Series HTA25PM – multi-/singleturn, programmable, analogue output, not redundant

Key features HTA25PM :

- Measuring range 10° to max. 72000° (200 shaft revolutions)
- Programmable by the user. Programmable are the sense of rotation (CW/CCW) and the effective electrical angle [°]
- Programmable up to 10000 times
- Can also be used as a programmable singleturn rotary encoder
- Maximum rotation of the shaft in a voltage-free state without loss of the angle information +/-179°
- Factory programming (ex works): effective electrical angle of rotation 3600° (10 shaft revolutions), sense rotation CW

Electrical data HTA25PM – multi-/singleturn, programmable, analogue output, not redundant

Effective electrical angle of rotation 1.)	0 to 10° - 0 to 72000° (max. 200 turns) Start point, endpoint and sense of rotation programmable by the customer. Ex works the angle is set to 3600°. For detecting absolute position >360° the sensor should not be turned more than ±179° without supply voltage.		
Independent linearity (best straight line) 1.)	±0.05% @ 3600°		
Absolute Linearity 1.)	±0.1% @ 3600°		
Output signal	0 to 5 V	0 to 10 V	4 to 20 mA
Resolution 1.)	12 Bit		
Update rate	3 ms		
Supply voltage	9 to 30 V	15 to 30 V	11 to 30 V
Power consumption (no load)	< 10 mA		< 14 mA
Output load	≥ 5 kOhm		≤ 500 Ohm
Insulation voltage 1.)	1000 VAC @ 50 Hz, 1 min		
Insulation resistance 1.)	2 MOhm @ 500 VDC, 1 min		
Max. number of programming cycles	10000		
MTTF (EN29500-2005-1)	224a		229a

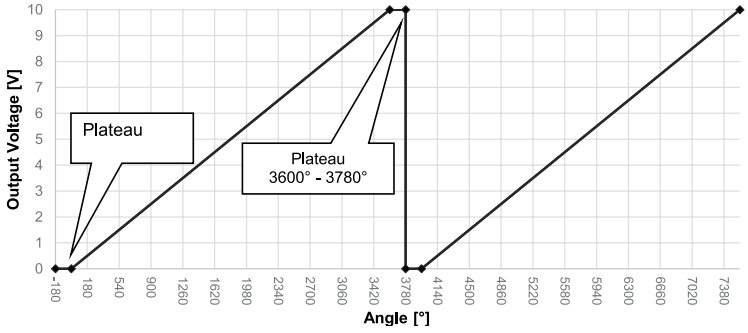
1.) According IEC 60393

Signal output function (factory programming). Automatic function for inserting signal plateaus

The function represents the relationship between the zero degree marking on the rotary encoder housing in dependency to the 0° position of the shaft and the resulting output signal in the state of delivery, when turning the shaft clockwise (sense of rotation CW). The effective electrical angle of rotation is 3600° ex works. Before and after the linearly rising output signal for 3600° the HTA25PM integrates automatically signal plateaus for a rotation angle of each 180° .
The following example shows the output signal pattern when actuating the shaft in the delivery state for 11 revolutions clockwise (sense of rotation CW), starting at the 0° position:

1. 10 rotations of the shaft clockwise 0° to 3600°, linearly increasing output signal 0% to 100% FS
2. 1/2 rotation of the shaft 180° (3600° to 3780°) signal plateau 100% FS
3. 1/2 rotation of the shaft 180° (3780° to 3960°) signal plateau 0% FS

The drawing shows the signal-amplitude function for 0 to 10 V signal output



Order Code HTA25PM – singleturn or multiturn, analogue output, not redundant				
Description	Selection: standard=**black/bold**, possible options=*grey/italic*			
Series	**HTA25PM**			
Shaft diameter, shaft length: **Shaft diameter Ø 6 mm, shaft length 12 mm** *Shaft diameter Ø 4 mm, shaft length 10 mm* *Custom shaft dimensions [mm] Ø ≤ 6.35 mm*		**6x12** *4x10* *XxXX*		
Supply voltage / output signal: **VSUP = 24 V (15 to 30 V) / OUT = 0 to 10 V** **VSUP = 24 V (9 to 30 V) / OUT = 4 to 20 mA** **VSUP = 24 V (9 to 30 V) / OUT = 0 to 5 V**			**2410** **2442** **2405**	
Electrical connection, cable length: **1 m round cable, axial** **1 m round cable, radial** **Plug M8, axial** **Connector M8, radial** *Round cable, customer-specific cable length [X.XX m], axial* *Round cable, customer-specific cable length [X.XX m], radial*				**PG** **PGR** **M8** **M8R** *PGX,XX* *PGRX,XX*

