

## Series HTI25 – singleturn, incremental output

### Key features HTI25:

- Channels: A, B and index signal Z
- TTL or Open Collector electronics
- Maximum number of pulses per channel 20.000 pulses per revolution
- Option: ex works programmable number of pulses in pulse step width 1

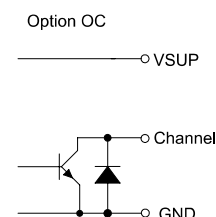
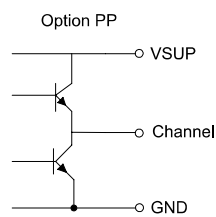
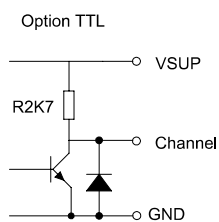


## Electrical data HTI25K – singleturn, incremental output

Output Signal	TTL	Open Collector
Number of pulses	1 to 1024 ppr	1 to 20.000 ppr
Limit frequency	100 kHz	250 kHz
Switch-on delay	20 ms	6.3 ms
Supply voltage	3.3 or 5 VDC $\pm$ 10%	4.8 to 42 V
Power consumption (no load)	$\leq$ 15 mA	$\leq$ 24 mA (for 5 V input)
Output load	$\geq$ 5 kOhm	
Max. pull-up voltage	-	42 VDC
Max. pull-up current	-	600 mA
Insulation voltage 1.)	1000 VAC @ 50 Hz, 1 min	
Insulation resistance 1.)	2 MOhm @ 500 VDC, 1 min	
MTTF (SN29500-2005-1)	473a	1000a

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> Shaft diameter $\varnothing$ 6 mm, shaft length 12 mm <i>Shaft diameter <math>\varnothing</math> 4 mm, shaft length 10 mm</i> <i>Custom shaft dimensions [mm] <math>\varnothing \leq 6.35</math> mm</i>		<b>6x12</b> <i>4x10</i> <i>XxXX</i>		
<b>Number of pulses (ppr):</b> 32 64 128 256 512 <b>1024</b> <i>User-defined number of pulses</i>			32 64 128 256 512 <b>1024</b> <i>XXXX</i>	
<b>Supply voltage / output signal:</b> VSUP=5 V $\pm$ 10% / OUT=TTL A, B, Z VSUP=4.8 to 42 V / OUT=open collector A, B, Z				<b>05BZTTL</b> <b>BZOC</b>
<b>Electrical connection, cable length:</b> 1 m round cable, axial 1 m round cable, radial <b>Connector M8, radial*</b> <i>Round cable, customer-specific cable length [X.XX m], axial</i> <i>Round cable, customer-specific cable length [X.XX m], radial</i>				<b>PG</b> <b>PGR</b> <b>M8R</b> <i>PGX,XX</i> <i>PGRX,XX</i>

\* M8 axial connector variant not available

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

Shaft  $\varnothing$  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:**

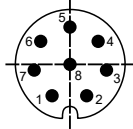
HTA25 6x12 1024 05BZTTL PG

**Cable and pin assignments – single outputs**

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

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

Pin-Numbering of socket connector in the encoder housing



8 pin (HTI25)

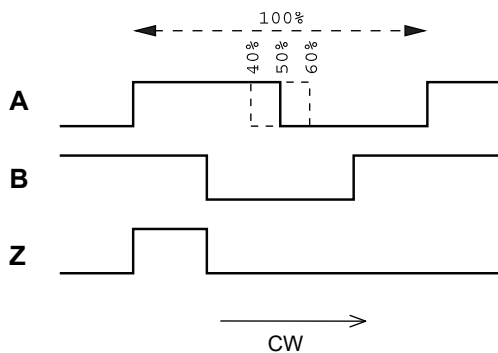
The orientation of the connector relative to the encoder body is not defined and varies from encoder to encoder. When using right-angle connectors in combination with axial outlets, the orientation of the cable outlet is therefore not defined.

