SRH880P SINGLE OUTPUT

rugged contactless rotary sensor

PERFORMANCE

ELECTRICAL

Measurement range	**°**	20 to 360 in 1° increments
Supply voltage	**Vdc**	9 to 30 (unregulated) and 5 ±0.5 (regulated)
Over voltage protection	**Vdc**	Up to 40 (-40 to +60°C)
Maximum supply current	**mA**	<12.5
Reverse polarity protection		Yes
Short circuit protection		
output to GND		Yes
output to supply		In 5V regulated mode only
Power-on settlement time	**S**	<1
Resolution	**%**	0.025 of measurement range (12 bit)
Non-linearity*	**%**	<±0.4
Temperature coefficient	**ppm/°C**	<±50

*Non-linearity is measured using the Least-Squares method on a computerised calibration system

Analog Output (order code A) – see graph on page 31

Voltage output range		
9-30V supply	**Vdc**	Absolute voltage, 0.5 to 4.5 over measurement range (±3%)
5V supply	**Vdc**	Ratiometric output voltage - 10 to 90% of Vs over measurement range(±1%)
Monotonic range	**Vdc**	0.25 (5%) and 4.75 (95%) nominal
Load resistance	**Ω**	10k minimum (resistive to GND)
Output noise	**mVrms**	<1
Input/output delay	**mS**	<2

PWM Output (order code P) – See output characteristics on page 31

PWM frequency		**Hz**	244 ±20% over temperature range
PWM levels	**9-30V supply**	**Vdc**	0 and 5 nominal (±3%)
	5V supply	**Vdc**	0 and Vs (±1%)
Duty cycle		**%**	10 to 90 over measurement range
Monotonic range		**%**	5 and 95 nominal
Load resistance		**Ω**	10k minimum (resistive to GND)
Rise/fall time		**µS**	<20

MECHANICAL

Mechanical angle	**°**	360, continuous
Operating torque - max	**g-cm**	1000
Shaft velocity max	**°/sec**	3600
Weight	**g**	500
Mounting		Use 3 x M6 threaded holes in front face or 3 x M6 clearance holes through the body - see dimensions for details
Phasing		When the shaft flat is facing the scribed mark on the front face (as shown in the diagram), sensor output is at mid travel (±5°)

SRH880P

ENVIRONMENTAL

Protection class		IP68
Life		20 million operations (10 x 10^6 cycles) of ±75° Sensing element life is essentially infinite (contactless), but the SRH880P life figures refer to the shaft seal. Mechanical load (axial and radial) on the shaft should also be considered.
Dither life		Contactless - no degradation due to shaft dither
Operational temperature†	°C	-40 to +120 (5V and 9V supply) -40 to +90 (30V supply)
Storage temperature	°C	-55 to +125
Vibration		10 to 2000Hz Random – 12.6gn rms – all axes
Shock		Survival to 2500g – all axes
EMC Immunity level		BS EN 61000-4-3:1999 to 100V/m, 80MHz to 1GHz and 1.4GHz to 2.7GHz (2004/108/EC)

† If the maximum operating temperature is exceeded, the voltage regulator will shut down to protect the device from overheating

OPTIONS

Measurement range (angle)	Select from 20° to 360° in 1° increments (factory programmed) for each output channel
Output	Analog voltage (A) or PWM (Pn)
Output direction	Clockwise or Anticlockwise shaft rotation with increasing output
Cabled socket	2m or 5m cabled socket assemblies available
Body material	Optional anodised aluminium or corrosion resistant stainless steel housing
Operating levers	Operating levers 155 or 230mm long should be ordered separately. See details page 25
OEM options	Outputs can be programmed to provide: non linear laws; switch outputs; clamp voltages; alternative PWM frequencies; faster input/output delay; extended analog range; and output mapping for potentiometer replacements.

AVAILABILITY

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

ORDERING CODES

SRH880P/ ..... / ..... / ..... / ..... / .....

