

# Data Sheet for Angle Sensors

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

Series ETP25



ETP25 - L



ETP25 - K

- PWM output
- Connecting possibilities:  
solder lugs or clamping terminal
- Versatile factory programming possibilities

The Series ETP25 can easy installed in the application based on the central thread. The high reliable Hall-Effect technology provides a constant signal quality over the whole life cycle.

### Electrical Data

|   |  |
|---|--|
| Effective electrical angle of rotation <sup>1.)</sup>     | $10^{\circ} \leq \alpha \leq 360^{\circ}$ (programmable in factory), $\pm 0.5^{\circ}$ |
| Independent linearity (best straight line) <sup>1.)</sup> | $\pm 0.4\%$ @ $360^{\circ}$  |
| Absolute Linearity <sup>1.)</sup>                         | $\pm 0.6\%$ @ $360^{\circ}$  |
| Output signal   | PWM (pulse width modulation)   |
| Output signal voltage                                     | 5V   |
| Carrier frequency   | 244Hz (constant)   |
| Minimum duty cycle  | 10%, equal to app. 0.4ms   |
| Maximum duty cycle  | 90%, equal to app. 3.5ms   |
| Resolution  | 12Bit  |
| Supply voltage  | 5 V $\pm 10\%$   |
| Power consumption (no load)                               | $\leq 10$ mA   |
| Output load   | $\geq 5$ kOhm  |
| 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<br>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 (800 rpm within short time)   |
| 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              | IP40 (solder pads and connectors excluded)  |
| Vibration (IEC 68-2-6, Test Fc)             | $\pm 1.5$ 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

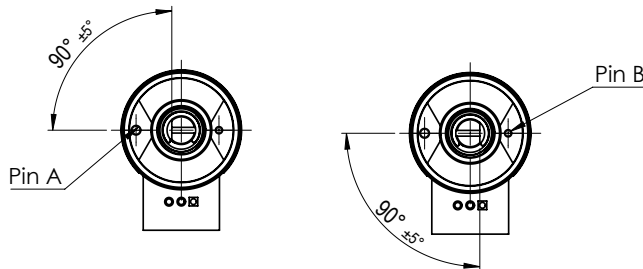
|  |         |
|--|---------|
| EN 61000-4-2 ESD                             | Class B |
| EN 61000-4-3 RF sine wave                    | Class A |
| EN 61000-4-6 Conducted sine wave             | Class A |
| EN 61000-4-8 Power frequency magnetic fields | Class A |

- 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 has 10% duty cycle.    |
| Option anti rotation pin B | If shaft flattening is facing antirotation pin B then output signal hat 10% of duty cycle. |



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### Order Code

| Description  |              | Selection: standard=black/bold, possible options=grey/cursive |  |             |  |                         |                          |                      |                      |
|--|--------------|---|--|-------------|--|-------------------------|--------------------------|----------------------|----------------------|
| <b>Series ETP25</b>  | <b>ETP25</b> |   |  |             |  |                         |                          |                      |                      |
| <b>Shaft diameter, shaft length:</b><br><b>Shaft diameter Ø 6 mm, shaft length 22 mm</b><br>Option: Shaft diameter Ø 6,35 mm, shaft length 22 mm<br>Option: User defined shaft dimensions [mm] Ø ≤6.35mm   |              | <b>6x22</b><br><i>6,35x22</i><br><i>XxXX</i>                  |  |             |  |                         |                          |                      |                      |
| <b>Supply voltage / Output signal:</b><br><b>VSUP=5 V (4.5...5.5 V) / OUT=5 V / 244 Hz / PWM 10-90 %</b>   |              |   |  | <b>5PWM</b> |  |                         |                          |                      |                      |
| <b>Sense of rotation:</b><br><b>Sense of rotation CW</b> (duty cycle I increases clockwise)<br>Option: CCW (duty cycle increases counterclockwise)   |              |   |  |             |  | <b>CW</b><br><i>CCW</i> |                          |                      |                      |
| <b>Electrical angle:</b><br><b>Electrical angle 360[°]</b> (positive integer)<br>Option: user defined rotation angle (≥ 10°, positive integer)   |              |   |  |             |  |                         | <b>360</b><br><i>XXX</i> |                      |                      |
| <b>Shaft sealing (standard without shaft sealing):</b><br>Option: D with shaft sealing   |              |   |  |             |  |                         |                          | <i>D</i>             |                      |
| <b>Electrical connection, cable length, anti rotation pin (according drawing):</b><br><b>Standards:</b><br><b>Solder pads</b> (anti rotation pin compatible to former series MAB25A, anti rotation pin A)  |              |   |  |             |  |                         |                          |                      | <b>LA</b>            |
| <b>Electrical connection, cable length, anti rotation pin (according drawing):</b><br><b>Options:</b><br><b>Electrical connection:</b><br>Option: solder pads<br>Option: clamping Terminals<br><b>Anti rotation pin:</b><br>Option: anti rotation pin A (anti rotation pin compatible to former series MAB25A)<br>Option: anti rotation pin B (anti rotation pin compatible to former series ENA22A) |              |   |  |             |  |                         |                          | <i>L</i><br><i>K</i> | <i>A</i><br><i>B</i> |

### Order example ETP25:

#### Requirement:

Shaft Ø 6.00 mm, shaft length 22 mm, VSUP=5 V / OUT=244 Hz, sense of rotation CW, rotation angle 360°, no shaft sealing, electrical connection solder lugs, anti rotation pin A

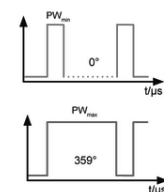
#### Example for order code:

ETP25 6,35x22 5PWM CW 360 LA

### Function description PWM signal output ETP25

The rotary encoder ETP25 supplies as output signal 244Hz constant carrier frequency with defined high low ratio. The duty cycle (ratio between high and low value) changes in dependency of the rotation angle. The duty cycle lies between 10% and 90%.

