SCH120M Heavy-Duty Encoder

Scancon's **SCH120M** Encoder is designed for severe duty applications where performance is critical. Rugged and reliable, it is the encoder of choice for motor and drive applications operating in rough environmental conditions.

- Encoder Body - 120 mm length
- IP 66 (~ Nema 6) Environmental Protection; electronics are fully encapsulated and are potted.
- Built-in Transient Suppression Module and Status LED

CE

Technical Specifications

Electrical

Code	Incremental Magnetic
Resolution	*See Table 1*
Supply Voltage	5 V or 9 to 30 V
Current Consumption	60 mA max. (no load)
Supply Voltage and Output Specifications for various Output Standards	TTL: Vsup = 5V +/- 5% and 5L Vhigh ≥ 4.2V @ Iout = -16 mA Vlow ≤ 0.5V @ Iout = 16 mA RS422: Vsup = 5V +/- 5% and 5L Min. differential load (Zo): 100 Ω Vdiff. ≥ 3.4V @ Zo = 100 Ω Vhigh ≥ 4.3V @ Zo = 100 Ω Vlow ≤ 0.9V @ Zo = 100 Ω HTL & HCHTL: Vsup ≥ 9V to 30V Vhigh ≥ Vsup - 1.2V@Iout = -20mA Vlow ≤ 1.0V @ Iout = 20 mA
Output Current	60 mA max. load per output channel
Output Frequency	200 kHz max. – depending on cable length
Output Format	Two channels (A, B) in quadrature with Index (Z) and Complementary outputs
Output Phase Sense	A leads B clockwise (CW)
Index	Gated with Channels A & B high; 1/4 cycle
Outputs	iC – DL Line Driver: MT, MS, and 5L OL7272 Line Driver: 3MS
Electrical Protection	Output short circuit, reverse polarity and transient surge protected (built-in module) Miswiring safe (except 3MS output)
Noise Immunity	Tested to EN61000-6-2 : 2005 and EN61000-6-3 : 2007 for EMC
Output Connections	*See Table 2*

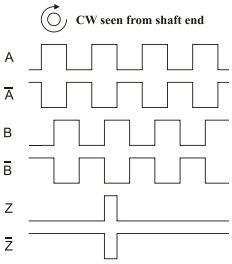
Environmental

Operating Temp.	
3MS output	-40° to +105° C
CG1 & CG2	-40° to +105° C
Cable & M23	-40° to +115° C
Storage Temp.	-40° to +105° C
Shock	100 G @ 11 ms
Vibration	10 G @ 10-2000 Hz
Bump	10 G @ 16 ms (1000 x 3 axis)
Humidity	98 % RH without condensation
Enclosure Rating	IP 66 / Nema 6 (approx.)

Mechanical

Material	Housing: Aluminum Cap: Aluminum Rotor: Aluminum
Weight	Encoder: Approx. 900 gr (1.98 lbs)
Shaft Speed	6,000 rpm max. continuous
Acceleration	10,000 rpm / sec.
Mass Moment of Inertia	750 g-cm² (10.6 x 10^{-3} oz-in-sec²)

Output Waveform



Channel tolerance	180 e° +/- 36 e°
Phase difference tolerance	90 e° +/- 18 e°
Z channel tolerance	90 e° +/- 18 e°

Table 1. Disk Resolutions ***(pulses per revolution)***

50	500	512	746	800	1000
1024	1250	1600	2000	2048	2500
3072	4096	8192			

Note: Any resolution from 1 to 10,000 ppr may be ordered

Diagnostics

LED Indicator	Alarm Output	Fault
Green	High	Unit is ok – *no faults*
Orange	Constant Low	Rotor (wheel) misaligned
Red	Constant Low	Fatal error

For more information refer to:
SCH120M Error Protection & Detection document

Ordering Code

SCH120M - [ ] - [ ] - [ ] - [**00**] - [**66**] - [ ]

1 2 3a 3b 4 5

1. Resolution

See Table 1.

