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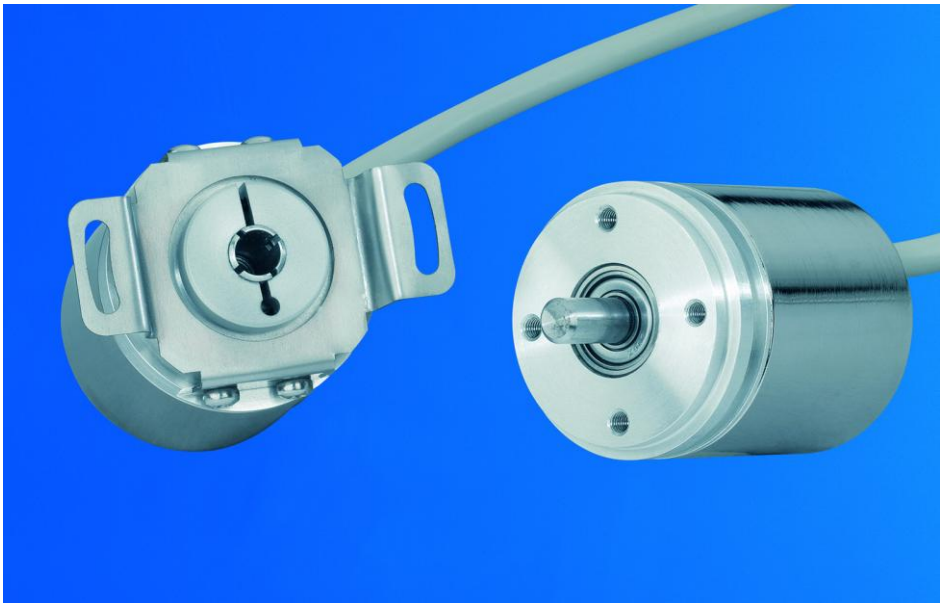
DATASHEET
ABSOLUTE MAGNETIC ROTARY ENCODER SSI



High-resolution absolute encoder based on magnetic technology. Singleturn encoding based on 360° Hall technology. Multiturn encoding based on magnetic pulse counter. No batteries used.

Main Features

- Compact industrial model
- Interface: SSI (Synchronous-serial Interface)
- Housing: 36.5 mm ∅
- Shaft: 6 or 10 mm ∅
- Blind hollow shaft: 6 mm ∅
- Max. revolution not limited (typical 13 bit)
- Preset input
- Code: Gray or Binary
- EMC: EN 61000-6-2, EN 61000-6-4

Applications

Sensing of :

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

Mechanical Structure

- Aluminum flange
- Nickel-plated steel housing
- Stainless steel shaft
- Precision ball bearings with sealing or cover rings

Electrical Features

- Polarity inversion protection
- Over-voltage-peak protection

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Technical data

Electrical data

Clock input	Via opto-coupler
Data output	Line-driver according to RS 422
Clock frequency	100 kHz - 2 MHz
Supply voltage	MCD-S1XXX- 10 - 30 V DC (absolute maximum ratings) * MCD-SMXXX- 4.5 – 5.5V DC (absolute maximum ratings) *
Turn on time	< 1 s
Power consumption	about 0.25 W
Electrical lifetime	> 10^5 h
EMC	Emitted interference: EN 61000-6-4 Noise immunity: EN 61000-6-2
Connection	Cable exit or Connector

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

Sensor data

Singleturn technology	magnetic 2 axis Hall sensor
Singleturn resolution	up to 16384 steps / revolution (14 Bit)
Singleturn accuracy	± 0.35°
Internal cycle time Singleturn	< 600 µs
Multiturn technology	self supplied magnetic pulse counter (Wiegand Sensor)
Multiturn range	can measure up to 200 Billion revolutions, limited by memory

Environmental Conditions

Operating temperature sensor (*)	- 30 ... + 85 °C (-22 …+185 °F)
Storage temperature (*)	- 30 ... + 85 °C (-22 …+185 °F)
Humidity	98 % (without liquid state)
Protection Class (EN 60529)	Casing side: IP 54 (moulded : MCD-…-CAW) Casing side: IP 64 (other types : MCD-…-P8M and MCD-…-GAW)
	Shaft side: IP 64

(*) Please also refer temperature range of cable

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Mechanical data

Housing	nickel-plated steel housing
Flange	Aluminum
Shaft	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 (0.11 oz-in^2)
Friction torque at + 25°C	≤ 3 Ncm (2.8 oz-in)
RPM (continuous operation)	max. 12.000 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)	≈ 150 g (0.33 lbs) including cable