Order example HTA25PM

Requirement:
Shaft Ø 6.00 mm, shaft length 12 mm, VSUP=24 V / OUT=0 to 5 V, sense of rotation CW, rotation angle ex works 3600° (can be programmed by customer), round cable 1 m radial

Example for order code:
HTA25PM 6x12 2405 PGR

Cable and pin assignment

Function	Roundcable (Option R)	Option M8(R), 8 pin
DIR	orange	Pin 1
END	green	Pin 2
START	yellow	Pin 3
VSUP	red	Pin 4
OUT	brown	Pin 5
GND	black	Pin 6
-	-	Pin 7 n/c
-	-	Pin 8 n/c

For details on output programming see page 31.

Order example HTA25PM programmer

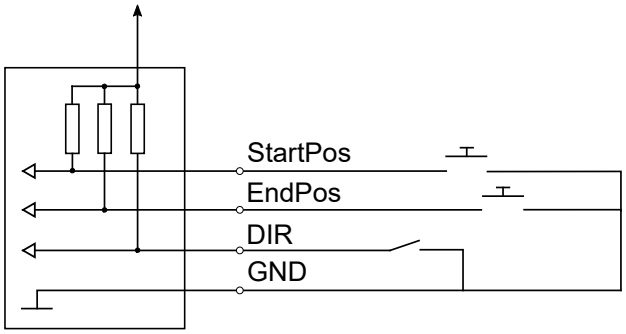
Key features HTA25 PM programmer:
- Programmable measuring range from 10° to max. 72000° (200 shaft revolutions)
- Programmable: sense of rotation (CW/CCW), effective electrical angle [°]
- Up to 10.000 programming cycles per rotary encoder

Order number:	Order code:
135945	Programmer Tool for ETA HTA PM

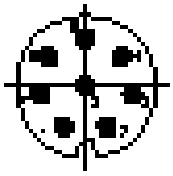
Programming of HTA25PM

The programming guide is available for download on the MEGATRON web page https://www.megatron.de/

To program the HTA25PM rotary encoder either the following circuit must be built, or the programmer must be ordered from MEGATRON.



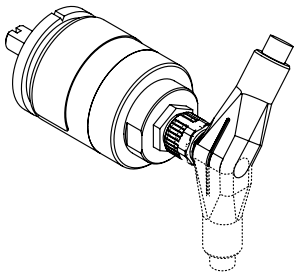
Plug M8(R) – pin assignment for 8-pin connector



