

### ABSOLUTE OPTICAL ROTARY ENCODER SINGLETURN BIT PARALLEL



#### Main Features

- Compact and Heavy-Duty Industrial Model
- Interface: Bit Parallel, Push Pull, Short Circuit Proof
- Housing:  $\varnothing$  58 mm
- Shaft:  $\varnothing$  6 or 10 mm, hollow-  $\varnothing$  15 mm
- Resolution: Max. 16 Bit = 65,536 Steps per revolution
- Code: Gray / Binary
- EMC: EN61000-6-2, EN61000-6-4, CE

#### Mechanical Structure

- Aluminum Flange and Housing
- Stainless Steel Shaft
- Precision Ball Bearings with Sealing or Cover Rings
- Code Disc made of unbreakable and Durable Plastic

#### Applications

Sensing of

- Angles
- Distances
- Tracks
- Inclinations
- Differences between two or more Axes

#### Electrical Features

- Temperature insensitive
- IR-Opto-Receiver-ASIC with integrated Signal Conditioning
- Only one
- IR-Transmitter-Diode per Opto-ASIC
- Highly Integrated Circuit in SMD-Technology
- Polarity Inversion Protection
- Over-Voltage-Peak Protection

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## 1 Technical Data

### 1.1 Electrical Data

Outputs	Bit-parallel, push pull
Output level "high"	~ supply voltage (load dependent)
Output current	Max. 20 mA each channel
Internal cycle time	< 3 $\mu$ s
Step frequency LSB	Max. 200 kHz
Turn on time	< 1 s
Accuracy of division	$\pm \frac{1}{2}$ LSB (12 bit), $\pm 2$ LSB (16 bit)
EMC	Emitted interference: EN 61000-6-4, Noise immunity: EN 61000-6-2
Supply voltage	10 – 30 V DC (absolute limits) <sup>1</sup>
Current consumption	Max. 230 mA (10 V DC), max. 100 mA (24 V DC)
Electrical lifetime	> 10 <sup>5</sup> h
Connection	Connector or cable exit 1 meter

1) Supply voltage according to EN 50 178 (safety extra-low voltage)

### 1.2 Mechanical Data

Housing	Aluminum, optional stainless steel
Lifetime	see next table
Shaft loading	Axial 40 N, radial 110 N
Inertia of rotor	$\approx 30 \text{ gcm}^2$
Friction torque	$\leq 3 \text{ Ncm}$ (version without shaft sealing)
RPM (continuously)	Max. 12,000
Shock (EN 60068-2-27)	$\leq 100 \text{ g}$ (halfsine, 6 ms)
Permanent shock (EN 60068-2-29)	$\leq 10 \text{ g}$ (halfsine, 16 ms)
Vibration (EN 60068-2-6)	$\leq 10 \text{ g}$ (10 Hz – 2,000 Hz)
Weight, single-turn	$\approx 200 \text{ g}$ , $\approx 400 \text{ g}$ (stainless steel)

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#### 1.3 Flange

Flange	Synchro	Clamp	Hollow Shaft
Shaft diameter	Ø 6 mm / 10 mm	Ø 10 mm	Ø 15 mm
Shaft length or hollow shaft depth	10 mm / 20mm	20 mm	15 – 30 mm

#### 1.4 Minimal Live Cycle Mechanical

Flange group	Live cycle in 10 <sup>8</sup> turns on F <sub>a</sub> / F <sub>r</sub>		
	40 N / 60 N	40 N / 80 N	40 N / 110 N
C10 (Clamp flange Ø 10 x 20)	247	104	40
S10 (Synchro flange Ø 10 x 20)	262	110	42
S6 (Synchro flange Ø 6 x 10) without shaft sealing	822	347	133

S6 (Synchro flange ø6 x 10) with shaft sealing: maximal 20 N axial, 80 N radial

#### 1.5 Environmental Conditions

Operating temperature	-40 – +85°C <sup>1</sup>
Storage temperature	-40 – +85°C <sup>1</sup>
Humidity	98 % (without liquid state)
Protection Class (EN 60529)	Casing side: IP 65
	Shaft side: IP 64 (optional with shaft sealing: IP66)

1) Cable eXIT: -30 – +70 °C (stationary cable), -5 – +70°C (moving cable)

