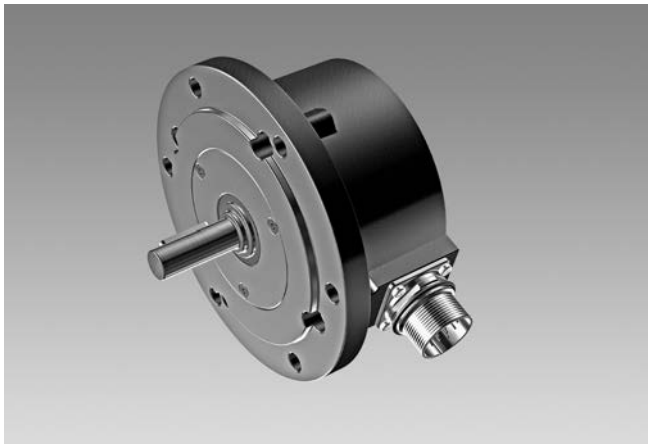
# Incremental encoders

## Solid shaft ø10 mm or ø11 mm with EURO flange B10

## 100...5000 pulses per revolution

## FOG 9



FOG 9

### Features

- **Solid shaft ø10 mm or ø11 mm**
- **Compact, robust die-cast housing**
- **Flange connector with metal mating connector**
- **EURO flange B10**
- **Output stage TTL with regulator UB 9...30 VDC**
- **Output stage HTL with power linedriver**

### Optional

- **Function control with EMS (Enhanced Monitoring System)**
- **Angle flange-connector**
- **Protected cable outlet (corrugated tube)**

### Technical data - electrical ratings

| | |
|---|---|
| Voltage supply | 9...30 VDC<br>5 VDC ±5 % |
| Consumption w/o load | ≤100 mA |
| Pulses per revolution | 100...5000 |
| Phase shift | 90° ±20° |
| Scan ratio | 40...60 % |
| Reference signal | Zero pulse, width 90° |
| Sensing method | Optical |
| Output frequency | ≤120 kHz<br>≤300 kHz (on request) |
| Output signals | K1, K2, K0 + inverted<br>Error output (only EMS) |
| Output stages | HTL-P (power linedriver)<br>TTL/RS422 |
| Interference immunity | EN 61000-6-2 |
| Emitted interference | EN 61000-6-3 |
| Approvals | CE, UL approval / E256710 |

### Technical data - mechanical design

| | |
|---|---|
| Size (flange) | ø115 mm |
| Shaft type | ø10...11 mm solid shaft |
| Admitted shaft load | ≤200 N axial<br>≤300 N radial |
| Flange | EURO flange B10 |
| Protection DIN EN 60529 | IP 66 |
| Operating speed | ≤10000 rpm (mechanical) |
| Starting torque | ≤6 Ncm |
| Rotor moment of inertia | 160 gcm² |
| Materials | Housing: aluminium die-cast<br>Shaft: stainless steel |
| Operating temperature | -30...+100 °C<br>-25...+100 °C (>3072 pulses per revolution) |
| Resistance | IEC 60068-2-6<br>Vibration 10 g, 10-2000 Hz<br>IEC 60068-2-27<br>Shock 100 g, 6 ms |
| Explosion protection | II 3 G Ex nA IIC T4 Gc (gas)<br>II 3 D Ex tc IIIB T135°C Dc (dust) |
| Connection | Flange connector M23, 12-pin<br>Mating connector |
| Weight approx. | 700 g |

## FOG 9

### Part number

**Incremental encoder**

**FOG9** [ ] [ ] **DN** [ ] [ ] [ ] [ ]

Voltage supply / signals
- I 9...30 VDC / output stage HTL with inverted signals
- TTL 5 VDC / output stage TTL with inverted signals
- R 9...30 VDC / output stage TTL with inverted signals

Pulse number - see table

Output signals
- DN K1, K2, K0

EMS - Enhanced Monitoring System
- Without EMS
- .2 With EMS

### Pulse number

| | | | | |
|---|---|---|---|---|
| 100 | 200 | 400 | 900 | 2048 |
| 120 | 250 | 500 | 1000 | 2500 |
| 128 | 256 | 512 | 1024 | 3072 |
| 180 | 300 | 600 | 1200 | 4096 |
| 192 | 360 | 720 | 1250 | 5000 |

Other pulse numbers on request.

