

Series ETI25F – singleturn, incremental output, not redundant

Key features ETI25F:

- 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

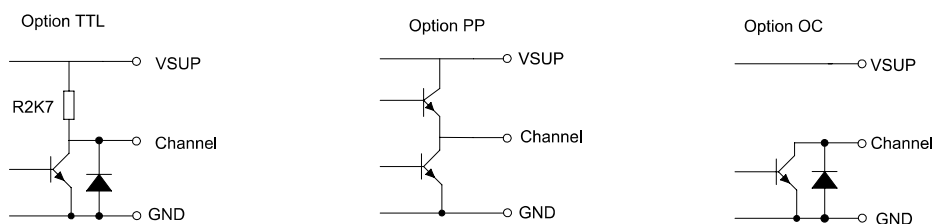


Electrical data ETI25F – singleturn, incremental output, not redundant

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	3.3 or 5 VDC $\pm 10\%$	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 ETI25F per channel

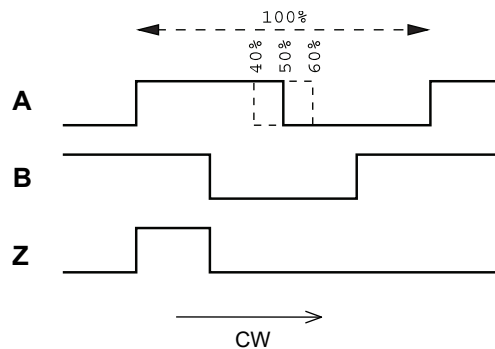


For details on zero point definition and output programming see page 25.

Order Code ETI25F – singleturn, incremental output							
Description	Selection: standard= black/bold , possible options= <i>grey/italic</i>						
Series	ETI25F						
Shaft diameter, shaft length: Shaft diameter Ø 6 mm, shaft length 15.6 mm <i>Shaft diameter Ø 6.35 mm, shaft length 15.6 mm</i> <i>Custom shaft dimensions [mm] Ø ≤ 6.35 mm</i>		6x15,6 <i>6,35x15,6</i> <i>XxXX</i>					
Number of pulses (ppr): 32 64 128 256 512 (<i>only for TTL and push-pull</i>) 1024 (<i>only for TTL and push-pull</i>) <i>User-defined number of pulses 1 to 128, increment 1 pulse</i>				32 64 128 256 512 1024 <i>0XXX</i>			
Supply voltage / output signal: VSUP=24 V (10 to 30 V) / OUT=push-pull A, B, Z VSUP=5 V ± 10% / OUT=TTL A, B, Z VSUP=24 V (10 to 30 V) / OUT=open collector A, B, Z					24BZPP 05BZTTL 24BZOC		
Operational Torque: Standard torque <i>Improved/medium torque</i>						- <i>MT</i>	
Shaft sealing: None <i>With shaft sealing</i>						- <i>D</i>	
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 <i>FX,XX</i> R1,00 <i>RX,XX</i>
Anti-rotation pin: Pin A <i>None (pin removed)</i>							A -

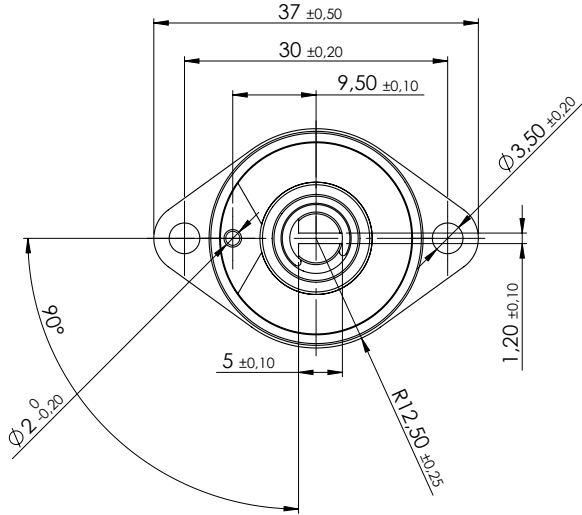
Order example ETI25F – singleturn, incremental output	
Requirement: Shaft Ø 6.00 mm, shaft length 15.6 mm, number of pulses 1024 TTL output, VSUP=5 V/TTL, no shaft sealing, round cable 1.20 m, anti-rotation pin A	
Example for order code: ETA125 6x15,6 1024 05BZTTL R1,20A	

Lead	Flat ribbon cable (option F)		Round signal cable (option R)	
	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

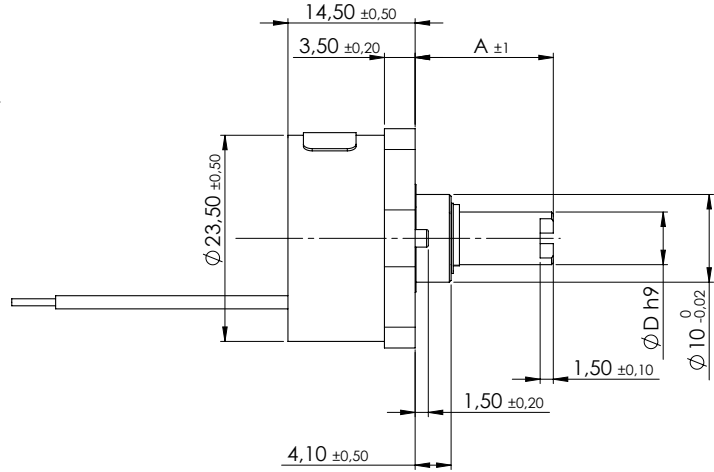
Signal details
A, B, Z (Standard)


