin 2               | VSUP     | black                     | GND      |
| Pin 3               | Z        | brown                     | A        |
| Pin 4               | B        | orange                    | B        |
| Pin 5               | A        | yellow                    | Z        |
| Pin 6               | n/c      |                           |          |
| Pin 7               | n/c      |                           |          |
| Pin 8               | n/c      |                           |          |

**Connector M8 – pin assignment for 8-pin connector**

Pin-Numbering of socket connector in the encoder housing

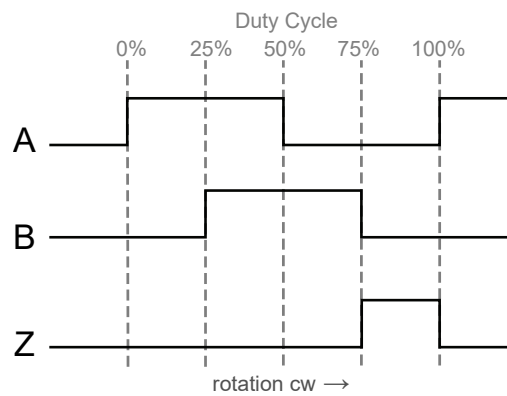


8 pin (HTI25)

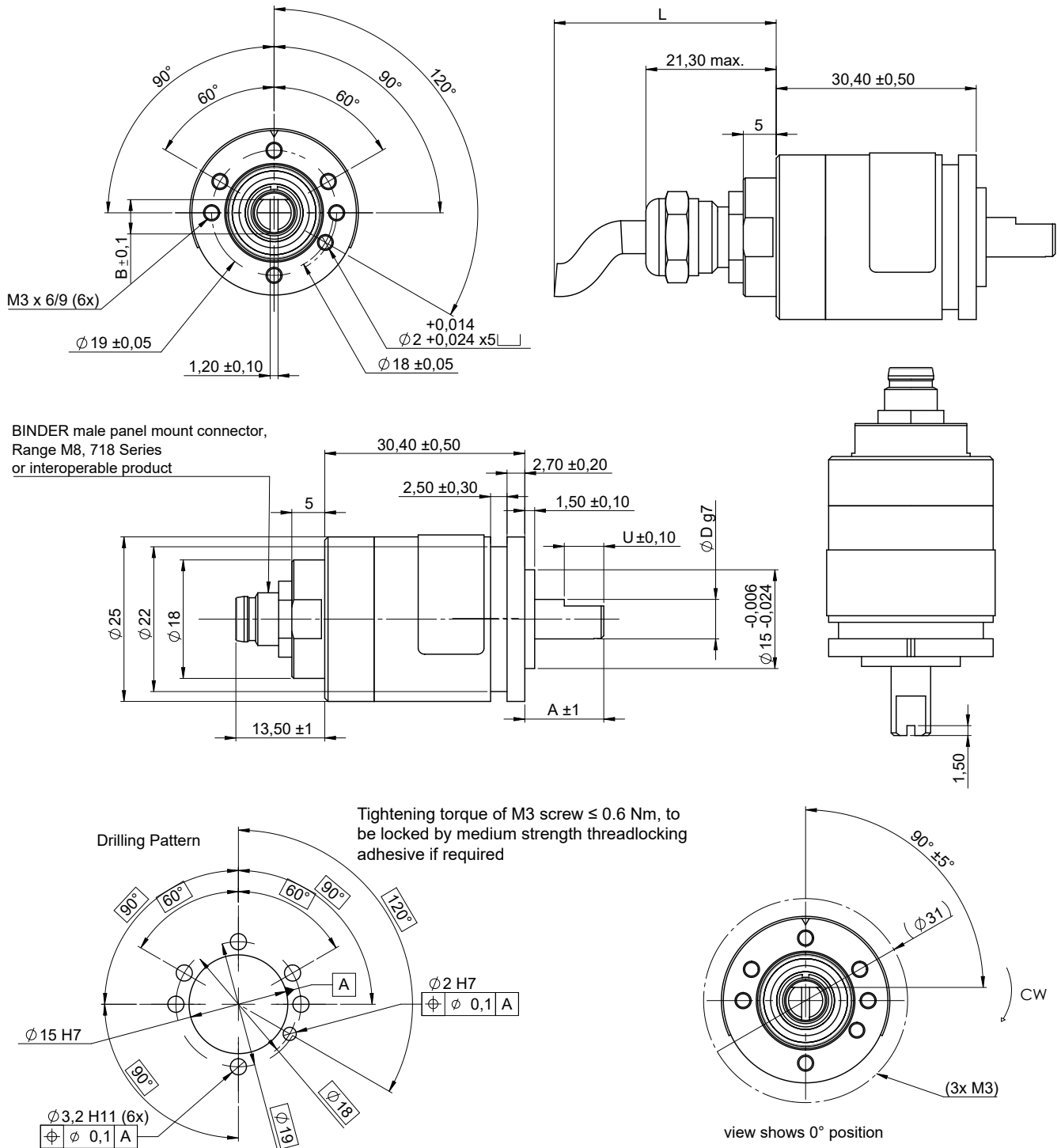
The orientation of the connector relative to the encoder body is not defined and varies from encoder to encoder. When using right-angle connectors in combination with axial outlets, the orientation of the cable outlet is therefore not defined.

