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ABSOLUTE IXARC ROTARY ENCODER
CANOPEN INTERFACE

CANopen

Main Features

- Compact and heavy duty industrial design
- Interface: CANopen / CAN
- Housing: 58 mm ∅
- Solid / hollow shaft: 6 or 10 mm ∅ / 15 mm ∅
- Through hollow shaft: 12 mm ∅
- Max. 65536 steps per revolution (16 Bit)
- Max. 16384 revolutions (14 Bit)
- Velocity and acceleration output

Mechanical Structure

- Aluminium flange and housing
- Stainless steel shaft
- Optional: stainless steel flange / housing
- Precision ball bearings with sealing or cover rings
- Code disc made of unbreakable and durable plastic

Software Features

- Direction of rotation (complement)
- Resolution per revolution
- Total resolution
- Preset value
- Two limit switches and eight cams
- Baud rate and CAN-identifier
- Transmission mode: polled mode, cyclic mode, sync mode, LSS

Electrical Features

- Temperature insensitive IR-opto-receiver-asic with integrated signal conditioning
- Connection cap: Status indication with two LEDs
- Highly integrated circuit in SMD-technology
- Polarity inversion protection
- Over-voltage-peak protection

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Technical Data

Electrical Data

Interface	Transceiver according ISO 11898, galvanically isolated by opto-couplers
Transmission rate	max. 1 MBaud
Device addressing	Programmable via SDO telegrams Encoder with Connection Cap (0CC): Additional adjustable by rotary switches in connection cap
Supply voltage	10 – 30* V DC (absolute limits)
Current consumption	Multiturn: max. 230 mA with 10 V DC, max. 100 mA with 24 V DC
	Singleturn: max. 100 mA with 10 V DC, max. 60 mA with 24 V DC
Power consumption	max. 2.5 Watts
Step frequency LSB	800 kHz
Accuracy of division	$\pm$ ½ LSB (12 bit), ± 2 LSB (16 bit)
EMC	Emitted interference: EN 61000-6-4
	Noise immunity: EN 61000-6-2
Electrical lifetime	> 10^5 h

*Absolute rotary encoders should be connected only to subsequent electronics whose power supplies comply with EN 50178 (protective low voltage)

Mechanical Data

Housing	Aluminium, optional stainless steel
Lifetime	Dependent on shaft version and shaft loading – refer to table
Max. shaft loading	Axial 40 N, radial 110 N
Inertia of rotor	$\leq$ 30 gcm^2
Friction torque	$\leq$ 3 Ncm (without shaft sealing)
RPM (continuous operation)	Singleturn: max. 12,000 RPM
	Multiturn: max. 6,000 RPM
Shock (EN 60068-2-27)	$\leq$ 100 g (half sine, 6 ms)
Permanent shock (EN 60068-2-29)	$\leq$ 10 g (half sine, 16 ms)
Vibration (EN 60068-2-6)	$\leq$ 10 g (10 Hz ... 2000 Hz) $\leq$ 10 g (10 Hz ... 1,000 Hz) (with Connection Cap)
Weight (standard version)	Singleturn: $\approx$ 300 g Multiturn: $\approx$ 400 g
Weight (with connection cap)	Singleturn: $\approx$ 500 g Multiturn: $\approx$ 700 g

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Weight (stainless steel version)	Singleturn:	$\approx$ 400 g
	Multiturn:	$\approx$ 500 g
Weight (stainless steel version with connection cap)	Singleturn:	$\approx$ 1,100 g
	Multiturn:	$\approx$ 1,200 g

Flange	Synchro (S)		Clamp (C)	Hollow shaft (B)
Shaft diameter	6 mm	10 mm	10 mm	15 mm
Shaft length	10 mm	20mm	20 mm	-
Hollow shaft depth min. / max.	-	-	-	15 mm / 30 mm

Minimum (Mechanical) Lifetime

Flange	Lifetime in 10^8 revolutions with F_a / F_r		
	40 N / 60 N	40 N / 80 N	40 N / 110 N
C10 (Clamp flange 10 x 20)	247	104	40
S10 (Synchro flange 10 x 20)	262	110	42
S06 (Synchro flange 6 x 10) without shaft sealing*	822	347	133

*S06 (Synchro flange 6 x 10) with shaft sealing: max. 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
	Casing side: IP 54 (Connector exit axial 9 pin D-Sub)
	Shaft side: IP 64 (optional with shaft sealing: IP66)
Heavy Duty Protection class (EN 60529)	Casing side: IP 67
	Shaft side: IP 66

* Cable exit: -30 … + 70 °C (static), -5 … + 70 °C (flexing)

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Conformity

UL International	-For use in NFPA 79 Applications only -Adapters providing field wiring means are available from the manufacturer. Refer to manufacturers information.
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Interface

Configuration

The standard configuration of the encoder is: node number 32 and baud rate 20KBaud. For adapting the encoder for a respective application the customer could use SDO telegrams. Valid baud rate range is 20 kBaud up to 1MBaud and for the node number from 0 to 89.

