

# Data Sheet for Panel Encoders

## Hall-Effect Single-Turn Rotary Encoder with Analog Output

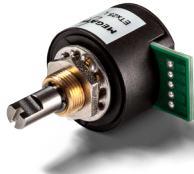
## Series ETAM25



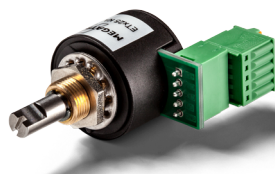
ETAM25 - R



ETAM25 - F



ETAM25 - L



ETAM25 - K

- 10 to 100-times longer life compared with potentiometers
- The series ETAM25 has an increased operational torque for manual control applications
- Mechanical angle 320° (other angles on demand)
- Sealed shaft and sealing against mounting panel
- Analogue output (voltage and current)
- Redundant version available (on request)

The panel encoder ETAM25 is working by means of the contactless and robust Hall-Technology. Shaft and housing sealing as a standard enable the usage in harsh environment.

### Electrical Data

Effective electrical angle of rotation 1.)	310° (260°/170°/80°), ±0.5°		
Independent linearity (best straight line) 1.)	±0.3 % @ 320°		
Absolute Linearity 1.)	±0.6 % @ 320°		
Output signal	0..5 V ratiometric	0..10 V	4..20 mA
Resolution 1.)	14Bit für 15° ≤ α < 90° bzw. 12Bit für 90° ≤ α < 360°		
Update Rate	200 µs		600 µs
Supply voltage	5 V ±10 %	15..30 V	9.. 30 V
Power consumption (no load)	≤16 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.)	320° (270°/180°/90°), ±5°
Lifetime 2.)	> 100 Mio. shaft rotating movements The sealing of the shaft is at least working up to 200 000 shaft rotating movements
Bearing	Sleeve bearing
Max. operational speed	100 rpm
Operational torque MT: Medium torque	0.3 ≤ M ≤ 1.3 Ncm (@ RT, 10 U/min)
Operating temperature range	-40...+85 °C (fixed cable) (the grease causes stiff torque at very low temperatures)
Storage temperature range	-40...+105 °C
Protection grade front side (IEC 60529) Standard: with shaft sealing	IP66S, IP55M
Protection grade rear side (IEC 60529) Round cable outlet	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 (including 1 m round cable)	Approx. 53 g
Fastening parts included in delivery	Hex nut (AF14) and tooth washer, O-Ring as sealing between mounting panel and rotary encoder.
Fastening torque mounting nut	≤ 3 Nm
Material shaft	Stainless steel
Material housing	Plastic / Bronze

### Immunity

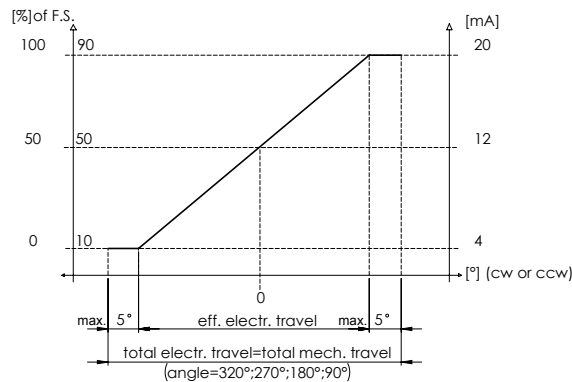
EN 61000-4-2 ESD	Class B
EN 61000-4-3 RF sine wave	Class A
EN 61000-4-6 Conducted sine wave	Class A
EN 61000-4-8 Power frequency magnetic fields	Class A

- 1.) According IEC 60393
- 2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

### Further information

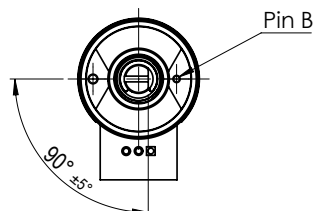
#### Relationship between mechanical angle of rotation and effective electrical angle of rotation

Mechanical angle of rotation ( $\pm 5^\circ$ )	Effective electrical angle of rotation ( $\pm 0.5^\circ$ )
320°	310°
270°	260°
180°	170°
90°	80°



#### Relationship between anti rotation pin and effective electrical angle

Option anti rotation pin A	On request
Option anti rotation pin B	If shaft flattening is facing antirotation pin B then output signal is 50% FS.



