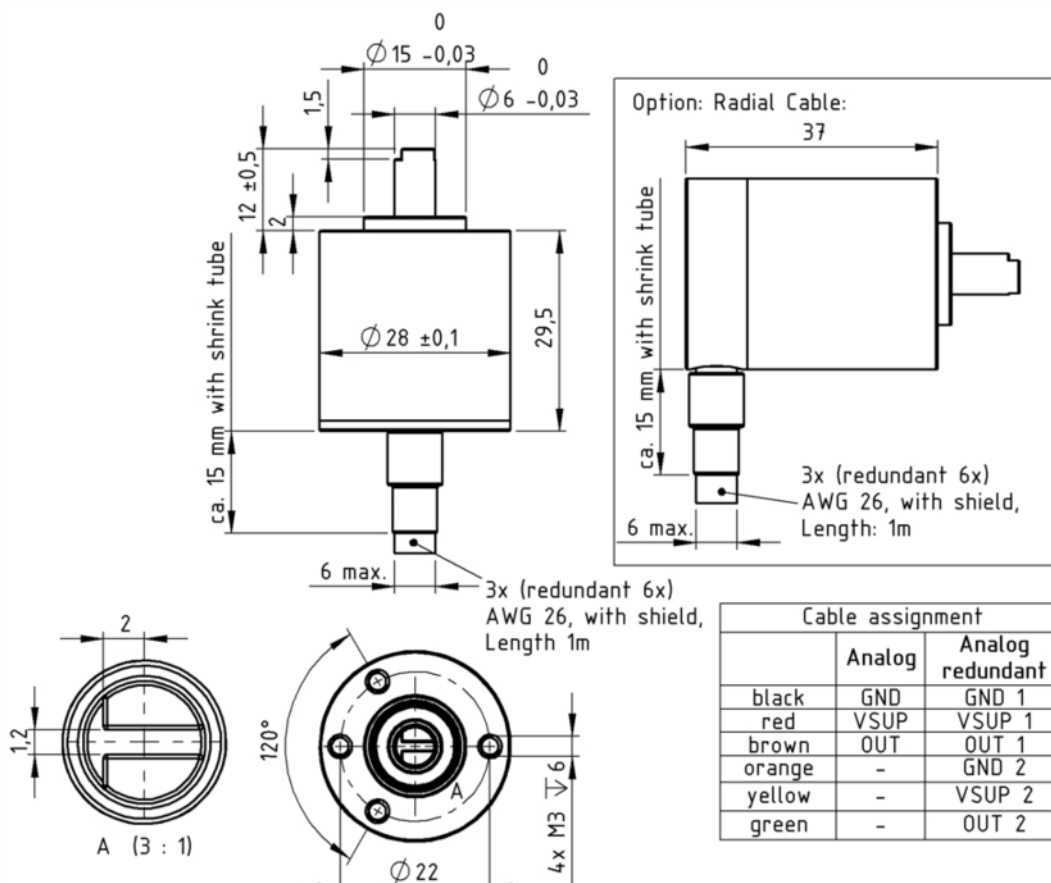## Serie MAB28A / Hall Effect Absolute Encoder

- Angle range 20...360° (individual signal characteristic and angle can be adjusted by the factory)
- 12 Bit resolution
- Analog output: 0-5V, 0-10V, 0-20mA, 4-20mA
- Supply voltage: 5V, 8-30V
- Housing ⌀ 28 mm
- Precision ball bearings

The MAB28A is a multifunctional and robust encoder. The precision ball bearings as well as the magnetic measuring principle are warrants for a high life expectancy.

## Drawing



| Cable assignment | Analog | Analog redundant |
|---|---|---|
| black | GND | GND 1 |
| red | VSUP | VSUP 1 |
| brown | OUT | OUT 1 |
| orange | – | GND 2 |
| yellow | – | VSUP 2 |
| green | – | OUT 2 |

Standard: Electrical zero point is not defined

Option N (Zero point alignment): In the shaft position shown in the upper drawing, the minimum signal will be measured on the output. When turning the shaft in the direction of the chosen direction (CW or CCW), the signal rises to the maximum value.

