POSITAL

IXARC ABSOLUTE ROTARY ENCODER

CANopen Safety

Specifications

- For use in stationary and mobile machines and systems, particularly for wind turbines, power plants, cranes, etc.
- Interface CANopen Safety
- Resolution up to 8192 steps/revolution (13 bit)
- Absolute multiturn
- Measuring range: 4096 revolution (12 Bit)
- Speed value in digits/ms with variable gate time
- Protection class IP67
- Parameterisable via CANopen
- SIL 2 and Perfomancel Level PL d certified
- Safety sosition and speed value

Design

- Robust housing manufactured from seawater-proof aluminium (AlMgSi1) or stainless steel (material: 1.4305 optionally 1.4404).
- Shaft fitted with ball bearings bears the magnet for recording the angular position and the multiturn gearing module for absolute revolution measurement.
- Shaft and transmission are located in the prechamber. Sealed off from this, the main chamber contains all electronic components for position recording, evaluation and output.
- Position recording and evaluation are of a redundant design to implement a reliable position value.
- A DC/DC module with transient filtering, voltage supply and output driver unit form the electrical interface.
- Electrical connection via two M12X1 connectors, a-coded, 5-pin, pin and socket for Bus-In / Bus-Out.

Function

A mechanical positive locking between the customer and sensor shaft ensures that the sensor shaft magnet precisely reflects the customer shaft's rotations. With the run-down absolute gear box, the rotary encoder achieves a measuring range of up to 4096 revolutions. Two autonomously operating, redundant sensor units measure the angular position and the revolutions of the customer's shaft. A sensor unit consists of angular position and revolution sensors, an interpolator and a microcontroller. In each unit, the signals of the angular position and the revolution sensors are comprised to form a consistent position value. Sampling errors are evaluated.
A further microcontroller compares the position values of both sensor units with each other, evaluates any error messages and then forwards the validated position values to the CAN interface.
The CAN interface outputs the validated position values via the CANopen Safety protocol within an SRDO (Safety Relevant Data Object) using two messages (normal and inverted).
The rotary encoder meets the conditions of safety level SIL 2 according to IEC 61508.

IXARC ABSOLUTE ROTARY ENCODER

Technical Data

Mechanical Data

Operating speed	1,000 min^{-1} rpm (option 2000 rpm)
Angular acceleration	10^5 rad/s^2 max.
Moment of inertia (shaft)	20 gcm^2
Operating torque	≤ 8 Ncm (at speed 500 rpm)
Starting torque	≤ 4 Ncm
Perm. shaft load	250 N axial 250 N radial
Bearing service life	10^9 revolutions
Weight	Approx. 0.7 kg

Electrical Data

Sensor system	ASIC with HALL elements
Operating voltage range	+9 VDC bis + 36 VDC
Power consumption	<2,5 W
Resolution	4096 steps / revolution (12 bit) bzw. 8192 steps / revolution (13 bit)
Measuring range	4096 revolution
Absolute accuracy	±0.25 % / revolution
Temperature drift	±0.02; -40 °C bis 85 °C
Output code	Binary
Code path	CW / CCW, parameterisable
Reference value	0 - (total No. of steps -1)
Overvoltage protection and galvanic separation	power supply - CANopen - housing
CAN interface	acc. to ISO/DIS 11898
Address setting	Via LMT / LSS
Terminating resistor	external
EMC standards: Interference emission Interference immunity	 acc. to EN 61000-6-4 acc. to EN 61000-6-2
Electrical connection	1 x connector M12 2 x Steck connector er M12, integrated T-coupler
CAN IC voltage rating	Maximum common mode voltage -7 to +12 V Maximum allowed voltage at pins ± 36 V
Electrical supply circuit	Reverse battery protection and protection against too high volage

