

# Data Sheet for Angle Sensors

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

## Series MAB12AH



- Only 12.7 mm housing diameter
- Suitable for shaft diameters from 2 mm..6.35 mm
- Mounting ring and push on magnet are part of delivery
- Supply voltage 5 VDC
- Output signal analog absolute or PWM
- Integrated MOLEX connector

Extreme compact Hall Kit Encoder delivered as complete ready to setup package. The Package consisting of the encoder a mounting ring and the matching magnet holder and magnet for the shaft.

With the MOLEX plug-in connection, the encoder could be easy connected to the evaluation unit. This improves the handling during installation and service.

| Electrical Data   | Analog           | PWM     |        |
|---|------------------|---------|--------|
| Effective electrical angle of rotation <sup>1.)</sup>     | 360°             |         |        |
| Independent linearity (best straight line) <sup>1.)</sup> | ± 0.14 % @ 25 °C |         |        |
| Output signal   | 0...5 V analog   | 5 V PWM |        |
| Resolution  | 10 Bit           | 10 Bit  | 12 Bit |
| Update rate   | 0.38 ms          | 1 ms    | 4.1 ms |
| Supply voltage  | 5 V ±10 %        |         |        |
| Power consumption (no load)                               | ≤ 20 mA          |         |        |
| Output load   | ≥ 10 kOhm        |         |        |

| Mechanical and environmental data, Miscellaneous |                                 |
|--|---------------------------------|
| Mechanical angle of rotation <sup>1.)</sup>      | 360° without stop               |
| Lifetime <sup>2.)</sup>                          | Mechanically unlimited          |
| Max. operational speed                           | 10.000 rev./min.                |
| Operating temperature range                      | -40..+125 °C                    |
| Storage temperature range                        | -40..+125 °C                    |
| Vibration (IEC 68-2-6, Test Fc)                  | (5 Hz to 2 kHz) 20 g            |
| Housing diameter                                 | 12.7 mm                         |
| Housing depth                                    | 13.9 mm                         |
| Shaft diameter                                   | 2..6.35 mm                      |
| Shaft type                                       | Push on magnet for solid shafts |

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## Mechanical and Environmental Data, Miscellaneous

|   |  |
|---|--|
| Connection type   | Molex plug on sensor: 53398-0371   |
| Connection position                                       | Axial  |
| Sensor mounting   | Mounting ring  |
| Mass  | Magnet + magnet holder + kit encoder + mounting ring: app. 20 g  |
| Fastening parts included in delivery                      | Kit Encoder, mounting ring, push on magnet<br>Not included in delivery: 2 pcs. lens head screws 4-40 1/4"<br>for mounting of the mounting ring |
| Fastening torque of the mounting screws for mounting ring | 0.67 Nm  |
| Material mounting ring                                    | Plastic  |
| Material housing  | Plastic  |
| Material magnet holder                                    | Metal  |

## Immunity

|     |  |
|-----|--|
| ESD | Human Body Model<br>MIL-STD-883R, Method 3015.7 ± 2 kV |
|-----|--|

1.) According IEC 60393

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

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## Order Code

| Description  | Selection: standard=black/bold, possible options=grey/cursive |          |             |           |             |
|--|---|----------|-------------|-----------|-------------|
| <b>Series:</b>   | <b>MAB12AH</b>  |          |             |           |             |
| <b>Shaft diameter:</b>   |   |          |             |           |             |
| Option Ø2 mm   |   | 2        |             |           |             |
| Option Ø2.3 mm   |   | 2,3      |             |           |             |
| Option Ø2.5 mm   |   | 2,5      |             |           |             |
| Option Ø3 mm   |   | 3        |             |           |             |
| Option Ø3.17 mm  |   | 3,17     |             |           |             |
| Option Ø4 mm   |   | 4        |             |           |             |
| Option Ø5 mm   |   | 5        |             |           |             |
| <b>Ø6 mm</b>   |   | <b>6</b> |             |           |             |
| Option Ø6.35 mm  |   | 6,35     |             |           |             |
| <b>Resolution:</b>   |   |          |             |           |             |
| <b>Supply voltage / Output signal:</b>   |   |          | <b>0505</b> |           |             |
| <b>Standard: VSUP=5 V ±10 % / OUT=0...5 V</b>  |   |          |             |           |             |
| (ratiometric resolution 10Bit)   |   |          |             |           |             |
| Option: 1 VSUP=5 V ±10 % / PWM, Resolution 12 Bit                                    |   |          | 12 05PWM    |           |             |
| Option: 2 VSUP=5 V ±10 % / PWM, Resolution 10 Bit                                    |   |          | 10 05PWM    |           |             |
| <b>Sense of rotation:</b>  |   |          |             |           |             |
| <b>Standard: CW</b> (output signal (analog) or duty cycle (PWM) increases clockwise) |   |          |             | <b>CW</b> |             |
| <b>Electrical angle:</b>   |   |          |             |           |             |
| <b>Standard: 360°</b>  |   |          |             |           | <b>360°</b> |
| <b>Electrical connection:</b>  |   |          |             |           |             |
| <b>In sensor housing integrated Molex connector</b>                                  |   |          |             |           | <b>K</b>    |

## Order example MAB12AH:

### Requirement:

Shaft diameter 6.00 mm, VSUP=5 V, output signal OUT=0..5 V (ratiometric), sense of rotation CW, effective electrical angle 360°, electrical connection: integrated connector in sensor housing

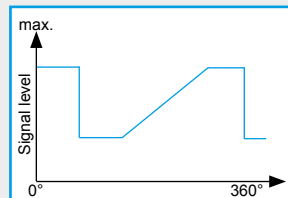
**Example for order code:** MAB12AH 6 0505 CW360 K

