



ABSOLUTE ROTARY ENCODER CANOPEN



Main Features

- Compact and heavy-duty industrial design
- Interface: CAN according to CAL
- Housing: 58 mm Ø
- Solid or hollow shaft: 6 or 10 mm Ø / 15 mm Ø
- Max. 65536 steps per revolution (16 Bit)
- Max. 16384 revolutions (14 Bit)
- Code: Binary

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

Programmable Parameters

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

Electrical Features

- Temperature insensitive IR-opto-receiver-asic with integrated signal conditioning
- Status indication with two LEDs in the connection cap
- Optional programmable LED-Dot-Matrix display integrated in connection cap
- 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	Adjustable by rotary switches in connection cap
Supply voltage	10 – 30* V DC (absolute limits)
Current consumption	max. 230 mA with 10 V DC, max. 100 mA with 24 V DC
Power consumption	max. 2.5 Watts
Step frequency LSB	800 kHz
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
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	Aluminum, 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	≤ 30 gcm ²
Friction torque	≤ 3 Ncm (without shaft sealing)
RPM (continuous operation)	Singleturn: max. 12,000 RPM
	Multiturn: max. 6,000 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)	Singleturn: ≈ 550 g
	Multiturn: ≈ 600 g
Weight (stainless steel version)	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

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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
S6 (Synchro flange 6 x 10) without shaft sealing	822	347	133

S6 (Synchro flange 6 x 10) with shaft sealing: max. 20 N axial, 80 N radial

Environmental Conditions

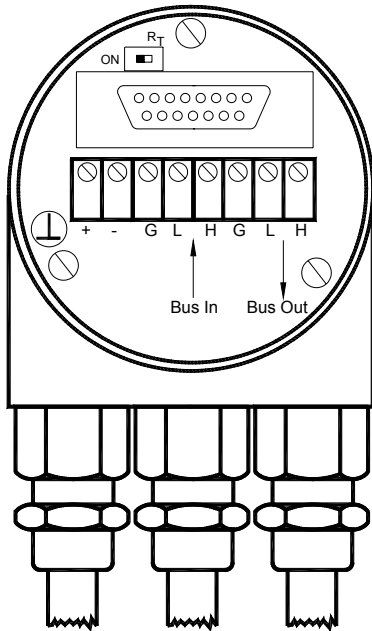
Operating temperature	- 40 .. +85°C
Storage temperature	- 40 .. + 85 °C
Humidity	98 % (without liquid state)
Protection class (EN 60529)	Casing side: IP 65
	Shaft side: IP 64 (optional with shaft sealing: IP66)

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Interface

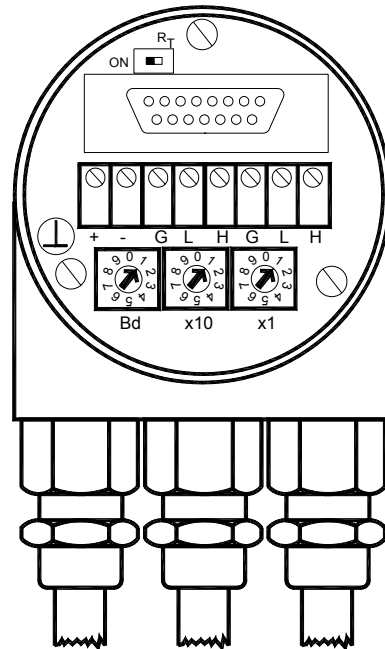
Installation connection cap

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 5.5 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
+	24 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:

Last Device



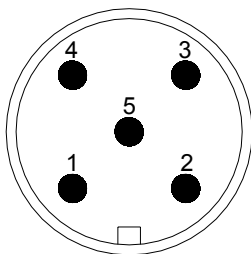
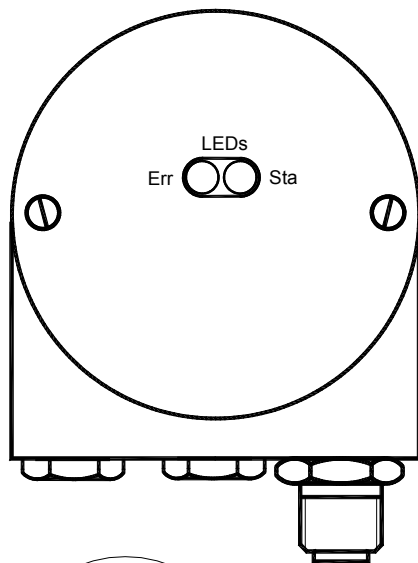
Device X



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Connection cap with round connector

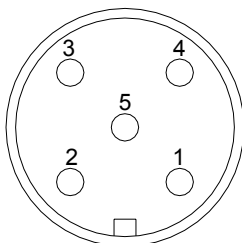
This connection cap type has one or 2 pieces of 5 pin round connectors in M12 version. All other cable glands are replaced by blind caps.