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

Drawing ETx25F Family

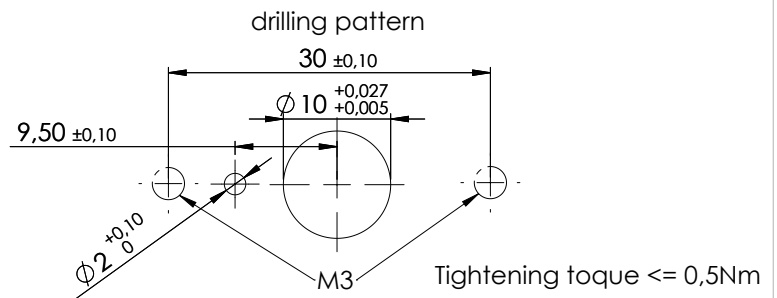


View shows 0° position

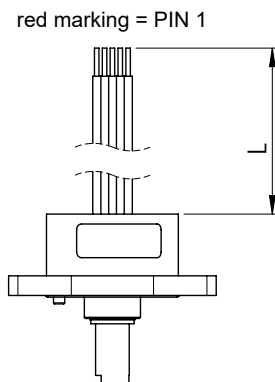


Standard shaft dimensions	
Shaft length A	15,6 mm
Shaft diameter D	6 mm

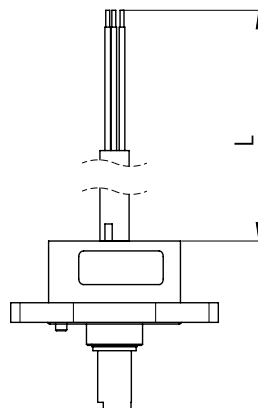
planarity of installation surface 0,1
 roughness of installation surface \sqrt{Ra} 6,3



Option F - Flat ribbon cable



Option R - Round cable



Standard shaft dimensions	
Shaft length A	15.6 +/- 1 mm
Shaft diameter D	6 h9 mm, 6.35 h9 mm
Shaft flattening (D-flat)	1 +/- 0.1 mm

All dimensions in mm

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

Mechanical and environmental data, miscellaneous	
Mechanical angle of rotation 1.)	Endless
Lifetime 2.)	> 100 Mio. shaft rotation movements Option D: Sealing specified for $\geq 200\,000$ shaft rotation movements
Bearing	Sleeve bearing
Max. operational speed	100 rpm (< 1 min. 800 rpm)
Operational torque	$0.1 \leq M \leq 0.6$ Ncm (without shaft sealing) $0.3 \leq M \leq 1.3$ Ncm (@RT, 10 rpm) (with increased torque)
Operating temperature range	Standard: -40 to +85 °C (cable not moving)
Storage temperature range	Standard: -40 to +105 °C
Protection grade (IEC 60529) front side	<ul style="list-style-type: none"> ▪ IP40 standard ▪ IP55M (IP66S) with shaft sealing (option D)
Protection grade (IEC 60529) rear side	IP66 (cable ends excluded)
Vibration (DIN EN 60068-2-6)	± 1.5 mm / 30 g / 10 to 2000 Hz / 16 frequency cycles (3x4 h)
Shock (DIN EN 60068-2-27)	50 g / 11 ms / half sine (3x6 shocks)
Housing diameter	$\varnothing 23.5$ mm (dimensions of the mounting flange, height: 37 mm, width 25 mm)
Housing depth	14.5 mm
Shaft diameter	Standards: $\varnothing 6$ mm, $\varnothing 6.35$ mm Option: User defined shaft diameter [mm]
Max. radial load	1 N
Max. axial load	1 N
Mass (circa)	<ul style="list-style-type: none"> ▪ ca. 40 g (option R: cable, valid for 1 m only) ▪ ca. 23 g (option F: flat ribbon cable, valid for 15 cm only)
Connection type	<ul style="list-style-type: none"> ▪ Ribbon cable (option F) ▪ Cable (option R)
Connection position	Axial
Sensor mounting	Flange, by means of two screws M3 (not enclosed)
Fastening parts included in delivery	If option D is ordered an additional O-Ring is part of delivery as sealing between mounting panel and rotary encoder.
Fastening torque mounting nut	≤ 3 Nm
Material shaft	Stainless steel
Material housing	Plastic / Bronze

1.) According to 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	

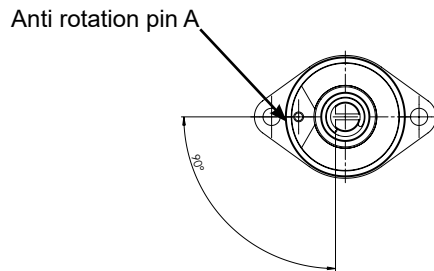
Definition of the zero position / anti-rotation pin

Output at the zero point:

- ETA25F (analogue outputs): Output signal 0% full scale (F. S.)
- ETP25F (PWM output): duty cycle 10% (10% duty cycle)
- ETS25F (serial output): Output signal 0% full scale (F. S.)
- ETI25F (incremental output): The index signal is output (Z)

Position of the zero position:

anti-rotation pin A	Zero position when shaft flattening faces anti-rotation pin A
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Signal definition for custom rotation angles

Custom angles <math><360^\circ</math>

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

