# Encoders

magnetic Encoder, digital outputs,
3 channels, 32 - 256 lines per revolution

**For combination with**
DC-Micromotors

## Series HEM3-256 W

| | | HEM3-32 W | HEM3-64 W | HEM3-128 W | HEM3-256 W | |
|---|---|---|---|---|---|---|
| Lines per revolution | *N* | 32 | 64 | 128 | 256 | |
| Frequency range, up to [1] | *f* | 16 | 32 | 64 | 128 | kHz |
| Signal output, square wave | | 2+1 Index | | | | Channels |
| Supply voltage [2] | $U_{DD}$ | 3 ... 3,6 | | | | V |
| Current consumption, typical [3] | $I_{DD}$ | 16 | | | | mA |
| Output current, max. [4] | $I_{OUT}$ | 2 | | | | mA |
| Pulse width | *P* | 180 ± 45 | | | | °e |
| Phase shift, channel A to B | *Φ* | 90 ± 45 | | | | °e |
| Logic state width | *S* | 90 ± 45 | | | | °e |
| Signal rise/fall time, max. ($C_{LOAD}$ = 50 pF) | *tr*/*tf* | 0,1 / 0,1 | | | | µs |
| Inertia of sensor magnet | *J* | 0,02 | | | | gcm² |
| Operating temperature range | | -30 ... +85 | | | | °C |

[1] Velocity (min$^{-1}$) = *f* (Hz) x 60/*N*
[2] $U_{DD}$ = 3,3 V: connect Pin 3 and 4 to 3,3 V. $U_{DD}$ = 5 V: connect Pin 3 to 5 V, Pin 4 open
[3] $U_{DD}$ = 3,3 or 5 V: with unloaded outputs
[4] $U_{DD}$ = 5 V: low logic level < 0,5 V, high logic level > 4,5 V: CMOS- and TTL compatible

**For combination with Motor**

| **Dimensional drawing A** | **<L1 [mm]** |
|---|---|
| 0816 ... SR - K2566 | 24,4 |

| **Dimensional drawing B** | **<L1 [mm]** |
|---|---|
| 1016 ... SR - K2566 | 24,4 |
| 1024 ... SR - K2566 | 32,4 |

| **Dimensional drawing C** | **<L1 [mm]** |
|---|---|
| 1224 ... SR - K1707 | 31,1 |

**Characteristics**

These incremental shaft encoders in combination with the FAULHABER DC-Micromotors are designed for indication and control of both shaft velocity and direction of rotation as well as for positioning.

Solid state sensors and a low inertia magnetic disc provide two channels with 90° phase shift and one index channel.

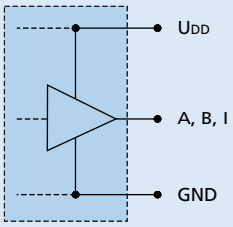
The nominal supply voltage for the encoder is selectable and either 3,3 VDC or 5,0 VDC. The supply voltage for the encoder and the DC-Micromotor as well as the output signals are interfaced with discrete wires and an 8-pin Molex crimp style connector.

Details for the DC-Micromotors and suitable reduction gearheads are on separate catalog pages.

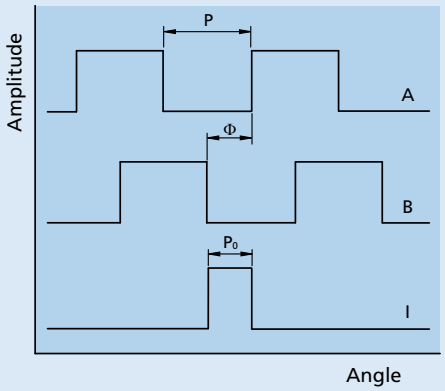
To view our large range of accessory parts, please refer to the "Accessories" chapter.

## Circuit diagram / Output signals

**Output circuit**



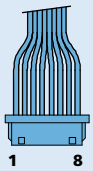

**Output signals**
with clockwise rotation as seen from the shaft end




## Connector information / Variants

| No. | Function |
|---|---|
| 1 | Motor – |
| 2 | GND |
| 3 | UDD 5V |
| 4 | UDD 3,3V |
| 5 | Channel A |
| 6 | Channel B |
| 7 | Channel I |
| 8 | Motor + |

**Connection Encoder and Motor**



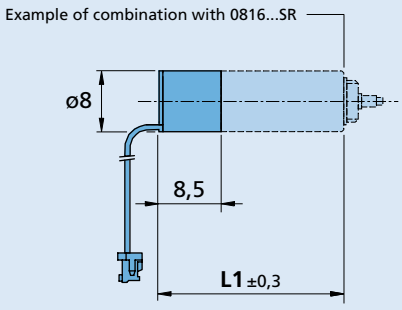

**Cable**
ETFE, AWG 30

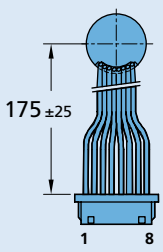
**Recommended connector**
8 circuits, 1,25 mm pitch, e.g.:
Molex: 51021-0800

**Full product description**

- Examples:
  **1016N012SR-K2566 HEM3-32**
  **1224N012SR-K1707 HEM3-256**

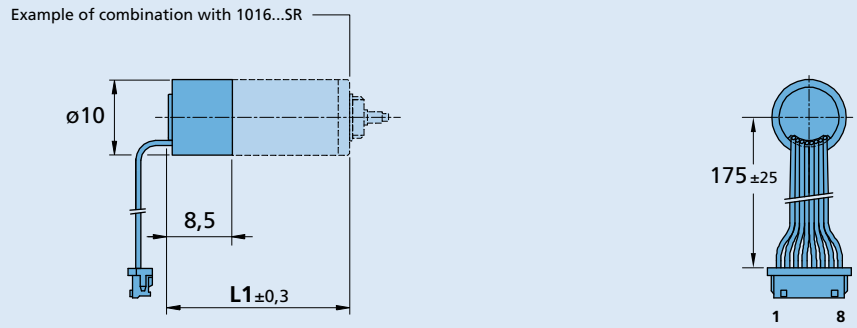
## Dimensional drawing A



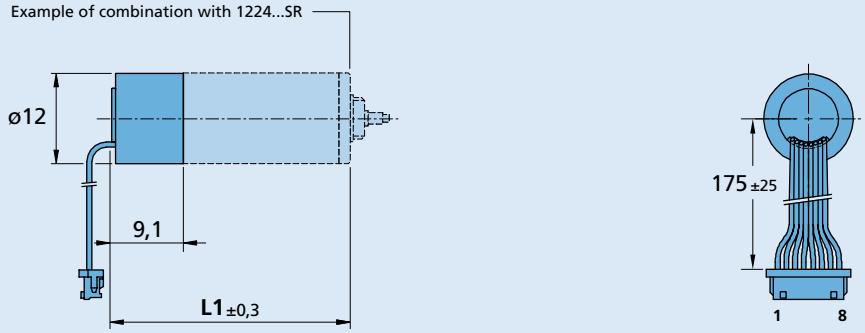

**HEM3-256 W**

## Dimensional drawing B




**HEM3-256 W**

## Dimensional drawing C

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