

DATA SHEET

ABSOLUTE MAGNETIC ROTARY ENCODER INDUSTRIAL

SSI



High-resolution absolute encoder based on magnetical technology. Single-Turn sensing based on 360° Hall technology. Multi Turn sensing based on magnetic pulse counter. No batteries used.

Main Features

- Compact Industrial Design
- Interface:
SSI (Synchronous-Serial Interface)
- Housing: Ø 36.5 mm
- Shaft: Ø 6 or 10 mm Ø
- Blind Hollow Shaft / Hub Shaft: Ø 6 mm
- Max. Number of Revolutions
- Not Limited (Typical 13 Bit)
- Preset Input
- Code: Gray or Binary
- EMC: EN 61000-6-2, EN 61000-6-4

Mechanical Structure

- Aluminum Flange
- Coated Steel Housing
- Stainless Steel Shaft
- Precision Ball Bearings With Sealing
or Cover rings

Applications

Sensing of:

- Angles
- Distances
- Tracks
- Inclinations
- Differences Between Two or More Axes

Electrical Features

- Reverse Voltage Protection
- Over-Voltage Protection
- Preset Function
- Switchable Counting Direction
- (Complement Function)

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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) ¹⁾ MCD-SMXXX- 4.5–5.5 V DC (Absolute Maximum Ratings) ¹⁾
Turn on Time	< 1 s
Power Consumption	Typical 0.25 W
MTBF Time According to	> 3x10 ⁶ h @ T = 40°C
EMC	Emitted Interference: EN 61000-6-4 Noise Immunity: EN 61000-6-2
Connection	Cable Exit or Connector

1) Supply voltage according to EN 50 178 (Safety Extra-Low Voltage)

Sensor Data

Single-Turn Technology	Magnetic 2 Axis Hall Sensor
Single-Turn Resolution	Up to 4096 Steps/Revolution (12 Bit)
Single-Turn Accuracy	± 0.35°
Internal Cycle Time	< 1 µs
Multi-Turn Technology	Self Powered Magnetic Pulse Counter (Wiegand Sensor)
Multi-Turn Resolution	Can Count Up to 200 Billion Revolutions, Limited By Memory
Data Retention Time	≥ 1.25x10 ⁵ h @ T = 35°C

Environmental Conditions

Operating Temperature Sensor ¹⁾	-40 – +85° (-40 – +185°F)
Storage Temperature ¹⁾	-40 – +85° (-40 – +185°F)
Humidity	98 % (without liquid state)
Protection Class (EN 60529)	Casing Side IP 54 (Moulded : MCD-...-CAW and MCD-...-CRW) IP 65 (Other : MCD-...-PAM and MCD-...-GAW)
	Shaft Side IP 65 (Clamp Flange MCD-...-C100-...) IP 54 (Other Types : MCD-...-S060-... and MCD-...-B060-...)

1) Please also refer to temperature range of cable

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Mechanical Data

Housing	Coated 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	$\leq 30 \text{ gcm}^2$ (0.11 oz-in ²)
Friction Torque at +25°C	$\leq 3 \text{ Ncm}$, (2.8 oz-in)
RPM (continuous operation)	Max. 12.000 RPM
Shock	EN 60068-2-27 $\leq 100 \text{ g}$ (half sine, 6 ms XYZ)
	MIL-STD-810C $\leq 200 \text{ g}$ (half sine, 3 ms XYZ)
Permanent Shock	EN 60068-2-29 $\leq 10 \text{ g}$ (half sine, 16 ms XYZ)
	MIL-STD-810C $\leq 30 \text{ g}$ (half sine, 11 ms XYZ)
Vibration	EN 60068-2-6 $\leq 10 \text{ g}$ (10 Hz – 1000 Hz XYZ)
	MIL-STD-810 $\leq 4.2 \text{ g}$ (5 Hz – 500 Hz XYZ)
Weight (Standard Version)	$\approx 150 \text{ g}$ (0.33 lbs), including cable