Pin-Numbering of socket connector in the encoder housing

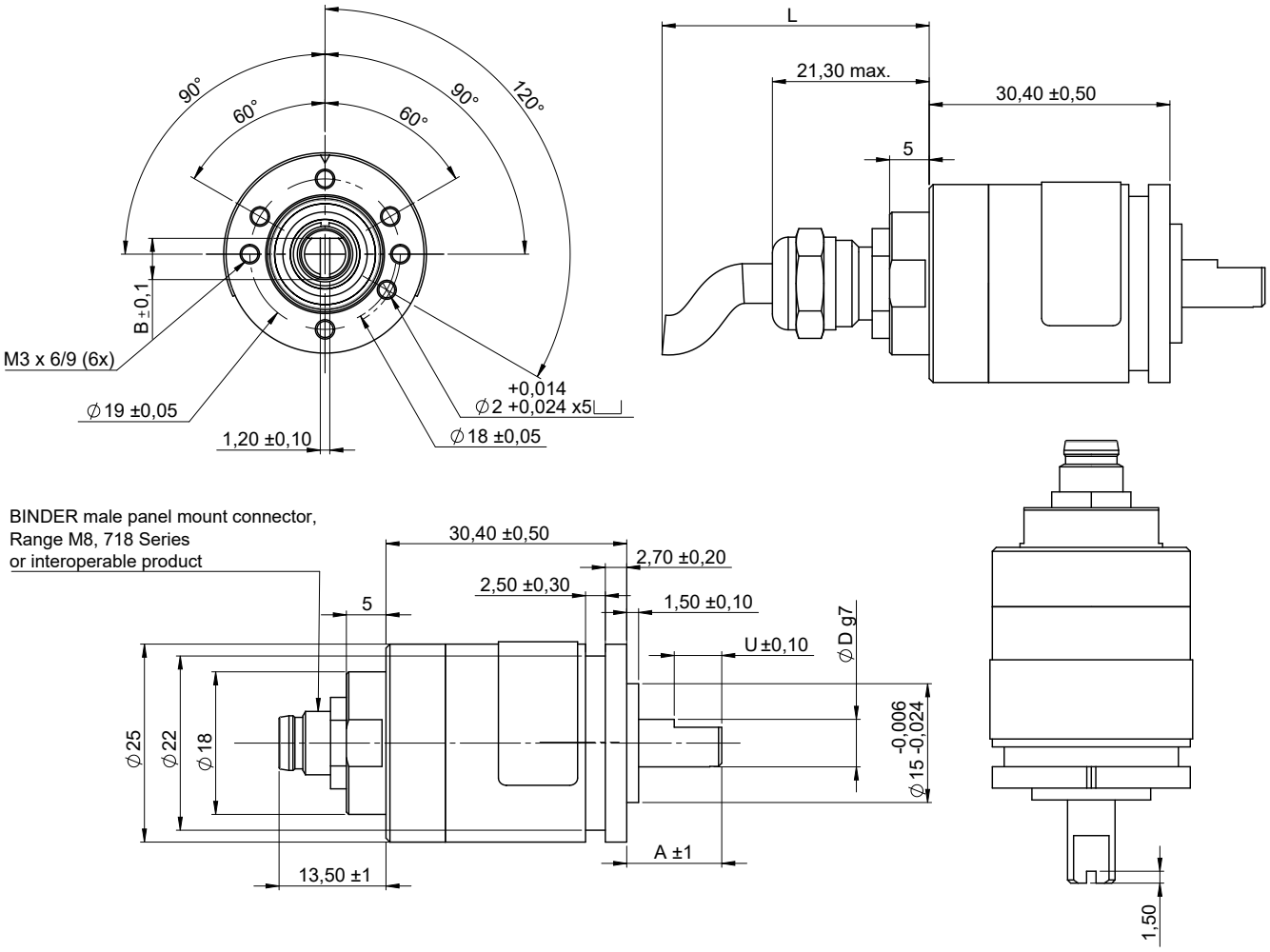
The orientation of the connector relative to the encoder body is not defined and varies from encoder to encoder. When using right-angle connectors in combination with axial outlets, the orientation of the cable outlet is therefore not defined.