Bus In

5 pin circular connector M12

Pinning (Male)



Bus Out

5 pin circular connector M12

Pinning (Female)

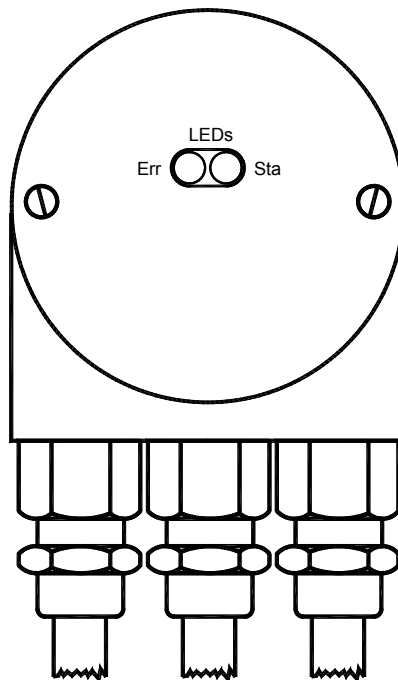
Following table indicates pinning of the micro style connector:

Pin number	Signal
1	(CAN Ground)
2	24 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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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. Each value between 1 and 4,096 can be programmed.
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	One free programmable cam can be set in the total measuring range. The same functionality is realized like a mechanical cam unit.

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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.

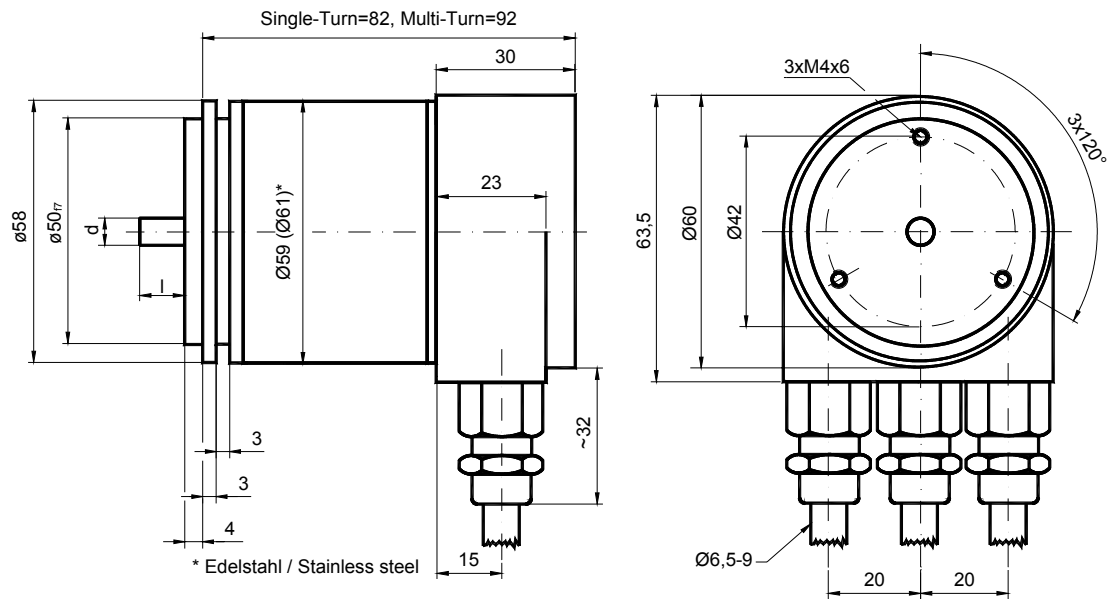
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Mechanical Drawings

Synchro flange (S)

