

Data Sheet for Angle Sensors

Hall Effect Multiturn Rotary Encoder with Analog Output

Series ETA25PM



- 10 to 100-times longer life compared with multiturn potentiometers
- Free user programmable start and end position (electrical angle 10° up to 72000°)
- Simple user programming
- Space saving bushing mounting, housing with 25mm diameter

The Series ETA25PM offers based on the programming interface an easy and exact adaptation to the application. This helps reducing costs and the number of different versions in stock.

Electrical Data

| | | |
|--|---|-----------|
| Effective electrical angle of rotation 1.) | 0...10° - 0...72000° (max. 200 turns) Start point, endpoint and sense of rotation programmable by customer. Ex works the angle is set to 3600°. For detecting absolute position >360 the sensor should not be turned more than ±179° without supply voltage. | |
| Independent linearity (best straight line) 1.) | ±0.05 % @ 3600° | |
| Absolute Linearity 1.) | ±0.1 % @ 3600° | |
| Output signal | 0...5 V | 0...10 V |
| Resolution 1.) | 12Bit | |
| Update rate | 3 ms | |
| Supply voltage | 9...30 V | 15...30 V |
| Power consumption (no load) | < 10 mA | |
| Output load | ≥ 5 kOhm | |
| Insulation voltage 1.) | 1000 VAC @ 50 Hz, 1 min | |
| Insulation resistance 1.) | 2 MOhm @ 500 VDC, 1 min | |
| Max. number of programming cycles | 10000 | |

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 ≤ M ≤ 0,6 Ncm / 0,3 ≤ M ≤ 1,3 Ncm (@ RT, 10 rev./min) |
| Operating temperature range: Flat band or round cable (option F or R) With integrated programming board (option TS) | -40..+85 °C (fixed cable) -25..70 °C |
| Storage temperature range: Flat band or round cable (Option F or R) With integrated programming board (option TS) | -40..+105 °C -40..+90 °C |
| Protection grade front side (IEC 60529) Standard Option D (with shaft sealing) | IP40 IP55M, IP66S |
| Protection grade rear side (IEC 60529) Flat ribbon - and round cable (Option F or R) With integrated programming board (option TS) | IP66 (end of cable excluded) IP00 |
| Vibration (IEC 68-2-6, Test Fc) 3.) | ±1,5 mm / 20 g / 10 to 2000 Hz / 16 frequency cycles (3x4 h) |
| Mechanical shock (IEC 68-27, Test Ea) 3.) | 50 g / 11 ms / halfsine (3x6 shocks) |

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Mechanical and Environmental Data

| | |
|--------------------------------------|---------------------------------|
| Max. radial load | 1 N |
| Mass (option F) | 32 g |
| Mass (option R) | 60 g |
| Mass (option TS) | 27,5 g |
| Fastening parts included in delivery | Hex nut (AF14) and tooth washer |
| Fastening torque mounting nut | ≤ 3 Nm |
| Material shaft | Stainless steel |
| Material housing | Plastic / Bronze |

Immunity

| | |
|--|---------|
| EN 61000-4-2 ESD 3.) | 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 |

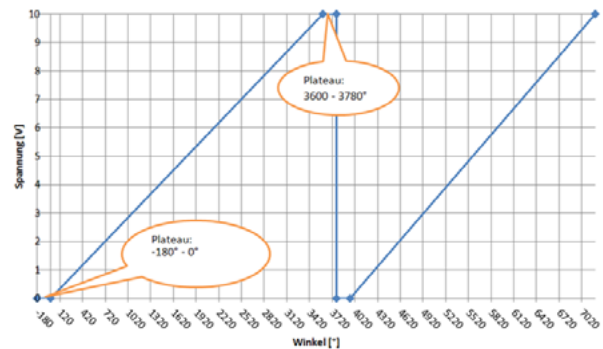
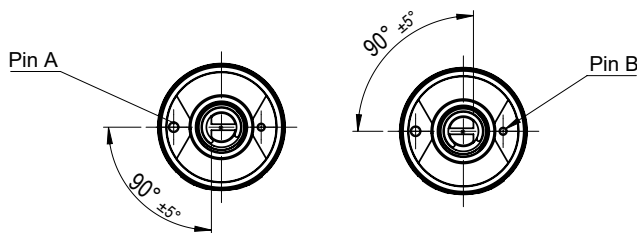
1.) According IEC 60393

