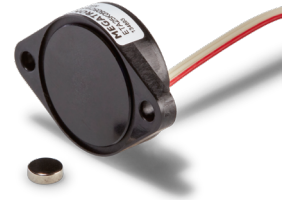


Series ETA25KPM – multi/singleturn, programmable, analogue output, not redundant

Key features ETA25KPM :

- Measuring range 10° to max. 72000° (200 shaft revolutions)
- Programmable by the user using teach-in function. 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
- Supply voltage: 9 to 30 VDC, 15 to 30 VDC
- Output signal: 4 to 20 mA, 0 to 5 V, 0 to 10 V



Electrical data ETA25KPM – 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

Programmable Multi/Singleturn Encoders

ETA25KPM

Order Code ETA25KPM – multi/singleturn, analogue output, not redundant

Description	Selection: standard= black/bold , possible options= <i>grey/italic</i>		
Series	ETA25KPM		
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: Flat ribbon cable, standard length 0.15 m <i>Flat ribbon cable with custom length [x.xx m]</i> Round cable, standard length 1 m <i>Round cable with custom length [x.xx m]</i>			F0,15 FX,XX R1,00 RX,XX

Order example ETA25KPM

Requirement:

VSUP=24 V / OUT=0...5 V, sense of rotation CW, rotation angle ex works 3600° (can be programmed by customer), flat ribbon cable 1.00 m

Example for order code:

ETA25KPM 2405 R1.00

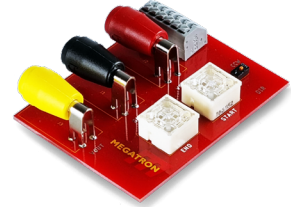
Cable and pin assignment			Connector assignment	
Function	Option F	Option R	Function	Option TS
DIR	Strand 1 (red)	orange	VSUP	23
END	Strand 2	grün	OUT	22
START	Strand 3	gelb	GND	21
VSUP	Strand 4	rot		
OUT	Strand 5	braun		
GND	Strand 6	schwarz		

For details on output programming see page 25.

Programming device PRO for programming the encoder in the field

Key features 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:

135945

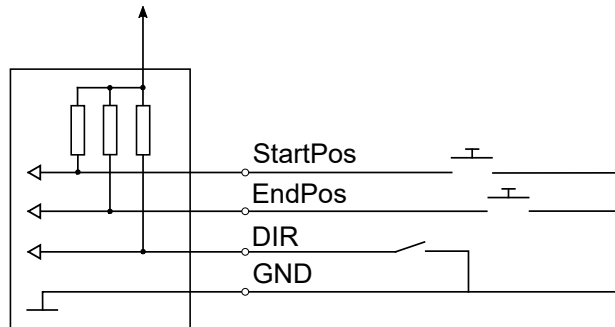
Order code:

Programmer Tool for ETA HTA PM

Programming of ETA25KPM

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

To program the HTA36PM rotary encoder either the following circuit must be built, or the programmer must be ordered from MEGATRON.

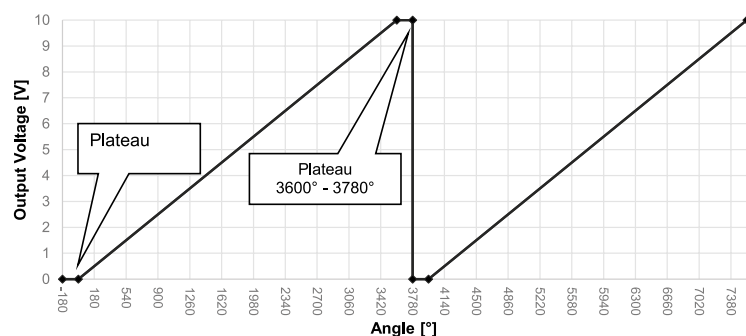


Signal output function (only for factory programming). Automatic function for inserting signal plateaus

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 ETA25KPM 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

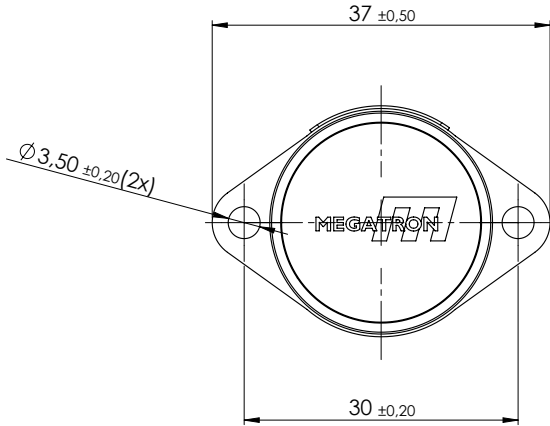


The drawing shows the signal amplitude function for 0 to 10 V signal output

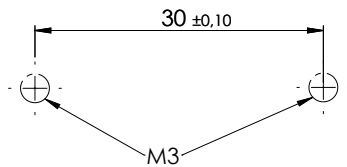
Teach-In function – manual field programming

When manual programming in the field using the teach-in function, the remaining angle for the next full revolution is divided equally into high and low. There are no further signal plateaus. Please see the programming guide on our website for more details.

