Penny+Giles

A Curtiss-Wright Company

CAN OUTPUT CONTACTLESS ROTARY POSITION SENSORS

Innovation In Motion

INNOVATION IN MOTION

The SRH520CN contactless rotary sensor is a development of the Penny + Giles SRH501/2P model, with additional integrated electronics to provide a CAN bus interface according to ISO/DIS 11898.

Model SRH520CN is designed to meet the harsh operating requirements in heavy duty industrial position sensing applications, including construction, agricultural, military and utility vehicles, as well as a variety of uses in steelworks, marine equipment and power generating plants.
The SRH520CN rotary sensor operates from a 9-30Vdc unregulated supply and has a choice of two configuration modes - J1939 or CANopen.

J1939 option

The J1939 option is factory set, with the following parameters:
Direction • Baud Rate • Node ID • Frame rate
selected from the order code on page 6.

CANopen option

The CANopen option is partially customer configurable (frame rate and output direction), with a protocol according to CIA standard DS 301, and supports the Device Profile for Encoders - DS 406.
Baud rate and Node ID are factory set and should be selected from the order code on page 6.

The SRH520CN incorporates a 14bit non-contact Hall effect sensor with microprocessor control - offering 0.022° resolution.

Features

- **Contactless – Hall effect technology**
- **Integrated CAN interface**
- **J1939 or CANopen output - CAN 2.0B**
- **14 bit resolution (0.022°/LSB)**
- **Rugged housing in marine grade aluminium**
- **Superior shaft strength with duplex bearings**
- **Shaft sealing to IP68 & IP69K; connector sealing to IP67**
- **M12 connector for easy installation**
- **Rapid despatch of any option**

Benefits

- **Long life and impervious to dither vibration**
- **Avoids cost intensive separate I/O modules**
- **Maximum baud rate of 1Mbit/sec**
- **Maximum sensitivity in all applications**
- **Suitable for extreme environments**
- **Optimum performance under vibration and shock**
- **Operation in hostile environments including pressure washing**
- **Industry standard connectivity**
- **Eliminates customer inventory**

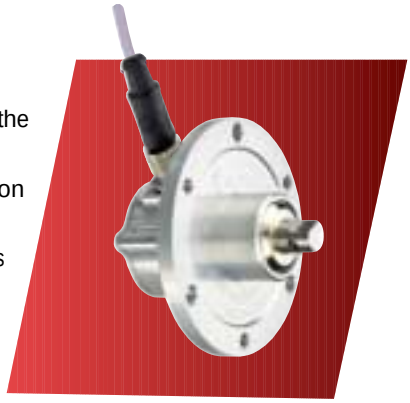
CE

EMC Directive 2004/108/EEC
The products detailed in this document have been tested to the requirements of EN 61000-4-3 (Immunity).

Quality Assurance
Penny+Giles are accredited to BS EN ISO9001:2008
Quality is at the heart of all our systems ensuring the reliability of our products from initial design to final despatch.

Certificate No. LRQ 0924881

SRH520CN CAN OUTPUT CONTACTLESS ROTARY POSITION SENSORS



Innovative, rugged design - superior protection

The SRH520CN contactless rotary sensor with CAN output has been designed to meet the harsh operating environments in heavy duty industrial position sensing applications. Based on non-contact Hall effect sensor technology it can operate in high dither vibration conditions with no deterioration of the sensing element during its lifetime. It is also highly resistant to shock which makes it ideal for many position monitoring applications on off-highway vehicles.

The sensor's housing is sealed to meet an IP68 and IP69K protection level on the operating shaft, with IP67 protection for the electrical connections when mated and locked.

Choice of mounting

The SRH520CN contactless rotary sensor can be mounted by three M6 (1/4in) clearance holes through the 87.5mm diameter mounting flange, or alternatively by three M6x1 threaded attachment holes in the front face. The sensor has a 12mm diameter stainless steel shaft with a machined flat on the surface, allowing it to be secured by a locking screw. An optional lever kit can be used to connect the sensor shaft to a moving surface via a selection of M8x1.25 threaded holes in the lever.