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

3.) Not tested for Option TS

Relationship between anti rotation pin and effective electrical angle in the state of delivery

| | |
|----------------------------|---|
| 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. |



The function as shown above represents the relationship between the anti-rotation pin A or B, the 0° position and the resulting output signal in the delivery state of the sensor when the shaft is turned clockwise (CW direction of rotation). The delivery state of the sensor is 10turns (= 3600°). Before and after the linear rising output signal for 3600° are located two signal plateaus with each of 180°. The following example describes the output signal when the shaft is operated by 11 turns clockwise, starting at the 0° position:

- 10 rotations of the shaft clockwise 0° to 3600°, linearly rising output signal 0% to 100% FS
- 1/2 turn of shaft 180° (3600° to 3780°) signal plateau 100% FS
- 1/2 turn shaft 180° (3780° to 3960°) signal plateau 0% FS

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Order Code

| | | | | | |
|--|---|--|----------------------------|---|----------------------|
| Description: User programmable multiturn rotary encoder. Sense of rotation, rotation angle ex works: CW, 3600° | Selection: standard=black/bold, possible options=grey/cursive | | | | |
| Series: | ETA25PM | | | | |
| Shaft diameter x shaft length: Ø6 x 22 mm <i>Option Ø6,35 x 22 mm</i> <i>Option user defined shaft dimensions X x XX [mm] Ø ≤6,35mm</i> | | 6x22 <i>6,35x22</i> <i>XxXX</i> | | | |
| Supply voltage / Output signal: VSUP=24 V (9...30 V) / OUT=0...5 V (not available for option TS) VSUP=24 V (15...30 V) / OUT=0...10 V | | | 2405 2410 | | |
| Shaft sealing: Standard without shaft sealing <i>Option D with shaft sealing</i> | | | | - <i>D</i> | |
| Electrical connection: Flat ribbon cable 0,15 m <i>Option round cable 1 m</i> <i>Option flat ribbon cable length in x,xx [m] (≤ 3 m)</i> <i>Option round cable length in x,xx [m]</i> <i>Option PCB with clamping terminal, two programming buttons, direction switch (CW/CCW) and LED for programming status. (Plug is part of delivery)</i> | | | | F0,15 <i>R1,00</i> <i>Fx,xx</i> <i>Rx,xx</i> <i>TS</i> | |
| Anti rotation pin: Anti rotation pin B (compatible to former series ENA22A) <i>Option anti rotation pin A (compatible to former series MAB25A)</i> | | | | | B <i>A</i> |

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Additional options:

Order example ETA25PM:

Requirement:

Shaft \varnothing 6.00 mm, shaft length 22 mm, VSUP=5 V / OUT=0...5 V, sense of rotation CW, rotation angle ex works 3600° (can be programmed by customer), no shaft sealing, flat ribbon cable 1.00 m, anti rotation pin B

Example for order code:

ETA25PM 6x22 0505 R1.00B

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

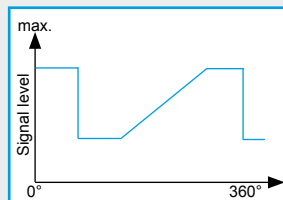
Examples:

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

Customized signal characteristic

For Example:

- Minimum/maximum signal level



Option with solder pads:



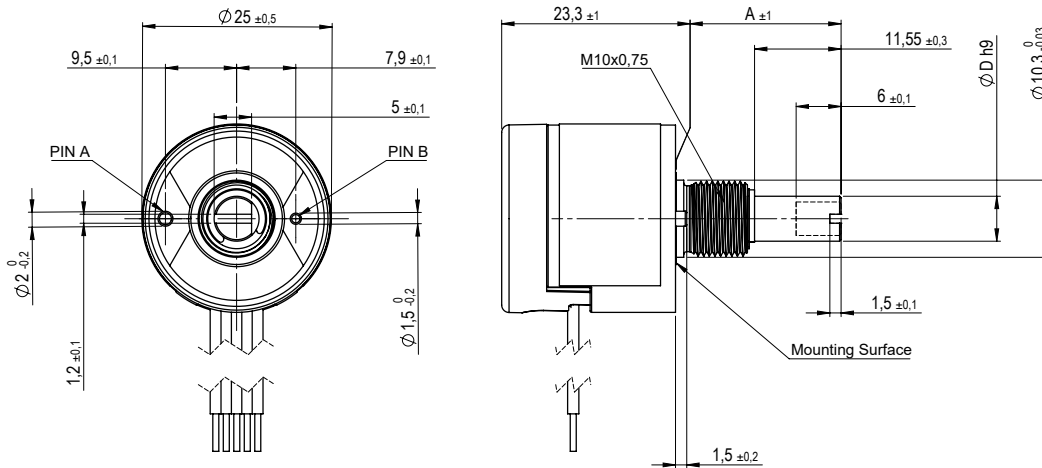
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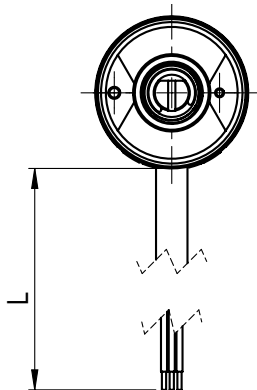
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Drawing

