

### DATA SHEET

#### ABSOLUTE MAGNETIC ROTARY ENCODER SSI HEAVY DUTY STAINLESS STEEL



Robust rotary sensor based on reliable magnetic technology. Its steel housing with an automotive proof coating and high protection class of IP69K make the IXARC Heavy Duty resistant against high-pressure water and corrosion. Combined with the sturdy ball bearings (for high shaft loads up to 200N) this sensor is an ideal choice for reliable measurement under extreme environmental con-

ditions and outdoor applications. The POSITAL IXARC Series uses the Wiegand effect technology to keep perfect track of the number of rotations even if the rotations are slow and/or there is no system power. The system comes without backup batteries making it maintenance free as well as ROHS compliant.

#### Main Features

- Stainless Steel Heavy Duty Design (V4A/AISI 316 L)
- Resistant against Salt Water Spray and Acids
- Protection Class IP69K & IP68
- Up to 300N Shaft Load
- Interface: SSI (Synchronous-Serial Interface)
- Housing:  $\varnothing$  38.2 mm
- Solid Shaft:  $\varnothing$  10 mm
- Max. revolution not limited (typical 13 bit)
- Preset input
- Code: Gray or Binary
- Gear and Battery Less Multi-Turn

#### Mechanical Structure

- Stainless Steel Flange and Housing
- Sturdy Ball Bearings

#### Applications

- Construction Machinery
- Cranes
- Trucks
- Offshore and Marine Equipment
- Food Production
- Chemical Industry

#### 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	4,5 – 30 V DC (absolute maximum ratings) <sup>1</sup>
Turn on time	< 1 s
Power Consumption	about 0.25 W
Electrical Lifetime	> 10 <sup>5</sup> h
EMC	Emitted interference: EN 61000-6-4 Noise immunity: EN 61000-6-2

<sup>1</sup> 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 Single Turn	< 600 µs
Multi-Turn Technology	Self supplied magnetic pulse counter (Wiegand Sensor)
Multi-Turn Resolution	Can measure up to 200 Billion revolutions, limited by memory

##### Environmental Conditions

Operating Temperature Sensor	-40 – +85° (-40 – +185°F)
Storage Temperature	-40 – +85° (-40 – +185°F)
Humidity	98 % (without liquid state)
Protection Class (EN 60529)	IP 65 / IP 67 / IP 68 / IP 69K

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#### Mechanical Data

Housing	Stainless Steel (1.4404; ASTM/AISI 316L; UNS S31603)
Flange	Stainless Steel (1.4404; ASTM/AISI 316L; UNS S31603)
Shaft	Stainless Steel (1.4112; ASTM/AISI 440B; UNS S44003)
Lifetime	Dependent on shaft version and shaft loading – refer to table
Max. Shaft Loading	Up to Axial 300 N, Radial 300 N
Friction Torque at +25°C	≤ 3 Ncm, (2.8 oz-in)
RPM (continuous operation)	Max. 6.000 RPM
Shock	EN 60068-2-27 ≤ 300 g half sine, 6 ms XYZ)
	MIL-STD-810C ≤ 200 g (half sine, 3 ms XYZ)
Permanent Shock	EN 60068-2-29 ≤ 30 g (half sine, 16 ms XYZ)
	MIL-STD-810C ≤ 30 g (half sine, 11 ms XYZ)
Vibration	EN 60068-2-6 ≤ 30 g (10 Hz – 1000 Hz XYZ)
	MIL-STD-810 ≤ 4.2 g (5 Hz – 500 Hz XYZ)
Weight (Standard Version)	≈ 180 g (0.77 lbs)

#### Minimum (mechanical) Lifetime

	Lifetime in 10 <sup>8</sup> revolutions with (F <sub>a</sub> /F <sub>r</sub> )		
	300 N/300 N	270 N/270 N	100 N/100 N
S10 Synchro Flange (MCD-...-S10G-...)	7.6	10	200

