

# 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 <sup>1.)</sup>	15° ≤ α ≤ 360° (programmable in factory), ±0.5°		
Independent linearity (best straight line) <sup>1.)</sup>	±0.3 % @ 360°		
Absolute Linearity <sup>1.)</sup>	±0.6 % @ 360°		
Output signal	0...5 V ratiometric	0...10 V	4...20 mA
Resolution	14Bit for 15° ≤ α < 90° resp. 12Bit for 90° ≤ α < 360°		
Update rate	200µs		600µs
Supply voltage	5 V ±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 <sup>1.)</sup>	1000 VAC @ 50 Hz, 1 min		
Insulation resistance <sup>1.)</sup>	2 MOhm @ 500 VDC, 1 min		

### Mechanical and Environmental Data

Mechanical angle of rotation <sup>1.)</sup>	Endless
Lifetime <sup>2.)</sup>	> 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 ≤ M ≤ 0.6 Ncm / 0.3 ≤ M ≤ 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

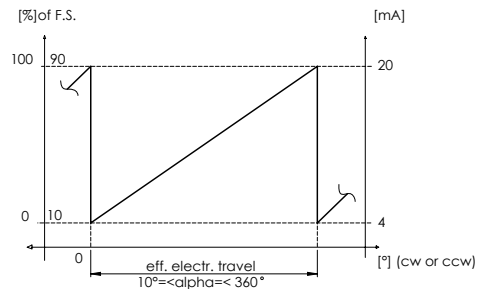
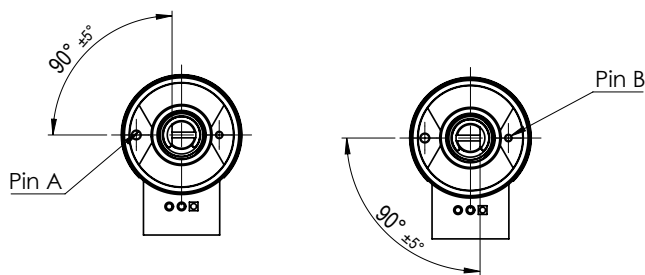
EN 61000-4-2 ESD	Class B
EN 61000-4-3 RF sine wave	Class A
EN 61000-4-6 Conducted sine wave	Class A
EN 61000-4-8 Power frequency magnetic fields	Class A

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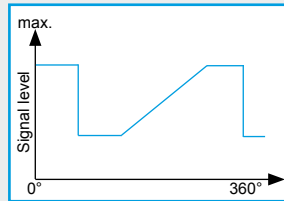
Series ETA25