Minimum (mechanical) lifetime

Flange	Lifetime in 10^8 revolutions with (F_a/F_r)		
S6 Synchro flange (MCD-…-S060-…)	224 (20N/20N)	28 (20N/40N)	3 (20N/80N)
C100 flange (MCD-…-C100-…)	247 (40N/60N)	104 (40N/80N)	40 (40N/110N)

Cable (*)

Operating temperature cable	flexing -5°C to +70°C (+23 … +158 °F) static -30°C to +70°C (-22 … +158 °F)
Minimum bend radius	flexing 10x cable diameter static 5x cable diameter
Cable	approx 6 mm (~0.236 in) ∅ / type : LIYCY 4x2x0.14

(*) Valid for types: MCD-…-CAW and MCD-…-GAW

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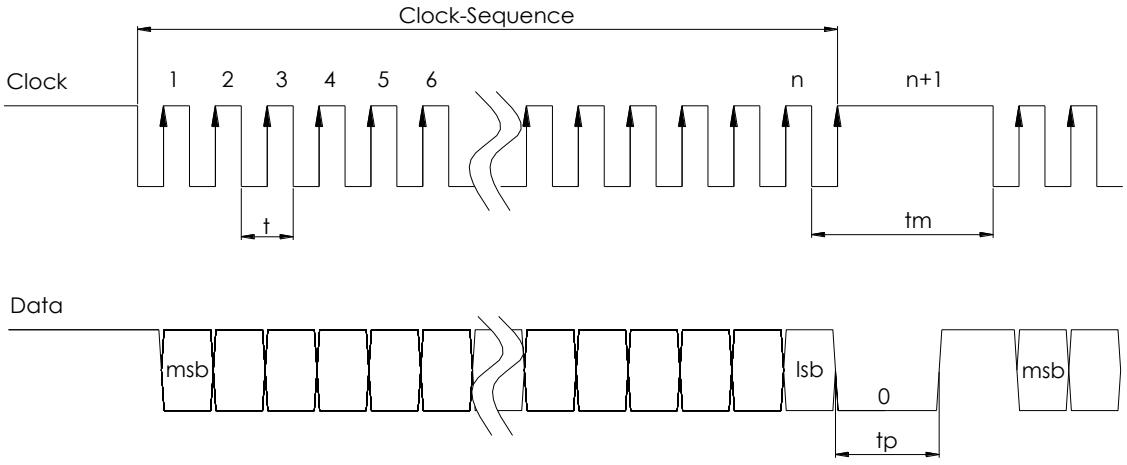
Interface

Synchronous Serial Interface (SSI)

Driver	Driver meets EIA standard RS 422; transmission rates up to 10 MBit/s
Transfer	Transfer distance up to 1.200 m
Transmission	Balanced transmission provides high noise immunity, shielded and twisted pair lines are essential to attain extremely high noise immunity

Protocol SSI

Detailed SSI-Interface description under technical description SSI interface



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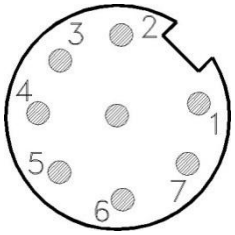
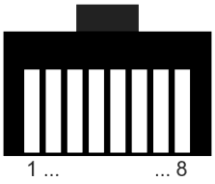
Electrical connection

Connection plan

Function	Wire end	Connector Pin-No.
GND	white	1
Supply Voltage +U_b	brown	2
SSI Clk+	green	3
SSI Clk-	yellow	4
SSI Data+	grey	5
SSI Data-	pink	6
Preset	black or blue	7
Complement	red	8
Shielding	Shielding	-

Connectors (front view)

M12 Connector MCD-XXXX-XXXX-XXXX-P8M	**Axial Cable Exit (*)** MCD-XXXX-XXXX-XXXX-CAW MCD-XXXX-XXXX-XXXX-GAW
	
8 pin M12 connector male	RJ45 Connector

(*) A RJ45 Connector is mounted on the cable end for the CAW / GAW version. This connector can be used for test purposes also for custom installation. Do not connect to any Ethernet network, devices may be damaged!

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Presetfunction

Voltage Level	Function
0 (Input = N.C. or GND)	inactive
1 (Input ≥ 10V / Input ≤ UB)	Preset is activated (*). The Encoder value will be set to 0 in the moment the Preset Level will change to inactive again (falling flange)
Input Resistance	10 kOhm

(*) The Preset needs to be activated for at least 1 second before the falling Edge will be detected

Complementfunction

Voltage Level	Encoder counting direction for clockwise rotation (view on shaft)
0 (Input = N.C. or GND)	Up
1 (Input ≥ 10V / Input ≤ UB)	Down
Input Resistance	10 kOhm

It takes 1 sec before the change take effect. The Encoder value is inverted after the Complement.