#### Cable<sup>1</sup>

Operating temperature cable	Flexing -30°C to +70°C (-22 – +158 °F)
	Static -40°C to +70°C (-40 – +158 °F)
Minimum bend radius	Flexing 10x cable diameter
	Static 5x cable diameter
Cable	Approx Ø 7 mm (~0.275 in)
	Type: LSP12YC11Y 4x2x0.35mm <sup>2</sup> - (~AWG22)

<sup>1</sup> Valid for types: MCD-...-GAW

### DATA SHEET

#### ABSOLUTE MAGNETIC ROTARY ENCODER SSI

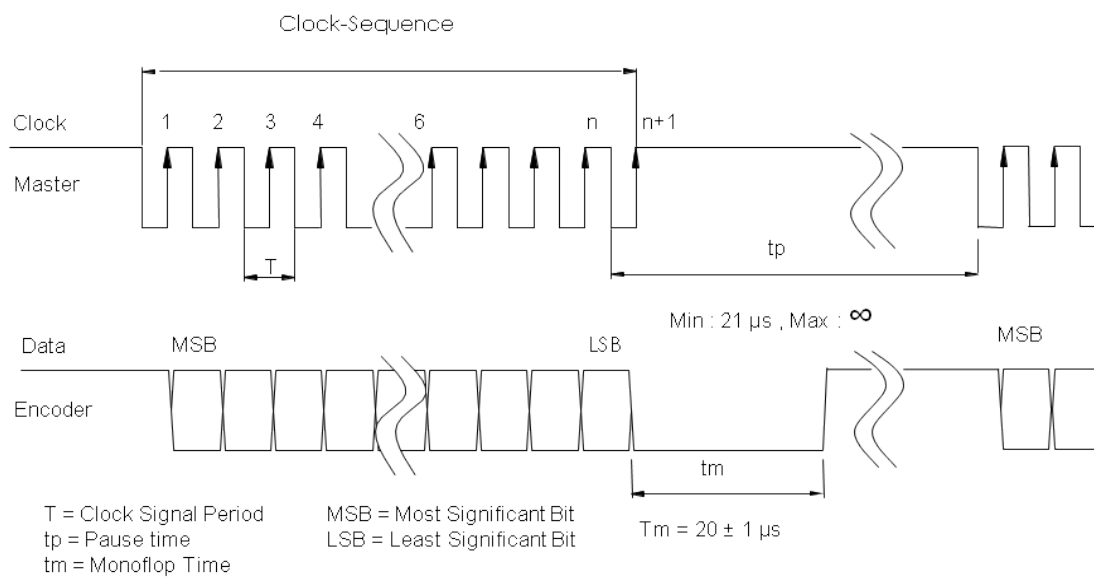
#### HEAVY DUTY STAINLESS STEEL

## Interface

### Synchronous-Serial Interface (SSI)

Driver	Driver meets EIA standard RS 422; transmission rates up to 10
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

### Synchronous-Serial Interface (SSI)



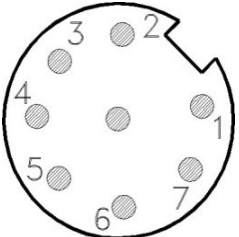
Detailed SSI-Interface description under [technical description SSI interface](#).

### DATA SHEET

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#### HEAVY DUTY STAINLESS STEEL

#### Electrical Connection

Function	Connector Pin-No.	Wire end	MCD-XXXX-XXXX-XXXX-PAM 
GND	1	white	
Supply Voltage +U <sub>b</sub>	2	brown	
SSI Clk+	3	green	
SSI Clk-	4	yellow	
SSI Data+	5	grey	
SSI Data-	6	pink	
Preset	7	Black or blue	
Complement / DIR	8	red	8 Pin M12 Connector Male (front view)

#### Preset Function

Voltage Level	Function
Input not connected or GND	inactive
Input $\geq 10V$ MCD-S1XX 10-30V max Input Voltage = $V_S$	Preset is activated. <sup>1)</sup> 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

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

#### Complement Function/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 $\leq U_B$ )	Down
Input Resistance	10 kOhm

