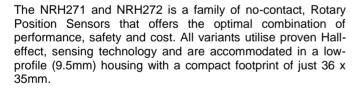


## Penny & Giles No-Contact, Rotary Position Sensor NRH271 & NRH272

- No-Contact Hall-effect technology
- Wear-Free unlimited mechanical life
- Simple mounting, low-profile design
- Measurement angle 20-360°
- 5V or 9-30V supply options
- Single or dual redundant outputs
- Analog output 0.5-4.5V or 0.2-4.8V
- PWM output 244Hz, 500Hz or 1,000Hz
- · Fail-safe outputs
- Encapsulated electronics
- Sealing to IP67
- AMP or Deutsch connector options
- Flying-lead option
- Protective cable conduit option



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 supplied magnet relative to the sensor body. The maximum air gap between magnet and sensor is 7mm, while concentric offsets of up to 2mm can be tolerated with minimal impact on output linearity. The magnet can be supplied in a convenient carrier, housed in a bolt, as a plug or loose.

A choice of power supply options are available – one for connection to a regulated 5V supply and the other to a varying voltage in the range of 9-30V, such as a vehicle's battery. The NRH271 range has a single output, while the NRH272 has a second, redundant output. In addition, the NRH272 contains two completely independent measuring circuits, each with its



own power supply, meaning high-performing, safety-critical applications can easily be addressed. Furthermore, both models 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 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.

A fully encapsulated 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 (IP68 rated) or Deutsch DT04 series (IP67 rated) 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 or 5Vdc ± 0.5Vdc and 9-30Vdc - auto-selects

SUPPLY CURRENT NRH271: <12.5mA NRH272: <25mA

SUPPLY REVERSE POLARITY PROTECTION Yes SHORT-CIRCUIT PROTECTION TO GND Yes

SHORT-CIRCUIT PROTECTION TO SUPPLY When used with 5Vdc supply only

**OVER-VOLTAGE PROTECTION** Up to 12Vdc with 5Vdc supply only, up to 40Vdc with 9-30Vdc option

**POWER-ON SETTLEMENT** <1s

RESOLUTION 12-bit (0.025% of measurement range)

LINEARITY (ABSOLUTE) ±0.4% with 5Vdc supply only, ±0.6% with 9-30Vdc option

TEMPERATURE COEFFICIENT <30ppm/°C (<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) 1%/0.05V to 99%/4.95V nominal LOAD RESISTANCE  $10k\Omega$  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  $10k\Omega$  min. (resistive to GND)

RISE/FALL TIME <15µs typical

**MECHANICAL** 

MECHANICAL ANGLE 360° continuous

MAXIMUM OPERATING SPEED 3600°/s WEIGHT <100g **MOUNTING** 2x M3 screws

**CABLE** Spec 44A wires 18AWG 1.65mm OD

**ENVIRONMENTAL** 

**OPERATING TEMPERATURE (5V SUPPLY)** -40°C to 140°C (limited to 120°C if conduit fitted)

OPERATING TEMPERATURE (9-30V SUPPLY) -40°C to 135.2°C at 9Vdc (de-rate upper temperature by 1.7°C per volt increase)

**SEALING** AMP connector: IP68, Deutsch connector: IP67

**VIBRATION** EN 60068-2-64: 1995 section 8.4 (31.4gn rms) 20-2000Hz random

SHOCK 3m drop onto concrete and 2500g

LIFE Virtually infinite MTTFd > 600 years

**ELECTROMAGNETIC INTERFERENCE** EN 61000-4-3: 1999 to 100V/m 80-1000MHz & 1.4-2.7GHz

SALT SPRAY BS EN 60068-2-52 test Kb severity 2

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cwia.cn@curtisswright.com

www.cw-industrial.com

