



## ABSOLUTE ROTARY ENCODER MIDI CANOPEN



### Main Features

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

### Software Features

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

### Mechanical Structure

- Aluminium flange and housing
- Stainless steel shaft
- Precision ball bearings with sealing or cover rings
- Code disc made of unbreakable and durable plastic
- Special flange with short housing SA6C

### Electrical Features

- Temperature insensitive IR-opto-receiver-asic with integrated signal conditioning
- 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
Supply voltage	10 - 30 V* DC (absolute limits)
Current consumption	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	$\pm 1/2$ LSB (12 bit), $\pm 2$ 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			
Lifetime	Dependent on shaft version and shaft loading – refer to table			
Max. shaft loading	Axial 40 N, radial 110 N			
Inertia of rotor	$\leq 30 \text{ gcm}^2$			
Friction torque	$\leq 3 \text{ Ncm}$ (without shaft sealing)			
RPM (continuous operation)	Singleturn: max. 12,000 RPM			
Shock (EN 60068-2-27)	$\leq 100 \text{ g}$ (half sine, 6 ms)			
Permanent shock (EN 60028-2-29)	$\leq 10 \text{ g}$ (half sine, 16 ms)			
Vibration (EN 60068-2-6)	$\leq 10 \text{ g}$ (10 Hz ... 2000 Hz)			
Weight (standard version)	Singleturn: $\approx 300 \text{ g}$			
<b>Flange</b>	<b>Synchro (S)</b>		<b>Clamp (C)</b>	<b>Hollow shaft (B)</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
	Casing side: IP 54 (Connector exit axial 9 pin D-Sub)
	Shaft side: IP 64 (optional with shaft sealing: IP66)
	Shaft side: IP 54 (MidiCAN flange SA6C)

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

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## Interface

### Configuration

The standard configuration of the encoder is: node number 32 and baudrate 20KBaud. For adapting the encoder for a respective application the customer could use SDO telegrams. Valid baudrate 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.**

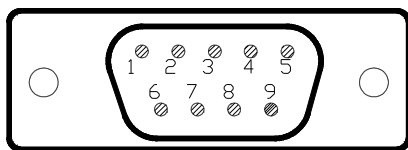
### Electrical Interface

There are various electrical connecting options like 5 pin M12 connector, 9 pin D-Sub connector or cable exit.

Signal	9 pin D-Sub Pin	5 pin M12 Pin	open cable
(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

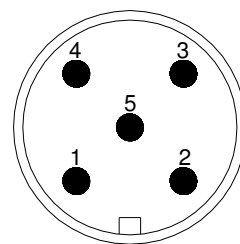
### Bus In

9 pin D-Sub connector



### Bus In

5 pin M12 connector male



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### 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.

### 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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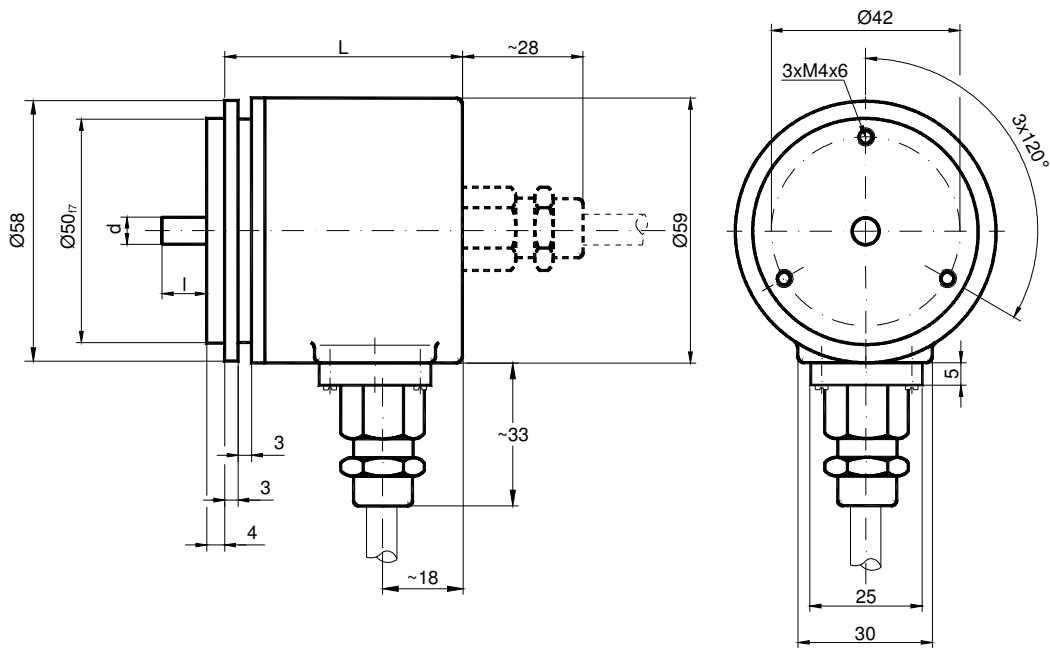
## Mechanical drawings