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

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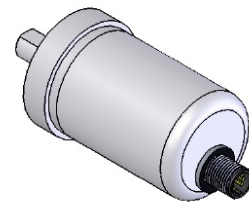
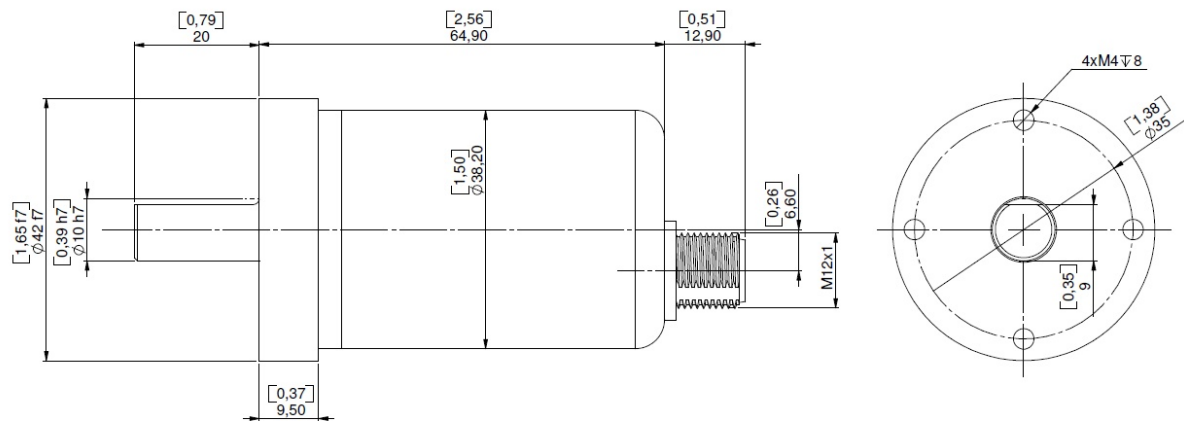
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#### Mechanical Models

#### Synchro Flange

MCD-SXXXX-XXXX-S10G PAM



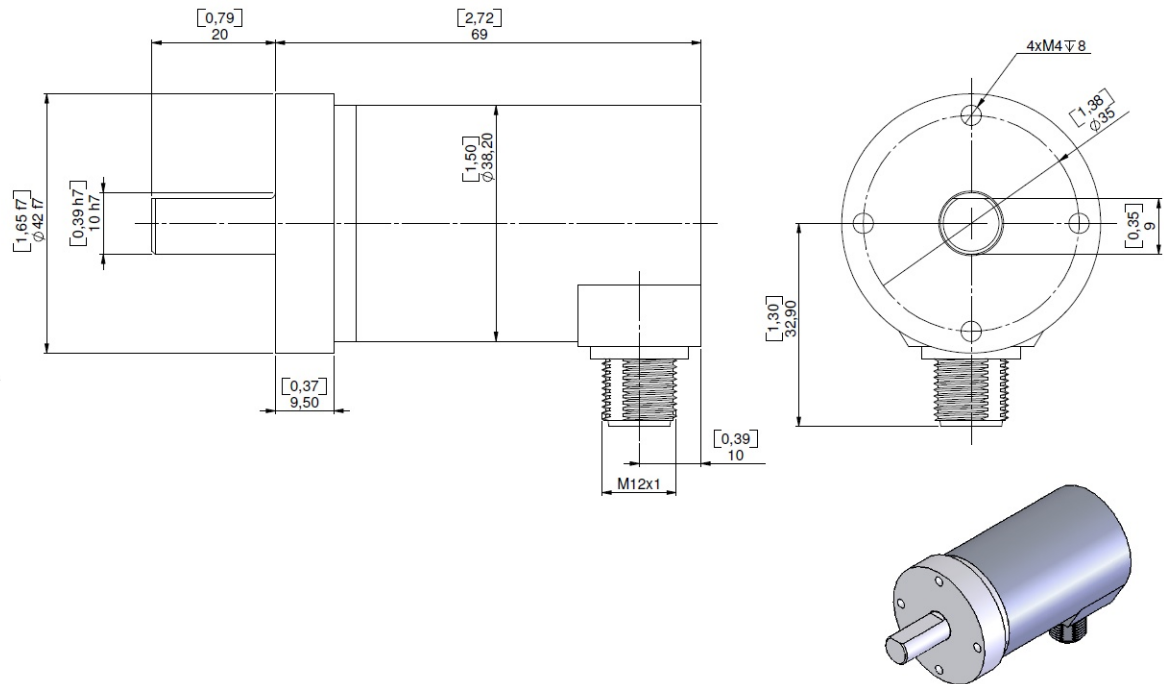
All dimensions in mm/ [inch]