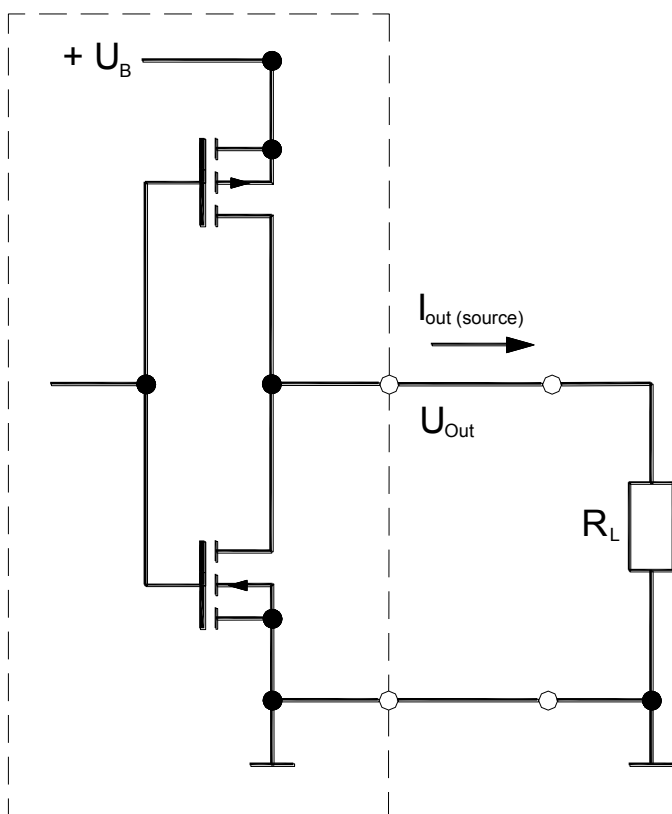
### ABSOLUTE OPTICAL ROTARY ENCODER SINGLETURN BIT PARALLEL

## 2 Interface

### Push Pull

Transmission	Data transmission via two transistors in push-pull circuit
Transfer	Transfer distance up to 50 m
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



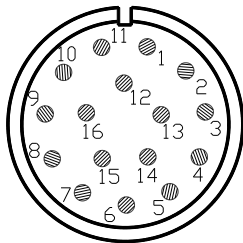
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#### 2.1 Electrical Interface

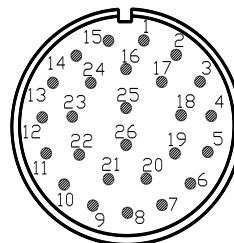
Signal	Cable	Round Connector Pin
Bit 1	white	1
Bit 2	brown	2
Bit 3	green	3
Bit 4	yellow	4
Bit 5	grey	5
Bit 6	pink	6
Bit 7	blue	7
Bit 8	red	8
Bit 9	black	9
Bit 10	violet	10
Bit 11	grey-pink	11

Signal	Cable	16 / 16 / 26 <sup>1</sup> pol. Connector Pin
Bit 12	blue-red	12
Bit 13	white-green	- / 13 / 13
Bit 14	brown-green	- / - / 14
Bit 15	white-yellow	- / - / 15
Bit 16	yellow-brown	- / - / 16
Preset (optional)	pink-brown	14 <sup>2</sup> / - / 22
Latch <sup>3</sup>	brown-blue	14 / - / 23
Complement	white-blue	13 / 14 / 24
+U <sub>b</sub> = 10-30 V	white-red	15 / 15 / 25
GND	brown-red	16 / 16 / 26

16 Pin Connector (male)



26 Pin Connector (male)



- 1) > 13 Bit
- 2) only for Graycode
- 3) only for binary or 26 pol. connector

COMPLEMENT-Eingang		Encoder counting direction at Clockwise rotation (as seen on shaft) Function
Function	Level	
Direction of rotation Switch time < 3 µs	0 (Eingang = offen <sup>1</sup> oder GND)	Direction of rotation
	1 (Eingang an + U <sub>b</sub> oder ≥ 4,5 V)	
Preset-Input (optional)		Function should not used during rotate the shaft
Function	Level	
Preset	0 (Eingang = offen <sup>1</sup> oder GND)	Preset
	1 (Eingang an + U <sub>b</sub> oder ≥ 4,5 V)	Set preset value to 0 (after 100 ms)
Latch-Input (optional)		Latch-Input Function
Function	Level	
Latch Latch time < 3 µs	0 (Eingang = offen <sup>1</sup> oder GND)	Latch
	1 (Eingang an + U <sub>b</sub> oder ≥ 4,5 V)	Latch time < 3 µs