Remark: The encoder adds internal 1 to the adjusted device address.

Electrical Interface

There are various electrical connecting options like 5 pin M12 connector. The encoder can be connected in the following versions:

- 5 pin M12 male connector and one 5 pin M12 male
- 5 pin M12 connector and venting element
- 9 pin D-Sub connector or cable exit (not available for Heavy Duty version)

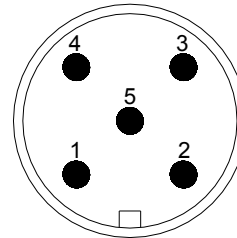| Signal	9 pin D-Sub (Not available for HD-version and radial exit)	5 pin M12	open cable
	Pin	Pin	
(CAN Ground)	3	1	green
24 V power supply	9	2	white
0 V power supply	6	3	brown
CAN High	7	4	yellow
CAN Low	2	5	pink

**Bus In**
9 pin D-Sub connector
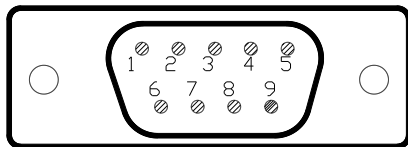
Bus In
5 pin M12 connector male

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Installation connection cap

The rotary encoder is connected with two or three cables depending on whether the power supply is integrated into the bus cable or connected separately. If the power supply is integrated into the bus cable, one of the cable glands can be fitted with a plug. The cable glands are suitable for cable diameters from 6.5 up to 9 mm.
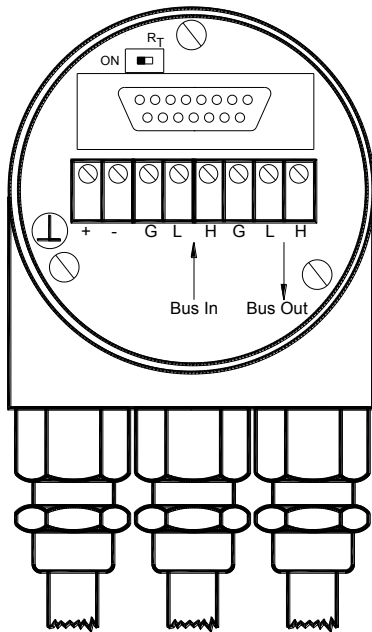
Configuration connection cap

The setting of the node number is achieved by 2 turn-switches in the connection cap. Possible addresses lie between 0 and 89 whereby every address can only be used once. **Inside the encoder the defined address is increased by one.** The connection cap can easily be opened for installation by removing the two cap screws.
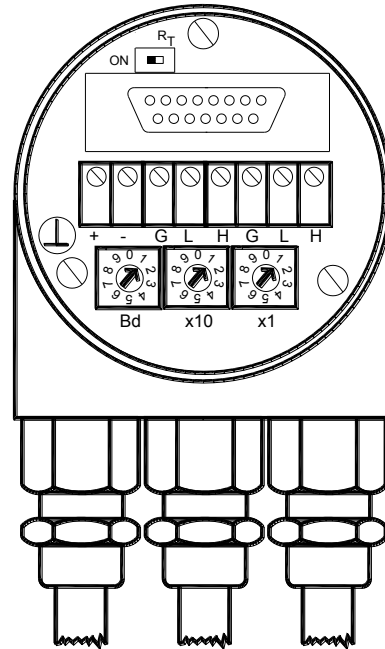
Clamp		Description	
⊥		Ground	
+		10..30 V Supply voltage	
-		0 V Supply voltage	
G	(left)	CAN Ground	(Bus In)
L	(left)	CAN Low	(Bus In)
H	(left)	CAN High	(Bus In)
G	(right)	CAN Ground	(Bus Out)
L	(right)	CAN Low	(Bus Out)
H	(right)	CAN High	(Bus Out)

A termination resistor is integrated in the connection cap. The resistor must be switched on if the encoder is connected at the end or at the beginning of the bus. Separation of Bus In and Bus Out signals if termination resistor is activated.
Resistor:

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Connection Cap with Round Connector

This connection cap type has one or two 5 pin round connectors in M12 version. All other cable glands are replaced by blind caps.

Following table indicates pinning of the micro style connector:

Bus In

5 pin circular connector M12
Pinning (Male)

Bus Out

5 pin circular connector M12
Pinning (Female)

Pin number	Signal
1	(CAN Ground)
2	10..30 V Supply voltage
3	0 V Supply voltage
4	CAN High
5	CAN Low

Diagnostic connection cap

Two LEDs on the backside of the connection cap show the operating status of the encoder.