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

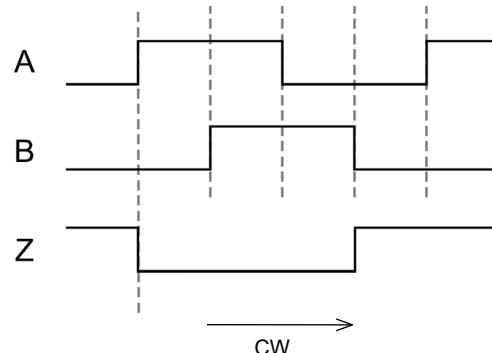
**Signal details**

Incremental signal output function

A, B, Z (version 05BZTTL)

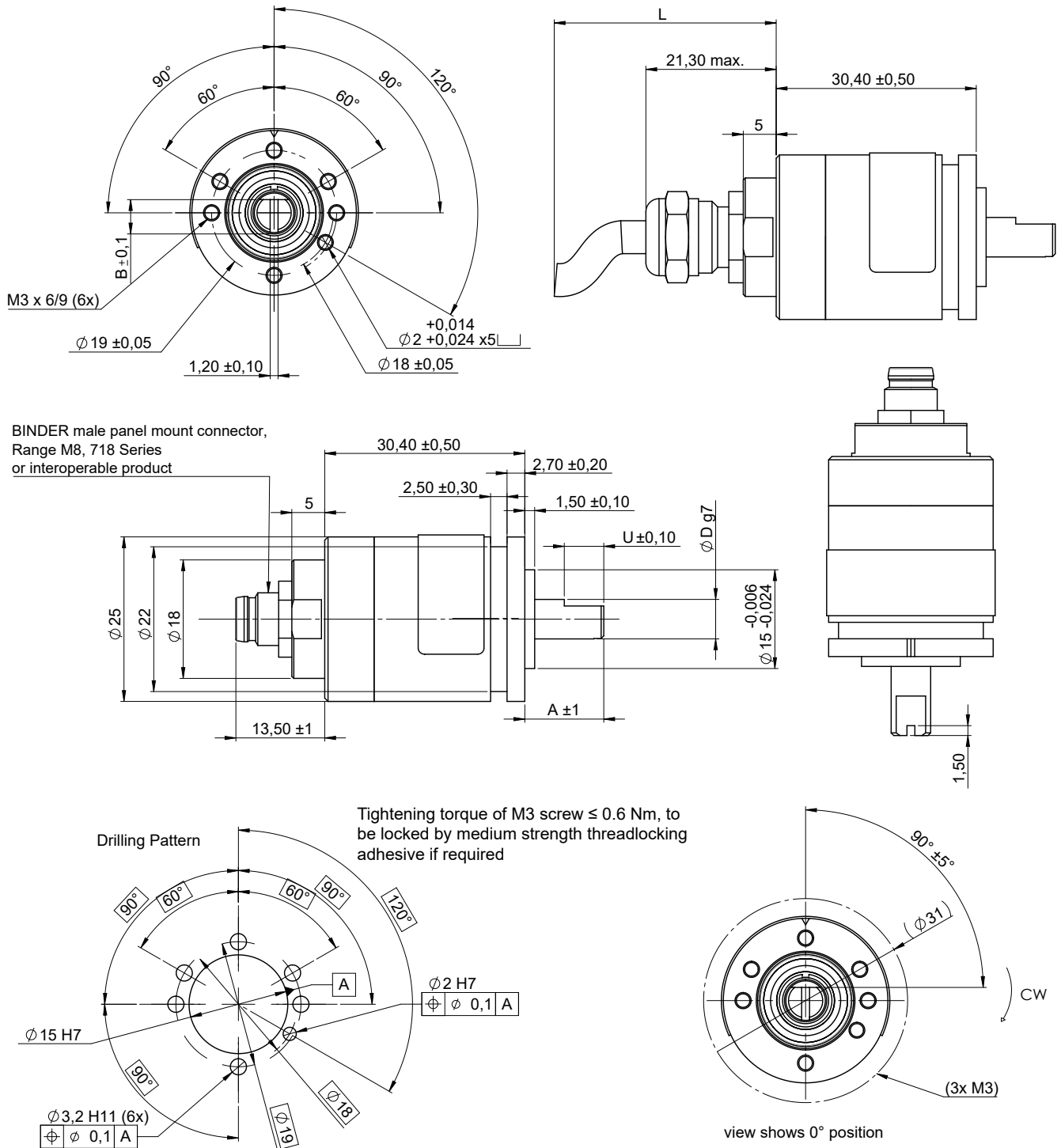


A, B, Z (version BZOC)