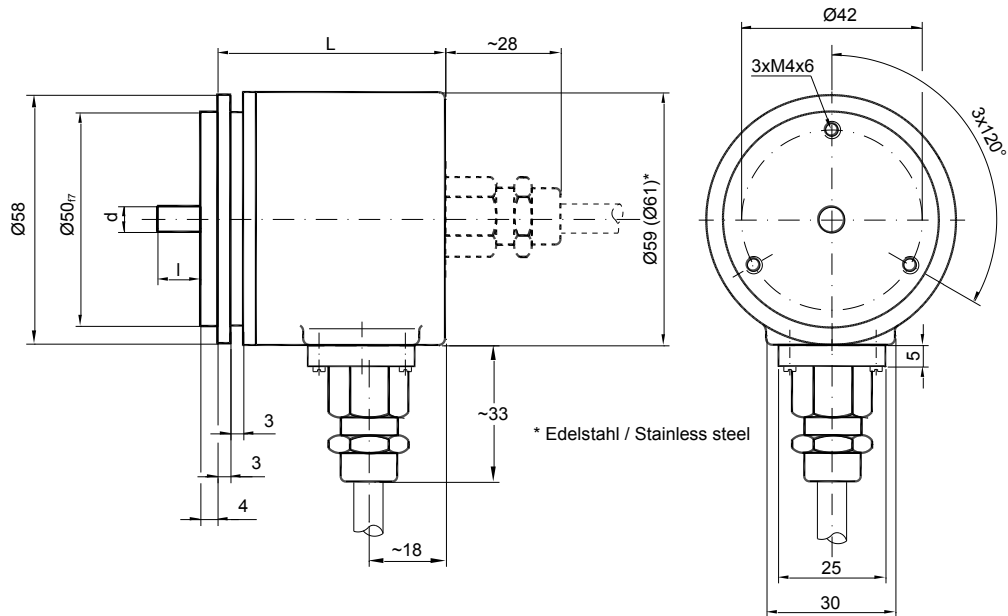
1) No ledge on connector disposed

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#### 3 Mechanical Drawings

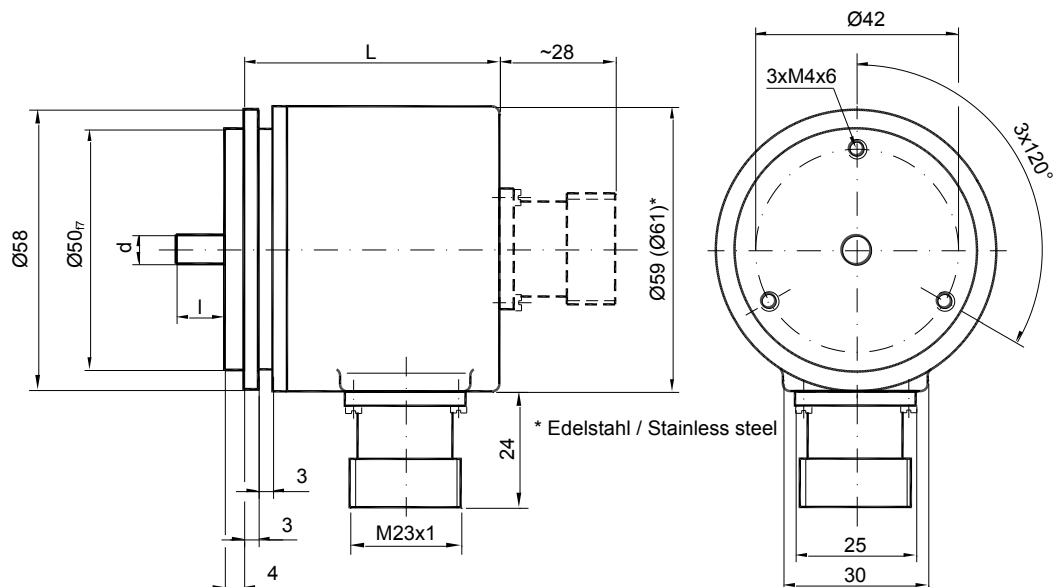
##### 3.1 Synchro Flange (S) (Two Version available)

Synchro Flange	d / mm	l / mm
Version S06	6 <sub>f6</sub>	10
Version S10	10 <sub>h8</sub>	20



		Parallel	Parallel Preset
Single-Turn	axial	42	53
	radial	53	53

Connector exit (for > 13 Bit only with M27x1 connector axial)









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**3.4 Mounting Instructions**

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

The diameter of the hollow shaft can be reduced to 12 mm, 10 mm or 8 mm by using an adapter (this

reducing adapter can be pushed into the hollow shaft). Allowed shaft movements of the drive element are listed in the table.