Minimum (mechanical) Lifetime

Flange	Lifetime in 10^8 revolutions with (F_a/F_r)		
	20 N/20 N	20 N/40 N	20 N/80 N
S10 Synchro Flange (MCD-...-S10G-...)	224	28	3
C100 Clamp Flange (MCD-...-C100-...)	40 N/60 N	40 N/80 N	40 N/110 N
	224	104	40

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Cable¹⁾

Operating Temperature Cable	Flexing	Static
	-5 – +70°C (23 – +158°F)	-40 – +80°C (-40 – +185°F)
Minimum Bend Radius	Flexing 10x cable diameter	
	Static 5x cable diameter	
Cable	Approx Ø 6 mm (~0.236 in)	
	Type: LIYCY 4x2x0.14 - (~AWG26)	

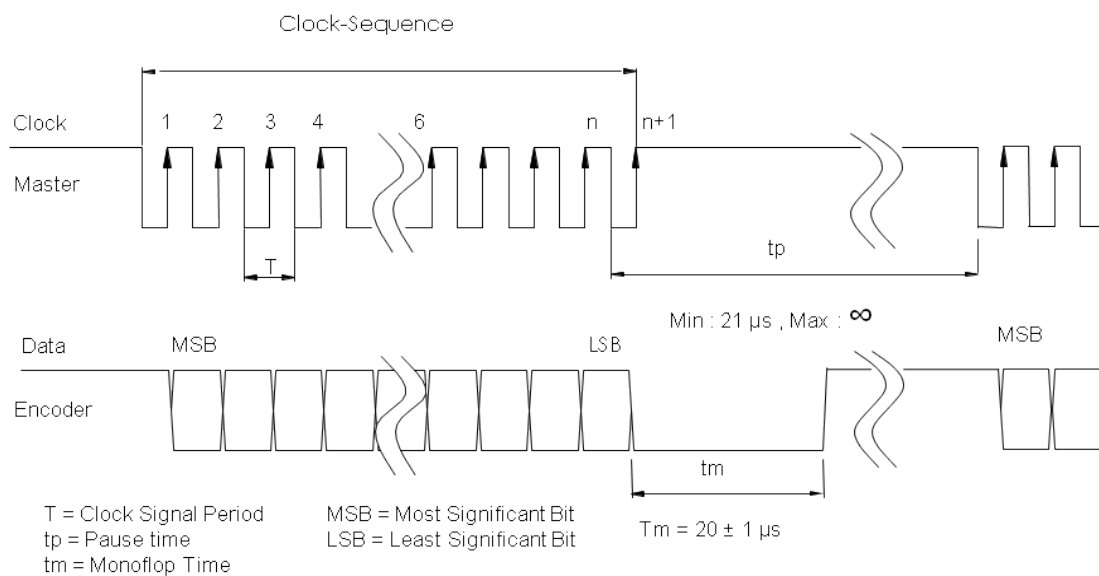
1) Valid for types: MCD-...-CAW, MCD-...-GAW, MCD-...-CRW

Interface

Synchron-Serielles Interface (SSI)

Driver	Driver meets EIA standard RS 422, transmission rates up to 2 Bit/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 High

Protocol SSI



Detailed SSI-Interface description under technical description SSI interface. This product is also available with analog or CANopen interface, please check our website.

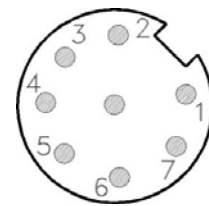
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ABSOLUTE MAGNETIC ROTARY ENCODER INDUSTRIAL SSI

Electrical Connection

Connection Plan

Connector Pin M12	Connector RJ45	Wire End	Function
1		White	GND
2		Brown	Supply Voltage
3		Green	SSI Clk+
4		Yellow	SSI Clk-
5		Grey	SSI Data+
6		Pink	SSI Data-
7		Black or Blue	Preset
8		Red	Complement
—		Shielding	Shielding



8 Pin M12 Connector Male



RJ45 Connector

Presetfunction

Voltage Level	Function
0 (Input = N.C. or GND)	Inactive
1 (Input $\geq 10V$ / Input $\leq UB$)	Preset is activated. ¹⁾ The Encoder value will be set to 0 in the moment the Preset Level will change to inactive again (falling edge)
Input Resistance	10 kOhm

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

Complementfunction / DIR-Function

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

It takes 1 second before the change take effect. The Encoder value is inverted after the Complement / DIR is activated.