If the option CW is chosen the duty cycle increases clockwise. If option CCW was chosen the duty cycle decreases clockwise. Normally for PWM signals no further processing - for example an external analog/digital converter - is needed, because many micro controllers are equipped with a PWM input.



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## 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

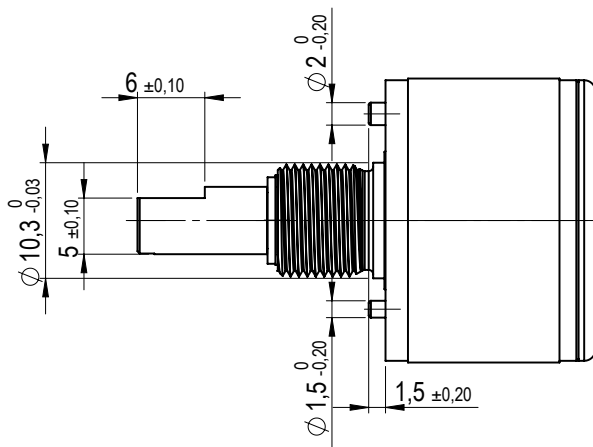
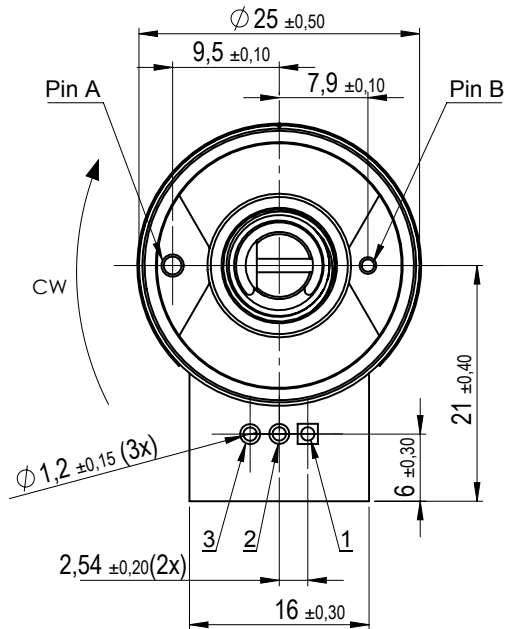
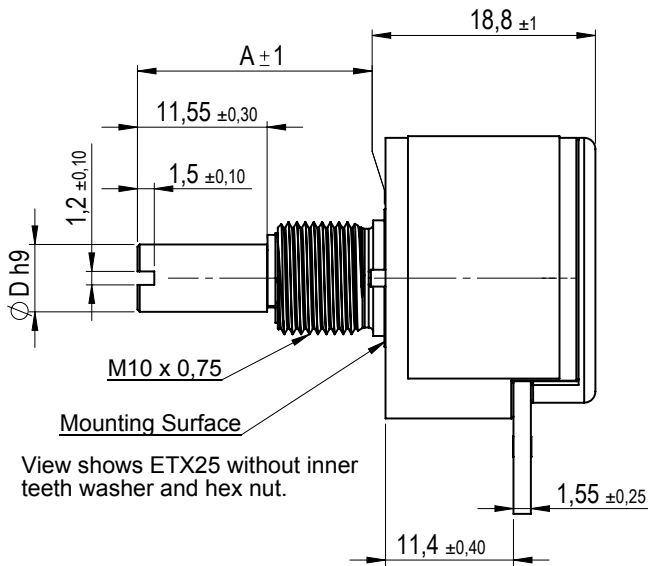
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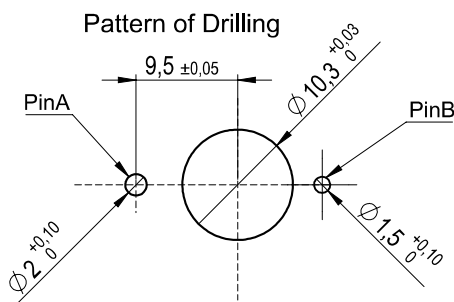
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## Drawing

### Option L



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



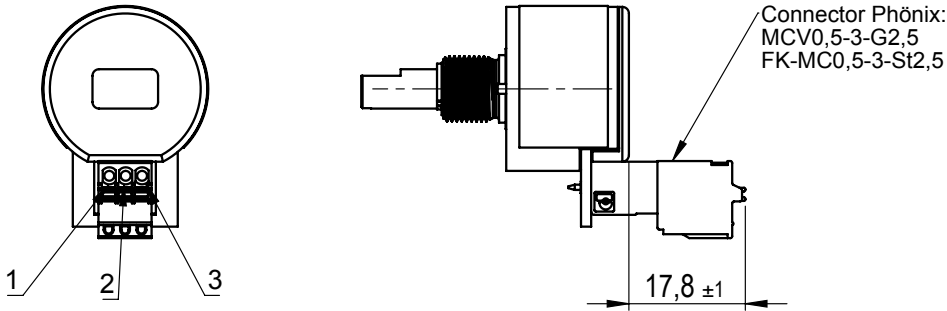
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## Drawing

### Option K



### Cable- and Pin-assignment ETP25

| Function | Option L and K |
|----------|----------------|
| OUT      | PIN 1          |
| VSUP     | PIN 2          |
| GND      | PIN 3          |