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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MAGNETIC ABSOLUTE ROTARY ENCODER
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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	SCM-S1XXX- 10 - 30 V DC (absolute maximum ratings) * SCM-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 : SCM-…-CAW) Casing side: IP 64 (other types : SCM-…-P8M and SCM-…-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	(SCM-…-S060-…)	224	(20N/20N)	28	(20N/40N)	3	(20N/80N)
C100 flange	(SCM-…-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: SCM-…-CAW and SCM-…-GAW

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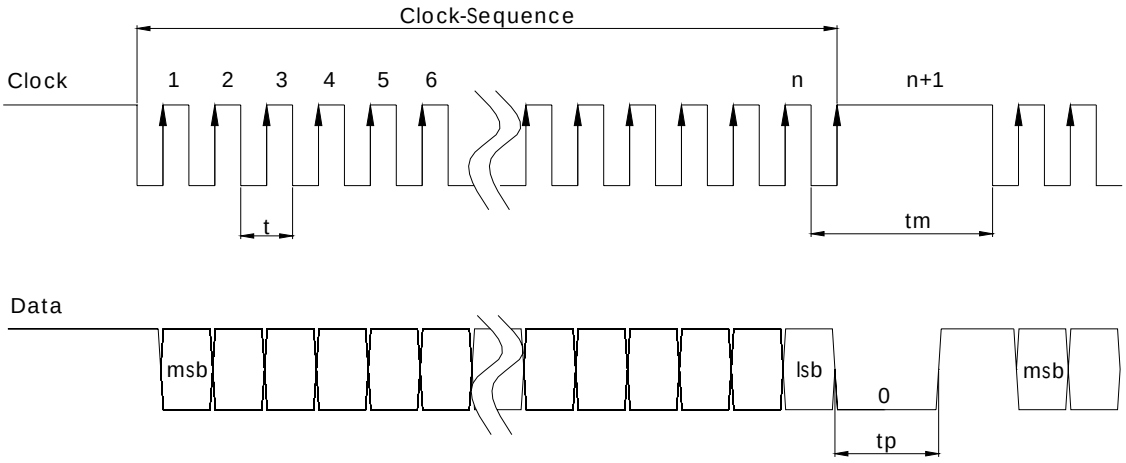
Interface

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 SSI-interface info



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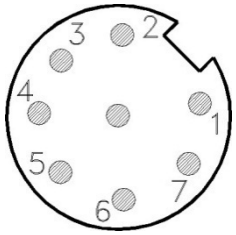
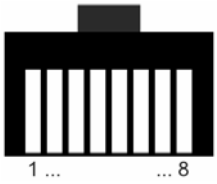
Electrical connection

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 SCM-XXXX-XXXX-XXXX-P8M	**Axial Cable Exit (*)** SCM-XXXX-XXXX-XXXX-CAW SCM-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!

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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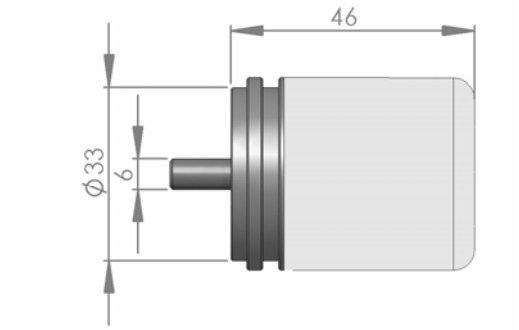
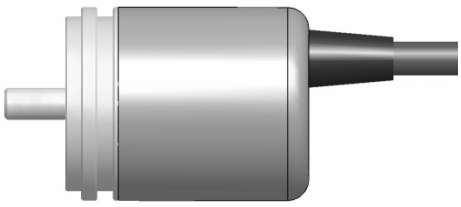
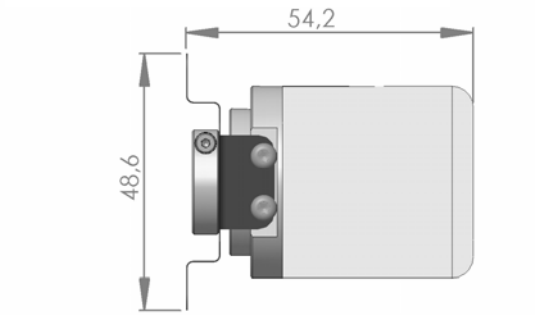
Mechanical Models

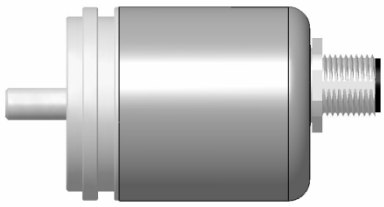
For more detailed mechanical drawing contact us

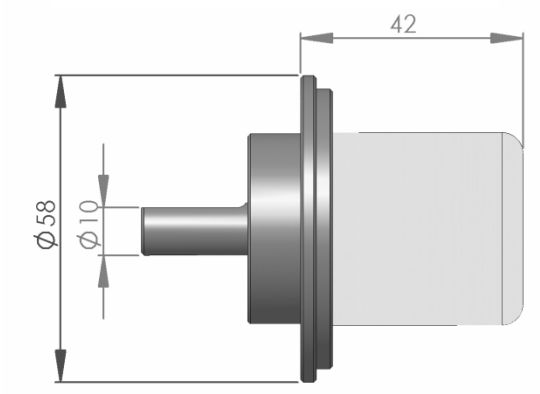
Flange Types	Housing and Connector Types
Synchro Flange SCM-XXXX-XXXX-S060-XXX	Axial Cable Exit SCM-XXXX-XXXX-XXXX-CAW
Blind Hollow Shaft SCM-XXXX-XXXX-B060-XXX	M12 Connector SCM-XXXX-XXXX-XXXX-P8M
Clamp Flange SCM-XXXX-XXXX-C100-XXX	Axial Cable Exit with Gland SCM-XXXX-XXXX-XXXX-GAW











All units measured in [mm]

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Models / Ordering Description

Description	Type key									
Magnetocode	**SCM-**	_ _	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:
SCM-S100G-1312-S060-CAW

Accessories

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

Disclaimer

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APPENDIX

Same Encoder Series also available as magnetic CANopen.

… or combined with a draw wire adapter to perform linear measurements.