Penny & Giles

Hall-Effect Rotary Position Sensor

SRH301 & SRH302

- **Non-contacting Hall-effect technology**
- **Simple mounting, low-profile design**
- **Measurement angle 20-360°**
- **5V or 9-30V supply options**
- **Single- or dual-redundant-output options**
- **Analog output – 0.5-4.5V or 0.2-4.8V**
- **PWM output option**
- **Fail-safe outputs**
- **Sealing to IP69K**
- **AMP or Deutsch connector options**
- **Flying-lead option**
- **Protective cable-conduit option**

The SRH301 and SRH302 range of shaft-operated Rotary Position Sensors offers the optimal combination of performance, safety and cost. The sensor utilises proven Hall-effect, sensing technology in a low-profile (17.3mm) housing with integral magnet.

The circuit design allows the sensor to be run from a regulated 5V supply or a varying voltage in the range of 9-30V, such as a vehicle's battery.

The electrical output span can be set to correspond to rotations of 20° to 360°, and the positional information is determined by the angle of the integral magnet relative to the sensor. The integral magnet arrangement ensures a consistent sensor-magnet separation, avoiding errors associated with air-gap fluctuations.

The SRH301 range has a single output, while the SRH302 contains two completely independent measuring circuits, each with its own power supply, meaning high-performing, safety-critical applications can easily be addressed. The versatile, factory-programmable electronics can be easily set to one of two analog voltage output ranges or one of three PWM frequencies. In addition, the polarities of each of the analog outputs can be independently set.

The SRH301 and SRH302 both contain on-board diagnostic functions that mean the outputs can be put into safe, pre-defined states should an internal sensor error be detected.

The sealed design offers exceptional levels of performance with respect to water and dust, shock, vibration and temperature, meaning the sensor is ideal for use in hostile, on- and off-highway vehicle environments.

Connection options are industry-standard AMP Superseal or Deutsch DT04 series connectors, or simple flying leads for customer termination. The sensor can also be supplied with a protective conduit for the cabling.

SPECIFICATIONS

ELECTRICAL	
MEASUREMENT RANGE	20-360° in 1° increments
SUPPLY VOLTAGE	5Vdc ± 0.5Vdc and 9-30Vdc – auto-selects
SUPPLY CURRENT	<17.5mA per output channel
SUPPLY REVERSE POLARITY PROTECTION	Yes
SHORT-CIRCUIT PROTECTION TO GND	Yes
SHORT-CIRCUIT PROTECTION TO SUPPLY	When used with 5Vdc regulated supply only
OVER-VOLTAGE PROTECTION	up to 40Vdc
POWER-ON SETTLEMENT	<1s
RESOLUTION	12-bit (0.025% of measurement range)
LINEARITY (ABSOLUTE)	±0.4%
TEMPERATURE COEFFICIENT	<30ppm/°C in 5Vdc mode, <110ppm/°C in 9-30Vdc mode
VOLTAGE OUTPUTS	
0.5-4.5V OUTPUT OPTION (5V SUPPLY)	10-90% ±1% of Vsupply over measurement range
0.5-4.5V OUTPUT OPTION (9-30V SUPPLY)	0.5-4.5V ±3% absolute
MONOTONIC RANGE (0.5-4.5V OUTPUT OPTION)	5%/0.25V to 95%/4.75V nominal
0.2-4.8V OUTPUT OPTION (5V SUPPLY)	4-96% ±1% of Vsupply over measurement range
0.2-4.8V OUTPUT OPTION (9-30V SUPPLY)	0.2-4.8V ±3% absolute
MONOTONIC RANGE (0.2-4.8V OUTPUT OPTION)	2%/0.1V to 98%/4.9V nominal
LOAD RESISTANCE	10kΩ min. (resistive to GND)
OUTPUT NOISE	<1mV rms
INPUT/OUTPUT DELAY	<2ms
PWM OUTPUTS	
PWM FREQUENCY	244Hz, 500Hz or 1kHz ±20%
PWM LEVELS (5V SUPPLY)	0V and Vsupply ±1%
PWM LEVELS (9-30V SUPPLY)	0V and 5V ±3% nominal
DUTY CYCLE	10-90% over measurement range
MONOTONIC RANGE	5-95% nominal
LOAD RESISTANCE	10kΩ min. (resistive to GND)
RISE/FALL TIME	<15µs typical
MECHANICAL	
MECHANICAL ANGLE	360° continuous
OPERATING SPEED, MAX.	3600°/s
TORQUE	120 gm cm max
WEIGHT	<70g
MOUNTING	2x holes to suit M4 screws tightened to 2.9Nm
CABLE	18AWG 1.65mm OD
ENVIRONMENTAL	
OPERATING TEMPERATURE	-40°C to 140°C (-40°C to 120°C if conduit fitted) -40°C to 135.7°C at 9V (de-rate by 1.7°C for each 1V increase)
STORAGE TEMPERATURE	-40°C to 140°C (-40°C to 120°C if conduit fitted)
SEALING	IP69K (excluding connector) if conduit fitted
VIBRATION	BS EN 60068-2-64; 1995 Sec 8.4 (31.4g rms) 20 to 2000Hz
SHOCK	Survival to 2500g all axes
FE	20 million operations
MTTFd	> 300 years
ELECTROMAGNETIC INTERFERENCE	EN 61000-4-3 to 100V/m 80-1000MHz & 1.4-2.7GHz

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