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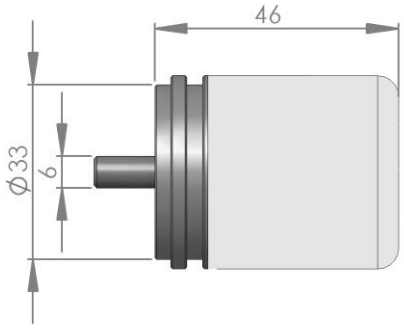
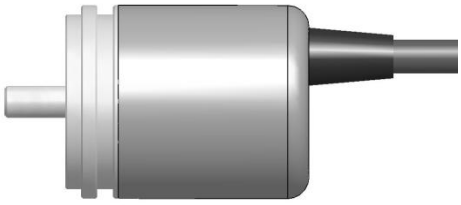
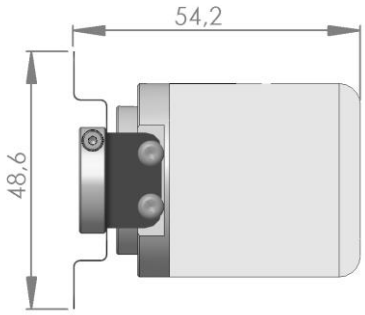
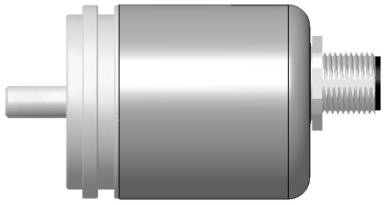
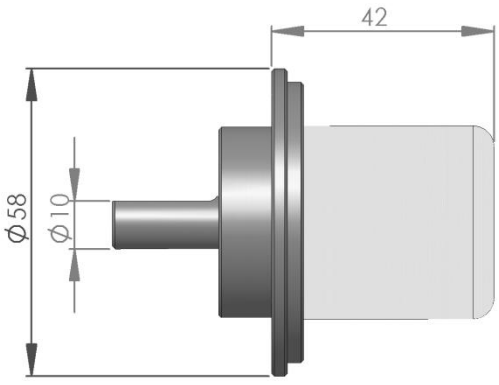
Mechanical Models

For detailed drawings please refer our website as drawing, IGES Drawing and STEP 3D Model under mechanical drawings or contact us

Flange Types	Housing and Connector Types
Synchro Flange MCD-XXXX-XXXX-S060-XXX 	Axial Cable Exit MCD-XXXX-XXXX-XXXX-CAW 
Blind Hollow Shaft MCD-XXXX-XXXX-B060-XXX 	M12 Connector MCD-XXXX-XXXX-XXXX-P8M 
Clamp Flange MCD-XXXX-XXXX-C100-XXX 	Axial Cable Exit with Gland MCD-XXXX-XXXX-XXXX-GAW 

All units measured in [mm]

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Models / Ordering Description

Description	Type key									
Magnetocode	**MCD-**	_ _	00	_ -	_ _	_ _ -	_	_ _	**0** -	_ _ _
Interface / Voltage	**SSI – 30Vdc**	**S1**								
	SSI – 5Vdc	SM								
Version			**00**							
Code	Gray			**G**						
	Binary			B						
Bits for Revolutions	Single turn				00					
	Multi turn (4.096 turns)				12					
	Multi turn (8.192 turns)				**13**					
Steps per revolution (Bits)	4096 (0.09°)					**12**				
Flange	Synchro flange (6mm shaft diameter)						**S**	**06**		
	Blind hollow shaft (6mm shaft diameter)						B	06		
	58mm Clamping Flange (10mm shaft diameter)						C	10		
Shaft diameter										
Mechanical options	Without								**0**	
	Customized								C	
Connection	Cable exit, axial 1m, moulded									**CAW**
	Cable exit, axial 1m, with cable gland									GAW
	Cable exit, axial 5m									CAW-5m
	Connector 8pol M12									P8M

Standard = bold, further models on request

Ordering example:
MCD-S100G-1312-S060-CAW

Accessories

Article No	Article	Description
34500800	P8F	Counter Connector for MCD-…-P8M
34500801	P8F-STK8.2	Counter Connector for MCD-…-P8M with 2m PUR cable
34500802	P8F-STK8.5	Counter Connector for MCD-…-P8M with 5m PUR cable

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APPENDIX

Same Encoder Series also available …

… with CANopen Interface. Please check for Documentation online : **magnetic rotary encoder with CANopen Interface**

… or combined with a draw wire adapter to perform linear measurements, please check for Documentation online : **linear measurement with draw wire sensor**