If you need a defined orientation of the cable outlet, please choose our housings with radial cable outlet and use straight mating connectors.

**Signal details**



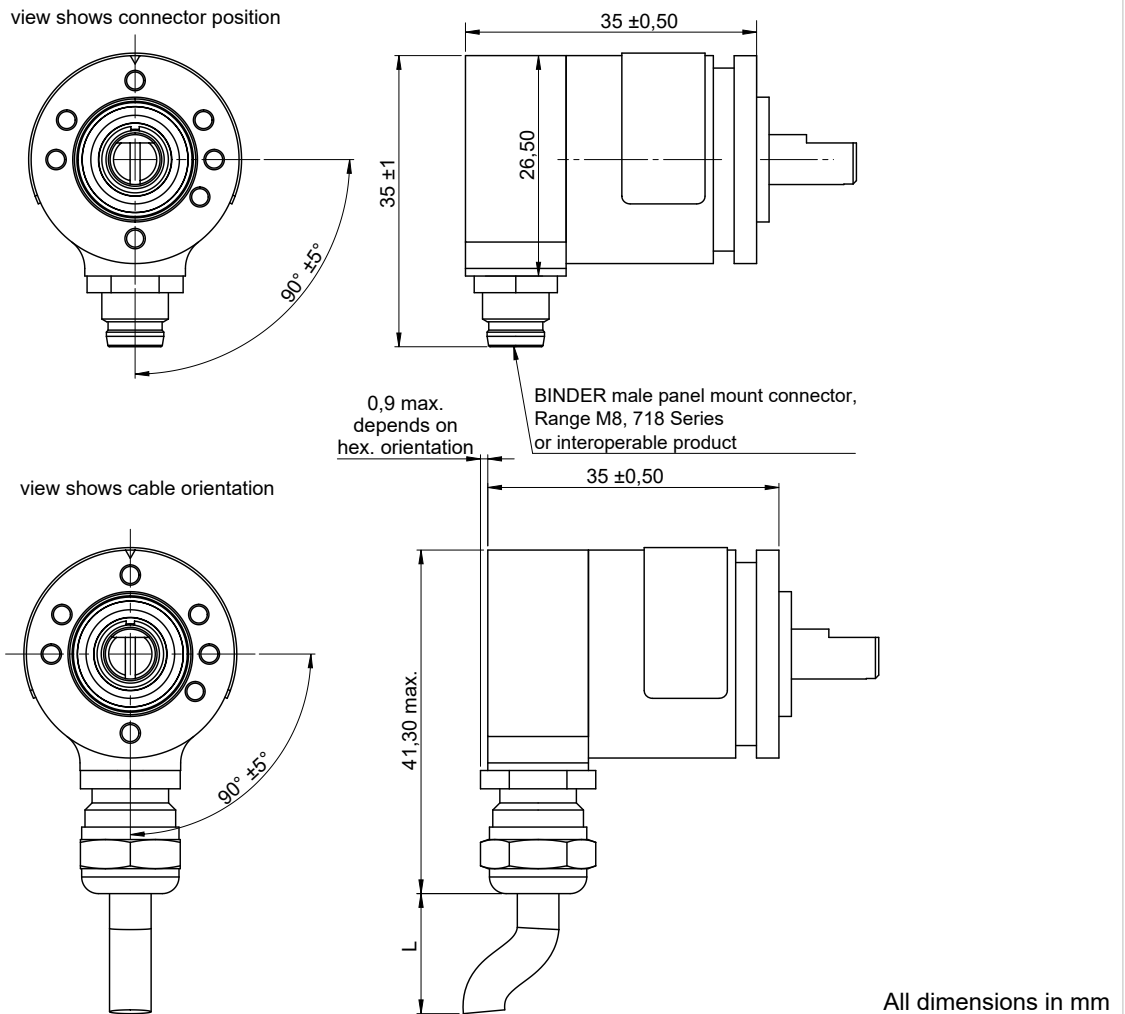
Drawing HTx25 - axial versions (option PG and M8), shaft dimensions, drilling pattern and zero position