Measuring range	= angle in °
Output	A = Analog P = PWM
Direction	1 = Clockwise 2 = Anticlockwise
Cabled socket	00 = None 02 = 2m 05 = 5m
Body material	AL = Aluminium SS = Stainless steel

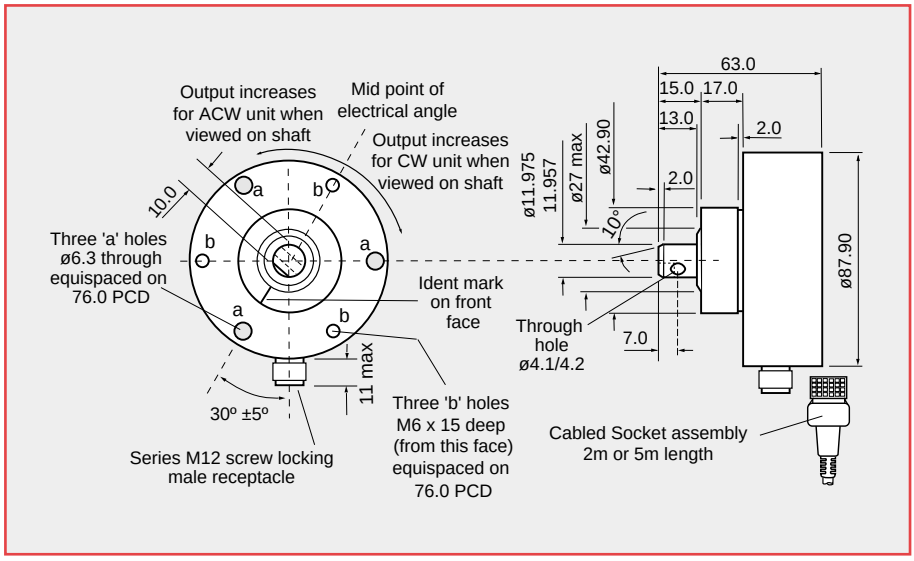
Accessories (order separately)
Drive lever kit – SA202195/MK - see page 25

DIMENSIONS

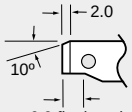
Note: drawings not to scale

LEVER OPTIONS

See SRH501P page 25



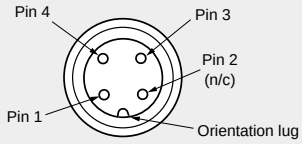
SHAFT FLAT DETAIL



ELECTRICAL CONNECTIONS

Straight cabled socket

E series M12 to IEC 61076-2-101(Ed.1) /IEC 60947-5-2,
PUR jacket
Conforms to VDE 0472 part 804
Cable temperature range -25 to +90°C



M12 connector

Cabled socket
2 metre long No. X61-169-102
5 metre long No. X61-169-105

Pin No.	Cable colour	Description
1	Brown	0V Supply (GND)
2	Not connected	
3	Blue	+V Supply
4	Black	Output

Output increases with CW or ACW rotation viewed on shaft - depending on selected order code

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 (Pin 4 - Black) to GND (Pin 1 - Brown), **but if the output (Pin 4 - Black) is connected to the supply this will result in device failure.**

Penny+Giles

A Curtiss-Wright Company

CONTACTLESS ROTARY POSITION SENSORS

INNOVATION IN MOTION

The Penny+Giles contactless rotary position sensors have been specially developed to provide maximum performance under extremes of temperature, humidity, vibration, shock and immersion. Using the latest advances in 12bit Hall effect sensing technology, this expanded range of new generation sensors are factory programmed to provide the user with a wide range of previously unavailable options, including single or dual redundant outputs, clockwise or anticlockwise rotation and measurement angles from 0-20° to 0-360° in 1° increments.

This sensor range is ideally suited to operate in extremely hostile applications that are typical in motorsport, off-road specialist vehicles, military vehicles and heavy industrial machinery.

Contactless magnetic rotary sensor IC

The NRH/TPS/SRH series use a high performance, factory programmable 12 bit magnetic rotary sensor IC that includes integrated Hall elements and digital signal processing. The angular position information is provided by a magnet integrated with the sensor's shaft, or supplied separately. The sensor provides a pulse width modulated signal or an absolute analog voltage signal. Most models are designed to operate from either a 5Vdc regulated or 9-30Vdc unregulated supply, with a high stability circuit and EMC immunity to 100V/m.