CANbus (CAN 2.0B)

Historically, position sensors have been connected indirectly to CAN networks via analog input/output (I/O) modules. More recently however, an increasing number of position sensors with integrated CAN interfaces have been developed which, like the Penny+Giles SRH520CN, avoid cost intensive I/O or gateway modules.

Operating from 9-30Vdc supply the SRH520CN is a development of our existing SRH501/2P models and integrates additional electronics to provide either CAN SAE J1939 or CANopen options. Both versions feature a 14 bit non-contact Hall effect sensor system offering 0.022° resolution.

[The device profile documents and EDS file can be downloaded from the SRH520CN product page on our website].

World leading availability

The SRH520CN has been 'designed for manufacture' enabling assembly in state-of-the-art manufacturing cells. This means that we can supply any of the configurations possible from the options offered, in a matter of days from ordering. This allows OEMs to reduce or eliminate their inventory and call on Penny + Giles to supply 'on demand'.

Performance assured

Penny+Giles' product development process includes exhaustive qualification testing to ensure that performance specifications published in our product brochures and technical data sheets are backed by real-life test evidence. This is our assurance to you that our designs have been tested at these parameters.

SRH520CN CAN OUTPUT
rugged contactless rotary sensors

PERFORMANCE

ELECTRICAL

Measurement range	°	360
Supply voltage	Vdc	9 to 30 unregulated
Over voltage protection	Vdc	Up to 40
Maximum supply current	mA	<80
Reverse polarity protection		Yes
Short circuit protection		Yes
Power-on settlement time	S	<1
Resolution		14bit (0.022°/LSB)
Non-linearity*	%	<±0.2
Temperature coefficient	ppm/°C	<±25

*Non-linearity is measured on a computerised calibration system

Output - Order code	**SRH520CN/J**	**SRH520CN/C**
Communication profile	CAN SAE J1939	CANopen CIA DS 301
Device profile	-	CIA DS 406
Direction	Factory set	Customer configurable
Output noise	±1 Bit	±1 Bit
Input/output delay	Maximum = selected frame rate, which is factory set	Maximum = selected frame rate, which can be customer set

MECHANICAL

Mechanical angle	°	360, continuous
Operating torque - max	g-cm	1000
Shaft velocity maximum	°/sec	3600
Weight	g	265 (without cable)
Mounting		Use 3 x M6x1 threaded holes in front face or 3 x M6 (or 1/4 UNC) clearance holes through the flange – See dimensions for details
Phasing		When the shaft flat is facing towards the M12 connector, sensor output is at mid electrical angle (±5°)

ENVIRONMENTAL

Protection class		IP68 and IP69K for shaft seal side (and rear cap seal) IP67 with mating connector and cable assembly attached and fully engaged
Life		20 million operations (10 x 10^6 cycles) of ±75° Sensing element life is essentially infinite (contactless), and the SRH520CN life figures refer to the operating shaft seal. Mechanical loads (axial and radial) on the shaft should also be a considered.
Dither life		Contactless - no degradation due to shaft dither
Shaft side load		2kg mounted on sensor shaft - tested 3 million cycles
Operational temperature†	°C	-40 to +85 (9 to 27V supply) -40 to +80 (30V supply) Derate upper temperature limit by 1.7°C for every 1V increase in supply from 27Vdc
Storage temperature	°C	-55 to +125
Vibration		BS EN 60068-2-64:1995 Sec 8.4 (31.4gn rms) 20 to 2000Hz Random
Shock		3m drop onto concrete and 2500g – all axes
EMC Immunity level		BS EN 61000-4-3:1999, to 100V/m, 80MHz to1GHz and 1.4GHz to 2.7GHz (2004/108/EC)
Salt spray		BS EN 60068-2-52: 1996, Test Kb Severity 2 (48Hrs)
Humidity		BS EN 60068-2-30: 2005, Severity Db (55°C, 93%RH)

† See Maximum Operating Temperature – Derating graph on page 6
If the maximum operating temperature is exceeded, the voltage regulator will shut down to protect the device from overheating