| Standard shaft dimensions / tolerances |                    |                    |                            |
|--|--------------------|--------------------|----------------------------|
|  | Standard type 6 mm | Standard type 4 mm | Other types $\leq 6.35$ mm |
| Shaft length A                         | 12 +/- 1 mm,       | 10 +/- 1 mm        | A (custom length)          |
| Shaft diameter D                       | 6 h9 mm            | 4 h9 mm            | D h9 (custom diameter)     |
| Shaft flattening U length              | 6 +/- 0.1 mm       | 1 +/- 0.1 mm       | 6 +/- 0.1 mm               |
| Shaft flattening B                     | 4.5 +/- 0.1 mm     | 3.5 mm +/- 0.1 mm  | D - 1 mm +/- 0.1 mm        |

All dimensions in mm

Drawings HTx25 – Radial cable versions with orientation



All dimensions in mm

Cable specs for option PG(R) (round control cable)

| Option    | Standard cable length L | Number of single strands (depends on electronics) | Cable sheath Ø or width | Single strands cross section | Allowed tolerance (L) | Minimum bending radius                    |
|-----------|-------------------------|---|-------------------------|------------------------------|-----------------------|---|
| PG<br>PGR | Standard 1000 mm        | 3   |                         | AWG26                        | -20 mm to +40 mm      | 10 x D Ø<br>(D = cable sheath diameter Ø) |
|           |                         | 6   |                         |                              |                       |   |
|           |                         | 8   |                         |                              |                       |   |
|           |                         | 10  |                         |                              |                       |   |
|           |                         | 12  |                         | AWG28                        |                       |   |

Cables without cable shield

(\*) Tolerances according IPC Association

Cable length tolerances – custom lengths

| Length L        | Tolerance        |
|-----------------|------------------|
| ≤ 0.3 m         | +25 mm / -20 mm  |
| > 0.3 m - 1.5 m | +40 mm / -20 mm  |
| > 1.5 m - 3 m   | +100 mm / -40 mm |
| > 3 m - 7.5 m   | +150 mm / -60 mm |

Wire harness length measured from sensor face including connector. Minimum cable length: 0.08 m (for round cable). Please contact us for lengths > 3 m regarding handling and packaging.

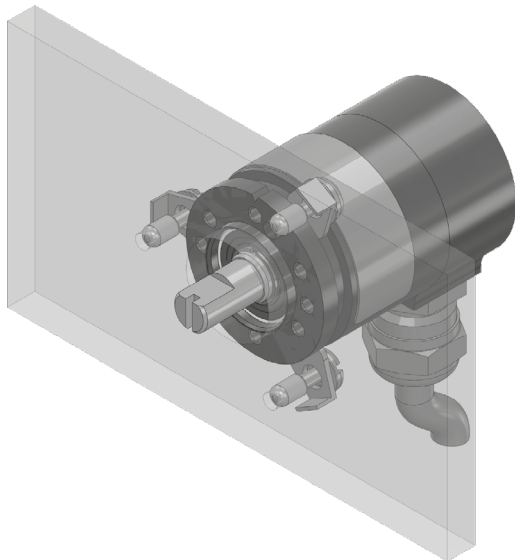
| Mechanical and Environmental data                          |  |
|--|--|
| Shaft type   | Solid shaft  |
| Mechanical angle of rotation 1.)                           | Endless  |
| Lifetime 2.)   | @100 % of max. permissible radial shaft load >1.4x10E8 shaft revolutions<br>@80 % of max. permissible radial shaft load >2x10E9 shaft revolution<br>@20 % of max. permissible radial shaft load >1.7x10E10 shaft revolutions |
| Bearing  | 2 pcs. groove ball bearings type 2RS   |
| Max. operational speed (with shaft sealing)                | max. 12,000 rpm  |
| Operational torque:<br>(@ room temperature and 10 rev/min) | ≤ 0.3 Ncm  |
| Operating temperature range                                | Option M8 (connector)<br>▪ -25 to +80°C<br>Option PG (cable gland incl. cable)<br>▪ -30 to +85°C Kabel fest verlegt<br>▪ -10 to +85°C Kabel in Bewegung  |
| Storage temperature range                                  | -30 to +105°C  |
| Protection grade (IEC 60529) front side                    | IP65S  |
| Protection grade (IEC 60529) rear side                     | Option PG: IP68 (cable ends excluded)<br>Option M8: IP67 (when mated with IP67 type M8 cable)  |
| Vibration (DIN EN 60068-2-64:2008 + A1: 2019)              | ±1.5 mm / 30 g / 10 to 2000 Hz / 16 frequency cycles (3x4 h)   |
| Shock (DIN EN 60068-2-27)                                  | 400 m/s <sup>2</sup> / 6 ms / half sine (100±5) shocks   |
| Housing diameter   | Ø 25 mm  |
| Housing depth  | In dependency to the electrical connection position:<br>▪ axial 51.7 mm (PG) / 43.9 mm (M8)<br>▪ radial 35 mm  |
| Shaft diameter   | Standards: Ø6 mm, Ø4 mm, details see drawings<br>Option Custom diameter [mm] Ø ≤ 6.35 mm   |
| Max. radial load   | 80 N (load point 80% in dependency to the visible standard shaft length)   |
| Max. axial load  | 40 N (axial application of force onto the shaft end)   |
| Masse (zirka)  | HTx25 mit Stecker M8(R) 40 g<br>HTx25 mit Kabelverschraubung und 1 m Signalkabel PG(R) 69 g  |

