

ABSOLUTE ROTARY ENCODER SINGLE-TURN BIT PARALLEL



Main Features

- Compact and heavy-duty industrial model
- Interface: Bit-parallel, push pull
Short circuit proof
- Housing: 58 mm Ø
- Shaft: 6 or 10 mm Ø, hollow- 15 mm Ø
- Resolution: Max. 16 Bit = 65,536 steps per revolution
- Code: Gray / Binary
- EMC: EN61000-6-2, EN61000-6-4, CE

Applications

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

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

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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Technical Data

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 μ s
Step frequency LSB	Max. 200 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. 230 mA (10 V DC), max. 100 mA (24 V DC)
Electrical lifetime	> 10 ⁵ h
Connection	Connector or cable exit 1 meter

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

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 60028-2-29)	$\leq 10 \text{ g}$ (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)		
Flange	Synchro	Clamp	Hollow shaft
Shaft diameter	$\varnothing 6 \text{ mm}$ / $\varnothing 10 \text{ mm}$	$\varnothing 10 \text{ mm}$	$\varnothing 15 \text{ mm}$
Shaft length or hollow shaft depth	10 mm / 20mm	20 mm	15 – 30 mm

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Minimal live cycle mechanical

Flange group	Live cycle in 10^8 turns on F_a / F_r		
	40 N / 60 N	40 N / 80 N	40 N / 110 N
C10 (Clamp flange $\varnothing 10 \times 20$)	247	104	40
S10 (Synchro flange $\varnothing 10 \times 20$)	262	110	42
S6 (Synchro flange $\varnothing 6 \times 10$) without shaft sealing	822	347	133

S6 (Synchro flange $\varnothing 6 \times 10$) with shaft sealing: maximal 20 N axial, 80 N radial

Environmental Conditions

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

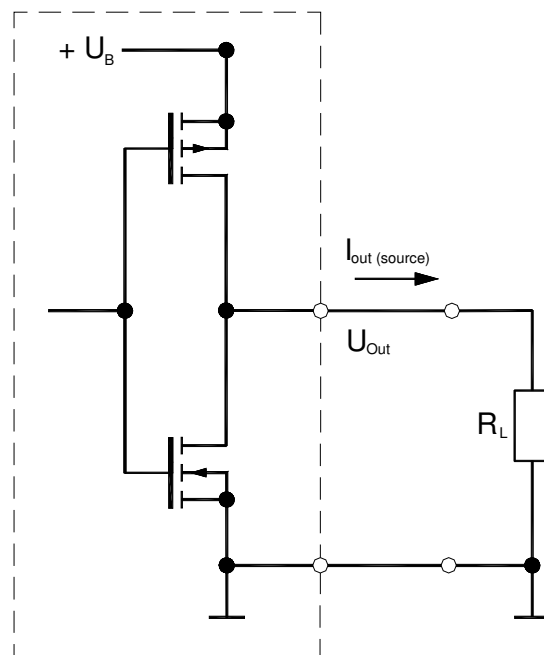
* Cable exit: -30 ... + 70 °C (stationary cable), -5 ... + 70 °C (moving cable)

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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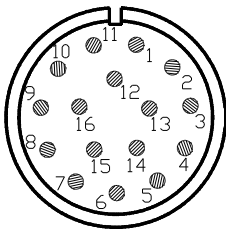
Electrical Interface

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

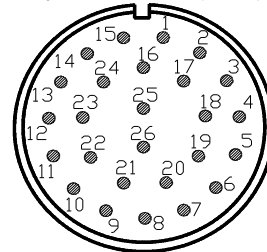
Signal	cable	16 / 16 / 26* pol. Connector Pin
Bit 12	blue-red	12
Bit 13	white-green	- / - / 13
Bit 14	brown-green	- / - / 14
Bit 15	white-yellow	- / - / 15
Bit 16	yellow-brown	- / - / 16
Preset (optional)	pink-brown	14** / - / 22
Latch ***	brown-blue	14 / - / 23
Complement	white-blue	13 / 14 / 24
+U _b = 10-30 V	white-red	15 / 15 / 25
GND	brown-red	16 / 16 / 26

* > 13 Bit ** only for Graycode, ***(only for binary or 26 pol. connector)

16 pin connector (male)



26 pin connector (male)