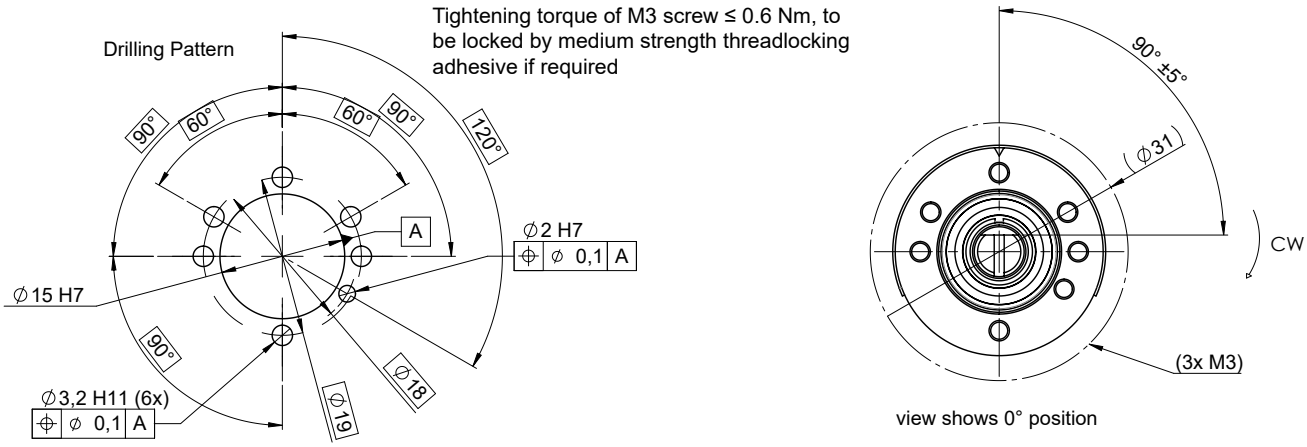
If you need a defined orientation of the cable outlet, please choose our housings with radial cable outlet and use straight mating connectors.



Orientation will vary when using angled connectors.

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

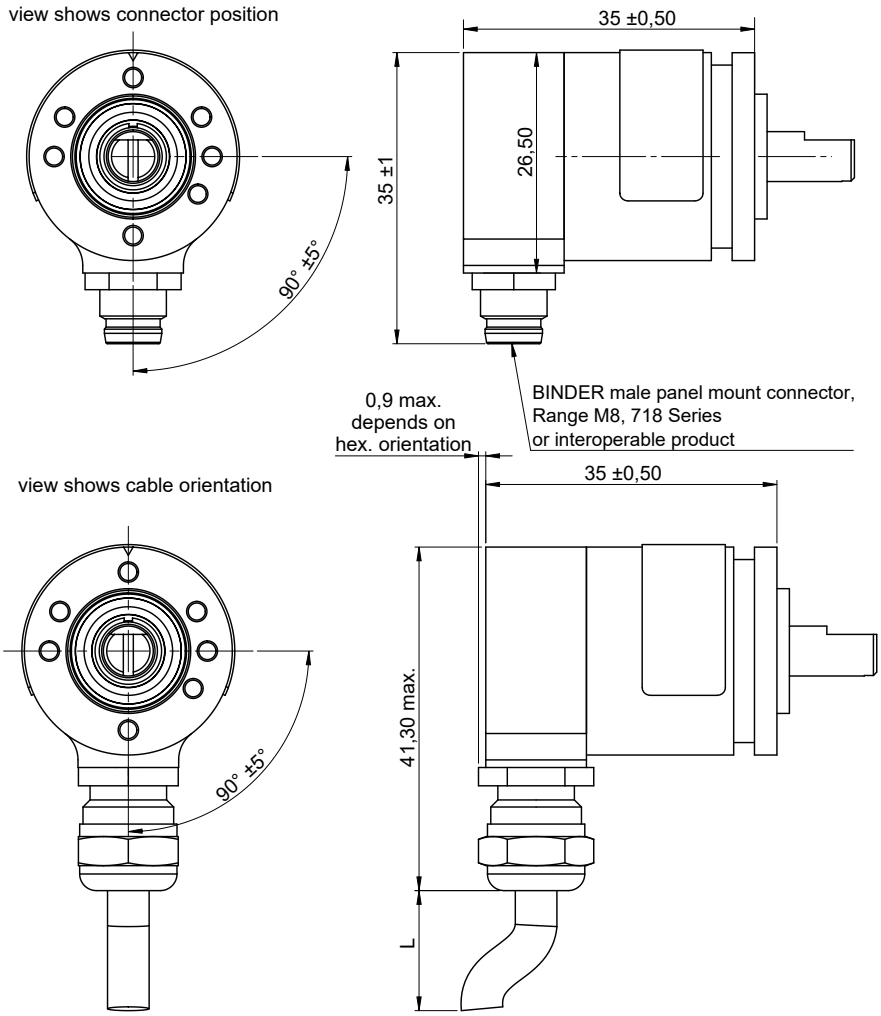




Standard shaft dimensions / tolerances			
	Standard type 6 mm	**Standard type 4 mm**	**Other types ≤ 6.35 mm**
Shaft length A	12 +/- 1 mm,	10 +/- 1 mm	A (custom length)
Shaft diameter D	6 h9 mm	4 h9 mm	D h9 (custom diameter)
Shaft flattening U length	6 +/- 0.1 mm	1 +/- 0.1 mm	6 +/- 0.1 mm
Shaft flattening 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		AWG28		
		12				
Cables without cable shield						