	Axial	Radial
Static	$\pm 0.3 \text{ mm}$	$\pm 0.5 \text{ mm}$
Dynamic	$\pm 0.1 \text{ mm}$	$\pm 0.2 \text{ mm}$

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#### 4 Ausführung / Bestellbezeichnung

Beschreibung	Typenschlüssel									
IXARC Optical	OCD-	--	A1	-	00	--	-	-	--	-
Interface Push Pull		<b>PP</b>								
Push Pull Preset		P1								
Version			<b>A1</b>							
Code	Gray			<b>G</b>						
	Binary			B						
Bits per Revolution	Singleturn				<b>00</b>					
Steps per Revolution	360 <sup>2</sup>					AA				
	4.096 (0,09°)					<b>12</b>				
	8.192 (0,04°)					13				
	65.536 (0,005°)					16				
Flange	Clamp flange						C			
	Synchro flange						S			
	Blind hollow shaft						B			
Shaft	10 mm							<b>10</b>		
	06 mm							<b>06</b>		
	15 mm (only for hollow shaft)							<b>15</b>		
Mechanical Options	Without								<b>0</b>	
	Shaft sealing								S	
	Stainless steel (only axial exit possible)								V	
	Customized								C	
Connection	Connector axial, < 14 bit									PAP
	Connector axial, > 13 bit									PAT
	Connector radial, max. 13 bit <sup>1</sup>									PRP
	1m cable exit, axial									CAW
	1m cable exit, radial <sup>1</sup>									CRW

Standard = **bold**, further models on request

1) Not in stainless version possible

2) Encoder length like Preset version

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#### 5 Accessories

Description		Type
Connector, counterpart	Circular connector, 16 pins	PAP
Connector, counterpart	Circular connector, 26 pins	PAT
Cable for PAP	12 x 2 x 0,14 mm <sup>2</sup>	STK-24
Cable for PAT	28 x 0,14 mm <sup>2</sup> + 2 x 1,5 mm <sup>2</sup>	STK-30
Shaft coupling <sup>1</sup>	Drilling: 10 mm	GS 10
	Drilling: 6 mm	GS 06
Clamp disc <sup>1</sup>	4 pcs. / AWC	SP 15
Clamp ring <sup>1</sup>	2 pcs. / AWC	SP H
Reducing adapter <sup>2</sup>	15 mm to 12 mm	RR12
Reducing adapter <sup>2</sup>	15 mm to 10 mm	RR10
Reducing adapter <sup>2</sup>	15 mm to 8 mm	RR8

1) Not for hollow shaft

2) Only for hollow shaft

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#### 6 Check Out Some of the Other POSITAL Products



##### **Absolute Magnetic Encoders for Industrial Environment**

To measure rotary movements or rotary displacements, an absolute magnetic rotary encoder can be used. The contact-free measuring sensor stage of the IXARC Magnetic Sensor does not have any abrasion. The Sensor can be connected directly to digital control

units via SSI, CANopen or Analog Interface.

[More Information](#)



##### **Heavy Duty Stainless steel Magnetic Encoders for the Toughest Environments**

Its stainless steel housing and high protection class of IP69K makes the IXARC Magnetic Heavy Duty rotary encoder resistant against active chemical cleaning and corrosion. Combined with the sturdy ball bearings this sensor is an ideal choice for reliable measurement under extreme environmental conditions and outdoor applications.

[More Information](#)



##### **Tilt Sensors to Measure Inclinations up to 360°**

TILTIX is developed on advanced MEMS technology based capacitance measurement. The sensor is a pre-calibrated device which can be put into immediate operation, upon simple and easy installation with a three point mount and setting of preset. Its compact design, installation “anywhere” and other versatile features makes it an ideal choice for very accurate measurement.

[More Information](#)

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**7 Disclaimer**

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