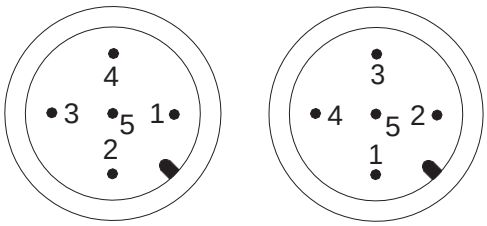
Environmental Data

Operating temperature range	-40 °C to +85 °C
Maximum relative humidity	100%
Resistance	Shock: 250 m/s², 6 ms, (DIN EN 60068-2-27) Vibration: 100 m/s², 5 Hz ... 2000 Hz, (DIN EN 60068-2-6)
Protection type	IP67, optional IP69K (Cable oder special connector M12) (DIN EN 60529)

System in General and Safety

Power on time due to power supply coming up	500 ms (10 % bis 90 %)
Rate of messages	up to 10,000 messages / s
Time of storage cycles	3 s per storage cycle
Setup Time	~ 2 s @ T ≥ +20° C > 20 s @ T ≤ -30° C
Time between error recognition and alarm (emergency message)	100 ms (power supply) 5 s (RAM test, single bit error) 2 s (ROM test during setup time)
Number of certificate	Certificate expired November 2019. User is responsible for integration in safety related application! FRABA GmbH does not overtake any responsibility for the usage of the product in safety related applications.
Safety-norms	EN 51508, 1 - 7: 2010 EN 62061: 2005 EN ISO 13849-1: 2008 EN 60947-5-1: 2004 + A1: 2009
Maximum service life	20 years

Pin Assignment CANopen M12 Stecker



female male

Pin	Function for standard version
1	CAN GND
2	Operating voltage $+U_B$
3	Operating voltage $-U_B$
4	CAN_H
5	CAN_L

Safety-Parameters

Norm EN 13849-1:2008

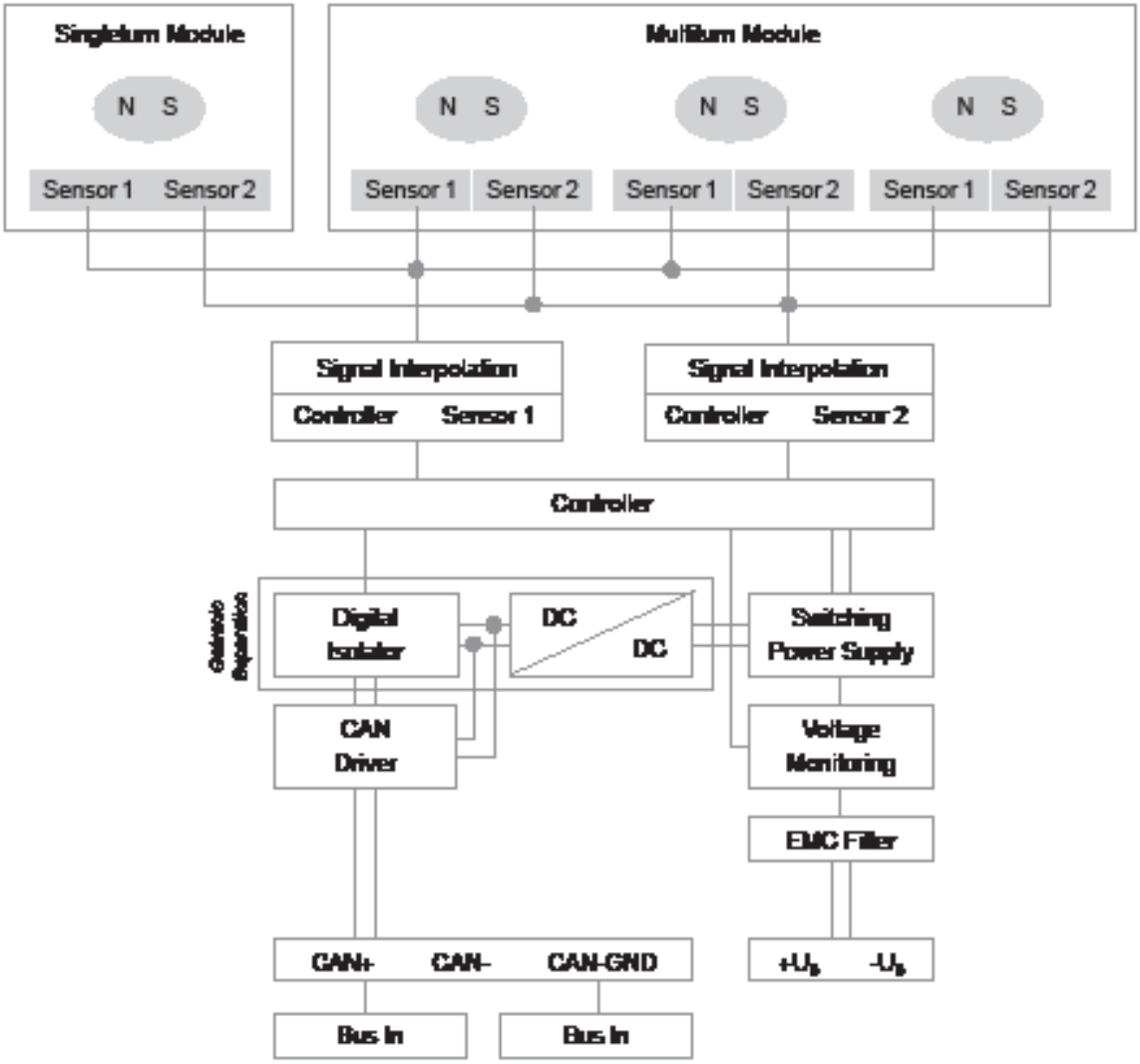
Category	2
MTTFd (years):	151
CCF:	fulfilled
DC [%]:	91.7
PL:	d