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Order Code										
Description		Selection: standard=black/bold, possible options=grey/cursive								
<b>Series ETAM25</b>	<b>ETAM25</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>Mechanical stop:</b> <b>With mechanical stop</b> (Without mechanical stop see series ETA25) Option: mechanical stop with center detend									<b>S</b>  <i>M</i>	
<b>Sense of rotation:</b> <b>Sense of rotation CW (output signal increases clockwise)</b> Option: CCW (output signal increases counterclockwise)								<b>CW</b> <i>CCW</i>		
<b>Electrical / mechanic angle:</b> <b>Electrical angle 320[°]</b> <b>Electrical angle 270[°]</b> <b>Electrical angle 180[°]</b> <b>Electrical angle 90[°]</b>								<b>320</b> <b>270</b> <i>180</i> <i>90</i>		
<b>Medium operational torque (MD), shaft sealing (D)</b>									<b>MT D</b>	
<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 ENA22A) <b>Round cable 1 m [x.xx m]</b> (anti rotation pin compatible to former series ENA22, anti rotation pin B) <b>Flat ribbon cable standard length 0.15 m</b> (anti rotation pin compatible to former series ENA22, anti rotation pin option B) <b>Clamping terminals</b> (anti rotation pin compatible to former series ENA22A)										<b>LB</b> <b>R1.00B</b>  <i>F0.15B</i>  <i>KB</i>
<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 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>B</i>

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## Order example ETAM25:

### Requirement:

Shaft  $\varnothing$  6,00 mm, shaft length 22 mm, VSUP=5 V / OUT=0...5 V, with mechanical stop, sense of rotation CW, electrical angle of rotation 320°, operational torque medium torque, with shaft sealing, round cable 1.00 m, anti rotation pin B

### Example for order code:

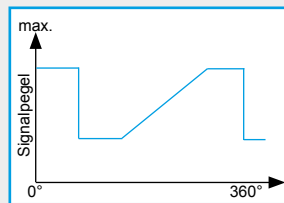
ETAM25 6x22 0505 SCW320 MT D R1.00B

## Additional options:

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

For example:

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



### Customized signal characteristic

For Example:

- Minimum/maximum signal level
- Signal plateaus

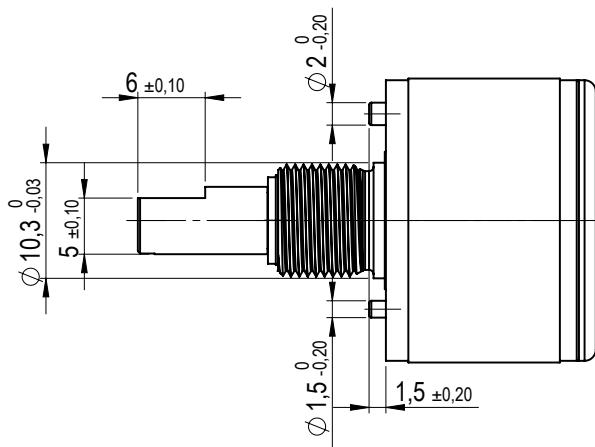
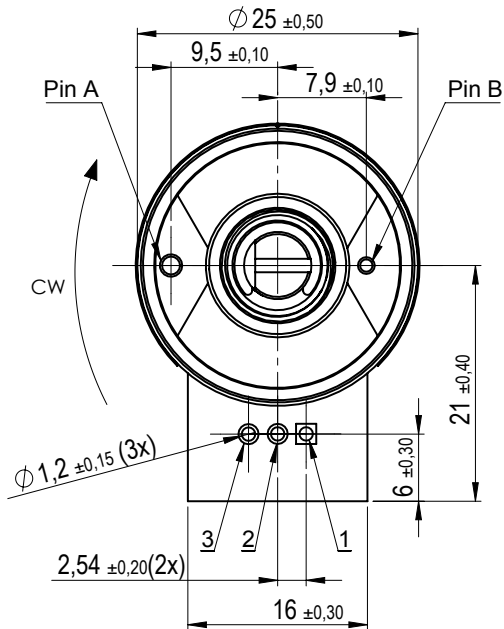
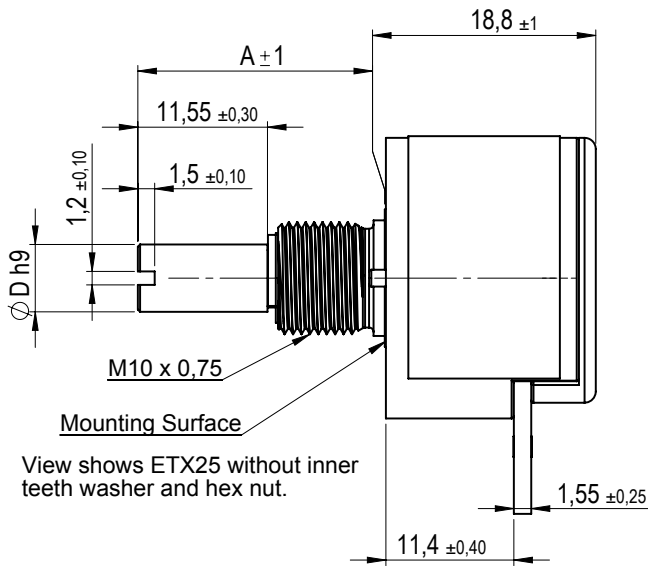
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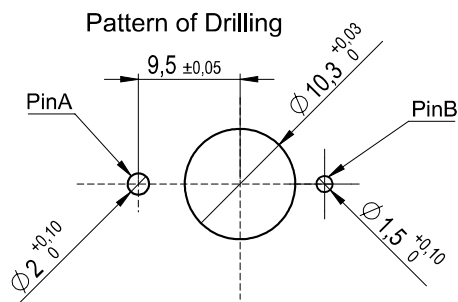
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## Drawing