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## Serie MAB28A / Hall Effect Absolute Encoder

| Electrical Data | Voltage output | Current output |
|---|---|---|
| Electrical angle | 20...360° (Standard 360°) | |
| Independent linearity tolerance | ±0,3 % | |
| Resolution | 4096 steps (12 Bit) | |
| Update rate | 0,6 ms (Option High Speed 0,2 ms) | |
| Signal output | 0-10V / 0-5V ratiometric / 5V PWM | 0-20mA / 4-20mA |
| Supply voltage | 15-30 VDC, 5 VDC ±10%, 9-30 VDC | 8-30 VDC |
| Supply current (no load) | <8 mA / >15 mA bei Option HS | |
| Signal load | ≥ 5kΩ | ≤500 Ω |

| Mechanical Data | |
|---|---|
| Maximum rotational speed | 6000 rpm |

| Other Data | |
|---|---|
| Protection class (shaft and housing) | IP65 |
| Operating temperature | -30 ... +80 °C |
| Storage temperature | -40 ... +80 °C |
| Bearing | 2 precision ball bearings |
| Material housing | chromed Aluminium |
| Material shaft | stainless steel |
| Weigth | approx. 90 g |

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# Serie MAB28A / Hall Effect Absolute Encoder

## Order Description and Options

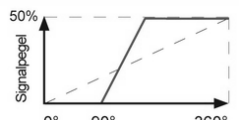| | | | | | | |
|---|---|---|---|---|---|---|
| Series MAB28A with single electronics | **MAB28A** | | | | | |
| | | | | | | |
| **Resolution / Update Rate** | | | | | | |
| 12 bit / Standard speed (*) | | 12 (*) | | | | |
| 12 bit / High speed | | **12HS** | | | | |
| | | | | | | |
| **Versorgungsspannung / Ausgangssignal** | | | | | | |
| 5 V / 0...5 V | | | 0505 (*) | | | |
| 24 V (9..30 V) / 0...5 V | | | 2405 (*) | | | |
| 24 V (15..30 V) / 0...10 V | | | **2410** | | | |
| 24 V (9..30 V) / 4...20 mA | | | **2442** | | | |
| 24 V (9..30 V) / 0...20 mA | | | 2420 (*) | | | |
| | | | | | | |
| Counterclockwise rising signal | | | | CCW360 (*) | | |
| | | | | | | |
| Other electrical effective angle | | | | C(C)Wxxx (*) | | |
| | | | | | | |
| Clockwise rising signal; 360°, zero point alignment | | | | | **N** | |
| | | | | | | |
| Other shaft length [mm] | | | | | Axx (*) | |
| | | | | | | |
| **Cable output** | | | | | | |
| Axial - 1 m | | | | | | - |
| Axial [m] | | | | | | CVxx(*) |
| Radial [m] | | | | | | CVRxx(*) |
| | | | | | | |
| Series MAB28A with redundant electronics | **MAB28A** | **X** | | | | |
| | | | | | | |
| **Resolution / Update Rate** | | | | | | |
| 12 bit / Standard speed | | **12** | | | | |
| | | | | | | |
| **Supply voltage / Output signal** | | | | | | |
| 5 V / 0...5 V | | | 0505 (*) | | | |
| 24 V (9..30 V) / 0...5 V | | | 2405 (*) | | | |
| 24 V (15..30 V) / 0...10 V | | | **2410** | | | |
| | | | | | | |
| Clockwise rising signal; 360°, zero point alignment | | | | | **CW360/CW360 N** | |
| | | | | | | |
| Counterclockwise rising signal at both channels | | | | | CCW360/CCW360 (*) | |
| | | | | | | |
| Other electrical effective angle | | | | | C(C)Wxxx/C(C)Wxxx (*) | |
| | | | | | | |
| Other shaft length [mm] | | | | | Axx (*) | |
| | | | | | | |
| **Cable output** | | | | | | |
| Axial - 1 m | | | | | | - |
| Axial [m] | | | | | | CVxx(*) |
| Radial [m] | | | | | | CVRxx(*) |
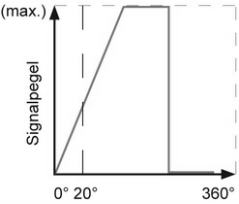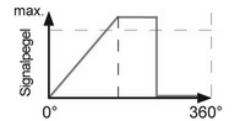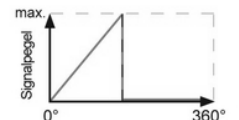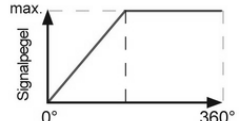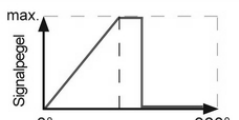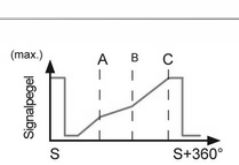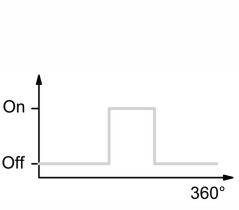
"bold print = standard option"
short-term stock types can be found on: http://www.megatron.de/en/stocklists/angle-sensors/lagerliste.html
(*) = on request available for projects