## 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



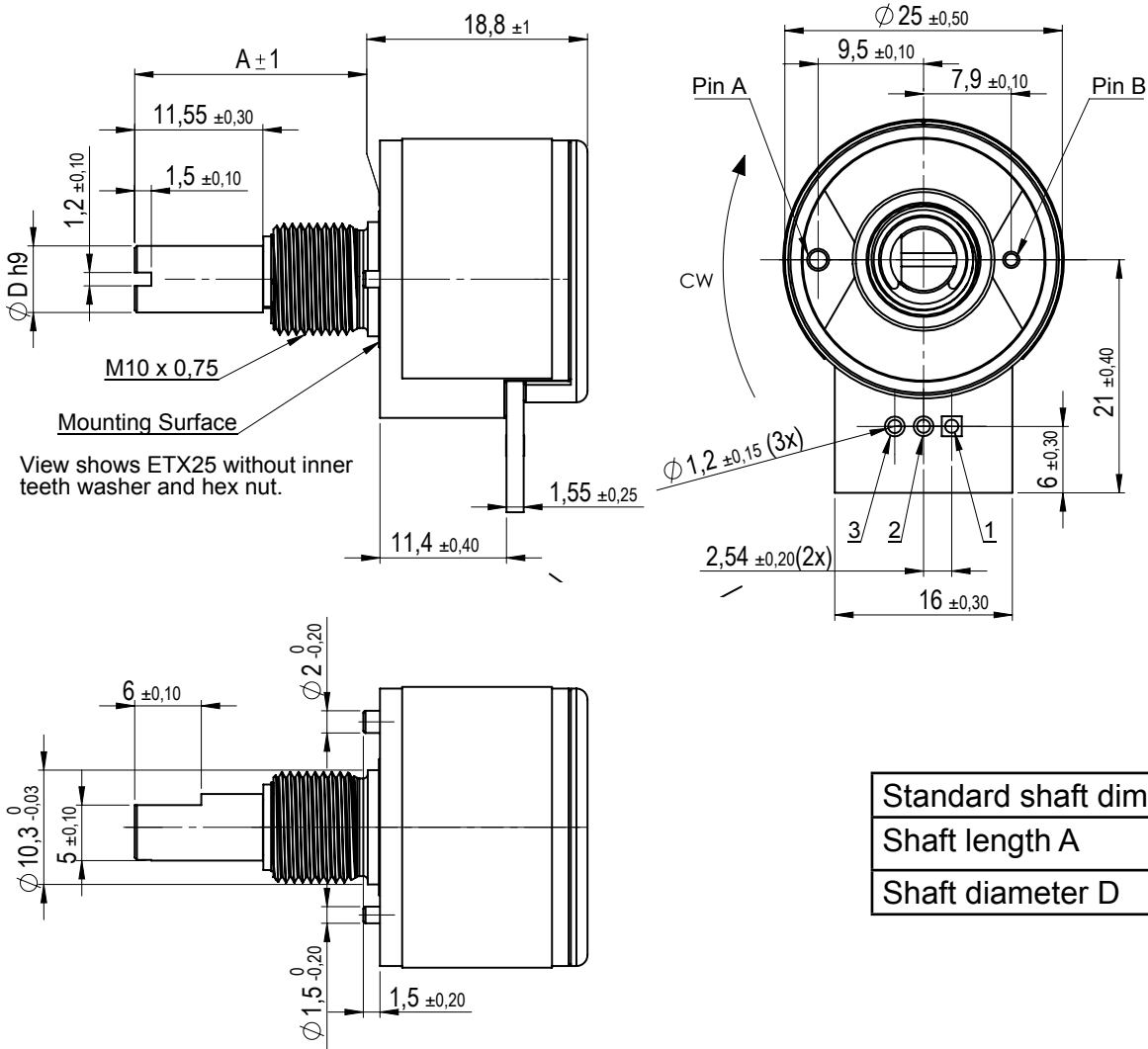
Customized signal characteristic

For Example:

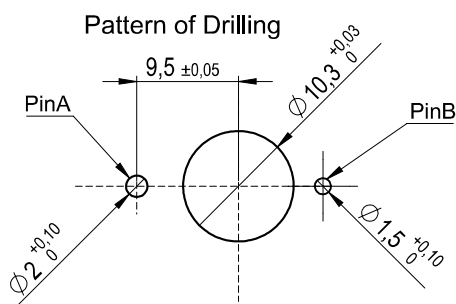
- minimum/maximum signal level
- signal plateaus

### Drawing

#### Option L



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



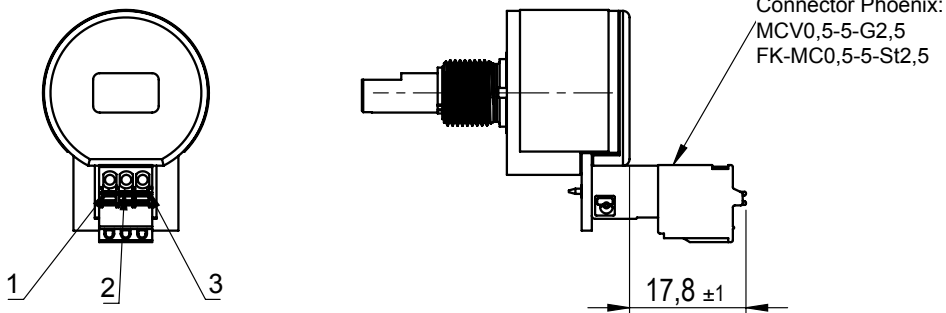
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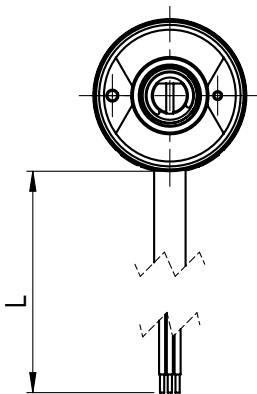
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## Drawing

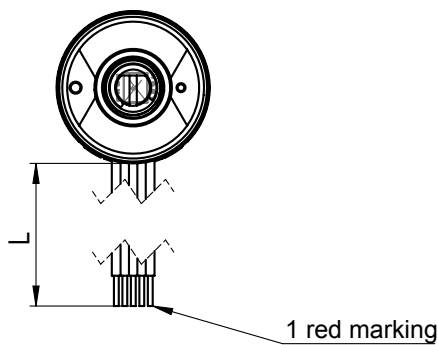
### Option K



### Option R

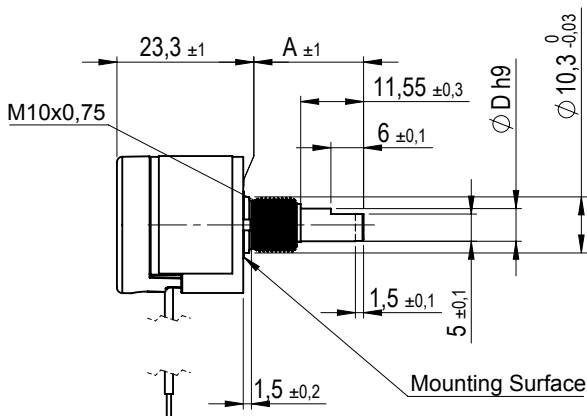


### Option F



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