This can be very useful for installing and setting-up the encoder

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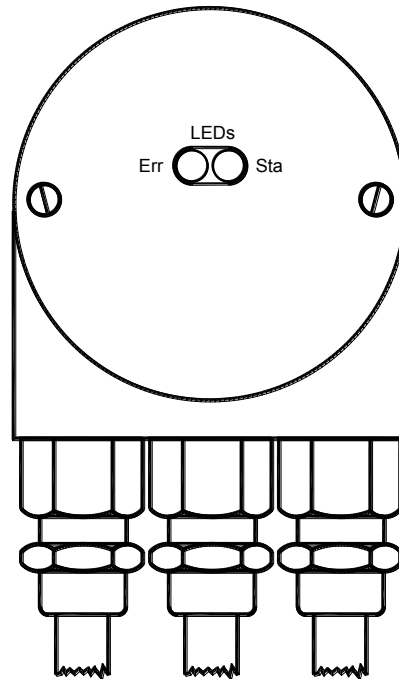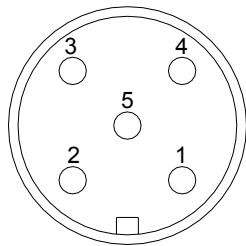
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Programmable Encoder - Parameter

Operating Parameters	This parameter determines the counting direction, in which the output code increases or decreases. As an important operating parameter the code sequence (complement) can be programmed.
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. If the encoder is used in a continuous measuring application, certain rules for the setting of this parameter must be followed. These rules are outlined in the manual.
Preset Value	The preset value is the desired position value, which should be reached at a certain physical position of the axis. The position value is set to the desired process value by the parameter pre-set.
Limit Switch, Min. and Max.	Two position values can be programmed as limit switches. By reaching these values one bit of the 32-bit process value is set to high.
Cam	Eight position values can be programmed as cams. By reaching these values bits in object 6300h Cam state register are set.

Programmable CAN Transmission Modes

Polled Mode	By a remote-transmission-request telegram the connected host calls for the current process value. The absolute rotary encoder reads the current position value, calculates eventually set-parameters and sends back the obtained process value by the same identifier.
Cyclic Mode	The absolute rotary encoder transmits cyclically - without being called by the host - the current process value. The cycle time can be programmed in milliseconds for values between 1 ms and 65536 ms.
Sync Mode	After receiving a sync telegram by the host, the absolute rotary encoder answers with the current process value. If more than one node number (encoder) shall answer after receiving a sync telegram, the answer telegrams of the nodes will be received by the host in order of their node numbers. The programming of an offset-time is not necessary. If a node should not answer after each sync telegram on the CAN network, the parameter sync counter can be programmed to skip a certain number of sync telegrams before answering again.

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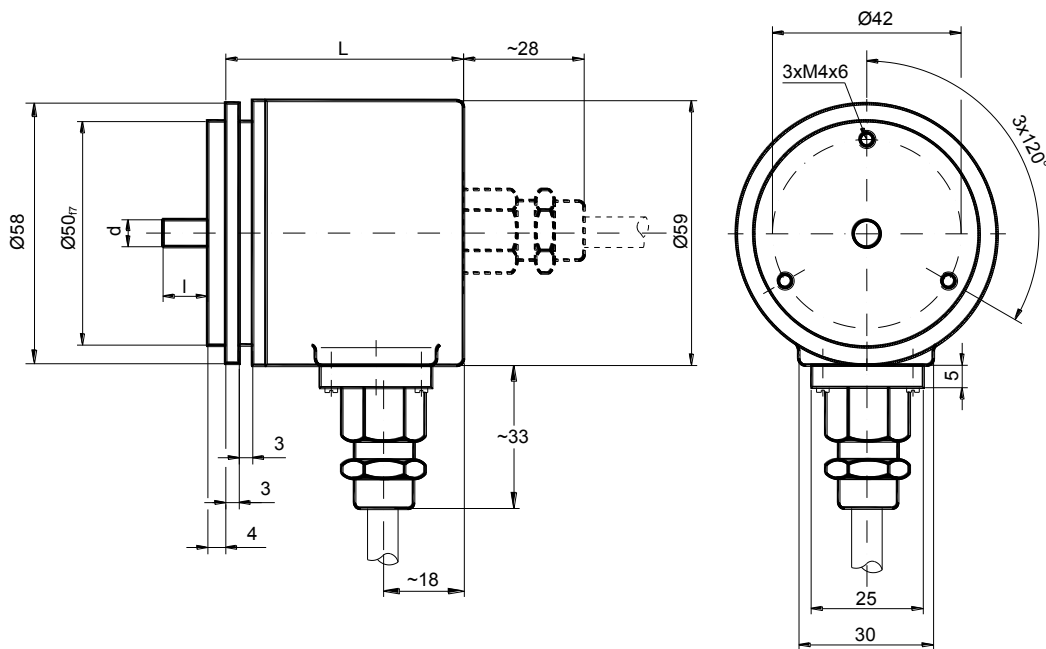## CANOPEN INTERFACE

Mechanical drawings

Synchro Flange (S)

Two versions available

Cable exit (cable diameter = 8 mm)

