

Data Sheet for Angle Sensors

Hall-Effect Single-Turn Rotary Encoder with Analog Output

Series ETA25



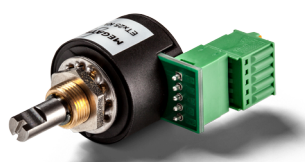
ETA25 - R



ETA25 - F



ETA25 - L



ETA25 - K

- 10 to 100-times longer life compared with potentiometers
- Analog output (voltage, current)
- Versatile connecting possibilities
- Redundant version
- Several factory programming possibilities

The Series ETA25 allows the simple replacement of potentiometers with bushing. The high reliable Hall-Effect technology provides a constant signal quality over the whole life cycle. For critical safety applications a redundant version is available.

Electrical Data

Effective electrical angle of rotation 1.)	$15^{\circ} \leq \alpha \leq 360^{\circ}$ (programmable in factory), $\pm 0.5^{\circ}$		
Independent linearity (best straight line) 1.)	$\pm 0.3 \% @ 360^{\circ}$		
Absolute Linearity 1.)	$\pm 0.6 \% @ 360^{\circ}$		
Output signal	0...5 V ratiometric	0...10 V	4...20 mA
Resolution	14Bit for $15^{\circ} \leq \alpha < 90^{\circ}$ resp. 12Bit for $90^{\circ} \leq \alpha < 360^{\circ}$		
Update rate	200µs		600µs
Supply voltage	5 V $\pm 10 \%$	15...30 V	9...30V
Power consumption (no load)	standard ≤ 16 mA redundant ≤ 23 mA	standard ≤ 16 mA redundant ≤ 23 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		

Mechanical and Environmental Data

Mechanical angle of rotation 1.)	Endless
Lifetime 2.)	> 100 Mio. shaft rotating movements For Option D (with shaft sealing) the sealing is at least working up to 200 000 shaft rotating movements
Bearing	Sleeve bearing
Max. operational speed	100 rpm (< 1 min 800 rpm)
Operational torque without / with X-Ring	$0.1 \leq M \leq 0.6$ Ncm / $0.3 \leq M \leq 1.3$ Ncm (@ RT, 10 rev./min)
Operating temperature range	-40...+85 °C (fixed cable)
Storage temperature range	-40...+105 °C
Protection grade front side (IEC 60529)	
Standard	IP40
Option D (with shaft sealing)	IP55M, IP66S
Protection grade rear side (IEC 60529)	
Solder- and clamping terminals	IP50 (solder pads and connectors excluded)
Flat ribbon - and round cable	IP66 (end of cable excluded)
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)

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Max. radial load	1 N
Mass (product with option L)	Approx. 26 g
Fastening parts included in delivery	Hex nut (AF14) and tooth washer, if option D is ordered then 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

Immunity

EN 61000-4-2 ESD	Class B
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

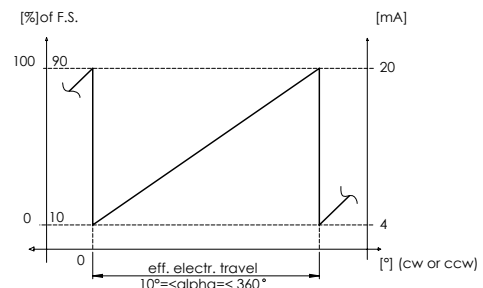
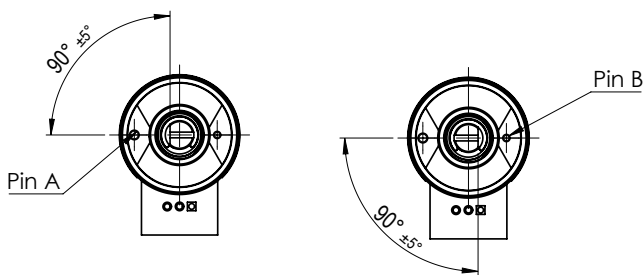
1.) According IEC 60393

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

Further information

Relationship between anti rotation pin and effective electrical angle

Option anti rotation pin A	If shaft flattening is facing antirotation pin A then output signal is 0% FS.
Option anti rotation pin B	If shaft flattening is facing antirotation pin B then output signal is 0% FS.