The percentage information describes the proportion of a pulse in dependency to the duration of one period

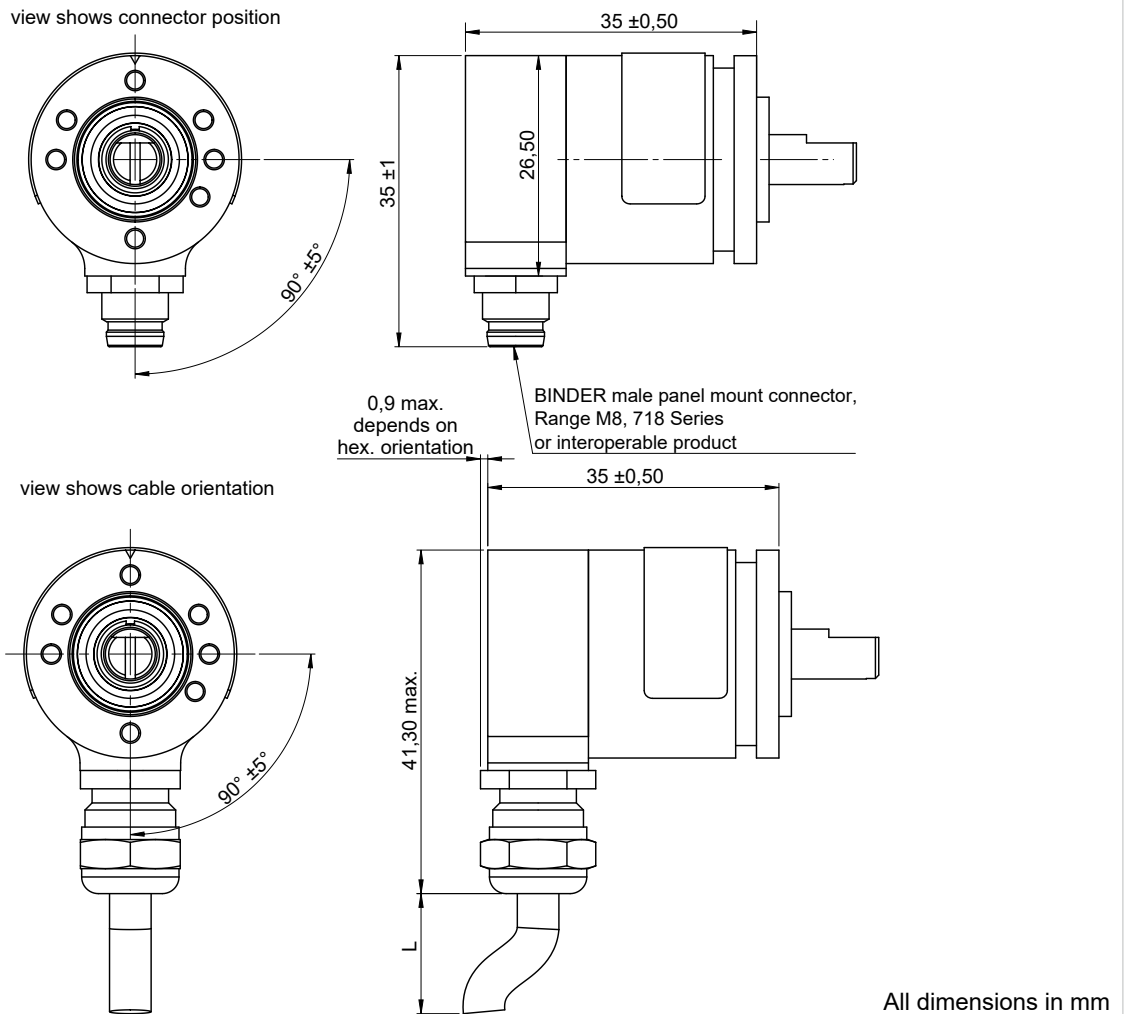
Drawing HTx25 - axial versions (option PG and M8), shaft dimensions, drilling pattern and zero position



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 PGR	Standard 1000 mm	3		AWG26	-20 mm to +40 mm	10 x D Ø (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.