Norm EN 61508:2010 and EN 62061

HFT	0
T1[s]:	8760
SFF [%]	95.1
PFH [1/h]:	6.24×10^{-8}
SIL	2

Electrical Connection

Block Circuit Diagram



IXARC ABSOLUTE ROTARY ENCODER

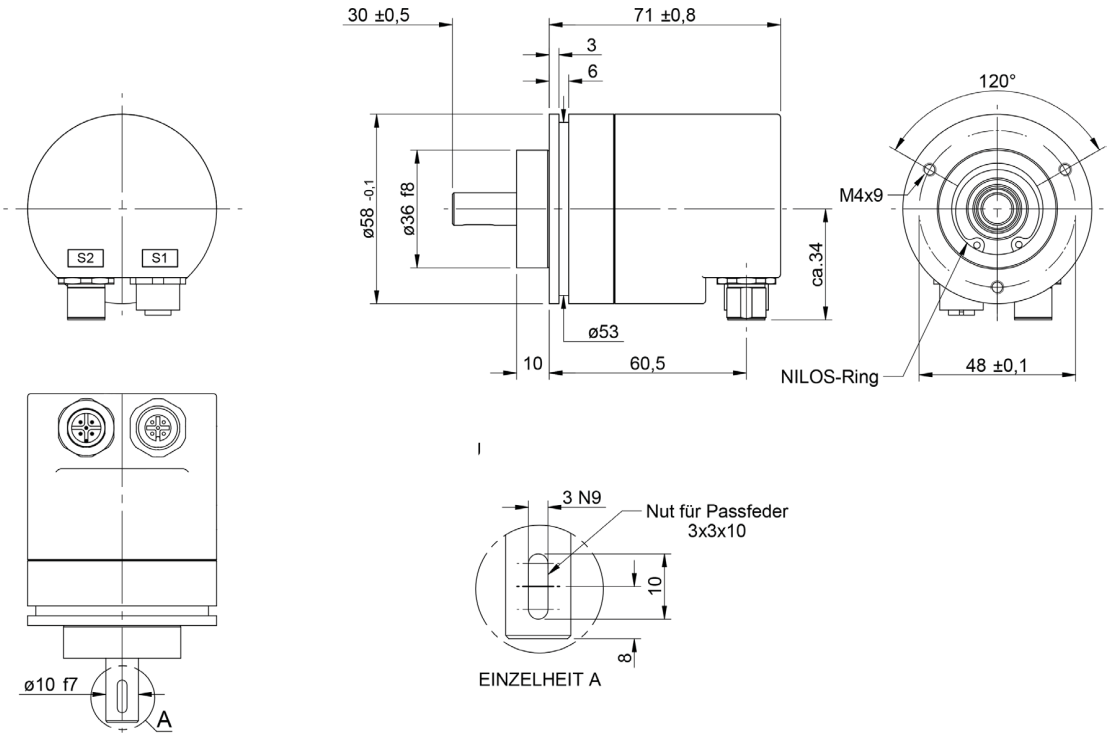
Product Selection Guide

Ordering Description

IXARC Safety	**MCS-**	**CS-**	**D**	**2**	**B-**	**12**	**__-**	**___**	**_-**	**___**	
Interface	CANopen Safety	**CS**									
Performance Level	PLd		**D**								
Version				**2**							
Code	Binary				**B**						
Revolutions (bits)	Multiturn (4096 revolutions)					**12**					
Steps per revolution (bits)	4096 (0.09°)						**12**				
	8192 (0.04°)						**13**				
Flange / Shaft Diameter	Clamp flange, Shaft Ø10mm with flat							**A0L**			
	Clamp flange, Shaft Ø10mm with keyway							**AKL**			
	Synchro flange, Shaft Ø6mm with flat							**60Y**			
	Blind hollow shaft, Shaft Ø12mm for key shaft							**1H2**			
Material	Aluminium								**S**		
	Stainless steel V2A								**V**		
	Stainless steel V4A (1.4404)								**W**		
Connection	Aligned M12 connectors									**PRM**	
	2 x radial M12 connector									**PRN**	
	Axial M12 connector									**PAM**	
	2 x axial M12 connectors									**PAN**	