23.02.2015

## Electrical Options
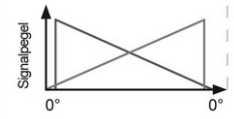
| | | |
|---|---|---|
| **Modified effective electrical angle**<br>Electrical zeropoint is at the begining of the signal rise without reference of housing and shaft. The electrical measuring range can be programmed from 0-20° to 0-360°. The mechanical angle is always larger or equal to the electrical angle. In the electrical basic type with stop, the zeropoint is always at CCW position. For non-effective electrical travel the options EA1a - EA1d are selectable.<br>If it is not specified by the customer, the signal level is programmed according EA1A. On request it is also possible to set the zeropoint at CW position. | CWxxx /<br>CCWxxx |  |
| **Electrically non effective angle - Delta 1/2**<br>If the electrical effective angle is programmed below 360°, the remaining electrically non effective angle is divided in two equal parts: High level & Low level (Delta ½). | EA1a |  |
| **Electrically non effective angle - Low-Level**<br>At electrically effective angle below 360°, after reaching the maximum the signal level falls to low level and remains at this. | EA1b |  |
| **Electrically non effective angle - High-Level**<br>If the electrically effective angle is programmed below 360°, the signal level remains high after reaching the full level. | EA1C |  |
| **Electrically non effective angle - Variable Level**<br>If the electrically effective angle is programmed below 360°, the remaining electrically non effective angle can be divided into high and low level in any ratio according to customer request. | EA1d |  |
| **Zero point positioning**<br>The mechanical zero point is established when the shaft marking is aligned with the marking on the sensor housing. The electrical zero point can be alligned to the mechanical zero point. Nevertheless the zero point can be programmed at any offset according to customer requirement.<br>Offset 0° = Standard option N | EA2 |  |
| **Center position**<br>The center of the effective electrical angle can be aligned with the mechanical zeropoint. The centre position gives equal effective electrical angles on both sides with reference to the shaft position against marking on the housing. (Example: For 120°, centre positioning will give 0° at center , and angle 60° CW and CCW). The center point can be programmed at any offset according to customer requirement | EA3 |  |
| **Multipoint programming**<br>This option allows an output characteristic which consists of 3 to 6 rising or horizontal linear segments. The minimum and maximum signal level can be defined within the total electrical angle. The first and last linear segment (minimun/maximum) is always horizontal. The first segment can start at the zeropoint or at a specified offset, and rise to maximum. Within maximum and minimum position, 1 to 3 calibration points can be set according to customer request | EA4 |  |
| **Software switching function**<br>Possible for housing Ø bigger than 28<br><br>Switching funktion can be assigned to any angular position by one potential free relay output (open/close, max. Voltage 60V, max. current 0,2A). For housing Ø bigger than 36 e.g. MAB36, a second switching function is also possible.<br>For each switching function the rising and falling edge can be configurated to any angular position.<br>Example:<br>MAB22A.... EA5 On: CW40° Off: CW85°<br>MAB36A.... EA5 On1: CW40° Off1: CW85° On2: CW55° Off2: CW70° | EA5 |  |

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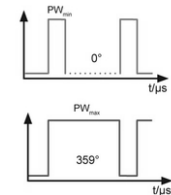| | | |
|---|---|---|
| **Rotational direction**<br>The standard direction of rotation is Clockwise (CW). It is also possible with this option to change the direction from Clockwise(CW) to Counterclockwise (CCW). | CCW |  |
| **PWM - Pulse width modulation**<br>For housing Ø bigger than 22 e.g. MAB22 possible<br><br>PWM provides a constant carrier frequency which defines high to how ratio. The ratio between high and low responds to the signal characteristics. It is in a fixed relation to the angle. The Standard electrical Options EA1 -EA4 can also be integrated in this version. Generally for further signal processing, no A/D converter is required because many microcontrollers already have PWM input.<br>Basic type: Frequency 244 Hz<br>- Duty cycle min. = 10% = approx. 0,4 ms<br>- Duty cycle max. = 90% = approx. 3,6 ms<br>- Duty cycle increases with clockwise rotation. | PWM |  |
| With this option custom specific PWM signals can be provided. You can choose the Frequency (100 Hz…1 kHz) and the minimum and maximum duty cycle. | EA7 | |
| **2-channel-output**<br>This is made up of a hall sensor Chip consisting of 2 galvanically insulated sensing elements. One magnet provides magnetic field simultaneously for both elements. If both elements are programmed identically, redundancy is provided. Channel 2 can also be programmed completeley different than channel 1. | MAB...X |  |
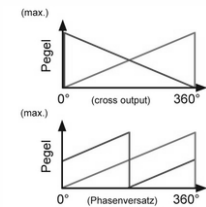
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