Drawing ETx25K Family

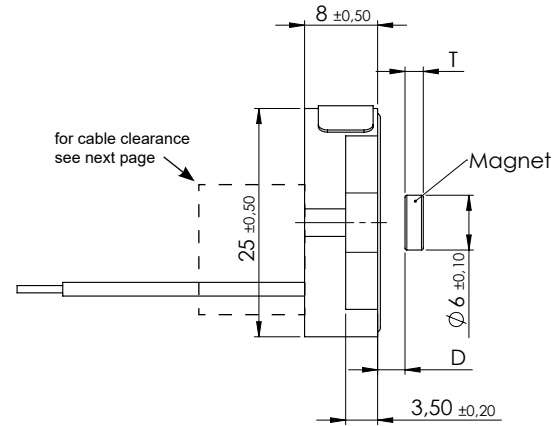


drilling pattern



Tightening torque $\leq 0,5\text{Nm}$

planarity of installation surface $\square 0,1$
roughness of installation surface $\sqrt{Ra\ 6,3}$



Option F - Flat ribbon cable

Option R - Round cable

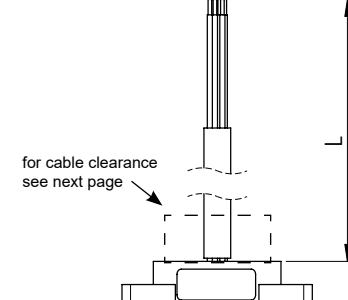
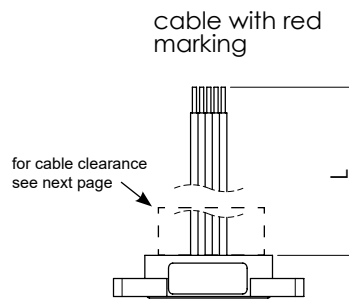


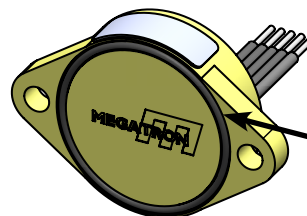
Table for parameter L see next page

Magnet thickness and distance from sensor surface (standard magnet only)

Electronics	Thickness T of the magnet	Mounting distance D
Analogue single turn not redundant, ETA25K, ETP25K, ETS25K (SPI only)	2 mm	1.00 +/- 0.15 mm
Analogue / Serial redundant, ETA25KX, ETS25KX	2.5 mm	0.50 +/- 0.15 mm
Incremental ETI25K, Serial ETS25K (SSI only)	4 mm	0.20 +/- 0.15 mm
Analogue Multi/singleturn ETA25KPM	4 mm	0.20 +/- 0.15 mm

Angular error in dependency of the deviation of the magnet to the center axis

Deviation from the center axis	Angular error
0.50 mm	0.6°
0.75 mm	1.2°



O-ring, part no. 133324
DIN 3771-22x1-NBR 70

- for sealing between sensor front and installation surface,
- not included in delivery, please order separately

Important note:

The correct thickness T of the magnet, the mounting distance D and the positioning relative to the central axis of the kit encoder are crucial for its correct function.

Drawings

Family ETx25K

Cable specs for option F (flat ribbon cable) and 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
R	Standard 1000 mm	3	4.3 mm	AWG26	-20 mm to +50 mm	3 x D Ø (D = cable sheath diameter Ø)
		6	5.2 mm			
		8	5.6 mm			
		12	6 mm	AWG28		
F	150 mm	3 to 12	ca. 1.25 per strand	AWG26	-20 mm to +25 mm	-

Cables without cable shield

(*) Tolerances according IPC Association

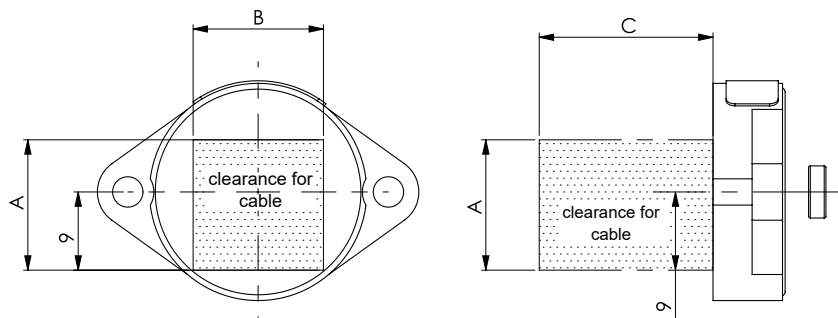
Cable length tolerances – custom lengths