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Order Code									
Description				Selection: standard=black/bold, possible options=grey/cursive					
Series ETA25				ETA25					
Shaft diameter, shaft length: Shaft diameter Ø 6 mm, shaft length 22 mm Option: Shaft diameter Ø 6.35 mm, shaft length 22 mm Option: User defined shaft dimensions [mm] Ø ≤6.35mm				6x22 <i>6.35x22</i> <i>XxXX</i>					
Supply voltage / Output signal: VSUP=5 V (4.5...5.5 V) / OUT=0...5 V (ratiometric) VSUP=24 V (15...30 V) / OUT=0...10 V VSUP=24 V (9...30 V) / OUT=4...20 mA VSUP=24 V (9...30 V) / OUT=0...5 V					0505 2410 2442 <i>2405</i>				
Sense of rotation: Sense of rotation CW (output signal increases clockwise) Option: CCW (output signal increases counter clockwise)					CW <i>CCW</i>				
Electrical angle: Electrical angle 360[°] (positive integer) Option: user defined rotation angle (≥15°, positive integer)					360 <i>XXX</i>				
Shaft sealing (standard without shaft sealing): Option: D with shaft sealing						<i>D</i>			
Electrical connection, cable length, anti rotation pin (according drawing): Standards: Solder pads (anti rotation pin compatible to former series MAB25A, anti rotation pin A) Clamping terminals (anti rotation pin compatible to former series MAB25A, anti rotation pin A) Flat ribbon cable standard length 0.15 m (anti rotation pin compatible to former series ENA22, anti rotation pin option B) Round cable 1 m [x.xx m] (anti rotation pin compatible to former series ENA22, anti rotation pin B)							LA KA F0.15B R1.00B		
Electrical connection, cable length, anti rotation pin (according drawing): Options: Electrical connection: Option: solder pads (not available for option 2405) Option: clamping terminals (not available for option 2405) Option: flat ribbon cable Option: round cable Cable length: Option: cable length in user defined length [x,XX m] (only for option F and R, flat ribbon cable ≤3 m) Anti rotation pin: Option: anti rotation pin A (anti rotation pin compatible to former series MAB25A) Option: anti rotation pin B (anti rotation pin compatible to former series ENA22A)							<i>L</i> <i>K</i> <i>F</i> <i>R</i>	<i>X,XX</i>	<i>A</i> <i>B</i>

Order example ETA25

Requirement:
 Shaft Ø 6.00 mm, shaft length 22 mm, VSUP=5 V / OUT=0...5 V, sense of rotation CW, rotation angle 360°, no shaft sealing, round cable 1.00 m, anti rotation pin B

Example for order code:
 ETA25 6x22 0505 CW 360 R1.00B

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Order Code

Description		Selection: standard=black/bold, possible options=grey/cursive									
Series ETA25X (X=electric redundant)	ETA25X										
Shaft diameter, shaft length: Shaft diameter Ø 6 mm, shaft length 22 mm Option: Shaft diameter Ø 6,35 mm, shaft length 22 mm Option: User defined shaft dimensions [mm]		6x22 <i>6.35x22</i> <i>XxXX</i>									
Supply voltage / Output signal: VSUP=5 V (4,5...5,5 V) / OUT=0...5 V (ratiometric) VSUP=24 V (15...30 V) / OUT=0...10 V			0505 2410								
Sense of rotation, output 1: Sense of rotation CW (output signal increases clockwise) Option: CCW (output signal increases counter clockwise)				CW <i>CCW</i>							
Sense of rotation, output 2: Sense of rotation CW (output signal increases clockwise) Option: CCW (output signal increases counter clockwise)					CW <i>CCW</i>						
Electrical angle: Electrical angle 360 [°] (positive integer) Option: user defined rotation angle (≥15°)						360 <i>XXX</i>					
Shaft sealing (standard without shaft sealing): Option: D with shaft sealing							<i>D</i>				
Electrical connection, cable length, anti rotation pin (according drawing): Standard Flat ribbon cable standard length 0,15 m (anti rotation pin compatible to former series ENA22, anti rotation pin option B) Round cable 1 m [x.xx m] (anti rotation pin compatible to former series ENA22, anti rotation pin B)									F0.15B <i>R1.00B</i>		
Electrical connection, cable length, anti rotation pin (according drawing): Options: Electrical connection: Option: flat ribbon cable Option: round cable Cable length: Option: cable length in user defined length [x,xx m] (only for option F and R, flat ribbon cable ≤3 m) Anti rotation pin: Option: anti rotation pin A (anti rotation pin compatible to former series MAB25A) Option: anti rotation pin B (anti rotation pin compatible to former series ENA22A)								<i>F</i> <i>R</i>	<i>X.XX</i>	<i>A</i> <i>B</i>	

Order example ETA25X (electric redundant version)

Requirement:

Redundant, shaft Ø 6.00 mm, shaft length 22 mm, VSUP=5 V /OUT=0...5 V, signal 1 sense of rotation CW, signal 2 sense of rotation CW, electrical rotation 360° signal 1 and 2, no shaft sealing, flat ribbon cable 0.15 m, anti rotation pin B

Example for order code:

ETA25X 6x22 0505 CW CW 360 F0.15B

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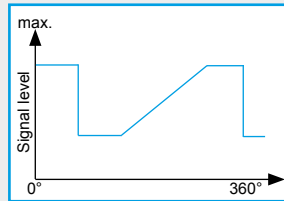
Series ETA25

Additional options

For higher quantities or on-going demand, additional options are available as described below on request

For example:

- Special shaft design
- Special cable and connection design
- Special torque



Customized signal characteristic

For Example:

- minimum/maximum signal level
- signal plateaus

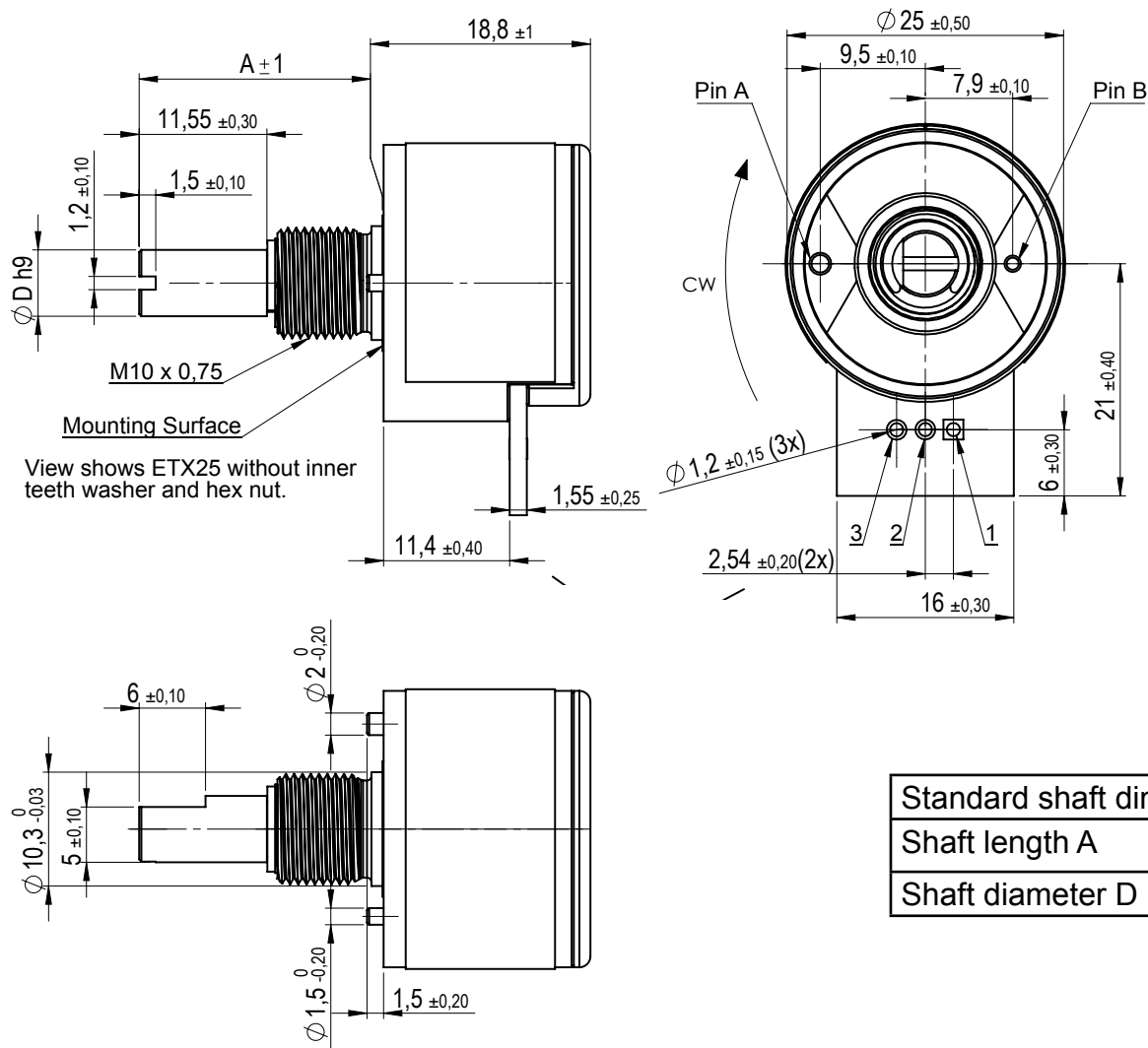
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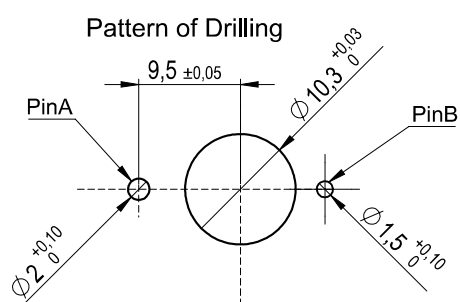
Series ETA25