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MCD-SXXXX-XXXX-S10G-PRM



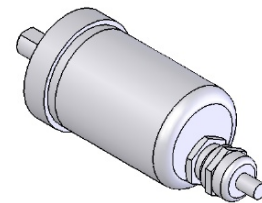
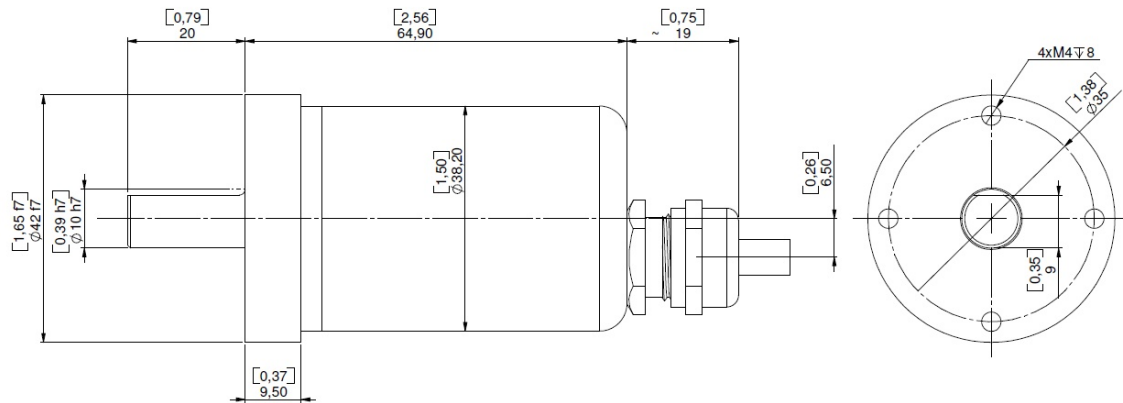
All dimensions in mm/ [inch]

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MCD-SX~~XXX-XXXX~~-S10G-GAW



All dimensions in mm/ [inch]