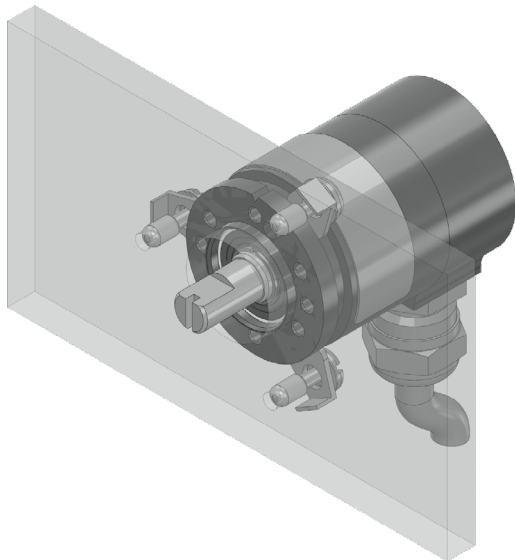
Mechanical and Environmental data	
Shaft type	Solid shaft
Mechanical angle of rotation 1.)	Endless
Lifetime 2.)	@100 % of max. permissible radial shaft load >1.4x10E8 shaft revolutions @80 % of max. permissible radial shaft load >2x10E9 shaft revolution @20 % of max. permissible radial shaft load >1.7x10E10 shaft revolutions
Bearing	2 pcs. groove ball bearings type 2RS
Max. operational speed (with shaft sealing)	max. 12.000 rpm
Operational torque: (@ room temperature and 10 rev/min)	≤ 0.3 Ncm
Operating temperature range	Option M8 (connector) ▪ -25 to +80°C Option PG (cable gland incl. cable) ▪ -30 to +85°C Kabel fest verlegt ▪ -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) 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: ▪ axial 51.7 mm (PG) / 43.9 mm (M8) ▪ radial 35 mm
Shaft diameter	Standards: Ø6 mm, Ø4 mm, details see drawings 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 HTx25 mit Kabelverschraubung und 1 m Signalkabel PG(R) 69 g

1.) According IEC 60393

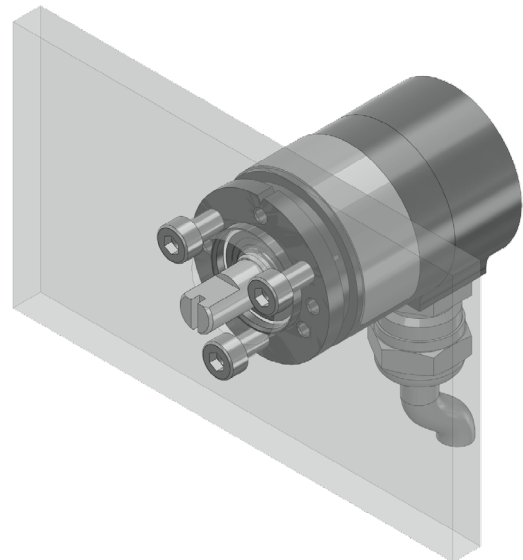
2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

**Mechanical and environmental data, miscellaneous**

Sensor mounting	<ol style="list-style-type: none"> <li>Via threaded holes integrated in the sensors head by use of stainless steel screws M3x0.5</li> <li>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) 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 / REACH / RoHS**

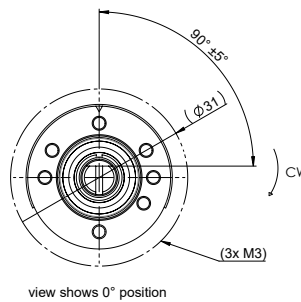
EN 61000-4-3 RF sine wave	Class A
EN 61000-4-6 Conducted sine wave	Class A
EN 61000-4-8 Power frequency magnetic fields	Class A
EN 61000-4-2 ESD	Class B
REACH Regulation (EC) 1907/2006 including the SVHC list	
RoHS Directive 2011/65/EU	

**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.

