

POSITAL

FRABA

ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK



Main Features

- Compact and Heavy-Duty Industrial Model
- Communication via Ethernet Powerlink V2, V1
- Integrated Web Server
- Interface: Ethernet
- Housing: 58 mm Ø
- Full or Hub Shaft: 6 or 10 mm Ø / 15 mm Ø
- Max. 65536 Steps per Revolution (16 Bit)
- Max. 16384 Revolutions (14 Bit)
- Code: Binary
- UL Listed

Mechanical Structure

- Aluminum Flange and Housing
- Stainless Steel Shaft
- Sealed Precision Ball Bearings
- Unbreakable and Durable Polycarbonate Code Disc
- Robust Electrical Connection in IP 67

Programmable Parameters

- Direction of Rotation (Complement)
- Resolution per Revolution
- Total Resolution
- Preset Value
- Network- and E-mail- Parameters

Electrical Features

- Status Indication Powerlink with a LED
- Network LEDs for Collision, Link, Receive
- Temperature Insensitive
IR-Opto-Receiver-ASIC
- Polarity Inversion Protection
- Over-Voltage-Peak Protection

FRABA Inc.

1800 East State Street, Suite 148, Hamilton, NJ 08609, USA

Tel. +1 609 750 8705, Fax. +1 609 750 8703

www.posital.com, info@posital.com

ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK

Technical Data

Electrical Data

| | |
|----------------------|---|
| Supply Voltage | 10 - 30 V DC (Absolute Limits) |
| Power Consumption | max. 4 Watt |
| EMC | Emitted Interference: EN 61000-6-4 |
| | Noise Immunity: EN 61000-6-2 |
| Bus Connection | Ethernet Powerlink V2, V1 |
| Transmission Rate | 100 MBit |
| Accuracy of Division | $\pm 1/2$ LSB (12 Bit), ± 2 LSB (16 Bit) |
| Step Frequency LSB | Max. 800kHz (Internal Valid Code) |
| Electrical Lifetime | $> 10^5$ h |
| Device Addressing | Programmable IP-Address with 2hex Coded Rotary Switches |

*Absolute rotary encoders should be connected only to subsequent electronics whose power supplies comply with EN 50178 (protective low voltage)

Mechanical Data

| | | | |
|----------------------------------|--|----------------------|----------------------|
| Housing | Aluminum, Optional Stainless Steel | | |
| Max. Shaft Load | Axial 40 N, Radial 110 N (9 lbs / 25 lbs) | | |
| Moment of Inertia of Rotor | $\leq 30 \text{ gcm}^2$ (0.16 oz-in ²) | | |
| Friction Torque | $\leq 3 \text{ Ncm}$ (4.2 oz-in) (without Shaft Sealing) | | |
| RPM (Continuous Operation) | Single-Turn: max. 12.000 RPM | | |
| | Multi-Turn: max. 12.000 RPM | | |
| Shock (EN 60068-2-27) | $\leq 100 \text{ g}$ (Half Sine, 6 ms) | | |
| Permanent Shock (EN 60028-2-29) | $\leq 10 \text{ g}$ (Half Sine, 16 ms) | | |
| Vibration (EN 60068-2-6) | $\leq 10 \text{ g}$ (10 Hz ... 1,000 Hz) | | |
| Weight (Standard Version) | Single-Turn: ~500 g (~1.1 lbs) | | |
| | Multi-Turn: ~700 g (~1.5 lbs) | | |
| Weight (Stainless Steel Version) | Single-Turn: ~1,000 g (~2.2 lbs) | | |
| | Multi-Turn: ~1,400 g (~3.1 lbs) | | |
| Flange | Synchro (S) | | Clamp (C) |
| Shaft Diameter | 6 mm (~0.236 in) | 10 mm (~0.394 in) | 10 mm (~0.394 in) |
| | Hub Shaft (B) 15 mm (~0.591 in) | | |
| Shaft Length | 10 mm (~0.394 in) | 20 mm (~0.787 in) | 20 mm (~0.787 in) |
| | * | | |

