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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 ∅
- Full or Hub Shaft: 6 or 10 mm ∅ / 15 mm ∅
- Max. 65536 Steps per Revolution (16 Bit)
- Max. 16384 Revolutions (14 Bit)
- Code: Binary
- UL Listed

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

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

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

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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	± ½ 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	≤ 30 gcm^2 (0.16 oz-in^2)			
Friction Torque	≤ 3 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)	≤ 100 g (Half Sine, 6 ms)			
Permanent Shock (EN 60028-2-29)	≤ 10 g (Half Sine, 16 ms)			
Vibration (EN 60068-2-6)	≤ 10 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)**	**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)	20 mm (~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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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)

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Interface

Configuration

The setting of the controlled node 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 cabeling 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

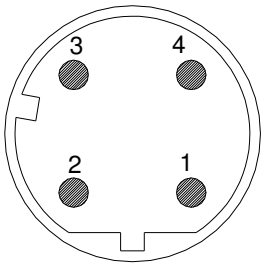
Pin Number	Signal
1	Tx +
2	Rx +
3	Tx -
4	Rx -

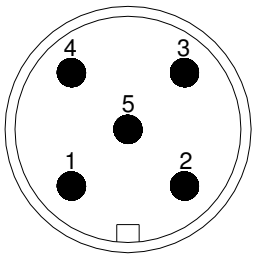
Connector Power Supply

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





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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.

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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.

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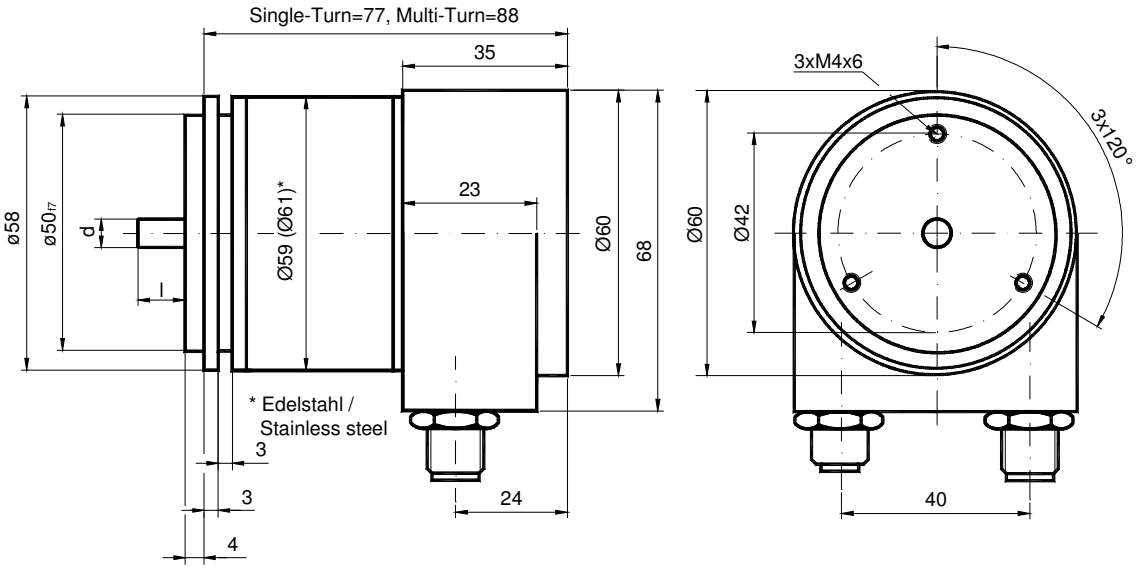
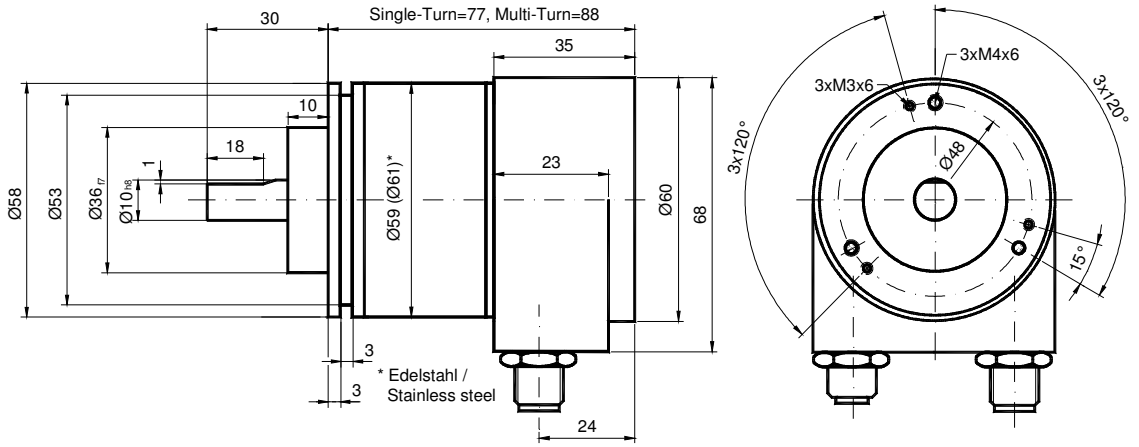
Mechanical Drawings (all dimensions in mm)

