Series ETI25K – singleturn, incremental output, not redundant

Key features ETI25K:

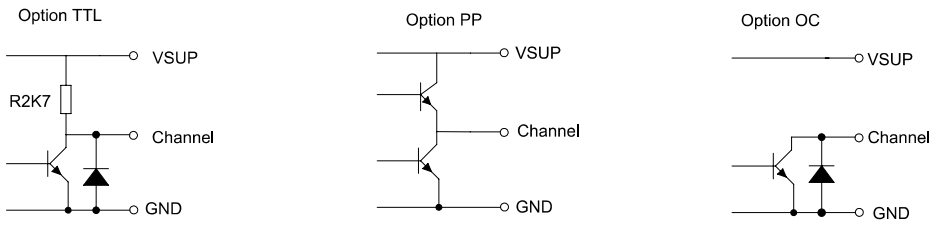
- Channels: A, B and index signal Z
- TTL, Push Pull or Open Collector electronics
- Maximum number of pulses per channel 1024 pulses per revolution (4096 steps)
- Option: ex works programmable number of pulses from 1 to 128 ppr in one pulse step-width, as well as 256, 512, 1024 ppr

Electrical data ETI25K – singleturn, incremental output, not redundant

Output Signal	TTL	Push-Pull	Open Collector
Number of pulses	1 to 128 ppr, 256, 512, 1024 ppr		1 to 128 ppr, 256 ppr.
Limit frequency	100 kHz		10 kHz
Switch-on delay	20 ms		
Supply voltage	5 VDC ±10%	10 to 30 V	10 to 30 V
Power consumption (no load)	≤ 15 mA	≤ 50 mA	≤ 25 mA
Output load	≥ 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		
MTTF (EN29500-2005-1)	473a	462a	570a

1.) According to IEC 60393

Output circuit ETI25K per channel



For details on output programming see page 24.

Order Code ETI25K – singleturn, incremental output

Description	Selection: standard=**black/bold**, possible options=*grey/italic*			
Series	**ETI25K**			
Number of pulses (ppr):				
32		*32*		
64		*64*		
128		*128*		
256		*256*		
512 (only for TTL and push-pull)		*512*		
1024 (only for TTL and push-pull)		**1024**		
User-defined number of pulses 1 to 128, increment 1 pulse		*0XXX*		
Supply voltage / output signal:				
VSUP=24 V (10 to 30 V) / OUT=push-pull A, B, Z			**24BZPP**	
VSUP=5 V ± 10% / OUT=TTL A, B, Z			**05BZTTL**	
VSUP=24 V (10 to 30 V) / OUT=open collector A, B, Z			**24BZOC**	
Electrical connection, cable length:				
Flat ribbon cable, standard length 0.15 m (not for UVW)				**F0,15**
Flat ribbon cable with custom length [x.xx m] (not for UVW)				*FX,XX*
Round cable, standard length 1 m				**R1,00**
Round cable with custom length [x.xx m]				*RX,XX*

Order example ETI25K – singleturn, incremental output

Requirement:
number of pulses 1024 TTL output, VSUP=5 V/TTL, flat ribbon cable 0,15 m

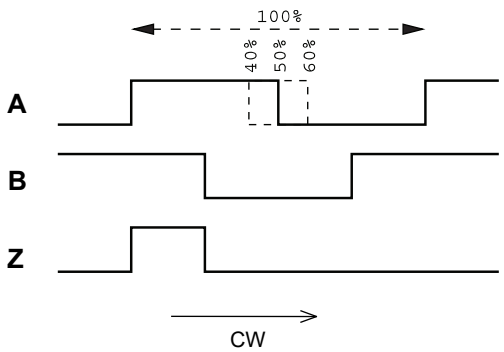
Example for order code:
ETA25K 1024 05BZTTL F0,15

Cable and pin assignments – option 24BZPP, 05BZTTL, 3,3BZTTL and 24BZOC

Flat ribbon cable (option F)			Round signal cable (option R)	
Lead	**TTL, OC**	**push-pull (PP)**	**Wire colour**	**PP, TTL, OC**
Lead 1 (red)	VSUP	VSUP	red	VSUP
Lead 2	GND	Z	black	GND
Lead 3	A	B	brown	A
Lead 4	B	A	orange	B
Lead 5	Z	GND	yellow	Z
			green	n/c

Signal details

A, B, Z (Standard)