Drawing

Option L



Standard shaft dimensions	
Shaft length A	22 mm
Shaft diameter D	6 mm



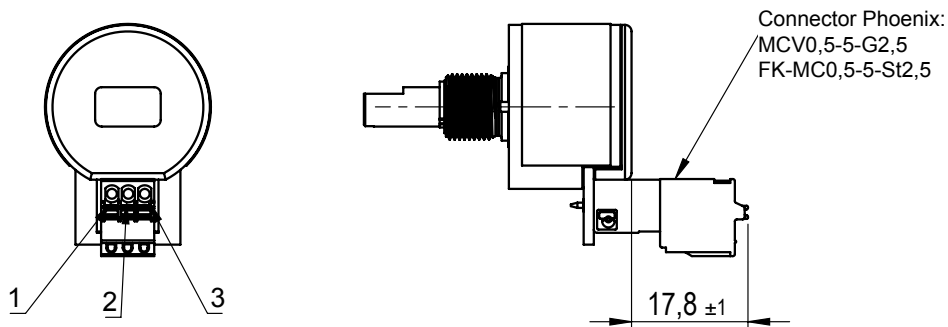
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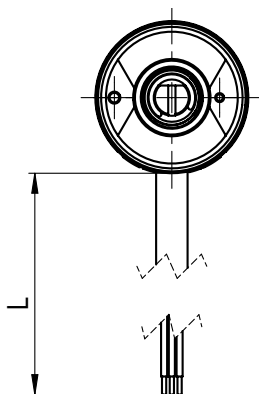
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Drawing

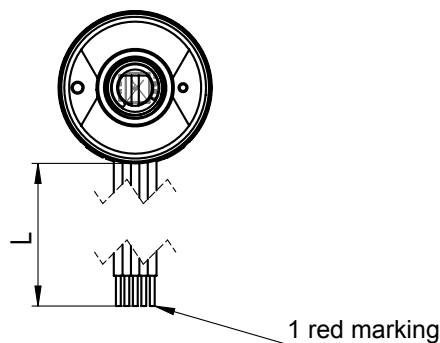
Option K



Option R

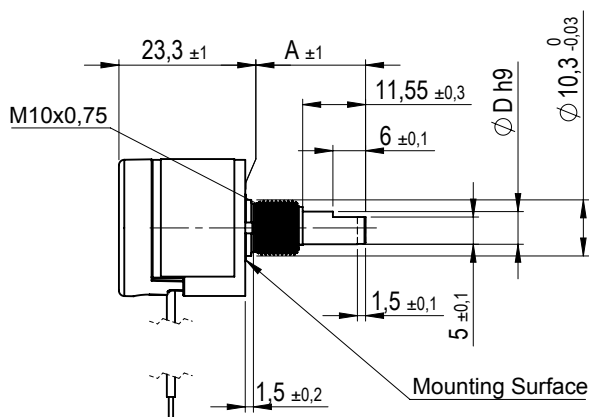


Option F



Option	Standard Cable Length L	Cable Cross Section	Allowed Tolerance
R	1000 mm	AWG26	-20 mm...+40 mm
F	150 mm	AWG26	-10 mm...+25 mm

(*) Tolerances according IPC Association



Drawing is applicable for option F and R

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Cable- and Pin-assignment ETA25

Function:	<u>Option L and K</u>	<u>Option F</u>	<u>Option R</u>
OUT	Pin 1	Lead 2	brown
VSUP	Pin 2	Lead 1 (red)	rer
GND	Pin 3	Lead 3	black

Cable and pin assignment ETA25X (redundant version)

Function:	<u>Option F</u>	<u>Option R</u>
VSUP 1	Lead 1 (red)	red
OUT 1	Lead 2	brown
GND 1	Lead 3	black
GND 2	Lead 4	green
OUT 2	Lead 5	yellow
VSUP 2	Lead 6	orange