### Synchroflange (S)

Two versions available

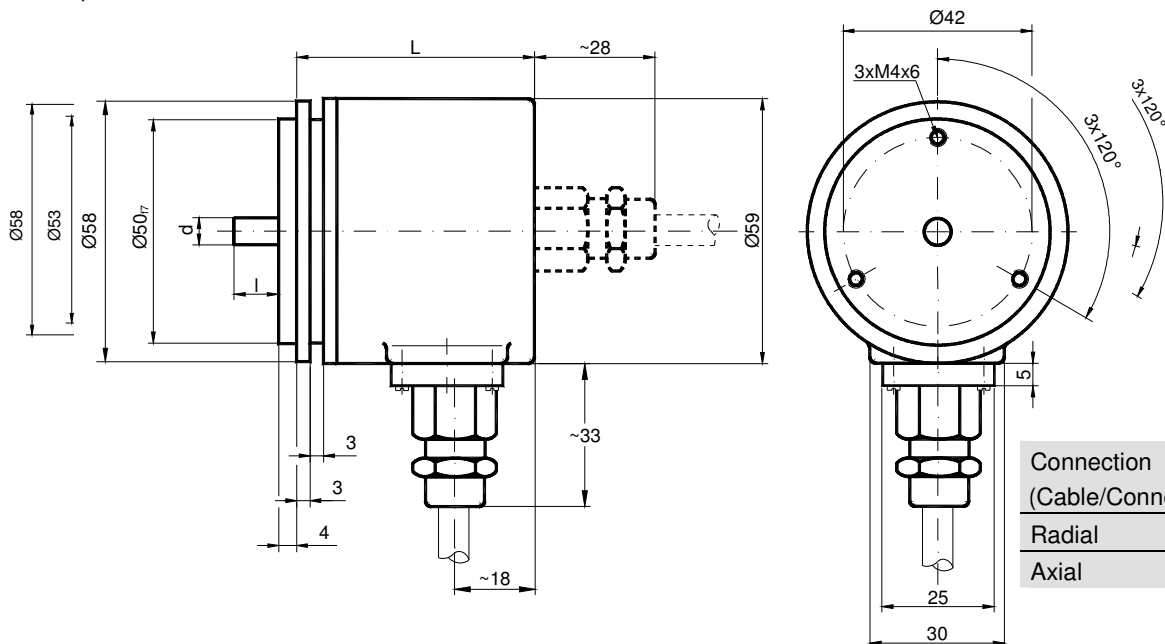
Cable exit (Cable diameter = 8 mm )  
ob 5 pin M12 connector male