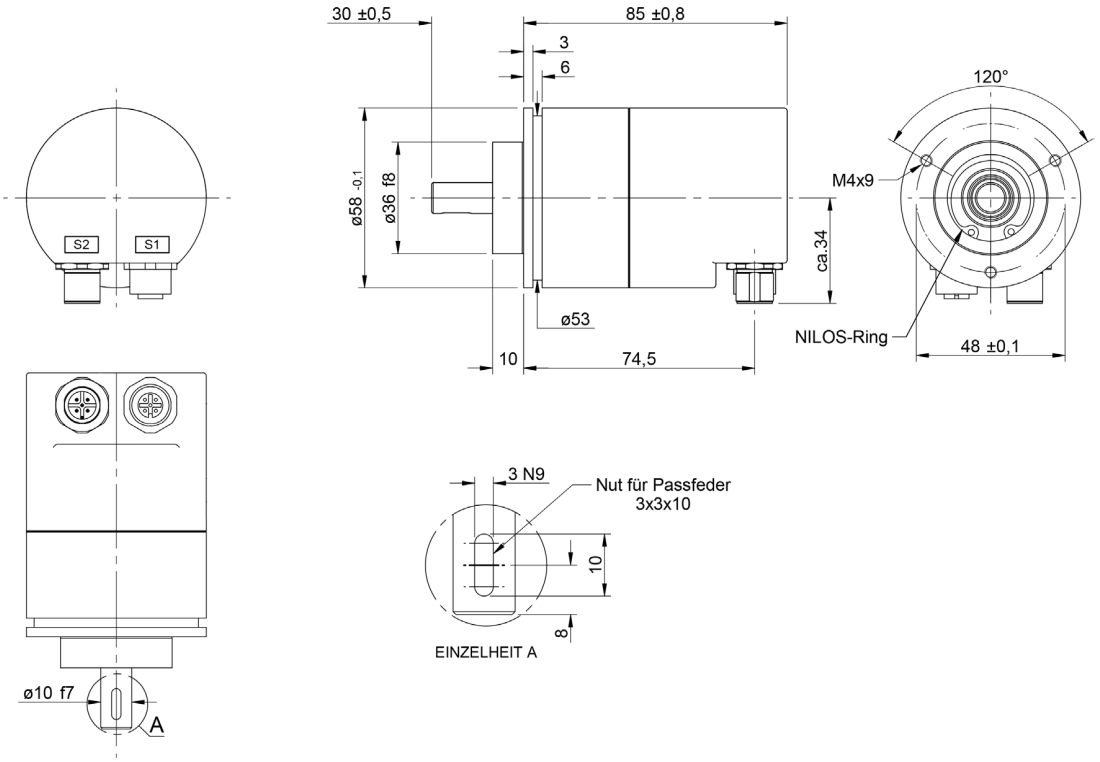
Dimensional Drawings

- **58 mm housing with clamp flange**
- **Type key: MCS-CSD2B-001x-AKLx-PRN, x as place holder**
- **Shaft Ø10 mm with parallel key**
- **Singleturn**



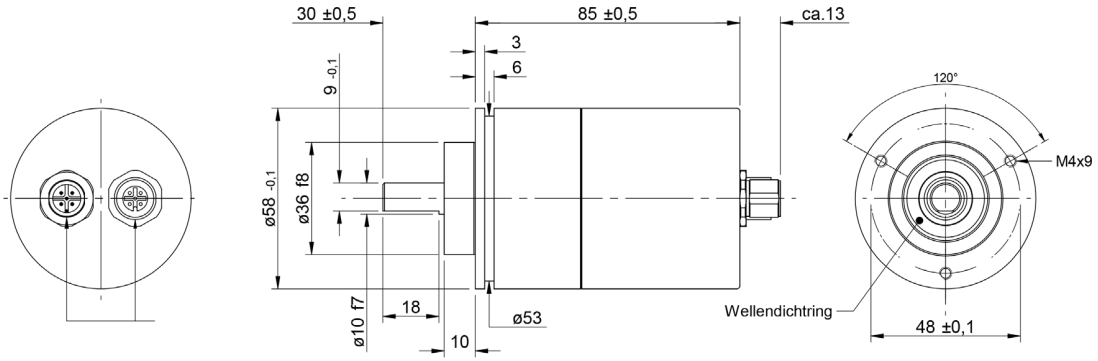
IXARC ABSOLUTE ROTARY ENCODER

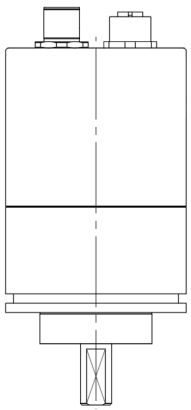
- **58 mm housing with clamp flange**
- **Type key: MCS-CSD2B-121x-AKLS-PRN, x as place holder**
- **Shaft Ø10 mm with parallel key**
- **Multiturn**