(*) Tolerances according IPC Association

Cable length tolerances – custom lengths

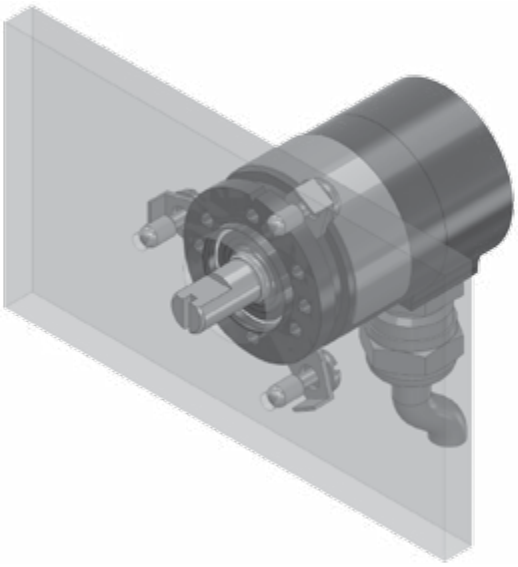
Length L	Tolerance
≤ 0.3 m	+25 mm / -20 mm
> 0.3 m - 1.5 m	+40 mm / -20 mm
> 1.5 m - 3 m	+100 mm / -40 mm
> 3 m - 7.5 m	+150 mm / -60 mm

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.

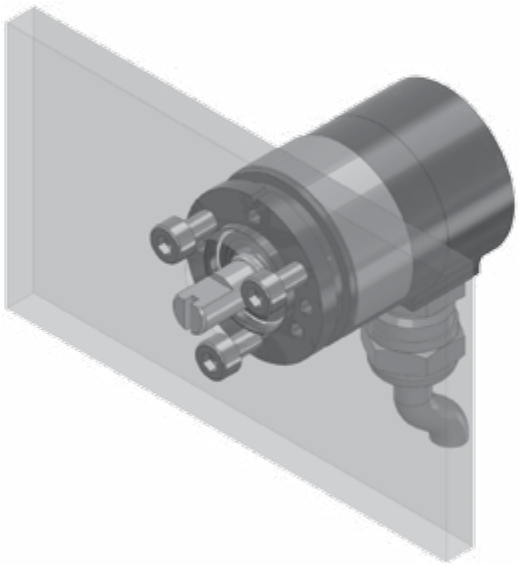
Mechanical and Environmental data	
Shaft type	Solid shaft
Mechanical angle of rotation 1.)	Endless
Lifetime 2.)	@100 % of max. permissible radial shaft load >1.4x10E8 shaft revolutions @80 % of max. permissible radial shaft load >2x10E9 shaft revolution @20 % of max. permissible radial shaft load >1.7x10E10 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/s² / 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	1. Via threaded holes integrated in the sensors head by use of stainless steel screws M3x0.5 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°
Mounting hardware included	none ▪ To attach the rotary encoder using a synchro flange, the MEGATRON SFN1 synchro clamps available as accessories ▪ 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
Fastening torque per screw for fastening of the rotary encoder	≤ 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
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



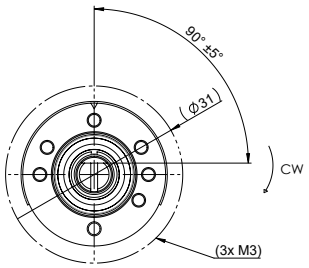
Flange mount using 3 screws M3

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)



view shows 0° position

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.