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



### Clampflange (C10)

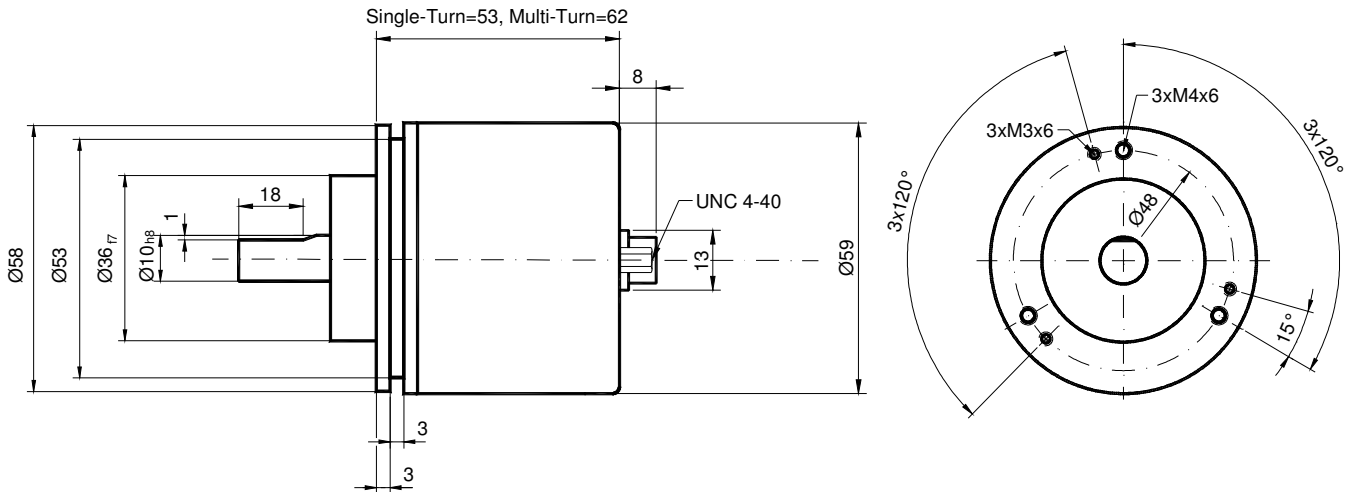
Cable exit (Cable diameter = 8 mm )  
ob 5 pin M12 connector male



Connection (Cable/Connector)	L
Radial	53mm
Axial	53mm

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## Clampflange (C), 9 pin D-Sub connector