COMPLEMENT-Input		Encoder counting direction at clockwise rotation (as seen on shaft) Function
Function	Level	
Direction of rotation	0 (Input = N.C.* or GND)	Direction of rotation
Switch time < 3 μs	1 (Input to + U _b or ≥ 4.5 V)	
Preset-Input (optional)		Function should not used during rotate the shaft
Function	Level	
Preset	0 (Input = N.C.* or GND)	
	1 (Input to + U _b or ≥ 4.5 V)	Set preset value to 0 (after 100 ms)
Latch-Input (optional)		Latch-Input Function
Function	Level	
Latch	0 (Input = N.C.* or GND)	
Latch time < 3 μs	1 (Input to + U _b or ≥ 4.5 V)	Latch time < 3 μs

* no ledge on connector disposed

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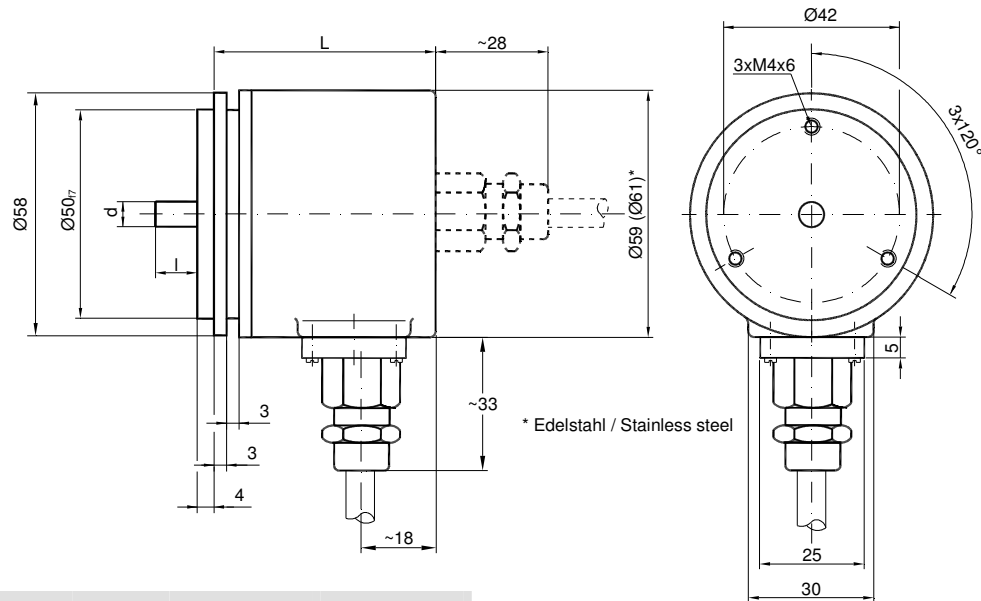
Mechanical Drawings

Synchro Flange

Two versions available

Cable Exit (~ \varnothing 10 mm)

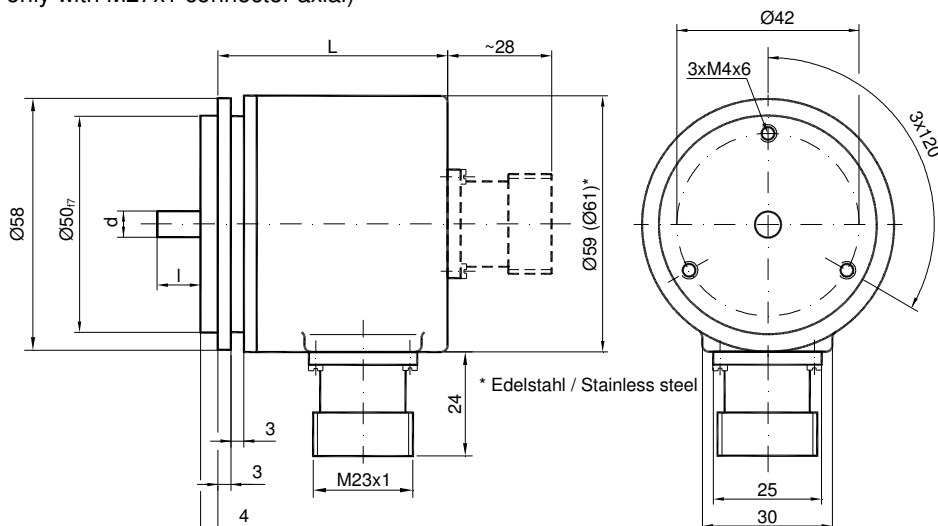
Synchro flange	d [mm]	l [mm]
Version S06	$\varnothing 6_{f6}$	10
Version S10	$\varnothing 10_{h8}$	20