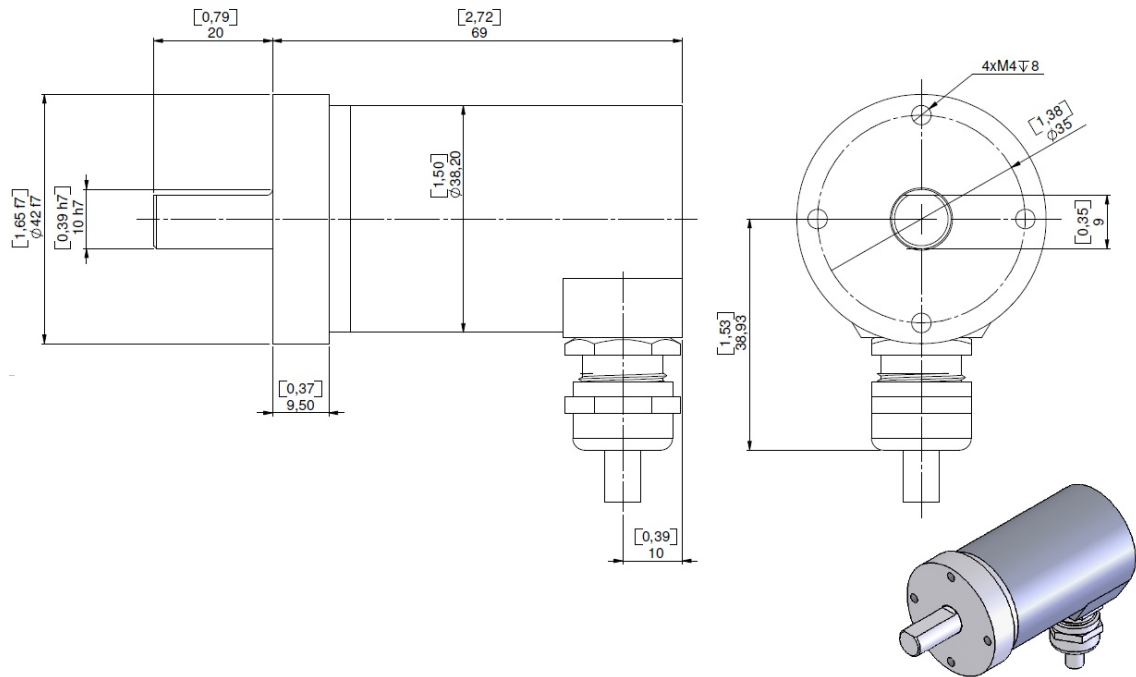


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MCD-SXXXX-XXXX-S10G-GRW



All dimensions in mm/ [inch]

For detailed drawings please refer our website as drawing, IGES Drawing and STEP 3D Model under [mechanical drawings](#) or contact us.

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#### Models / Ordering Description

Description

Magnetocode	<b>MCD-</b>	--	00	B -	--	--	G	10	<b>G-</b>	P8M
Interface/Voltage	SSI- 5-30 VDC	<b>S1</b>								
Version			<b>01</b>							
Code	Grey			<b>G</b>						
	Binary			B						
Bits for Revolutions	Single Turn					00				
	Multi Turn (4096 turns)					12				
	Multi Turn (32768 turns)					<b>13</b>				
Steps per revolution (Bits)	4096						<b>12</b>			
Flange	Synchro Flange (10 mm Shaft Diameter)						<b>G</b>			
Shaft Diameter								<b>10</b>		
Mechanical Options	Heavy Duty								<b>G</b>	
Connection	Connector: Axial M12 (5 pin)									<b>PAM</b>
	Connector: Radial M12 (5 pin)									PRM
	Cable: Axial 1 m									CAW
	Cable: Axial 2 m									2AW
	Cable: Axial 5 m									5AW
	Cable: Axial 10 m									AAW
	Cable: Radial 1 m									CRW
	Cable: Radial 2 m									2RW
	Cable: Radial 5 m									5RW
	Cable: Radial 10 m									ARW

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

Ordering example:

MCD-S100G-1312-G10G-PAM

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#### Accessories

Article No.	Article	Description steps.
34500800	P8F	Counter Connector for MCD-...-PAM (only IP67 tested)
34500801	P8F-STK8.2	Counter Connector for MCD-...-PAM with 2m PUR cable
34500802	P8F-STK8.5	Counter Connector for MCD-...-PAM with 5m PUR cable

#### List of types:

MCD-S100B-0012-S10G-PAM	MCD-S100B-1312-S10G-PAM	MCD-S100G-1212-S10G-PRM
MCD-S100B-0012-S10G-PRM	MCD-S100B-1312-S10G-PRM	MCD-S100G-1212-S10G-GAW
MCD-S100B-0012-S10G-GAW	MCD-S100B-1312-S10G-GAW	MCD-S100G-1212-S10G-GRW
MCD-S100B-0012-S10G-GRW	MCD-S100B-1312-S10G-GRW	MCD-S100G-1312-S10G-PAM
MCD-S100B-1212-S10G-PAM	MCD-S100G-0012-S10G-PAM	MCD-S100G-1312-S10G-PRM
MCD-S100B-1212-S10G-PRM	MCD-S100G-0012-S10G-PRM	MCD-S100G-1312-S10G-GAW
MCD-S100B-1212-S10G-GAW	MCD-S100G-0012-S10G-GAW	MCD-S100G-1312-S10G-GRW
MCD-S100B-1212-S10G-GRW	MCD-S100G-0012-S10G-GRW	
	MCD-S100G-1212-S10G-PAM	

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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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