* Mating Shaft: min: 15 mm (~0.591 in) / max: 30 mm (~1.181 in)

ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK

Minimum (Mechanical) Lifetime

| Flange | Lifetime in 10 ⁸ Revolutions with F _a / F _r | | |
|---|--|-------------------------------|--------------------------------|
| | 40 N / 60 N 9 lbs / 13 lbs | 40 N / 80 N 9 lbs / 18 lbs | 40 N / 110 N 9 lbs / 25 lbs |
| C10 (Clamp Flange 10 x 20) | 240 | 100 | 40 |
| S10 (Synchro Flange 10 x 20) | 210 | 90 | 30 |
| S6 (Synchro Flange 6 x 10) without Shaft Sealing* | 710 | 300 | 110 |

* S6 (Synchro Flange 6 x 10) with Shaft Sealing: max. 20 N Axial, 80 N Radial (5 lbs / 18 lbs)

Environmental Conditions

| | |
|-----------------------------|---|
| Operating Temperature | 0 .. +60 °C (32 ... 140 °F)* |
| Storage Temperature | - 40 ... + 85 °C (- 40 ... + 185 °F)* |
| Humidity | 98 % (No Condensation) |
| Protection Class (EN 60529) | Casing Side: IP 65 |
| | Shaft Side: IP 64 (Optional with Shaft Sealing: IP66) |

* Cable Exit: - 30 ... + 70 °C (- 22 ... + 158 °F) (Stationary), - 5 ... + 70 °C (23 ... 158 °F) (Flexing)

ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK

Interface

Configuration

The setting of the controlled node number is achieved by 2 hexadecimal coded turn-switches in the connection cap. Possible addresses lie between 1 and 239 whereby every address can only be used once in a Powerlink segment.

Ethernet Powerlink V2:

The IP-address is set up with a part named net-ID (192.168.100) which is constant and Host-ID (EPL-node ID). The resulting IP-address is: 192.168.100.EPL-node-ID.

Ethernet Powerlink V1:

The IP-address is set up with a part named net-ID (192.168.000) which is constant and Host-ID (EPL-node ID). The resulting IP-address is: 192.168.000.EPL-node-ID.

Installation

An integrated hub with encoder version A1 offers cabling in a line structure. Usage of external additional components can be prevented by that way. For the Ethernet ports two connectors in four pin Micro Style M12 male and D-coded version can be used. Power supply must be connected to the five pin M12 male connector. For Ethernet wiring cross over cable types must be used like recommended in the Powerlink specification. Maximum transmission rates up to 100 Mbit are supported, whereby a maximum network length of 100 meters can be achieved, if cables according to Cat5e will be used.

Pinning

Connector Ethernet

4 pin female, D-coded

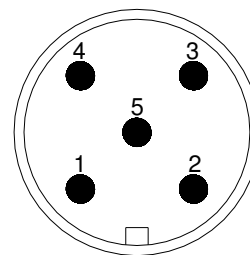
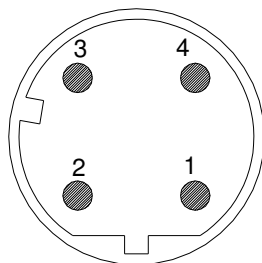
| Pin Number | Signal |
|------------|--------|
| 1 | Tx + |
| 2 | Rx + |
| 3 | Tx - |
| 4 | Rx - |

Connector Power Supply

5 pin male, A-coded

| Pin Number | Signal |
|------------|--------|
| 1 | +24 V |
| 2 | +24 V |
| 3 | 0 V |
| 4 | 0 V |
| 5 | PE |

