

POSITAL

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ABSOLUTE ROTARY ENCODER MULTI-TURN BIT PARALLEL



Main Features

- Compact and Heavy-Duty Industrial Model
- Interface: Bit-parallel, Push Pull
Short Circuit Proof
- Input: Preset (Optional) and Latch
- Housing: 58 mm Ø
- Shaft: 6 or 10 mm Ø, Hub- 15 mm Ø
- Max. 65,536 Steps per Revolution (16 bit)
- Max. 16,384 Revolution (14 bit)
- Code: Gray / Binary
- EMC: EN61000-6-2, EN61000-6-4, CE
- UL Listed

Mechanical Structure

- Aluminum Flange and Housing
- Stainless Steel Shaft
- Sealed Precision Ball Bearings
- Unbreakable and Durable Polycarbonate Code Disc

Applications

- Sensing of
- Angles
 - Distances
 - Tracks
 - Inclinations
 - Differences between two or more axes

Electrical Features

- Temperature Insensitive IR-Opto-ASIC with Integrated Signal Conditioning
- Monitored Integrated IR-Illumination
- Reliable SMD and FPGA Technology
- Polarity Inversion Protection
- Over-Voltage-Peak Protection

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Technical Data

Electrical Data

| | |
|----------------------|---|
| Outputs | Bit-Parallel, Push Pull |
| Output Level "High" | ~ Supply Voltage (Load Dependent) |
| Output Current | max. 20 mA Each Channel |
| Cycle Time | < 10 μ s (< 150 μ s with Preset Version) |
| Step Frequency | Version with Preset: 4,5 kHz Version without Preset: 50 kHz |
| Turn on Time | < 1 s |
| Accuracy of Division | $\pm 1/2$ LSB (12 Bit), ± 2 LSB (16 Bit) |
| EMC | Emitted Interference: EN 61000-6-4, Noise Immunity: EN 61000-6-2 |
| Supply Voltage | 10-30 V DC (Absolute Limits) * |
| Current Consumption | max. 400 mA (10 V DC), max. 180 mA (24 V DC) |
| Electrical Lifetime | > 10 ⁵ h |
| Connection | Connector or Cable Exit 1m (~3ft) |

* Supply Voltage According to EN 50 178 (Safety Extra-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 (Continuously Operation) | max. 6,000 | | | |
| 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 ... 2,000 Hz) | | | |
| Weight, Multi-Turn (Stainless Steel) | ~400 g (~800 g), ~0.9 lbs (~1.8 lbs), | | | |
| Flange | Synchro (S) | | Clamp (C) | Hub shaft (B) |
| Shaft Diameter | 6 mm (~0.236 in) | 10 mm (~0.394 in) | 10 mm (~0.394 in) | 15 mm (~0.591 in) |
| Shaft Length | 10 mm (~0.394 in) | 20mm (~0.787 in) | 20 mm (~0.787 in) | * |

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

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Minimal (Mechanical) Lifetime

| Flange | Lifetime in 10^8 Turns on 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 | - 40 ... + 85 °C (- 40 ... + 185 °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) |

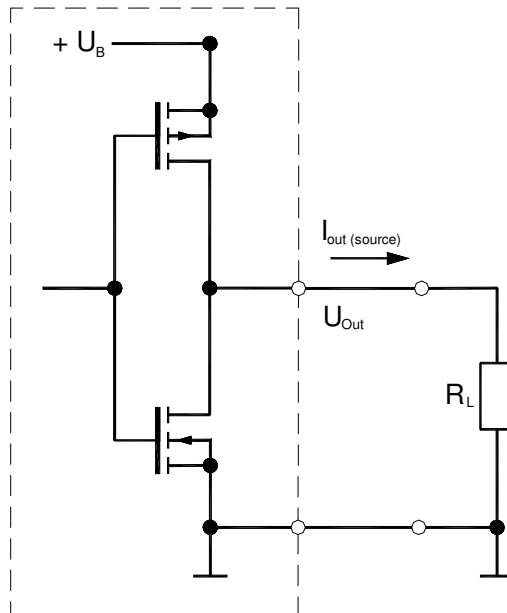
* Cable Exit: - 30 ... + 70 °C (- 22 ... + 158 °F) (Stationary), - 5 ... + 70 °C (23 ... 158 °F) (Flexing)

Interface

Push Pull

| | |
|----------------|--|
| Transmission | Data Transmission via Two Transistors in Push-Pull Circuit |
| Transfer | Transfer Distance up to 50 m (164 ft) |
| Shielded Lines | Shielded Lines are Essential to Attain Extremely High Noise Immunity |
| Connectable | Connectable to All Usual PLC Concepts with Digital I/Os |
| Optional | Binary Code Transmission with Integrated Latch Function |