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

Drawing ETx25K Family

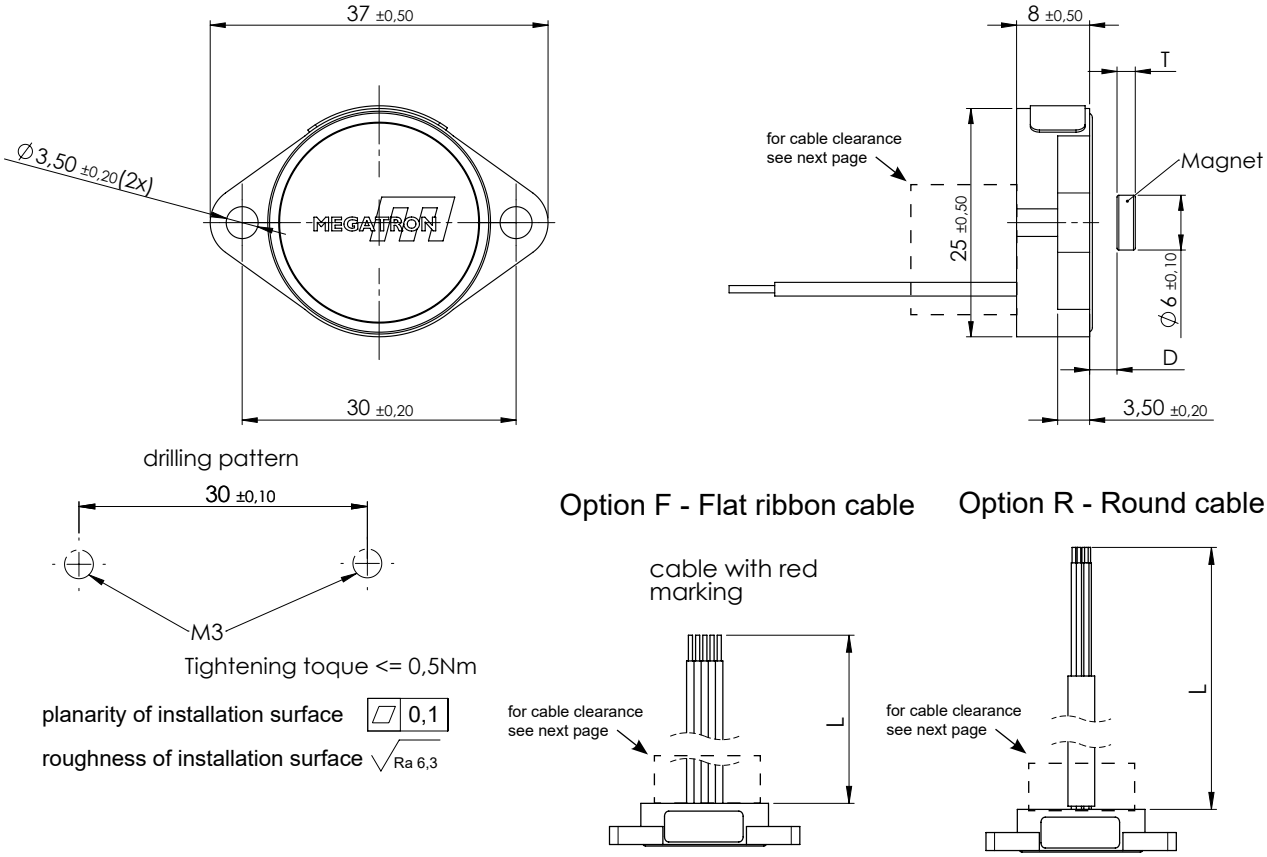
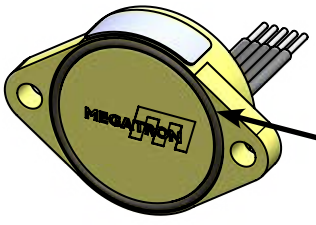


Table for parameter L see next page

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
Serial single turn ETS25K mit SER (veraltet)	4 mm	0.20 +/- 0.15 mm
Analogue/ Serial redundant, ETA25KX, ETS25KX	2.5 mm	0.50 +/- 0.15 mm
Incremental ETI25K	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.

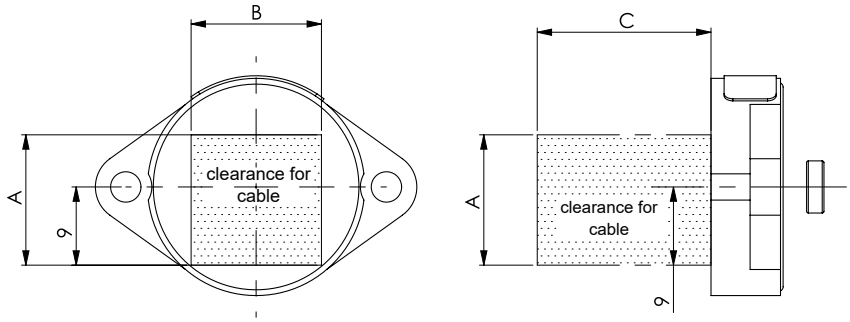
Cable specs for option F (flat ribbon cable) and R (round control cable)						
Option	**Standard cable length L**	**Number of single strands (depends on electronics)**	**Cable sheath Ø or width**	**Single strands cross section**	**Allowed tolerance (L)**	**Minimum bending radius**
R	Standard 1000 mm	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

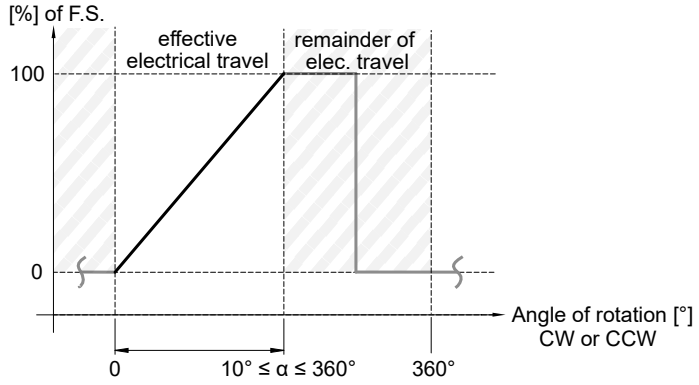
Cable harness length measured from sensor surface or soldering pad including connector.
Minimum cable length: 0.08 m (for round cable), 0.05 m for ribbon cable

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	9	14	15
ETS25KX	Serial, redundant, single turn (SPI)	18	12	20



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.



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: $rev./min.(@max.\ resolution) = \frac{1}{2^{\text{Resolution in Bit}} * Updaterate\ in\ s} * 60s$ 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 / 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	