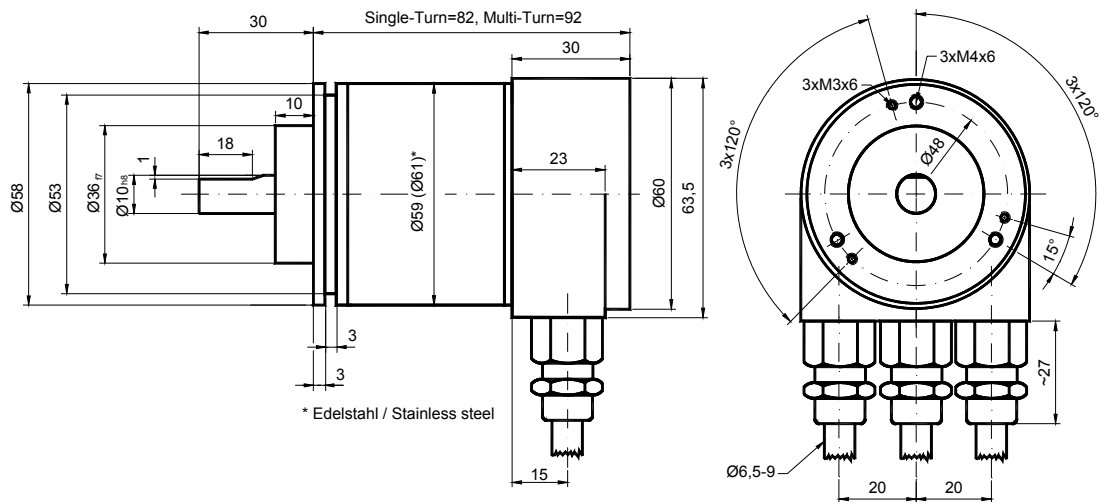
available in 2 versions

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



Schlüsselweite, wrench size=17

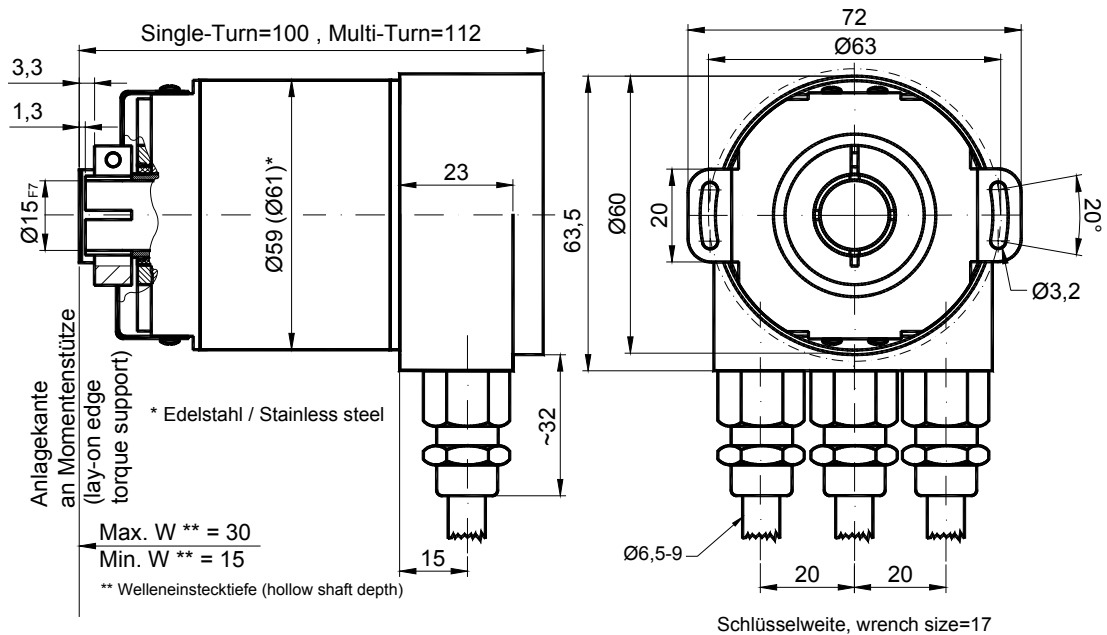
Clamp flange (C)



Schlüsselweite, wrench size=17

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Hollow shaft (B)



Mounting instructions

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

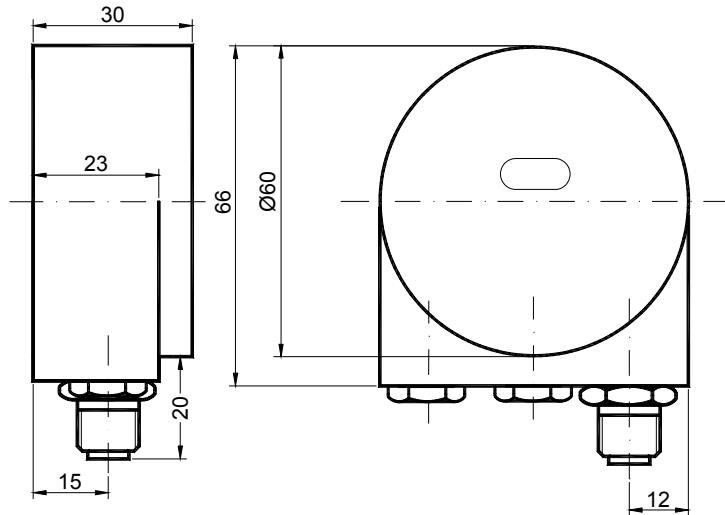
The diameter of the hollow shaft can be reduced to 12mm, 10 mm or 8 mm by using an adapter (this reducing adapter can be pushed into the hollow shaft).