OPTIONS

SRH520CN/J

Output mode
Output direction
Baud rate
Node ID
Frame rate

FACTORY SET

Mode J – CAN SAE J1939
Both clockwise, both anticlockwise or CH1 CW, CH2 ACW
50, 125, 250, 500 kbit/s or 1 Mbit/s
Hexadecimal value between 01 and 7F
25, 50 or 100mS

SRH520CN/C

Output mode
Baud rate (factory set)
Node ID (factory set)
Output direction
Frame rate

PARTIALLY CONFIGURABLE VIA CANopen INTERFACE

Mode C – CANopen CiA DS 301/ DS406 (Class 1)
50, 125, 250, 500 kbit/s or 1 Mbit/s
Hexadecimal value between 01 and 7F
Can be customer configured
Can be customer configured

SRH520CN/J and SRH520CN/C

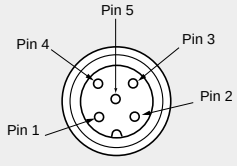
Operating levers
Mating connectors

Operating levers 155 or 230mm long can be ordered separately. See details on page 7
Mating M12 straight connector and cable assembly must be ordered separately. See details on page 6 and below.

ELECTRICAL CONNECTIONS

Series M12 screw locking receptacle fitted to sensor body. Mating cabled sockets to be ordered separately.

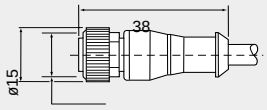
Connection details for M12 connector



M12 connector

Pin No.	Cable colour	Description
1	Screen	Cable screen
2	Red	+V supply
3	Black	0V Supply (GND)
4	White	CAN-H
5	Blue	CAN-L

M12 mating connector and cable assembly



M12 connector IP67

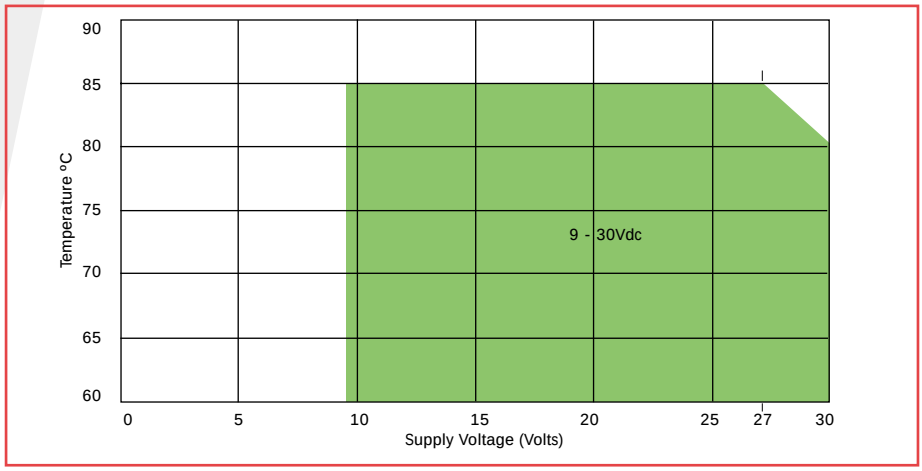
2 metre	X61-242-002
5 metre	X61-242-004
10 metre	X61-242-006

Cable type: 2 x 0.25 + 2 x 0.34mm^2 PUR (UL/CSA) jacket

Recommended connector mating torque – 0.6Nm
When connecting the sensor, care should be taken with the correct connections.
The sensor is provided with indefinite reverse polarity protection and short circuit protection between output to GND, **but if the outputs are connected to the supply this will result in device failure.**

SRH520CN

MAXIMUM OPERATING TEMPERATURE DERATING CURVE



AVAILABILITY

All standard configurations can be supplied rapidly from the factory – check with your local supplier for more details

ORDERING CODES

J1939 OUTPUT

SRH520CN/J /..... /..... /..... /.....