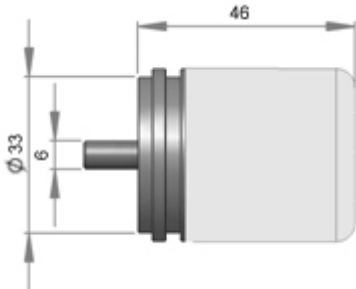

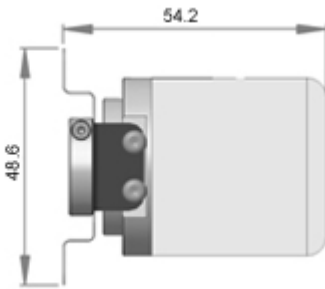

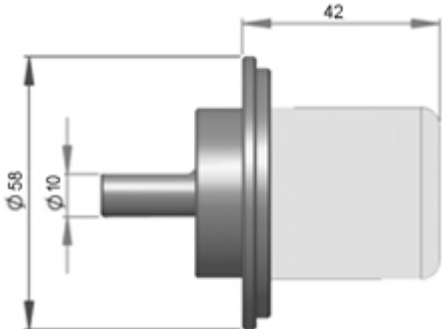


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Mechanical Models

For detailed drawings please refer our [website](#) or directly contact us. Also available as IGES Drawing and STEP 3D Model.

Flange Type	Housing and Connector Type
<p>Synchro Flange. MCD-XXXX-XXXX-S060-XXX</p> 	<p>Axial Cable Exit MCD-XXXX-XXXX-XXXX-CAW</p> 
<p>Blind Hollow Shaft / Hub Shaft MCD-XXXX-XXXX-B060-XXX</p> 	<p>M12 Connector MCD-XXXX-XXXX-XXXX-PAM</p> 
<p>Clamp Flange MCD-XXXX-XXXX-C100-XXX</p> 	<p>Axial Cable Exit with Gland MCD-XXXX-XXXX-XXXX-GAW</p> 
	<p>Radial Cable Exit</p> 

All units measured in mm

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Models / Ordering Description

Description	Type key									
Magnetocode	MCD-	--	00	-	--	--	-	--	0-	---
Interface and Version	SSI- 30Vdc	S1								
	SSI-5Vdc	SM								
Current Version	CA	00								
	CL	00								
Code	Grey	G								
	Binary	B								
Bits for Revolutions	Single-Turn			00						
	Multi-Turn (4.096 Turns)			12						
	Multi-Turn (8.192 Turns)			13						
Steps per Revolution	4096 (0.09°)			12						
Flange	Synchro flange (6mm Shaft Diameter)	S	06							
	Blind Hollow (Hub) 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 1 m, Moulded								CAW	
	Cable exit, Radial 1 m, Moulded								CRW	
	Cable exit, Axial 1 m, with Cable Gland								GAW	
	Cable exit, Axial 5 m								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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Check Out Some of the Other POSITAL Products



Absolute Magnetic Encoders for Industrial Environment

To measure rotary movements or rotary displacements, an absolute magnetic rotary encoder can be used. The contact-free measuring sensor stage of the IXARC Sensor does not have any abrasion. The Sensor can be connected directly to digital control units via SSI, CANopen or Analog Interface.

[More Information](#)



Heavy Duty Stainless steel Magnetic Encoders for the Toughest Environments

Its stainless steel housing and high protection class of IP69K makes the IXARC Heavy Duty rotary encoder resistant against active chemical cleaning and corrosion. Combined with the sturdy ball bearings this sensor is an ideal choice for reliable measurement under extreme environmental conditions and outdoor applications.

[More Information](#)



Tilt Sensors to Measure Inclinations up to 360°

TILTIX is developed on advanced MEMS technology based capacitance measurement. The sensor is a pre-calibrated device which can be put into immediate operation, upon simple and easy installation with a three point mount and setting of preset. Its compact design, installation "anywhere" and other versatile features makes it an ideal choice for very accurate measurement.

[More Information](#)

Disclaimer

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