Output Circuit



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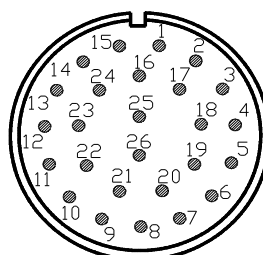
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Electrical Interface

| Signals | 26 Pin Connector | Cable Color |
|---------|------------------|--------------|
| Bit 1 | Pin 1 | White |
| Bit 2 | 2 | Brown |
| Bit 3 | 3 | Green |
| Bit 4 | 4 | Yellow |
| Bit 5 | 5 | Grey |
| Bit 6 | 6 | Pink |
| Bit 7 | 7 | Blue |
| Bit 8 | 8 | Red |
| Bit 9 | 9 | Black |
| Bit 10 | 10 | Violet |
| Bit 11 | 11 | Grey-Pink |
| Bit 12 | 12 | Blue-Red |
| Bit 13 | 13 | White-Green |
| Bit 14 | 14 | Brown-Green |
| Bit 15 | Pin 15 | White-Yellow |

| Signals | 26 Pin Connector | Cable Color |
|---------------------------|------------------|--------------|
| Bit 16 | Pin 16 | Yellow-Brown |
| Bit 17 | 17 | White-Grey |
| Bit 18 | 18 | Grey-Brown |
| Bit 19 | 19 | White-Pink |
| Bit 20 | 20 | Pink-Brown |
| Bit 21 | 21 | White-Blue |
| Bit 22 | - | Brown-Blue |
| Bit 23 | - | White-Red |
| Bit 24 | - | Brown-Red |
| Bit 25 | - | White-Black |
| Preset (opt.) | 22 | Brown-Black |
| Latch | 23 | Grey-Green |
| Complement | 24 | Yellow-Grey |
| +U _b = 10-30 V | 25 | Pink-Green |
| GND | Pin 26 | Yellow-Pink |

26 Pin Connector (male)



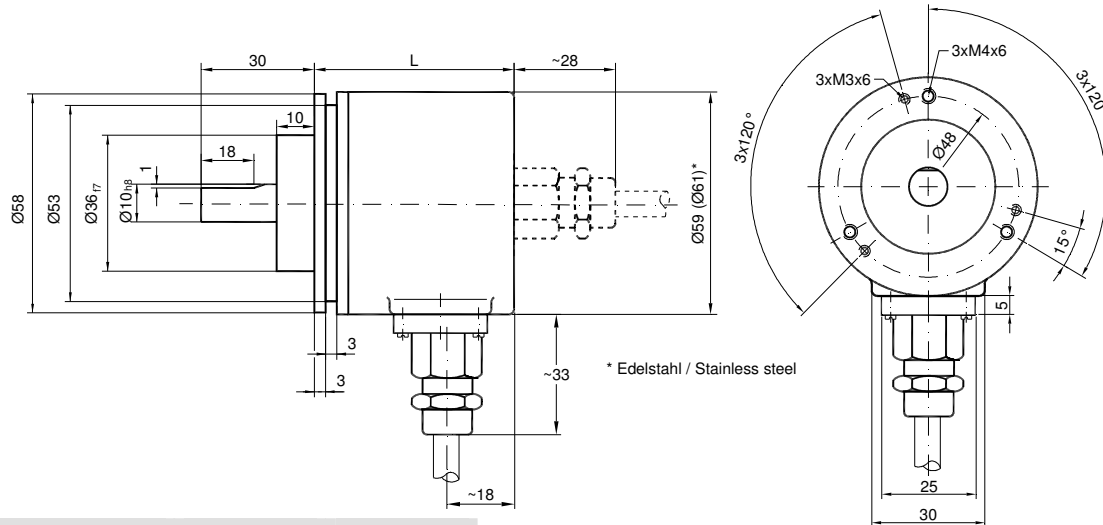
| COMPLEMENT-Input | | Encoder Counting Direction at Clockwise Rotation (As Seen on Shaft) |
|--|--|--|
| Function | Level | |
| Direction of Rotation | 0 (Input = N.C.* or GND) | Up |
| Switch Time < 3 μs | 1 (Input to + U _b or ≥ 4,5 V) | Down |
| Preset-Input (Optional, Should not Used During Shaft Rotation) | | |
| Function | Level | |
| Preset | 0 (Input = N.C.* or GND) | Use the Current Value |
| | 1 (Input to + U _b or ≥ 4.5 V) | Set Preset Value to 0 (After 100ms) |
| Latch-Input | | |
| Function | Level | |
| Latch | 0 (Input = N.C. or GND) | Use the Current Value |
| Latch Time < 3 μs | 1 (Input to + U _b or ≥ 4.5 V) | Latch the Value |