		L	
		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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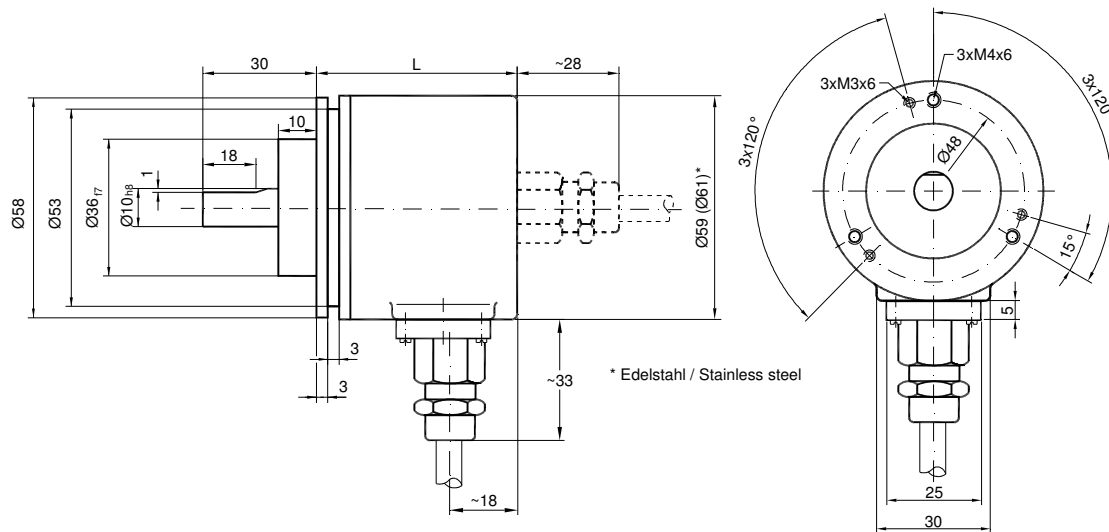
Web: www.kindele.com

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Mechanical Drawings

Clamp flange

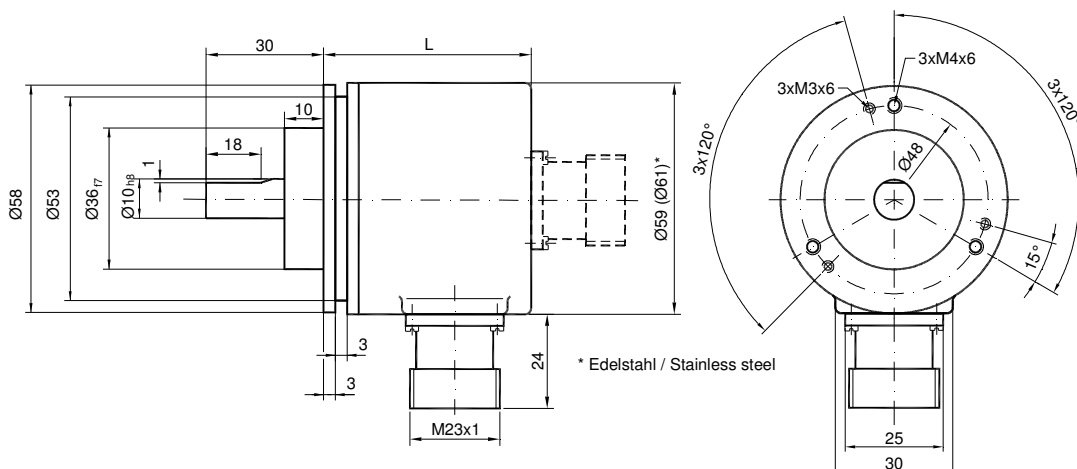
Cable Exit (~ \varnothing 10 mm)