Length L	Tolerance
≤ 0.3 m	+25 mm / -20 mm
> 0.3 m - 1.5 m	+50 mm / -20 mm
> 1.5 m - 3 m	+100 mm / -40 mm
> 3 m - 7.5 m	+150 mm / -60 mm

Cable harness length measured from sensor surface or soldering pad including connector.
Minimum cable length: 0.08 m (for round cable), 0.05 m for ribbon cable

Clearance for cable exit at back side

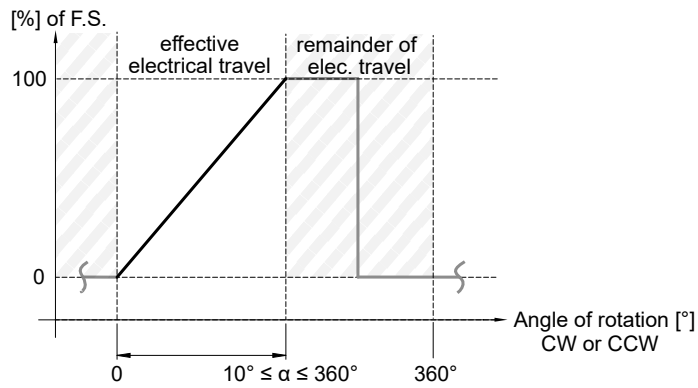
Series	Electronics	Clearance parameters [mm]		
		A	B	C
ETP25K	PWM, single turn	6	8	15
ETA25K	Analogue, single turn	6	8	15
ETA25KPM	Analogue, programmable multiturn	6	14	15
ETA25KX	Analogue, redundant single turn	18	8	15
ETI25K	Incremental, single turn, A, B, Z	6	14	15
	Serial, single turn, SER (deprecated)	6	14	15
	Serial, single turn, SPI, SSI	9	14	15
ETS25KX	Serial, redundant, single turn (SPI)	18	12	20



Signal definition for custom rotation angles

Custom angles $< 360^\circ$

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



Mechanical Data

Family ETx25K

Mechanical and environmental data - ETx25K Family

Mechanical angle of rotation 1.)	Endless
Lifetime 2.)	Mechanically unlimited
Max. operational speed	The maximum actuation speed is not limited mechanically. The maximum permissible actuation speed [rev./min] is calculated in relation to the resolution. For absolute encoders: $rev./min. (@max. resolution) = \frac{1}{2^{Resolution\ in\ Bit} * Update\ rate\ in\ s}} * 60s$ For incremental encoders: $Max. rev./min. = \frac{Limit\ Frequency\ \frac{1}{s} * 60s}{Number\ of\ Pulses}$
Operating temperature range	-40..+85°C (fixed cable)
Storage temperature range	-40..+105°C
Protection grade front side (IEC 60529)	IP6
Protection grade rear side (IEC 60529)	IP67 (end of cable excluded) - standard with encapsulated electronics IP00 (end of cable excluded) - option without encapsulated electronics
Vibration (IEC 68-2-6, Test Fc)	±1.5 mm / 20 g / 10 bis 2000 Hz / 16 frequency cycles (3x4 h)
Mechanical shock (IEC 68-27, Test Ea)	50 g / 11 ms / halfsine (3x6 shocks)
Housing diameter / length	25 mm (dimensions of the mounting flange, height: 37 mm, width 25 mm)
Housing depth	8 mm
Shaft diameter	No limitation
Mass	Option F (0.15 m flat ribbon cable) approx. 15 g Option R (1.00 m round cable) approx. 40 g
Connection type	▪ Flat ribbon cable (AWG26, 0.15 m with tinned cable endings) ▪ Round cable (AWG26, 1 m with tinned cable endings) ▪ Other connection types on request
Connection position	Axial
Sensor mounting	Flange, by means of two pieces of screws M3
Delivery content	Kit Encoder and Magnet. O-ring/gasket must be ordered separately (Screws for fastening the rotary encoder are not part of the scope of delivery)
Fastening torque (per screw or nut)	≤ 0.5 Nm
Housing material	Glass-fibre reinforced thermoplastic

1.) According IEC 60393

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

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