Mode	J =	J1939
Direction	1 =	Both clockwise
	2 =	Both anticlockwise
	3 =	CH1 clockwise; CH2 anticlockwise
Baud rate	1 =	50 kbit/s
	2 =	125 kbit/s
	3 =	250 kbit/s
	4 =	500 kbit/s
	5 =	1 Mbit/s
Node ID	Between 01 and 7F in Hexadecimal	
Frame rate	1 =	25mS
	2 =	50mS
	3 =	100mS

The above options are factory set before despatch

CANopen OUTPUT

SRH520CN/C/1/..... /.....

Mode	C =	CANopen
Output code	1 =	CANopen (DS406) Class 1
Baud rate	1 =	50 kbit/s
	2 =	125 kbit/s
	3 =	250 kbit/s
	4 =	500 kbit/s
	5 =	1 Mbit/s
Node ID	Between 01 and 7F in Hexadecimal	

Baud rate and Node ID are initially set at the factory before despatch.

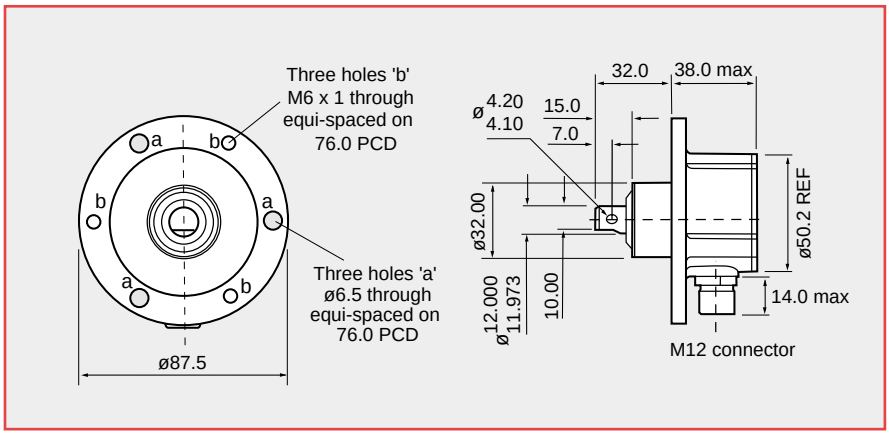
Communication functionality and objects used in the CANopen encoder profile are described in the EDS file which can be downloaded from the SRH520CN product page at www.pennyandgiles.com
Some of these objects are customer configurable via the CANopen interface.

Accessories (ordered separately)

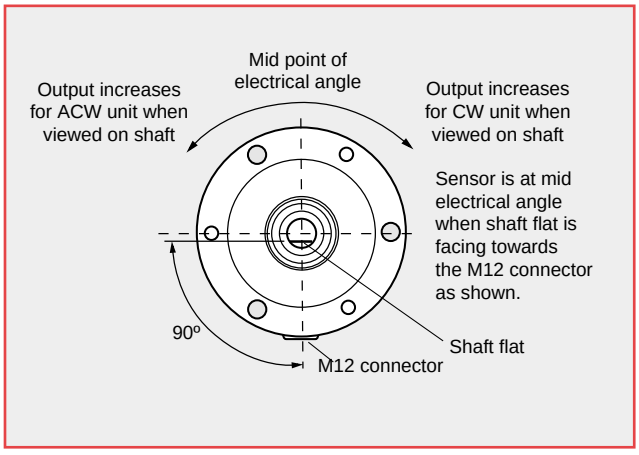
Drive lever kit, including pin	SA202195/MK1 or 2 – see page 7
Mating connector/cable assembly	2 metre length X61-242-002 see details on page 5
	5 metre length X61-242-004
	10 metre length X61-242-006

DIMENSIONS

Note: drawings not to scale

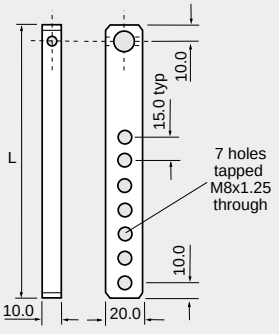


PHASING OF SHAFT TO HOUSING



LEVER OPTIONS (order separately)

Lever SA202195/MK1 L = 155
Lever SA202195/MK2 L = 230



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www.pennyandgiles.com

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