Allowed shaft movements of the drive element are listed in the table.

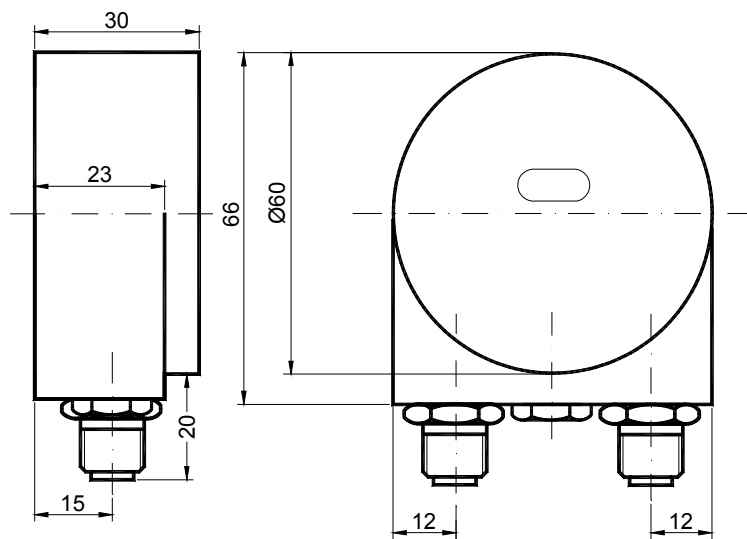
	axial	radial
static	± 0.3 mm	± 0.5 mm
dynamic	± 0.1 mm	± 0.2 mm

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Connection cap AH58-B1CA-1BW, 5pin round connector M12, Micro style



Connection cap AH58-B1CA-2BW, female and male connector 5pin connector M12, Micro Style





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Part Numbering System

Absolute Rotary Encoder -- CANopen

(Example: SAG – C2B1B - 0013 – B150 – OCC)

Part Number: SAG - C 2 B1 B - _ _ - _ - _ - OCC

Description

Interface	CANopen	C2						
Version			B1					
Code	Binary			B				
Revolutions (in Bits)	Single turn (1 revolution)						00	
	Multi turn (4,096 revolutions)						12	
	Multi turn (16,384 revolutions) <i>(option)</i>						14	
Steps per Revolution (in Bits)	4,096 steps (0.09° deg./step)						12	
	8,192 steps (0.04° deg./step)						13	
	65,536 steps (0.005° deg./step) <i>(option)</i>						16	
Flange	Clamp flange							C
	Synchro flange							S
	Blind hollow shaft							B
Shaft diameter	06 mm							06
	10 mm							10
	15 mm (Blind hollow shaft)							15
Mechanical options	Without							O
	Shaft sealing (IP66) <i>(option)</i>							S
	Stainless Steel <i>(option)</i>							V
	Customized <i>(option)</i>							C
Connection	Connection Cap							OCC

Standard offering shown in bold

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Connection caps

All connection cap are equipped with a switchable terminal resistor, integrated T-coupler, BCD rotary switch to set Baudrate and Node Number as well as LED's for diagnosis.

Beschreibung	Artikelname	Artikelnummer
Aluminium Gehäuse mit drei M12 Kabelverschraubungen für Kabeldurchmesser: 6,5 – 9 mm	AH 58-B1CA-3PG	
Edelstahl Gehäuse mit drei M12 Kabelverschraubungen	AH 58-B1CA-3PG-VA	
Aluminium Gehäuse mit einem 5 poligem Stecker	AH 58-B1CA-1BW	
Aluminium Gehäuse mit einem 5 poligem Stecker und einer 5 poligen M12 Buchse	AH 58-B1CA-2BW	
Aluminium Gehäuse mit zwei M20 Kabelverschraubungen für Kabeldurchmesser: 9 - 13 mm	AH 58-B1CA-2M20	

Accessories and Documentation

Description		Type
Shaft coupling**	Drilling: 10 mm	GS 10
	Drilling:: 6 mm	GS 06
Clamp disc**	4 pcs. / AWC	SP 15
Clamp ring**	2 pcs. / AWC	SP H
Reducing adapter ***	15 mm to 12 mm	RR12
Reducing adapter ***	15 mm to 10 mm	RR10
Reducing adapter ***	15 mm to 8 mm	RR8
User Manual*	Installation and configuration manual, German	UMD-CA
User Manual*	Installation and configuration manual, English	UME-CA
EDS-File*	Disc containing EDS-file for configuration.	DK-CA

*** only for hollow shaft

** needless for hollow shaft

* These can be downloaded free of charge from our Homepage www.scancon.dk

We do not assume responsibility for technical inaccuracies or omissions. Specifications are subject to change without notice.