IXARC ABSOLUTE ROTARY ENCODER

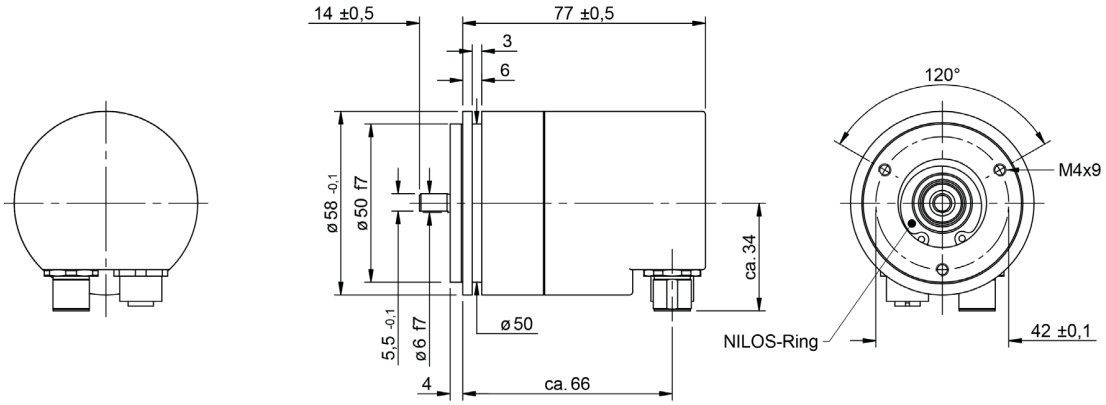
- **58 mm housing with clamp flange**
- **Type key: MCS-CSD2B-xx1x-A0Lx-PAN, x as place holder**
- **Shaft Ø10 mm with flat**
- **Multiturn**

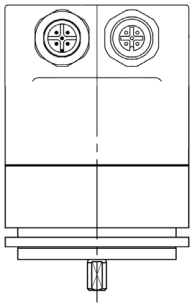




IXARC ABSOLUTE ROTARY ENCODER

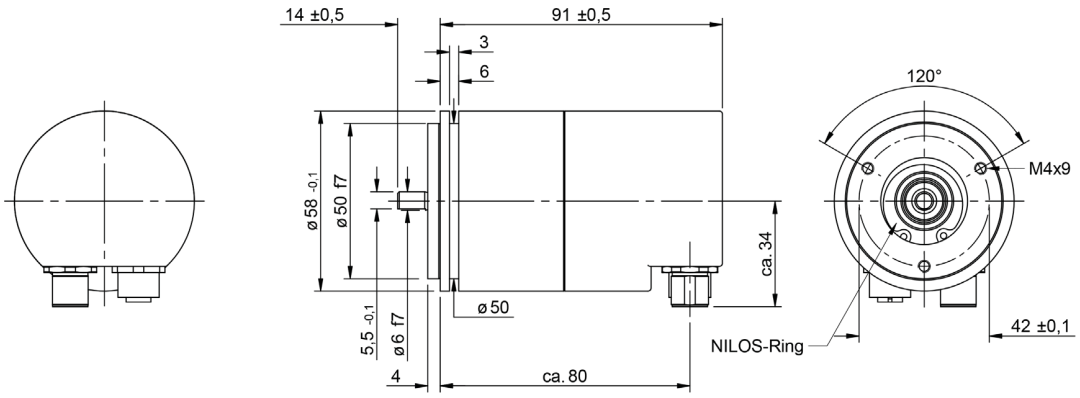
- **58 mm housing with synchro flange**
- **Type key: MCS-CSD2B-001x-60Yx-PRN, x as place holder**
- **Shaft Ø6 mm with flat**
- **Singleturn**