### Option L



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



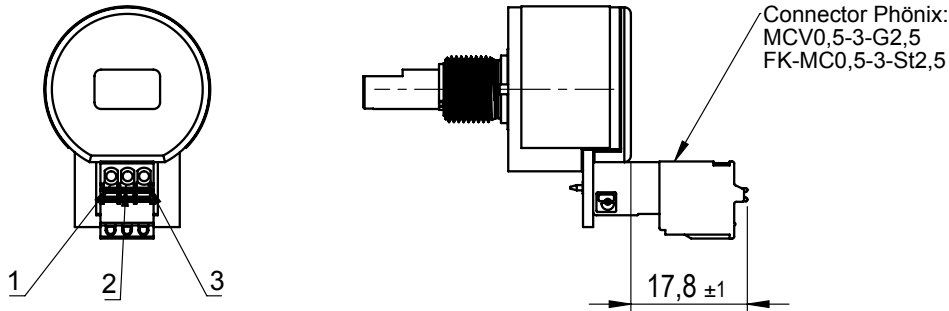
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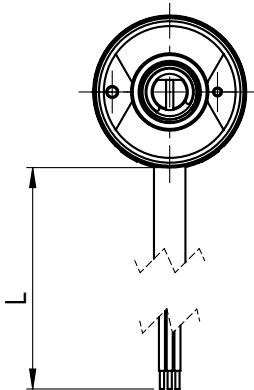
Series ETAM25

## Drawing

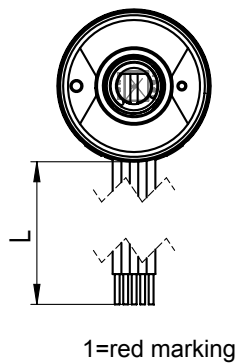
### Option K



### Option R

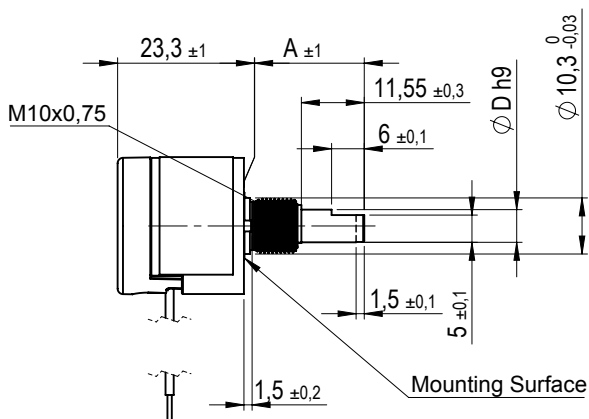


### Option F



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



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## Cable and pin assignment

<u>Function:</u>	<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)	red
GND	Pin 3	Lead 3	black