## Additional options

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

For example:

- Special cable and connection design
- Sense of rotation CCW
- User defined electrical angle



Customized signal characteristic

For Example:

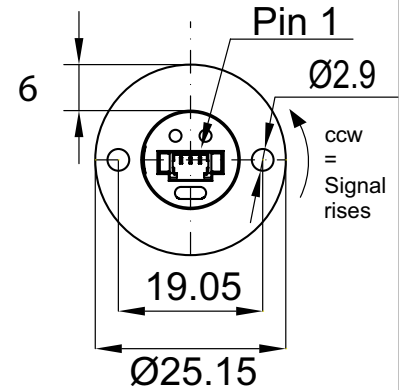
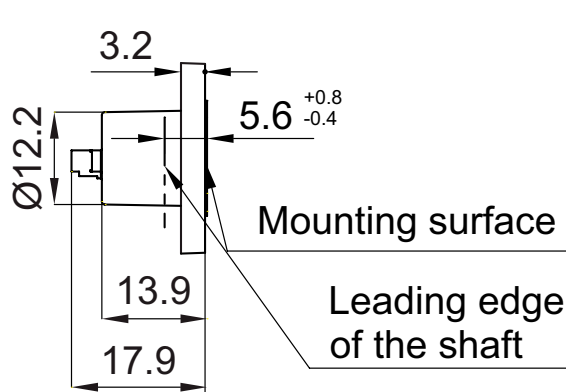
- minimum/maximum signal level
- signal plateaus

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## Technical Drawing



Dimensions in mm

### Terminal lay-out and connector

Pin 1 +5VDC

Pin 2 Analog Out

Pin 3 GND

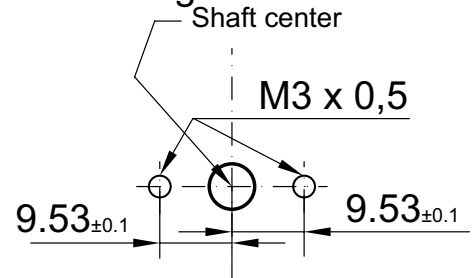
Connector in the sensor: Molex # 53398-0371

Counter connector housing: Molex # 51021-0300

Crimp pins for counter conn.: Molex # 50079-8100

Crimp tools: Molex # 50079

### Mounting sketch



Radial mounting tolerance:  
Eccentricity max. failure / 360°  
< 0.25 mm approx. 0.2°  
< 0.5 mm approx. 0.6°  
< 0.75 mm approx. 1.2°

### Please take care !

**That the max. allowed axial mounting tolerances from the leading edge of the shaft to the mounting surface are 5.6 +0.8/-0.4 mm**

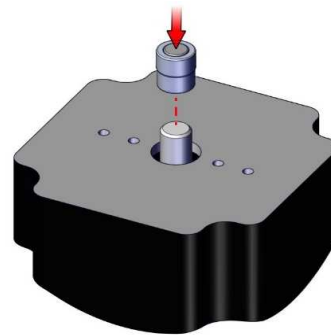
**Leaving the tolerance band lead to signal loss and malfunction of the encoder.**

### Mounting Instruction

**During transport, storage, assembly and operation, it must be followed the ESD guidelines.**

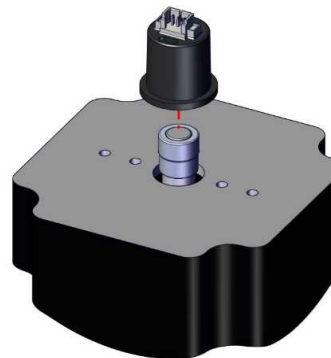
#### Step 1:

Slip push-on magnetic hub over shaft and firmly press down until top of shaft fills cavity of hub.



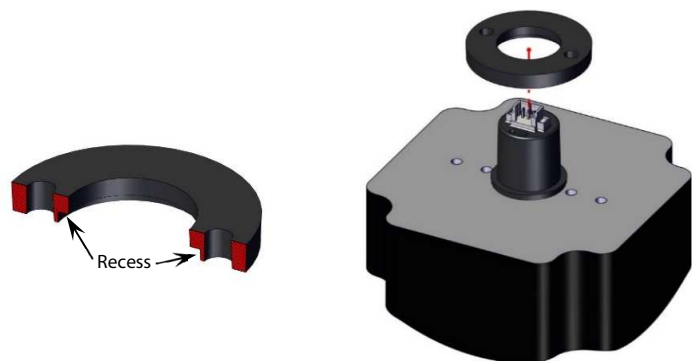
#### Step 2:

Place encoder body over shaft assembly so that it sits on mounting surface.



#### Step 3:

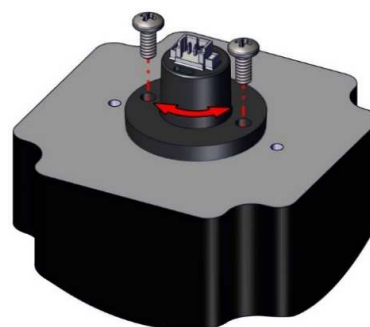
With recess in base facing towards mounting surface, place base over encoder body so that flange of body fits into recess of base.



#### Step 4:

Secure base to mounting surface with two screws (#4 recommended, sold separately).

**Zero positioning:** Prior to fully tightening screws, encoder can be powered and rotated by hand to set absolute zero position, if desired.



Recommendation for mounting screws: 4-40 1/4"  
Max. allowed tightening torque 0.67 Nm.