Synchroflange	d / mm	l / mm
Version S06	6_{f6}	10
Version S10	10_{h8}	20

Clamp Flange (C10)

Cable exit (Cable diameter = 8 mm)
or 5 pin M12 connector

	L
Single-Turn	53mm
Multi-Turn	62mm
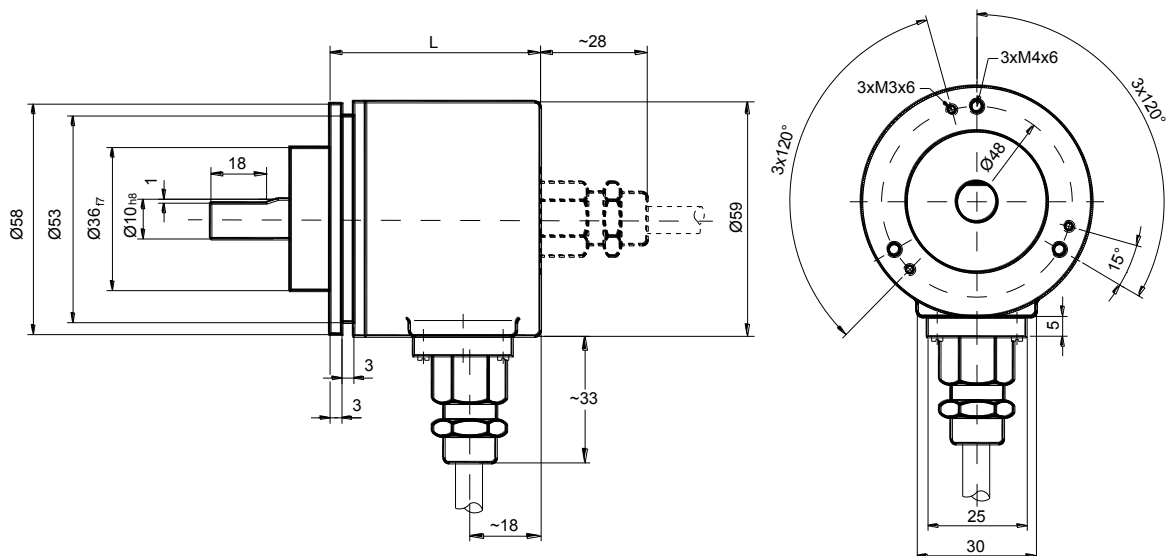
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Clamp Flange (C), 9 pin D-Sub Connector

Single-Turn=53, Multi-Turn=62

8

UNC 4-40

13

Ø58 Ø53 Ø36 f7 Ø10 h8 1 18

Ø59

3

3

3x120° 3xM3x6 3xM4x6 3x120° Ø48 15°
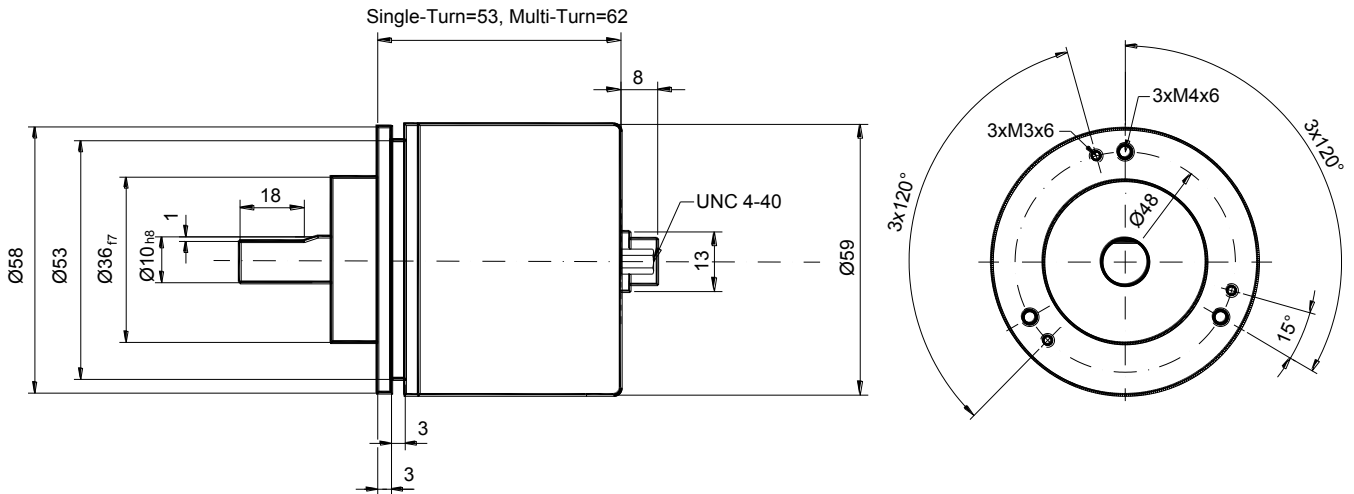
Synchro Flange (S), 9 pin Connector

The dimensions of encoder housing in the versions cable exit, 12 pin circular connector and 5 pin connector from clamp flange are also valid for the synchro flange.