2. Output

HTL *9 to 30V*	**MS**
HCHTL *9 to 30V (long cable runs)*	**3MS***
TTL and RS422 *5V in / 5V out*	**MT**
TTL and RS422 *9 to 30V in / 5V out*	**5L**

* ***Not Miswiring Protected***

3. Hollow Shaft ***Dia. x Length*** **3a 3b**

1 inch (25.4 mm)	**01 - 00**
1 1/8 inch (25.57 mm)	**02 - 00**
15/16 inch (23.81 mm)	**03 - 00**
5/8 inch (15.87 mm)	**04 - 00**
7/8 inch (22.22 mm)	**05 - 00**

4. Environmental Protection

IP 66 **66**

5. Output Connection Options

Connectors

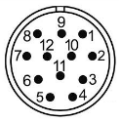
M23 12-pin *clockwise pins*	**C12**
MIL 10-pin *clockwise pins*	**C10**

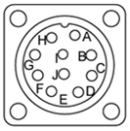
Cable Glands ***(remove End Cap to attach cable)***

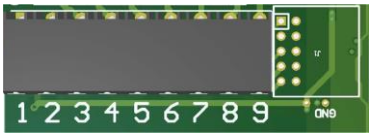
M20 for ø 08 – 11 mm cable	**CG1**
M20 for ø 11 – 14 mm cable	**CG2**

Table 2. Output Connection Options

CW







Remove End Cap to attach wires to Terminal Block located on PCB

	M23 Connector 12 pins
Pin	**Channel**
1	B -
2	*NC*
3	Z
4	Z -
5	A
6	A -
7	*NC*
8	B
9	*NC*
10	GND
11	Error
12	Vsup

	MIL Connector 10 pins
Pin	**Channel**
A	A
B	B
C	Z
D	Vsup
E	Error
F	GND
G	*NC*
H	A -
I	B -
J	Z -

GND = Circuit Ground

Connect Cable Shield to Mating Connector Housing

	Terminal Block
Terminal	**Channel**
1	Vsup
2	GND
3	Z
4	Z -
5	B
6	B -
7	A
8	A -
9	Error

GND = Circuit Ground

Use Red Cable Shoe for Shield Connection

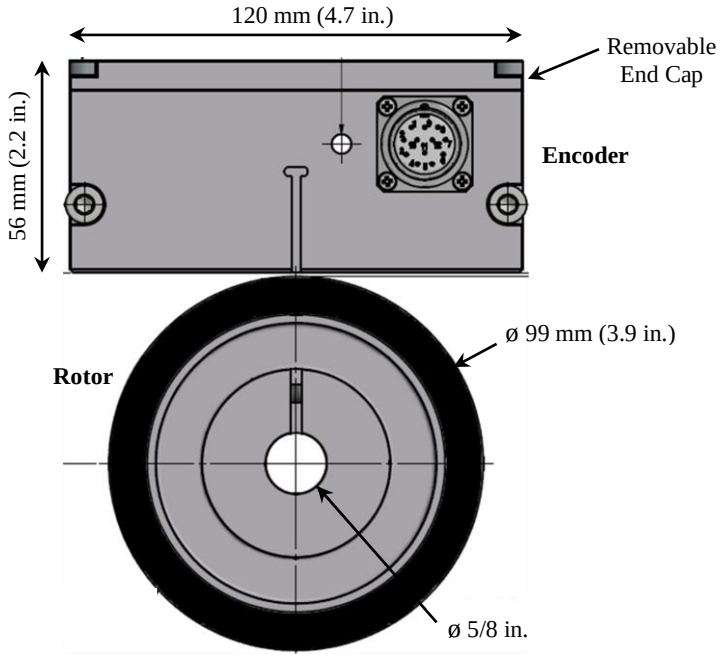
All Output Connections shown are for Differential Output (A, B, Z and Complements).

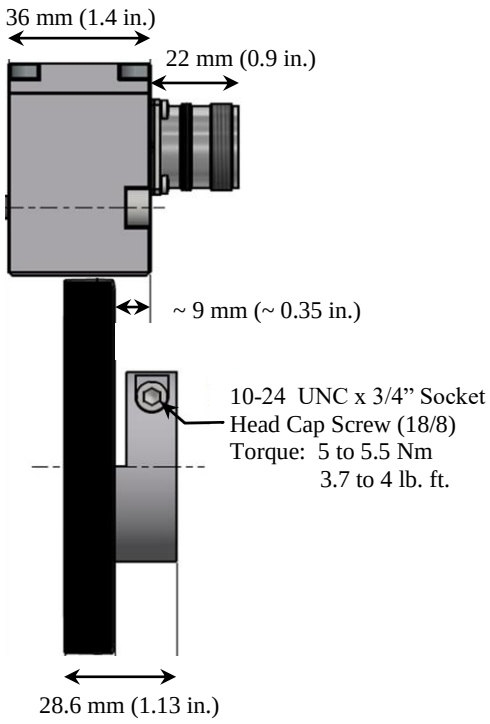
If a Standard (Single-ended) Output is required, the customer should not attach the wires for the Complementary Outputs (A-, B- & Z-).