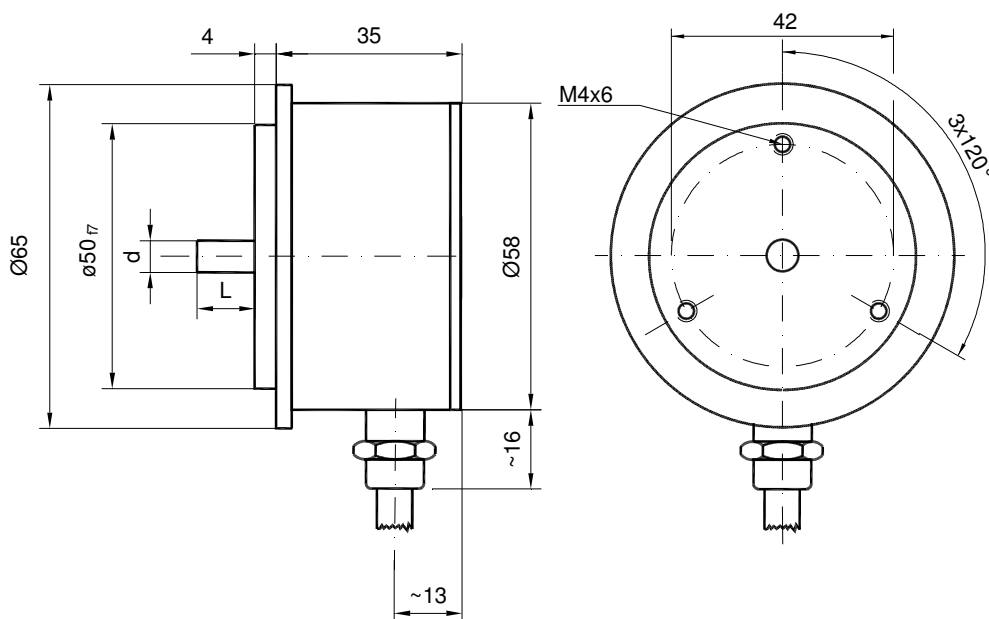


Connection	L
Axial	53mm

## Synchroflange (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.

## MidiCAN Synchroflange (SA6C) with radial cable exit and short housing

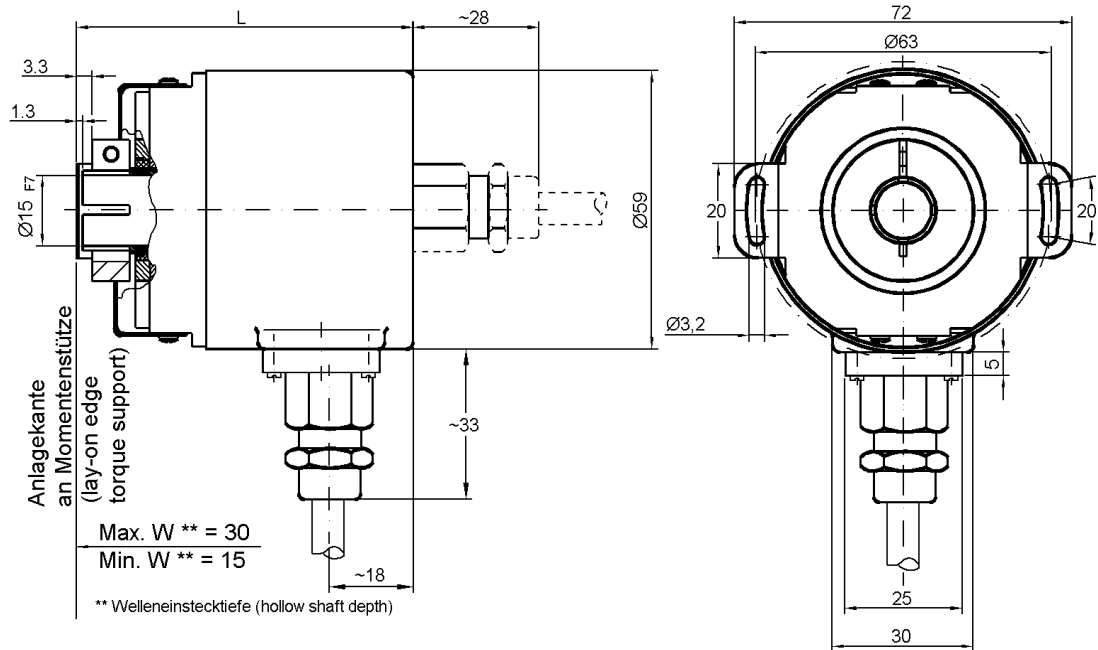


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### Blind shaft (B)

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

Connection (Cable/Connector)	L
Radial	53mm
Axial	53mm



### 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



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## Models/Ordering Description

Description	Typekey						
Optocode	SAG-	__	00	B -	__	-	CRW
Interface	Midi CANopen	<b>C6</b>					
Version			<b>00</b>				
Code	Binary			<b>B</b>			
Revolutions (Bits)	Singleturn			<b>00</b>			
Steps per revolution	4096				<b>12</b>		
(Bits)	8192				13		
	65536				16		
Flange	Clamp flange					<b>C</b>	
	Synchro flange					<b>S</b>	
	Blind shaft					<b>B</b>	
Shaft diameter	10 mm					<b>10</b>	
	06 mm					<b>06</b>	
	15 mm (hollow shaft)					<b>15</b>	
	6mm solid shaft, 65mm Ø, short*					A6	
Mechanical options	without					<b>0</b>	
	Shaft sealing (IP66)					S	
	customized					C	
Connection	Cable exit 1m, radial, open cable ends						<b>CRW</b>
	Cable exit 1m, axial, open cable ends						CAW
	Connector exit, radial, 5 pin male M12						PRM
	Connector exit, axial, 5 pin male M12						PAM

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

\* Encoder only available in following mechanical configuration: SA6C-CRW-018 (refer technical drawing)

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### Accessories and documentation

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 Ring*	15 mm to 12 mm	RR 12	32220291
Reducing Ring *	15 mm to 10 mm	RR 10	32220292
Reducing Ring *	15 mm to 8 mm	RR 8	32220295

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