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Blind Hollow Shaft (B)

Cable exit (cable diameter = 8 mm)
or 5 pin M12 connector

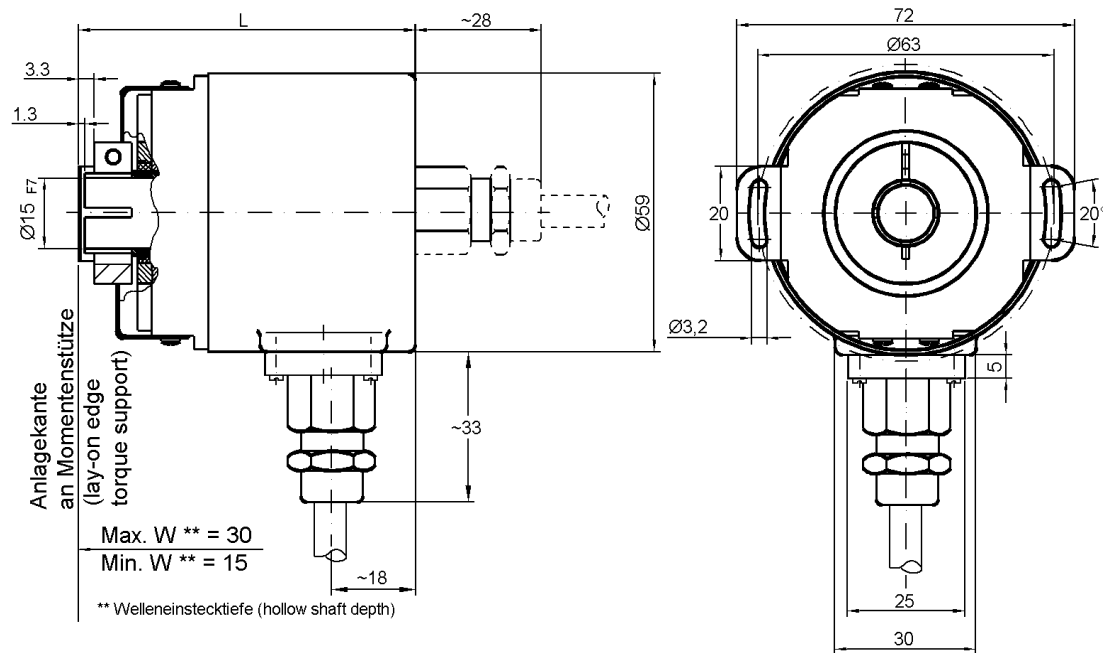| Connection (Cable/Connector)	L
Singleturn	53 mm
Multiturn	81 mm

Mounting Instructions

The clamp ring should only be tightened if the shaft of the driving element is inserted into the hub shaft.

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

Maximum 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

Mechanical Drawings with Connection Cap

Synchro Flange (S)

Two versions available

Synchro flange	d / mm	l / mm
Version S06	6_{f6}	10
Version S10	10_{h8}	20
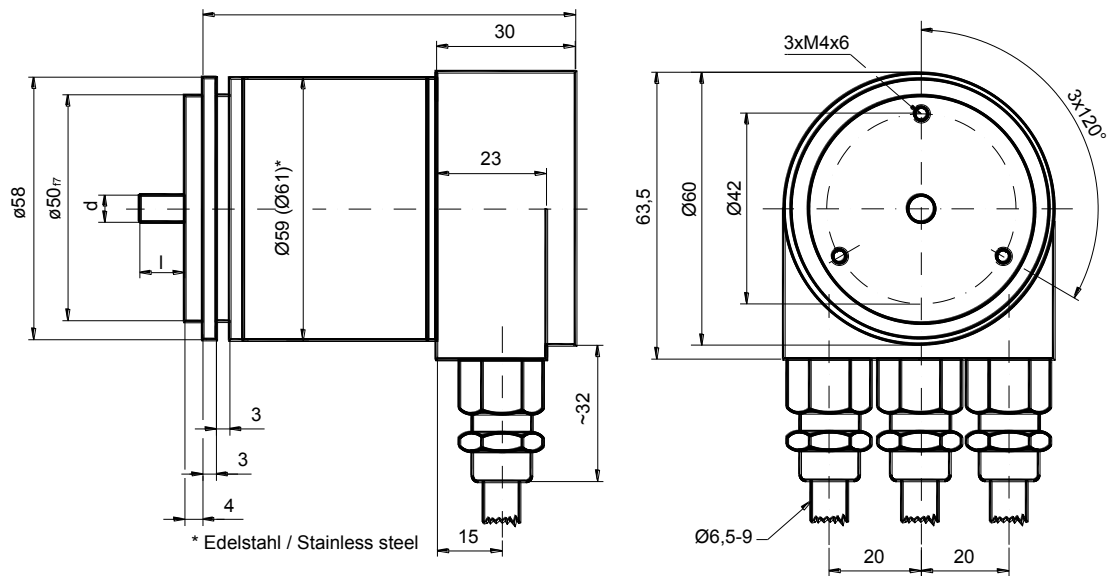
* Edelstahl / Stainless steel