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Mechanical Drawings

Clamp Flange ©

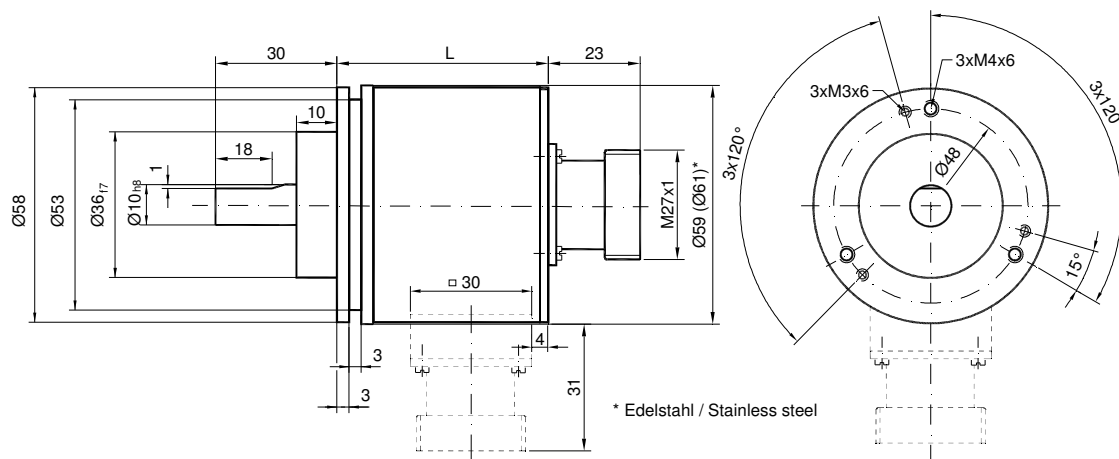
Cable exit (~ ø 10 mm)



| | | L |
|------------|--------|----|
| Cable Exit | | 62 |
| Connector | Axial | 62 |
| | Radial | 78 |

Connector exit

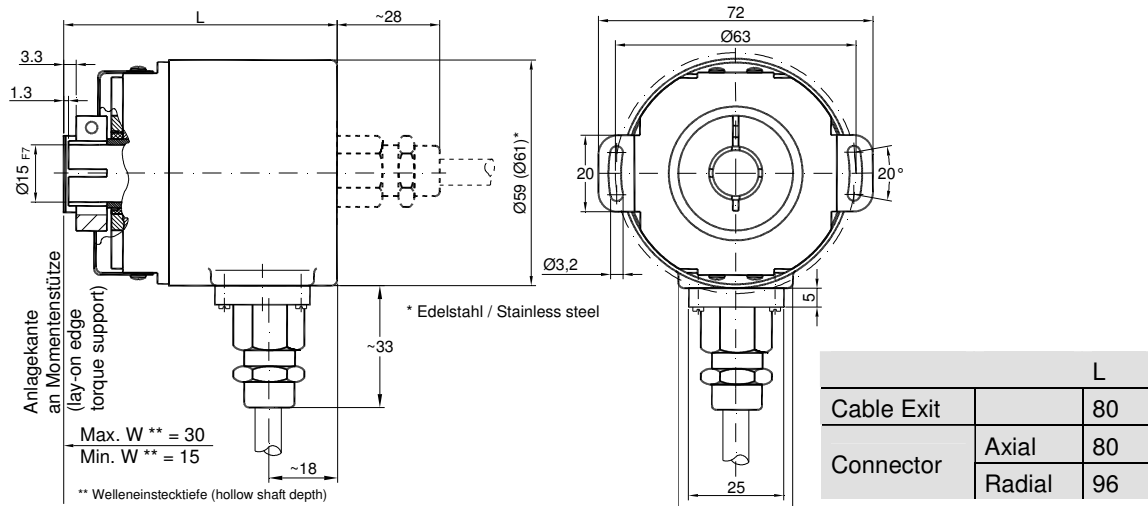
(only for max. 21 Bit)