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)



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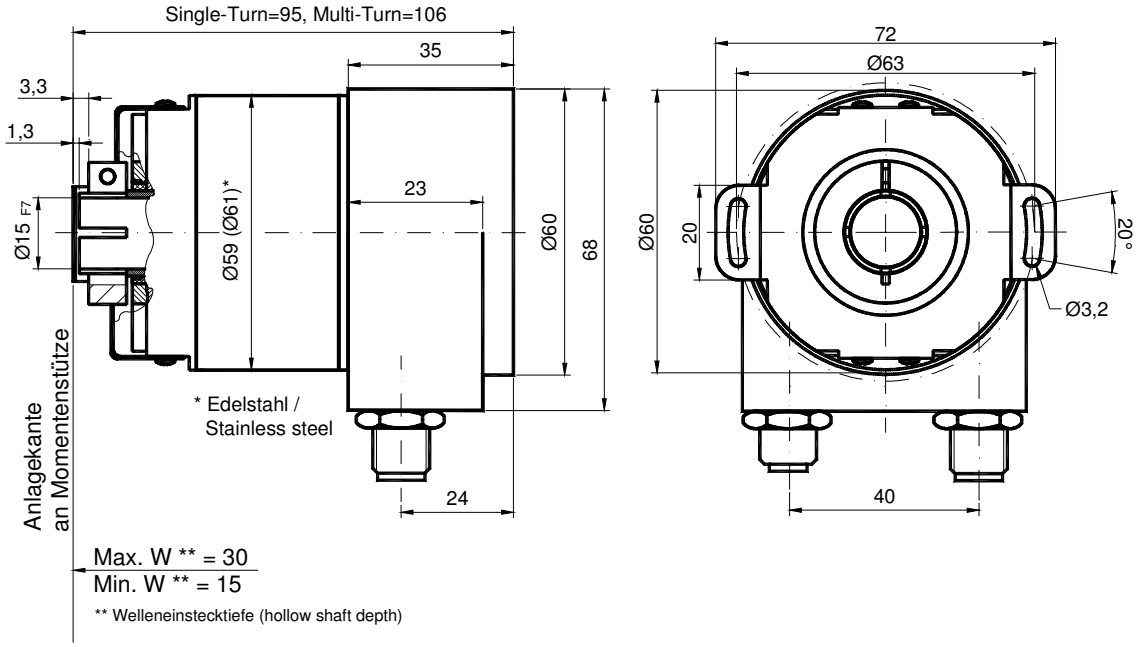
Hub shaft (B)



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).

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-**	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

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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.