Schlüsselweite, wrench size=17

Clamp Flange (C)
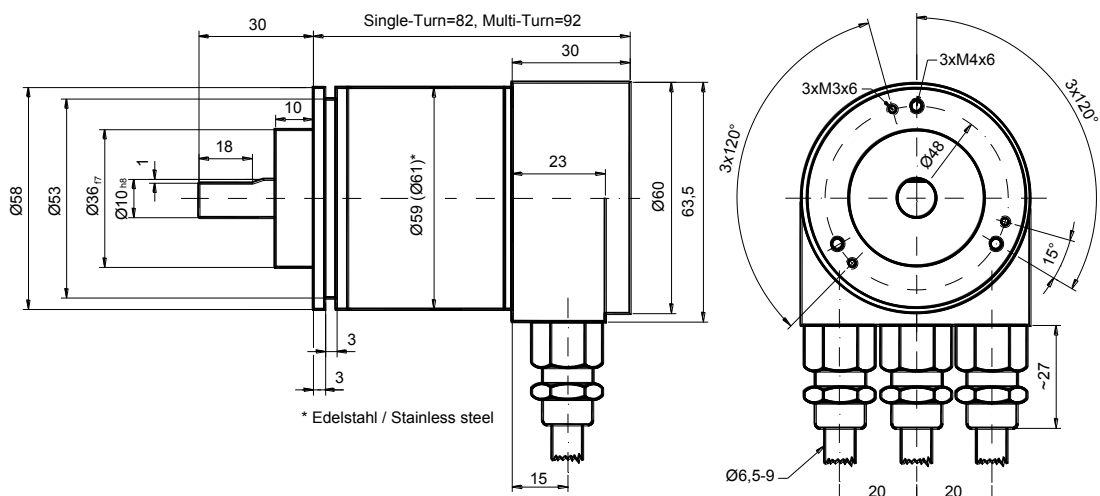
* Edelstahl / Stainless steel

Schlüsselweite, wrench size=17

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Blind Hollow Shaft (B)

Single-Turn=100 , Multi-Turn=112

3,3

1,3

Ø15 F7

Ø59 (Ø61)*

23

* Edelstahl / Stainless steel

Anlagekante
an Momentenstütze
(lay-on edge
torque support)

Max. W ** = 30
Min. W ** = 15
** Welleneinstecktiefe (hollow shaft depth)

15

63,5

~32

72

Ø63

Ø60

20

20°

Ø3,2

Ø6,5-9

20   20

Schlüsselweite, wrench size=17
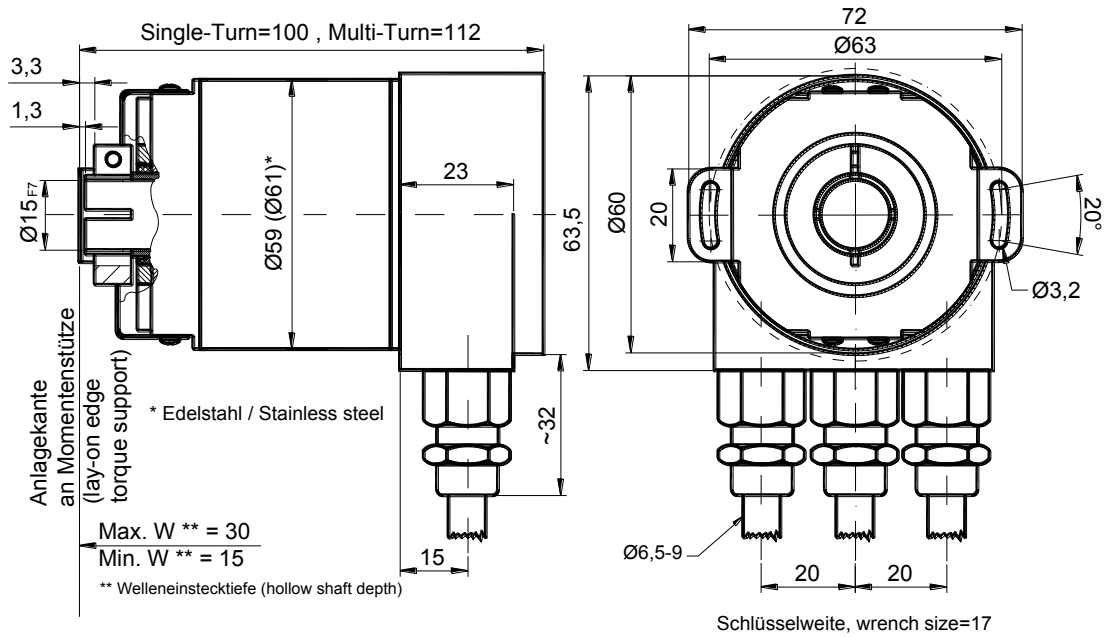
Mounting Instructions

The clamp ring may only be tightened if the shaft of the driving element is in the hollow shaft.