1.) According IEC 60393

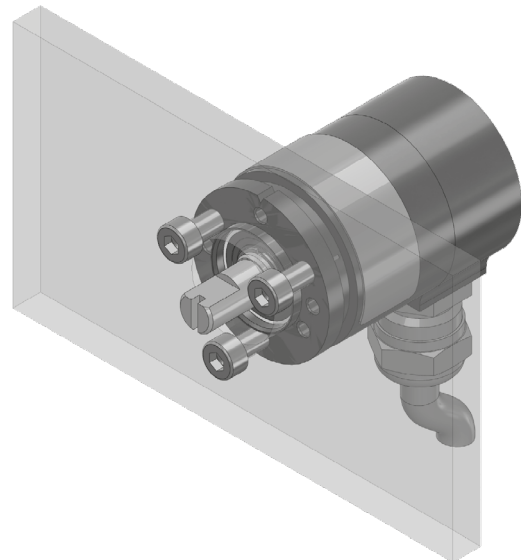
2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

**Mechanical and environmental data, miscellaneous**

|  |   |
|--|---|
| Sensor mounting  | <ol style="list-style-type: none"> <li>1. Via threaded holes integrated in the sensors head by use of stainless steel screws M3x0.5</li> <li>2. Via synchro flange with optional available servo mount fixing nails SFN1 incl. screws M3 x 0.5 from MEGATRON (not enclosed), recommended at angles of 120°</li> </ol>   |
| Mounting hardware included                                     | <p>none</p> <ul style="list-style-type: none"> <li>▪ To attach the rotary encoder using a synchro flange, the MEGATRON SFN1 synchro clamps available as accessories</li> <li>▪ For the electrical connection option M8 (R), cables and mating connectors are not part of the scope of delivery. M8 connectors with cables are available as accessories from MEGATRON</li> </ul> |
| Fastening torque per screw for fastening of the rotary encoder | <p>≤ 0.6 Nm (M3 screw, thread tensile strength class 5.6)<br/>For screw securing, the use of a medium-strength thread securing adhesive is recommended</p>  |
| Material shaft   | Stainless steel   |
| Material housing   | Aluminium   |
| Material cable gland (PG)                                      | Stainless steel   |
| Material connector M8  | CuZn nickel-plated  |



Servo mount using fixing nails SFN1  
incl. 3 screws M3 x 0.5



Flange mount using 3 screws M3

**Immunity / Electrostatic Discharge**

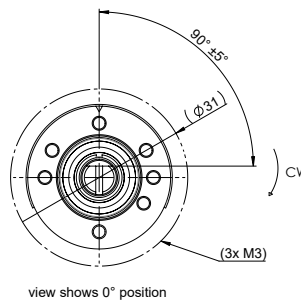
|  |         |
|--|---------|
| EN 61000-4-3 RF sine wave                    | Class A |
| EN 61000-4-6 Conducted sine wave             | Class A |
| EN 61000-4-8 Power frequency magnetic fields | Class A |
| EN 61000-4-2 ESD                             | Class B |

**Definition of the zero position / anti-rotation pin**

**Output at the zero point:**

- HTA25 (analogue outputs): Output signal 0% full scale (F. S.)
- HTP25 (PWM output): duty cycle 10% (10% duty cycle)
- HTS25 (serial output): Output signal 0% full scale (F. S.)
- HTI25 (incremental output): The index signal is output (Z)

Position of the zero position see drawing below (nodge at top)



**Signal definition for custom rotation angles**

Custom angles <360°

When programming the electrical angle of rotation of <360°, the remaining non-effective range of rotation is divided equally into high and low.