### Accessories

**Connectors and cables**

| | |
|---|---|
| HEK 8 | Sensor cable for encoders |

**Mounting accessories**

| | |
|---|---|
| K 35 | Spring washer coupling for solid shaft ø6...12 mm |
| K 50 | Spring washer coupling for solid shaft ø11...16 mm |
| K 60 | Spring washer coupling for solid shaft ø11...22 mm |

**Diagnostic accessories**

| | |
|---|---|
| HENQ 1100 | Analyzer for encoders |

# Incremental encoders

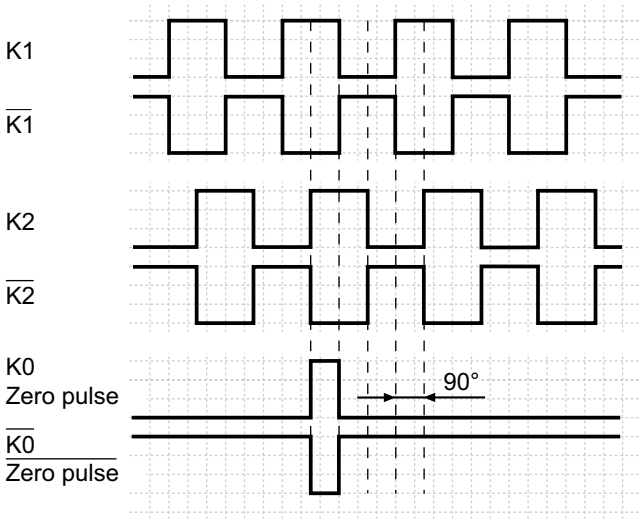
## Solid shaft ø10 mm or ø11 mm with EURO flange B10

## 100...5000 pulses per revolution

### FOG 9

#### Output signals

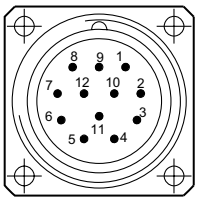
At positive rotating direction




#### Terminal assignment

**View A** - Flange connector M23, 12 pin, male contacts, CW

| Pin | Assignment |
|---|---|
| 1 | $\overline{K2}$ (K2 inv.) |
| 2 | Do not use |
| 3 | K0 (Zero pulse) |
| 4 | $\overline{K0}$ (Zero pulse inv.) |
| 5 | K1 |
| 6 | $\overline{K1}$ (K1 inv.) |
| 7 | Do not use (Option EMS: $\overline{Err}$) |
| 8 | K2 |
| 9 | Do not use (Option EMS: 0 V) |
| 10 | 0 V |
| 11 | Do not use |
| 12 | +UB |

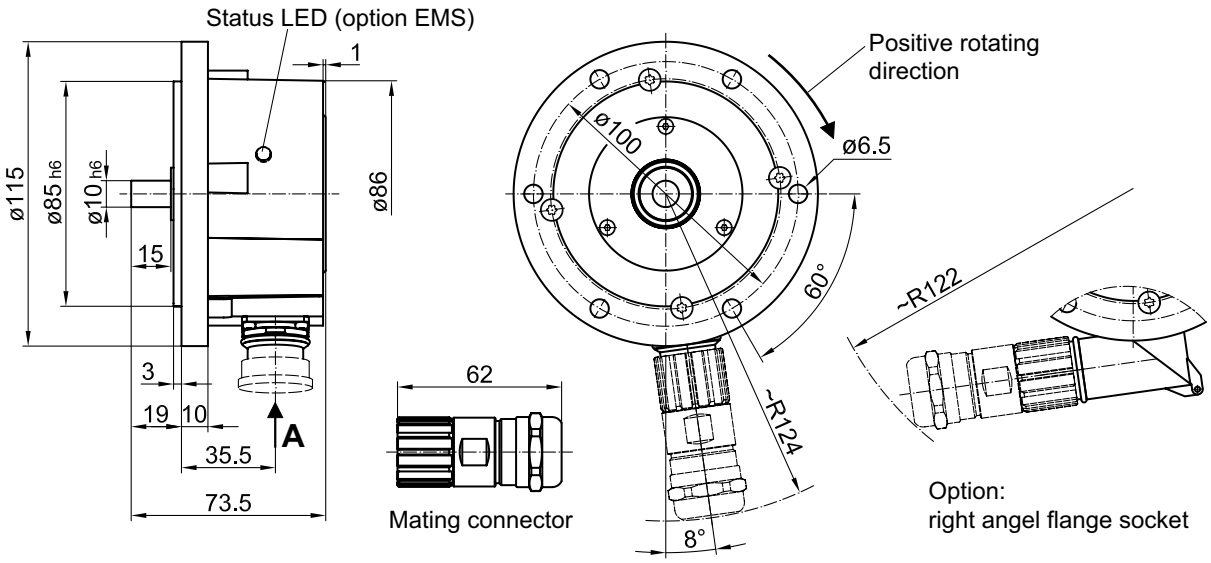



| **Option EMS: LED status / Error output** | |
|---|---|
| Flash light red* | Error of signal sequenze, zero pulse or pulses (Error output = HIGH-LOW alternation) |
| Red | Overload output transistors (Error output = LOW) |
| Flash light green | Encoder o.k., rotating (Error output = HIGH) |
| Green | Encoder o.k., stopped (Error output = HIGH) |
| No light | No output voltage connection or wrong connection (Error output = LOW) |

* Only at rotating encoder

### Dimensions

**FOG 9 (FOG 9.2) - Version with shaft ø10 mm**




**FOG 9 (FOG 9.2) - Version with shaft ø11 mm**