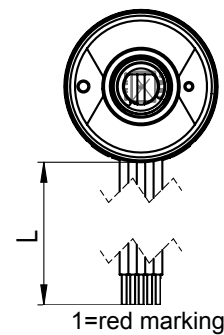
The following drawing is applicable for option R and F



Option R

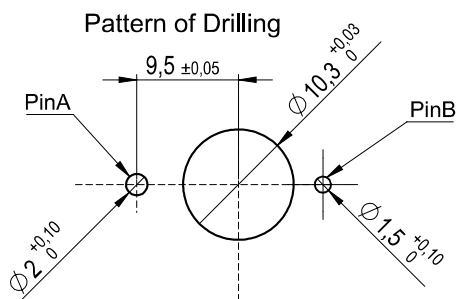


Option F



| 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



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

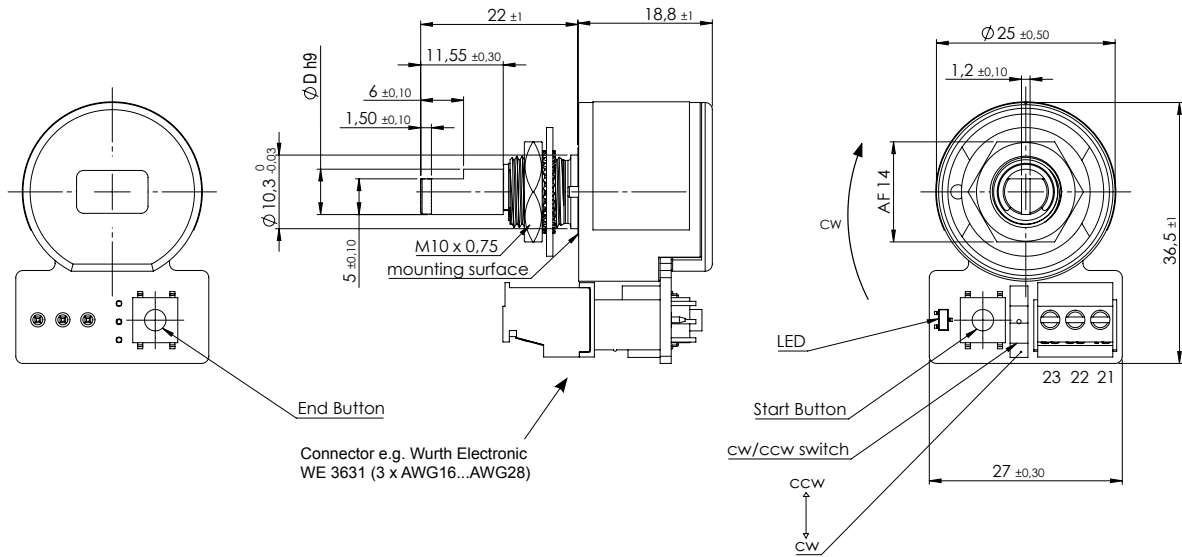
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Drawing

Option TS



Cable and pin assignment

| Function: | Option F | Option R |
|-----------|----------------|----------|
| DIR | Strand 1 (red) | orange |
| END | Strand 2 | green |
| START | Strand 3 | yellow |
| VSUP | Strand 4 | red |
| OUT | Strand 5 | brown |
| GND | Strand 6 | black |

Plug Connection

| Function | Option ST |
|----------|--|
| | Numbers according drawing for option TS from above |
| VSUP | 23 |
| OUT | 22 |
| GND | 21 |

Further information can be found in the programming manual. For download of the programming manual please visit <https://www.megatron.de>