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

Maximum 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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Connection Cap AH58-B1CA-1BW, 5pin Round Connector M12, Micro Style
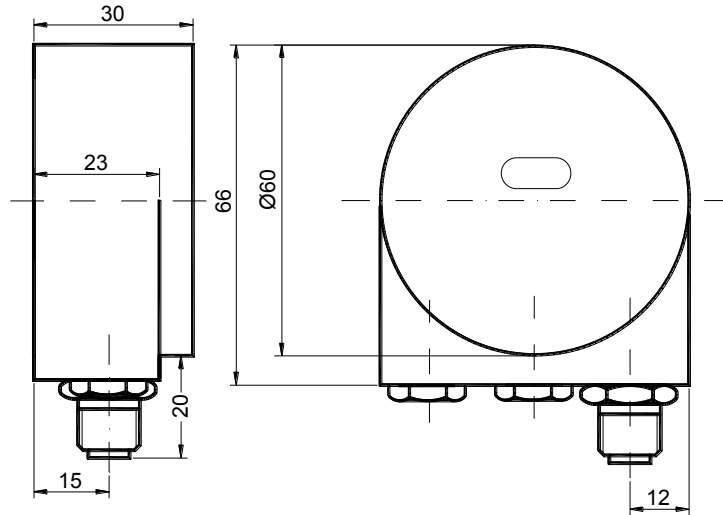
Connection Cap AH58-B1CA-2BW, Female and Male 5pin Connector M12, Micro Style

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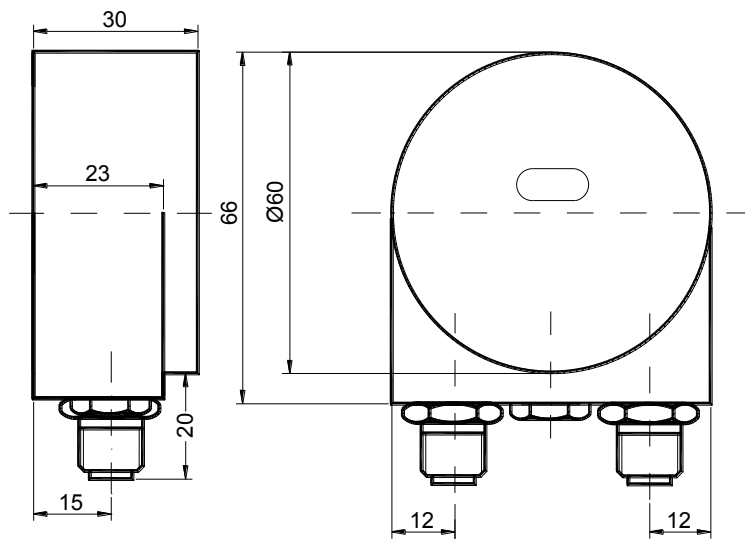
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Heavy Duty Version

These „Outdoor encoder" is suitable for harsh industrial environments. The heavy duty option for the CANopen encoder provides a wide temperature range, protection elements against perspiration water inside the encoder and a heavy duty housing. Uppermost attention was laid on a high EMI protection. Micro style connectors for power supply and bus-in / bus-out connection allow easy installation of the encoder. The CANopen encoder can be configured with all available project tools by implementing the ESD file into the current project.

Main features

- Compact dimensions
- Heavy duty housing
- Protective element against perspiration water
- Integrated T-coupler
- Standard protection class: IP66 shaft side
  IP67 casing side

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Heavy Duty Version with Solid Shaft and Clamp Flange(C)
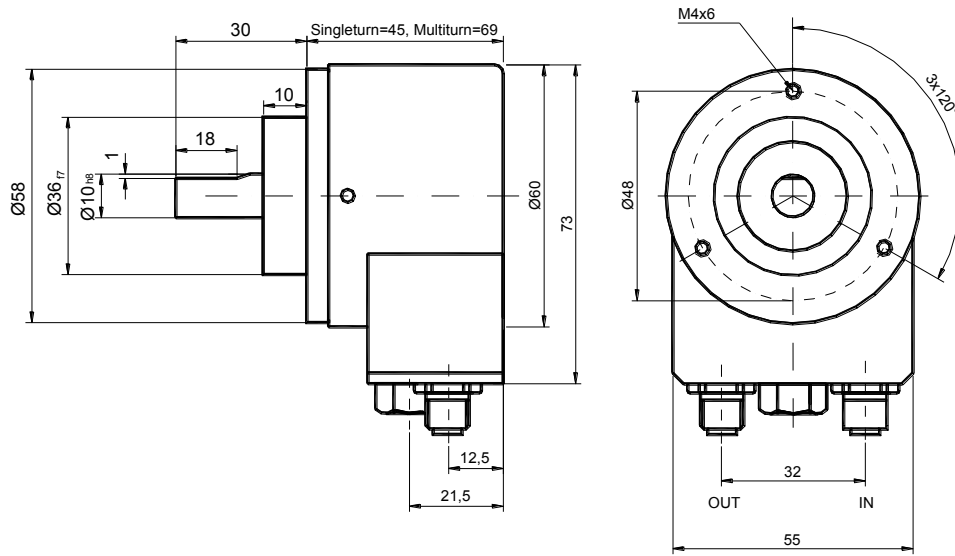
Heavy Duty Version with Blind Shaft (B)
Maximum shaft movements of drive element
are listed in the table.