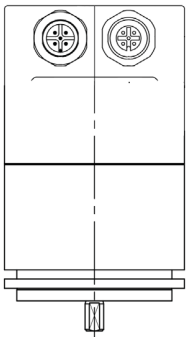




IXARC ABSOLUTE ROTARY ENCODER

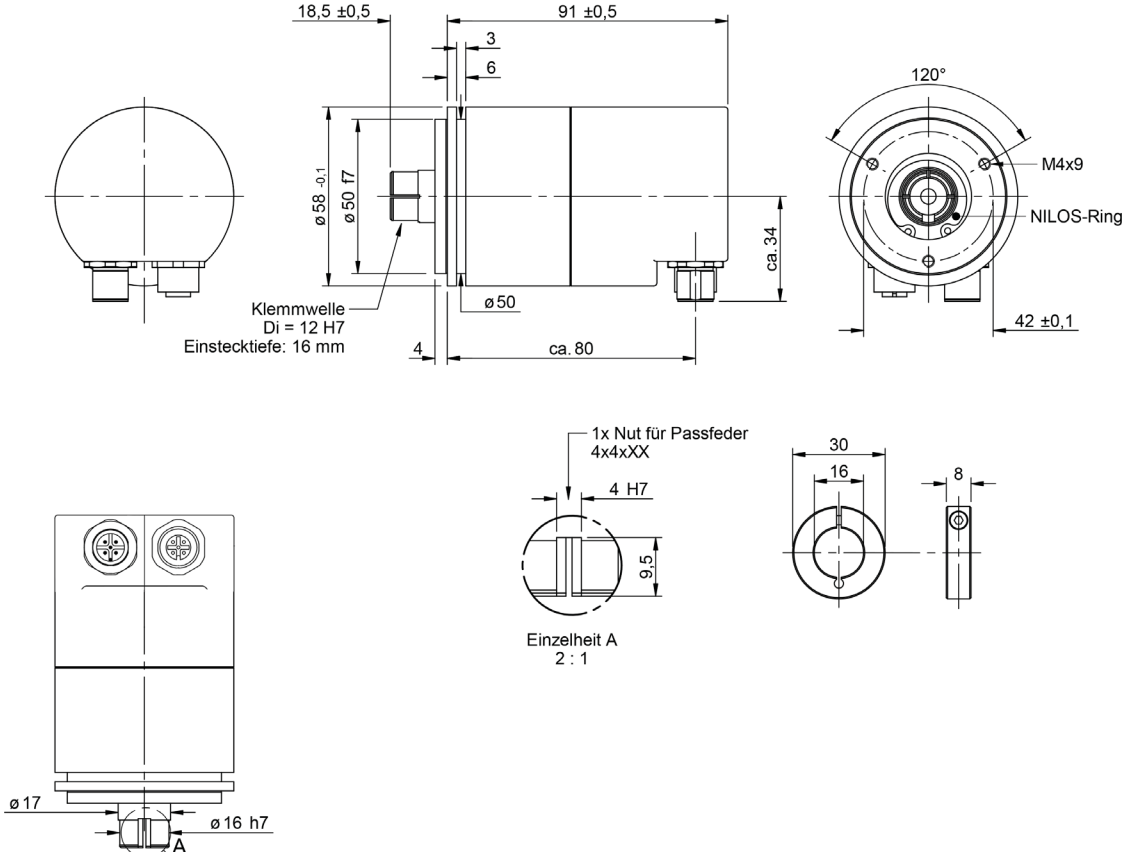
- **58 mm housing with synchro flange**
- **Type key: MCS-CSD2B-121x-60Yx-PRN, x as place holder**
- **Shaft Ø6 mm with flat**
- **Multiturn**





IXARC ABSOLUTE ROTARY ENCODER

- **58 mm housing with hollow shaft**
- **Type key: MCS-CSD2B-121x-1H2x-PRN, x as place holder**
- **Hollow shaft Ø12 mm**
- **Multiturn**



The picture and drawing are for general presentation purposes only. Please refer to the "Download" section at **www.posital.com** for detailed technical drawings. All dimension in [inch] mm.

Contact

America
FRABA Inc.
1 N Johnston Ave, Ste C238
Hamilton, NJ 08609 2020, USA
T +1 609 750-8705
www.posital.com, info@posital.com

Europe
FRABA GmbH
Zeppelinstraße 2
50667 Cologne, Germany
T +49 221 96213-0, F +49 221 96213-20
www.posital.com, info@posital.eu

Asia
FRABA Pte. Ltd.
30 Kallang Place, #04-16/17
Singapore 339159
T +65 6514 8880, F +65 6271 1792
www.posital.com, info@posital.sg

Disclaimer