Sketch on encoder view



ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK

Protocols

The communication is based on Ethernet-Powerlink protocol, which was defined by the organization EPSG (Ethernet Powerlink Standardisation Group). By using the time slot method the protocol is suited for hard real time class 4 applications and enabled furthermore transmission of protocols like TCP, UDP and http within asynchronous slot of a Powerlink cycle Version 2. With integration of CANopen device profiles in the Powerlink specification users can overtake device parameters out of the fieldbus world. As alternative a graphical

user interface (GUI) and full documentation is provided on an integrated "micro web server" for a convenient configuration and diagnosis. Based on http, html and Java applets the GUI and all documents can be displayed on all common web browsers. All parameters are saved in a non volatile memory so that the configuration is available promptly after a restart. Another feature of the web server is the optional output of messages via the SMTP protocol. In this way parameters and diagnosis messages can be sent by e-mail.

| | |
|-----------|--|
| TCP / UDP | TCP-Protocol assures an error free data transmission. For an enhanced real-time performance, the UDP protocol can be used alternatively. |
| HTTP | Via HTTP a common web browser can be used for read out, configuration and diagnosis of the encoder. |
| SMTP | Via SMTP protocol messages of the encoder can simply be sent by e-mail. |

ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK

Programmable Encoder Parameters

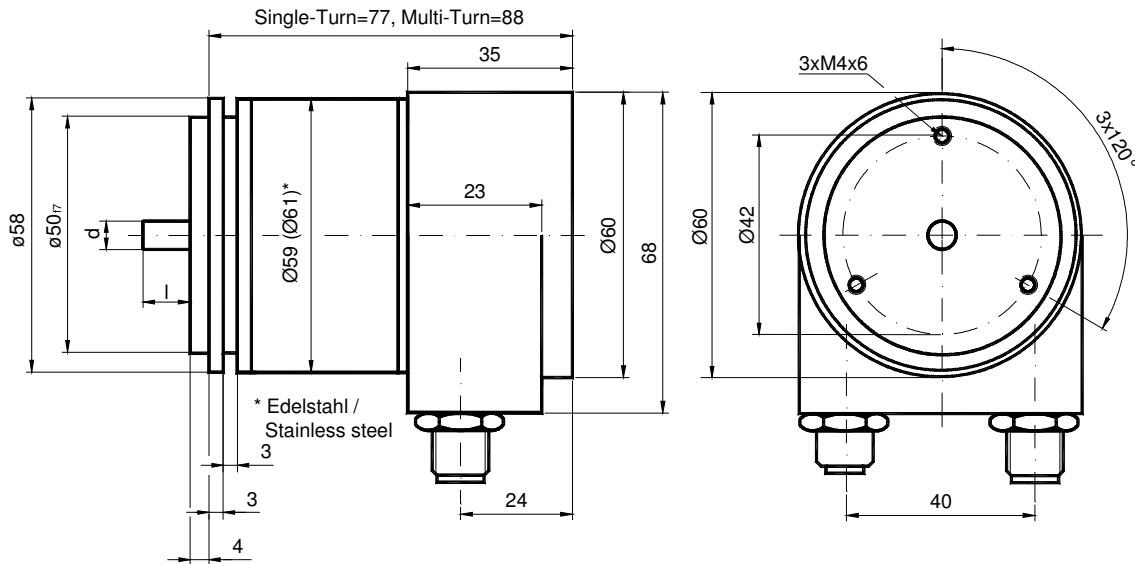
| | |
|---------------------------|---|
| Code Sequence | The code sequence (complement) can be programmed as an operating parameter. This parameter determines whether the output code increases or decreases when the axis is turned clockwise. |
| Resolution per Revolution | The parameter resolution per revolution is used to program the desired number of steps per revolution. |
| Total Resolution | This parameter is used to program the desired number of measuring units over the total measuring range. This value may not exceed the total resolution of the absolute rotary encoder. |
| Preset Value | The preset value is the desired output value for the actual position of the axis. The actual output value will be set to this preset value. |

ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK

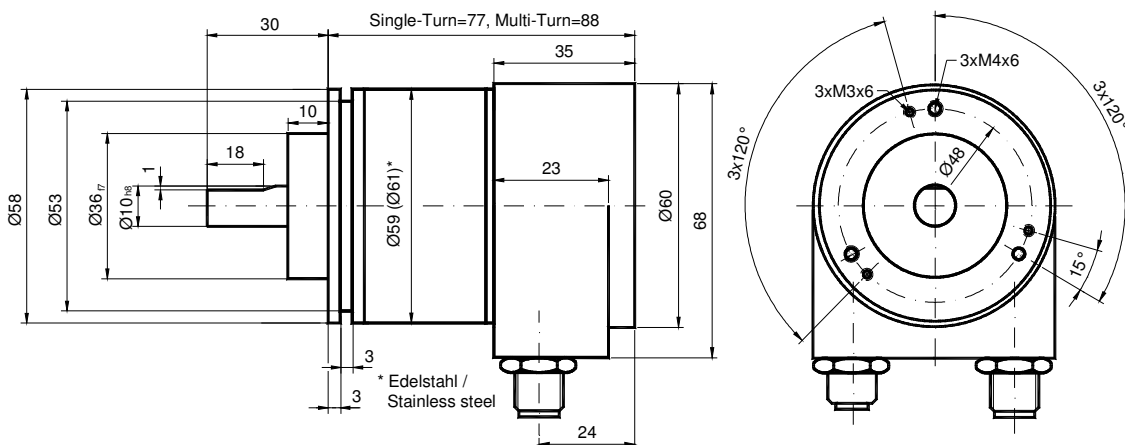
Mechanical Drawings (all dimensions in mm)

Synchro Flange (S)
available in 2 versions

| Synchro Flange | d / mm | l / mm |
|----------------|------------------|--------|
| Version S06 | 6 _{f6} | 10 |
| Version S10 | 10 _{h8} | 20 |

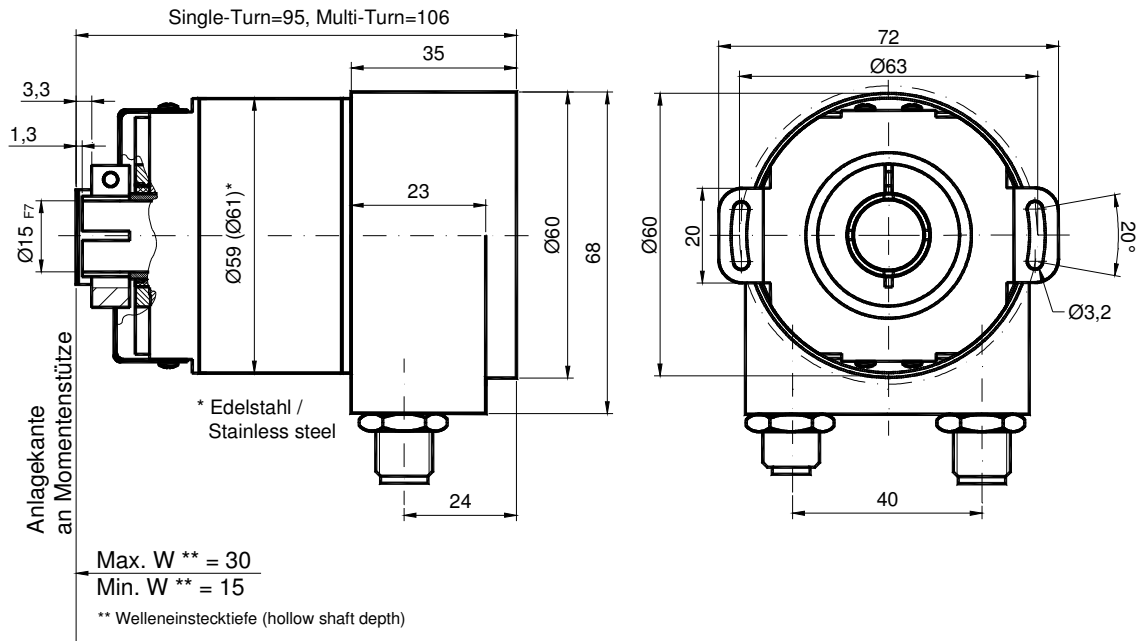


Clamp Flange (C)



ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK

Hub shaft (B)



Mounting Instructions

The clamp ring may only be tightened if the shaft of the driving element is in the hub shaft.

The diameter of the hub shaft can be reduced to 12mm, 10 mm or 8 mm by using an adapter (this reducing adapter can be pushed into the hub shaft).

| | Axial | Radial |
|---------|-------------------------|-------------------------|
| Static | ± 0.3 mm (~0.012 in) | ± 0.5 mm (~0.020 in) |
| Dynamic | ± 0.1 mm (~0.004 in) | ± 0.2 mm (~0.008 in) |

Allowed shaft movements of the drive element are listed in the table.

ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK

Models/Ordering Description

| Description | Type Key | | | | | | |
|-----------------------------------|--------------------------------|-----------|----------|-----------|----------|-----------|------------|
| Optocode | OCD- | E | B | | | | |
| Interface Powerlink (Protocol) | EPL V1 | 1 | | | | | |
| | EPL V2 | 2 | | | | | |
| Version | 2 x M12, Actual Release | 01 | | | | | |
| | Integr. Hub, 3x M12 | A1 | | | | | |
| Code | Binary | | B | | | | |
| Revolutions (Bits) | Single-Turn | | | 00 | | | |
| | Multi-Turn (4096 Revolutions) | | | 12 | | | |
| | Multi-Turn (16384 Revolutions) | | | 14 | | | |
| Steps per Revolution (Bits) | 8,1924 | | | 13 | | | |
| | 65,536 | | | 16 | | | |
| Flange | Clamp Flange | | | | C | | |
| | Synchro Flange | | | | S | | |
| | Hub Shaft | | | | B | | |
| Shaft Diameter | 10 mm | | | | | 10 | |
| | 06 mm | | | | | 06 | |
| | 15 mm (Hub Shaft) | | | | | 15 | |
| Mechanical Options | Without | | | | | | 0 |
| | Shaft Sealing (IP66) | | | | | | S |
| | Stainless Steel Version | | | | | | V |
| | Customized | | | | | | C |
| Connection | Radial, M12 Connectors | | | | | | PRM |

Standard = bold, further models on request

All types UL-listed

ABSOLUTE ROTARY ENCODER ETHERNET-POWERLINK

Accessories and Documentation

| Description | | Type |
|-------------------------------------|--|--------|
| Connector | M12 4 Pin Male D-Coded | PAM4 |
| | M12 5 Pin Female A-Coded | PAM5 |
| Clamp Disc ** | 4 pcs. / | SP 15 |
| Shaft Coupling ** | Diameter: 10 mm | GS 10 |
| | Diameter: 6 mm | GS 06 |
| Clamp Ring ** | 2 pcs. / OCD | SP H |
| Reducing Adapter *** (Hub Shaft) | 15 mm to 12 mm (to ~0.472 in) | RR12 |
| | 15 mm to 12 mm (to ~0.472 in) | RR10 |
| | 15 mm to 12 mm (to ~0.472 in) | RR8 |
| User Manual * | Installation / Configuration Manual, English | UMD-EP |
| | Installation / Configuration Manual, German | UME-EP |

* Note: All datasheets and manuals can be downloaded for free from our website www.posital.com

** Not for hub shaft

*** Only for hub shaft

We do not assume responsibility for technical inaccuracies or omissions. Specifications are subject to change without notice.