Features

- **Contactless technology**
- **Absolute analog or digital (PWM) output**
- **Measuring range from 20° to 360° in 1° increments**
- **Single or Dual outputs**
- **Temperature error less than 50ppm/°C**
- **Rugged housing and shaft designs**
- **Protection up to IP69K**
- **Choice of shaft attachments and mountings**
- **Rapid despatch of any option**
- **CE approved**

Benefits

- **Long life and impervious to dither vibration**
- **No loss of position on power down**
- **Maximum sensitivity in all applications**
- **Optional redundant output for safety critical applications**
- **Maximises system accuracy over temperature range**
- **Suitable for extreme environments**
- **Operation in hostile environments including pressure washing**
- **Interchangeable with existing installations**
- **Eliminates customer inventory**
- **Confidence in EMC performance**

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.

Design Statement

The design of models SRH501P and SRH502P are subject to Community Registered Design No 000961610-0001.

The majority of our designs include an input protector circuit (Patent

Innovative, rugged designs - superior protection

All models in our range have been designed to offer the best combination of materials and mounting styles that ensure survivability in the most rugged applications. We use sealing systems and cable connections that offer superior protection against the most hostile of operating conditions.

Impressive environmental capability

Designed with 21st century applications in mind most of our models can withstand operating temperatures from -40°C to +140°C (+170°C for 72 hours with our NRH and TPS models) and have been tested to withstand severe shock and vibration. All sensors have protection to at least IP68 rating, with some models offering protection to IP69K. With an EMC immunity of 100V/m, these position sensors are ready for the harshest applications.

Superior performance

This range of sensors has an impressive performance specification and most can operate from a 5Vdc regulated or 9 – 30Vdc supply.

Outputs can be PWM or analog voltage (nominal 0.5 - 4.5Vdc) over the measurement range, with clockwise or anticlockwise shaft rotation. A choice of 341 different electrical angles from 20° to 360° are possible. 12 bit resolution (0.025%) is available over the selected measuring range, with a non-linearity better than ±0.4% and temperature stability better than ±50ppm/°C. The sensor's analog output option has a very low output noise level of less than 1mV rms.

World leading availability

All models have been 'designed for manufacture' which enables 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.

* The qualification and suitability of these products in any customer specific application is the responsibility of the customer, unless otherwise agreed with Penny+Giles.

Selection Guide

Penny+Giles offers the widest choice of options to suit your unique application. We can also offer a custom design service if one of our standard models does not suit your requirements.

NRH280DP

- **Dual output**
- **6.5mm deep with metal flange**
- **Separate magnet assembly**
- **Sealed to IP69K**
- **Raychem™ DR25 cable**

NRH285DR

- **Dual input/dual output version of NRH280DP**
- **5Vdc operation only**

SRH220DR

- **Dual input/dual output**
- **28 x 38mm body with crush proof flange**
- **Sealed to IP68**
- **Integrated connector**

SRH280P

- **Single output**
- **28mm body with crush proof flange**
- **Three shaft styles**
- **Sealed to IP68**

SRH280DP

- **Dual output**
- **Raychem™ DR25 cable**
- **28mm body with crush proof flange**
- **Three shaft styles**
- **Sealed to IP68**

TPS280DP

- **Dual output**
- **D drive**
- **Sealed to IP68**
- **25mm body with crush proof flange**
- **Raychem™ DR25 cable+connector**

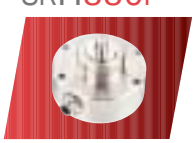
SRH501P

- **Single output**
- **87.5mm mounting flange**
- **Marine grade alloy housing**
- **Sealed to IP69K**

SRH502P

- **Dual output**
- **87.5mm mounting flange**
- **Marine grade alloy housing**
- **Sealed to IP69K**

SRH880P



- **Single output**
- **88 mm body**
- **Aluminum or stainless steel housing**
- **Sealed to IP68M**

Penny+Giles
A Curtiss-Wright Company

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