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

Connector exit

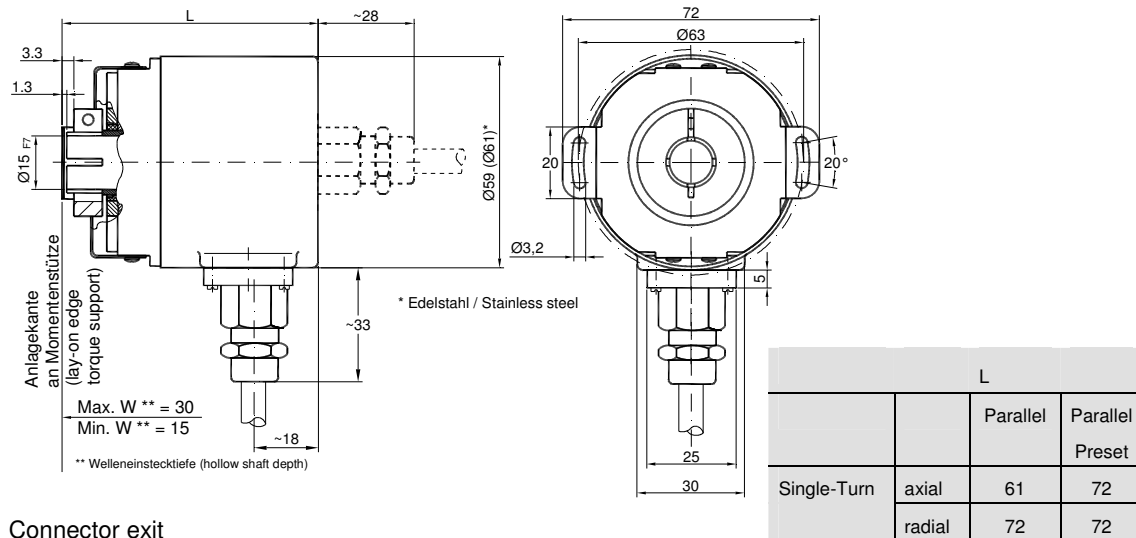
(for > 13 Bit only with M27x1 axial connector)



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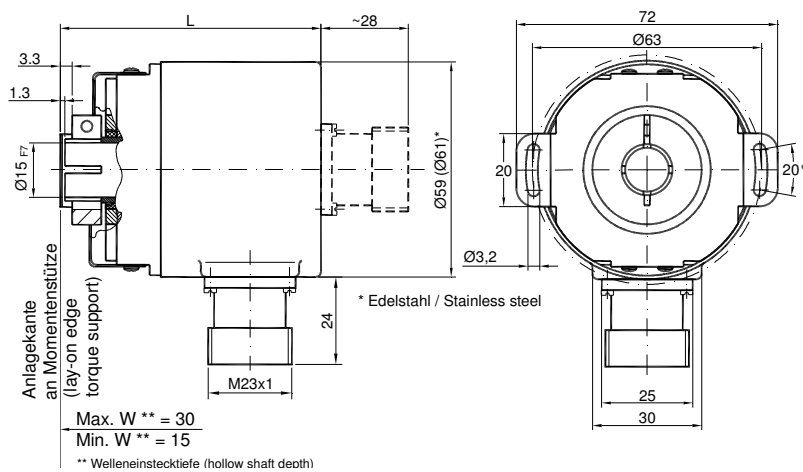
Hollow Shaft (H)

Cable Exit (~ \varnothing 10 mm)



Connector exit

(for > 13 Bit only with M27x1 axial connector)



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	± 0.3 mm	± 0.5 mm
dynamic	± 0.1 mm	± 0.2 mm

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Models / Ordering Description

Description	Type Key				
Interface push pull	PP				
push pull preset	P1				
Version	A1				
Code	Gray	G			
	Binary	B			
Bits for revolutions	Singleturn	00			
Steps per revolution	360**		AA		
	4,096 (0.09°)		12		
	8,192 (0.04°)		13		
	65,536 (0.005°)		16		
Flange	Clamp flange		C		
	Synchro flange		S		
	Blind hollow shaft		B		
Shaft	ø10 mm		10		
	ø06 mm		06		
	ø15 mm (only for hollow shaft)		15		
Mechanical options	Without		0		
	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 *				PRP
	1m cable exit, axial				CAW
	1m cable exit, radial *				CRW
Options	number for special options				

Standard = bold, further models on request

* not in stainless version possible

** encoder length like Preset version