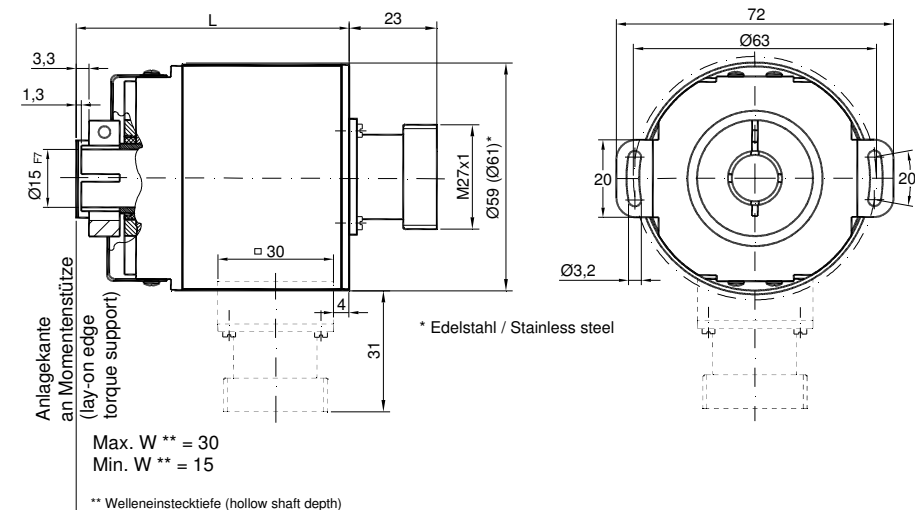
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Hub Shaft (B)

Cable Exit (~ \varnothing 10 mm)



Connector exit (only for max. 21 Bit)



Mounting Instructions

Do not tighten the clamp ring unless the machine shaft is properly inserted into the bore of the hub shaft.

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

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

| | 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) |

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Models / Ordering Description

| Description | Type Key | | | | | | | |
|---------------------------------|--|---|----|-----------|-----------|----------|-----------|----------------------------|
| Optocode | OCD | - | 00 | - | - | - | - | - |
| Interface Push Pull with Preset | PP P1 | | | | | | | |
| Version | | | 00 | | | | | |
| Code | Gray | | | G | | | | |
| | Binary | | | B | | | | |
| Bits for Revolutions *1 | 16 | | | 04 | | | | |
| | 256 | | | 08 | | | | |
| | 4096 | | | 12 | | | | |
| | 16384 | | | 14 | | | | |
| Steps per Revolution *1 | 4096 (0.09°) | | | | 12 | | | |
| | 8192 (0.04°) | | | | 13 | | | |
| | 65536 (0.005°) | | | | 16 | | | |
| Flange | Clamp Flange | | | | | C | | |
| | Synchro Flange | | | | | S | | |
| | Hub Shaft | | | | | B | | |
| Shaft | ø10 mm | | | | | | 10 | |
| | ø06 mm | | | | | | 06 | |
| | ø15 mm (only for Hub Shaft) | | | | | | 15 | |
| Mechanical Options | Without | | | | | | | 0 |
| | Shaft Sealing | | | | | | | S |
| | Stainless Steel (Only Axial Exit Possible) | | | | | | | V |
| | Customized | | | | | | | C |
| Connection | Connector Axial, max. 21 bit | | | | | | | PAT |
| | Connector Radial, max. 21 bit ** | | | | | | | PRT |
| | 1m Cable Exit, Axial, max. 25 bit | | | | | | | CAW |
| | 1m Cable Exit, Radial, max. 25 bit ** | | | | | | | CRW |
| Options | | | | | | | | Number for Special Options |

Standard = Bold, Further Models on Request

All types UL-listed

* Total Resolution on connector exit max. 21 bit, on cable exit max. 25 bit

** Not available in Stainless Steel

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Accessories

| Description | | Type |
|------------------------|---|--------|
| Connector, Counterpart | Circular Connector, 26 pins | PAT |
| Cable for PAT | 28 x 0,14 mm ² + 2 x 1,5 mm ² | STK-30 |
| Shaft Coupling * | Diameter: 10 mm | GS 10 |
| | Diameter: 6 mm | GS 06 |
| Clamp Disc * | 4 pcs. / OCD | SP 15 |
| Clamp Ring * | 2 pcs. / OCD | SP H |
| Reducing Adapter ** | 15 mm to 14 mm (to ~0.551 in) | RR14 |
| | 15 mm to 12 mm (to ~0.472 in) | RR12 |
| | 15 mm to 10 mm (to ~0.394 in) | RR10 |
| | 15 mm to 8 mm (to ~0.315 in) | RR8 |

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.