	Axial	Radial
static	± 0,3 mm	± 0,5 mm
dynamic	± 0,1 mm	± 0,2 mm

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CANOPEN INTERFACE

Models/Ordering Description

(Models/Ordering Description for Heavy Duty Version → see next side)

Description	Type key										
IXARC Optical	**OCD-**	**CA**	**A1**	**B -**	_ _ -	_	_	_	_ _	-	___
Interface	CANopen	**CA**									
Version			**A1**								
Code	Binary			**B**							
Revolutions (Bits)	Singleturn				**00**						
	Multiturn (4096 revolutions)				**12**						
	Multiturn (16384 revolutions)				14						
Steps per revolution	4096 (0,09°)					**12**					
	8192 (0,04°)					13					
	65536 (0,005°)					16					
Flange	Clamp flange						**C**				
	Synchro flange						**S**				
	Through hollow shaft						**T**				
	Blind shaft						**B**				
Shaft diameter	06 mm							**06**			
	10 mm							**10**			
	12 mm (Through hollow shaft)							**12**			
	15 mm (Blind hollow shaft)							**15**			
Mechanical options	without								**0**		
	Shaft sealing (IP66)								S		
	Stainless Steel version*								V		
	Customized								C		
Connection	Cable exit 1m, radial, open cable ends										**CRW**
	Cable exit 1m, axial, open cable ends										CAW
	Connection cap **										**0CC**
	Connector exit, radial, 5 pin male M12										PRM
	Connector exit, axial, 5 pin male M12										PAM
	Connector exit, axial, 9 pin D-Sub										PA9

Standard = bold, further models on request

* Stainless Steel version is not available with radial cable or connector exit (namely CRW, PRM)

** The connection cap has to be ordered separately – see accessories!

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Models/Ordering Description for Heavy Duty Version

Description	Type key										
IXARC optical	**OCD-**	**CA**	**00**	**B -**	_ _	_	_	_	_ _	-	___
					-						
Interface	CANopen	**CA**									
Version		**A1**									
Code	Binary		**B**								
Revolutions (Bits)	Singleturn		**00**								
	Multiturn (4096 revolutions)		**12**								
	Multiturn (16384 revolutions)		14								
Steps per revolution	4096			**12**							
	8192			13							
	65536			16							
Flange	Clamp flange				**C**						
	Synchro flange				**S**						
	Blind shaft				**B**						
Shaft diameter	10 mm					**10**					
	15 mm (Hollow shaft)					**15**					
Mechanical options	without						**H**				
	Customized						C				
Connection	1 x 5 pin M12 connector male, 1x 5 pin M12 connector female, venting element							PRN			
	1 x 5 pin M12 connector male, venting element							PRM			

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Accessories and Documentation

Connection Caps

All connections caps are equipped with a switchable terminal resistor, integrated T-cooupler for CAN bus lines, BCD switches to adjust baudrate and node number, as well as LEDs for diagnosis

Description	Article Name	Article Number
Aluminium housing with three M12 cable glands for cable diameters between 6,5 – 9 mm.	AH 58-B1CA-3PG	0246370325
Stainless steel housing with three M12 cable glands.	AH 58-B1CA-3PG-VA	0246370328
Aluminium housing with one 5 pin male M12 connector.	AH 58-B1CA-1BW	0246370342
Aluminium housing with one 5 pin male M12 connector and one 5 pin female M12 connector	AH 58-B1CA-2BW	0246370370
Aluminium housing with two M20 cable glands for cable diameter between 9 – 13 mm.	AH 58-B1CA-2M20	0246370339

Description		Article Name	Article Number
Shaft coupling	Drilling: 10 mm / 10 mm	GS 10	29100450
	Drilling: 6 mm / 6 mm	GS 06	29100350
Clamp disc	Set (4 pieces).	SP 15	32400155
Clamp ring	Set (2 pieces)	SP H	32400152
Reducing adapter*	15 mm to 12 mm	RR 12	32220291
Reducing adapter*	15 mm to 10 mm	RR 10	32220292
Reducing adapter*	15 mm to 8 mm	RR 8	32220295

*   only for hollow shaft (also available as stainless steel version)

Note: All data sheets and manuals can be downloaded for free from our website www.posital.com

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