Maximum Cable Length

MS Output :	30 m @ 150 kHz
3MS Output :	200 m @ 150 kHz
MT Output :	100 m @ 150 kHz
5L Output :	100 m @ 150 kHz

Technical Drawings





Mechanical Tolerances

Rotor Hollow Shaft ***(ISO tolerance):***	ISO 286-2 ANSI B4.2
Hollow bore ø > 10 mm to ≤ 18 mm	H7 (+ 0 / + 0.018 mm)
Hollow bore ø > 18 mm to ≤ 30 mm	H7 (+ 0 / + 0.021 mm)
Shaft ***(recommended ISO tolerance):***	ISO 286-2 ANSI B4.2
Shaft ø > 10 mm to ≤ 18 mm	h7 (- 0 / - 0.018 mm)
Shaft ø > 18 mm to ≤ 30 mm	h7 (- 0 / - 0.021 mm)
Shaft Runout (TIR) ***(recommended):***	+ / - 0.1 mm (0.004 in.)

Optimal Rotor / Encoder Gap
1.0 +/- 0.5 mm (.039 +/- .02 in.)

An easy-to-use mounting tool is provided to ensure proper placement of the rotor

Status LED / Error Output

The SCH120M is equipped with a Status LED and an Error Output. The Error Output is low (connected to GND) when activated and floating when not activated. The electrical specifications for the Error Output are:

Output Type:	Open Collector – NPN type
Pull Down Current:	1 A max.
Voltage over Output:	40 V max.

The Status LED can emit three colours: green, orange and red. The colours indicate the following:

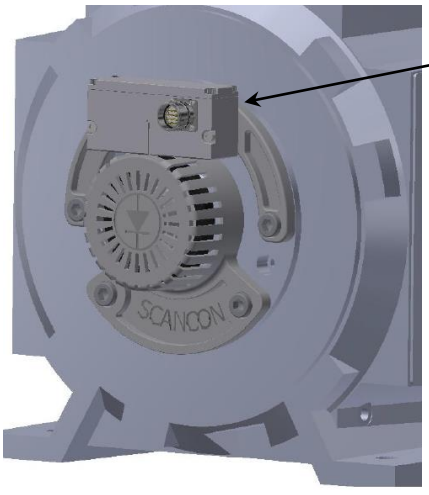
LED is not lit: The encoder is either unpowered, mis-wired or has a severe internal failure.

LED is green: The encoder is operational. No error conditions are detected. The Error Output is not activated.

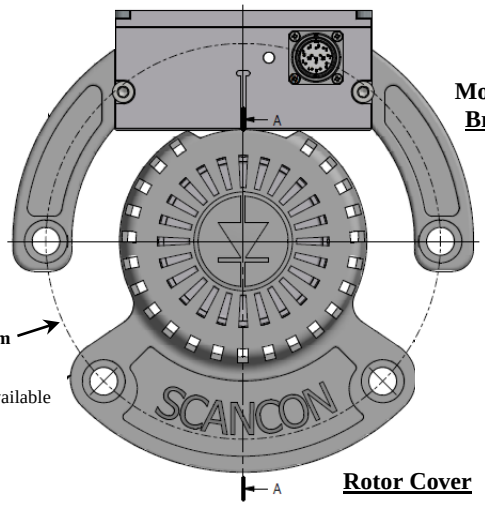
LED is orange: The internal adjustment of the encoder is out of range. The Error Output is activated. The encoder may work, but most likely with reduced accuracy. The encoder cannot be adjusted on site but must be sent to factory for adjustment.

LED is red: The internal output circuitry is overheated and has gone into thermal shutdown. The outputs are disconnected, and the Error Output is activated. The reason may be short-circuiting of outputs or mis-wiring. The outputs will automatically reconnect when the outputs cool down. The result of this will be that the LED will slowly oscillate between red and green as the outputs warm up, cool down, warm up, etc. This condition will not harm the encoder but is an indication that the encoder has not been wired correctly.

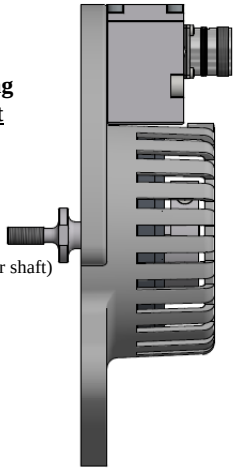
Accessories



SCH120M Encoder



Mounting Bracket



(motor shaft)

ø 184.14 mm
(7.25 in)

Other Diameters Available

Rotor Cover