



The Penny & Giles dual redundant output, no-contact rotary position sensor has a slim, low profile rectangular housing (36 x 35mm), and uses a factory programmable 12 bit Hall effect sensor system.

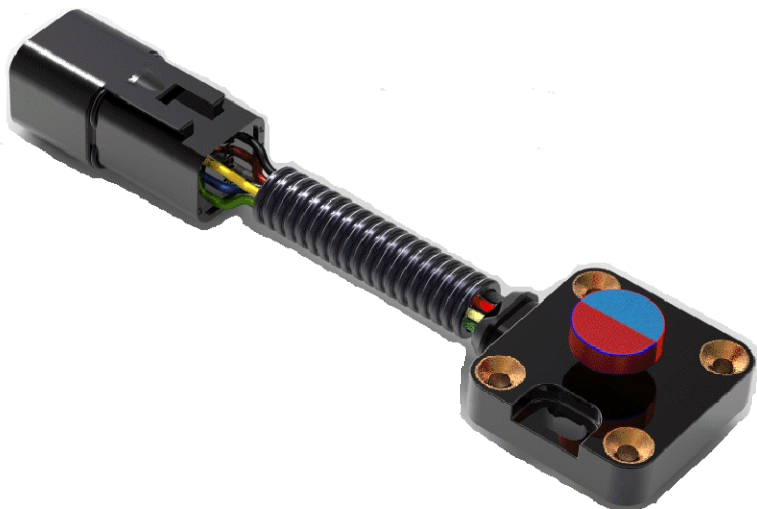
NRH275DR has a fully encapsulated sensor system that can withstand high shock and vibration as well as operate up to 140°C, with environmental protection to IP67 (dust protection and water immersion to 1m depth for 24 hours).

The sensor is activated by a separate magnet with a choice of three mounting styles.

NRH275DR is designed for applications in extreme environments where space is limited. It also allows up to ± 2 mm radial magnet offset, with a permissible air gap of 2-7mm between the sensor and magnet.

NRH275DR operates from a 5Vdc regulated supply and is factory programmed to allow a wide range of output configurations which include CH1 angle; CH2 angle; Output type; Output direction; Electrical connections.

NRH275DR is ideally suited to operate in hostile environmental conditions on a range of applications with specialty vehicles - such as articulated dump trucks (tip control), garbage collection vehicles (bin lift control), road sweeping vehicles (4-wheel steering), and racing cars (throttle pedal position).



Key Features

- NO CONTACT – Hall effect technology
- Unlimited mechanical lifetime – WEAR FREE
- Simple mounting, low profile design
- Dual redundant outputs
- Analog (Vdc) outputs – 0.1-4.9 or 0.5-4.5Vdc
- Optional Digital (PWM) outputs
- Environmental protection to IP67
- 18 AWG wires suitable for AMP or Deutsch connectors
- Optional NC10 conduit tube protection

NRH275DR

NO CONTACT ROTARY POSITION SENSOR

PERFORMANCE

ELECTRICAL

| | | |
|-----------------------------|--------|---|
| Measurement range | ° | 20 to 360 in 1°increments |
| Supply voltage | Vdc | 5 ±0.5 (regulated) to each independent sensor channel |
| Over voltage protection | Vdc | Up to 12 (-40 to +60°C) |
| Maximum supply current | mA | <12.5 each independent supply (<25 total) |
| Reverse polarity protection | | Yes |
| Short circuit protection | | |
| Output to GND | | Yes |
| Output to supply | | Yes (up to 10Vdc) |
| Power-on settlement time | S | <1 |
| Resolution | % | 0.025 of measurement range (12bit) |
| Non-linearity* | % | < ±0.4 |
| Temperature coefficient | ppm/°C | < ±30 |

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

Analog Output (order code A1, A4, A6 or A7)

| | | |
|----------------------|-------|--|
| Voltage output range | Vdc | Ratiometric output voltage – 10 to 90% (A1, A6) or 2 to 98% (A4, A7) of Vsupply over measurement range (±1%) |
| Monotonic range | Vdc | 0.25 (5%) and 4.75 (95%) nominal (A1, A6) 0.05 (1%) and 4.95 (99%) nominal (A4, A7) |
| Load resistance | Ω | 10k minimum (resistive to GND) |
| Output noise | mVrms | <1 |
| Input/output delay | mS | <2 (A1, A4) (<0.6 is optional for this parameter- A6, A7) |

PWM Output (order code Pn)

| | | |
|-----------------|-----|---|
| PWM frequency | Hz | 244 ±20% over temperature range (P1) with options for 500 (P2) or 1000 (P3) |
| PWM levels | Vdc | 0 and Vsupply (±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 | <15 |

MECHANICAL

| | | |
|--------------------------|-------|---|
| Mechanical angle | ° | 360, continuous |
| Maximum rotational speed | °/sec | 3600 |
| Weight | G | <100 |
| Mounting | | Use 4 x M3 CSK head screws. Bolt (B) or Plug (P) or Magnet only (M) options are available for the customer to assemble to their equipment or integrate into their design |
| Phasing | | When magnet/carrier ident feature is facing toward the sensor and cable exit, sensor output is at mid travel. Sensor and magnet are supplied as a matched pair. |

ENVIRONMENTAL

| | | |
|-------------------------|----|--|
| Protection class | | IP67 |
| Life | | This product has no contacting mechanical parts |
| Dither life | | Contactless – no degradation due to mechanism dither |
| Operational temperature | °C | -40 to +140 |
| Storage temperature | °C | -55 to +140 |
| Vibration | | BS EN 60068-2-64: 1995 Sec 8.4 (31.4gn rms) 20 to 2000Hz Random |
| Shock | | 3m drop onto concrete and 2500g |
| EMC immunity level | | BS EN 61000-4-3:1999 to 100V/m. 80MHz to 1GHz and 1.4GHz to 2.7GHz (2004/108/EC) |

DIMENSIONS and ORDERING CODES

See following pages

ELECTRICAL CONNECTIONS [options]

| | |
|------------------|---|
| Individual wires | Spec 44A wire x 6; 18 AWG, 1.65mm diameter |
| Connectors | Deutsch 6 way (DTM04 6P) or AMP Superseal 1.5 |
| Conduit | NC10 conduit tube can be fitted as an option |

METRIC
IF IN DOUBT ASK

All specification data on this drawing has been tested and documented by Penny & Giles unless otherwise stated.
The qualification and suitability of this product in any customer specific application is the responsibility of the customer unless otherwise agreed with Penny & Giles.

| | | | | | |
|-----|----------|-------|----------|-----|-----|
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FIG 1. **NRH275DR Magnet Misalignment Vs Linearity**

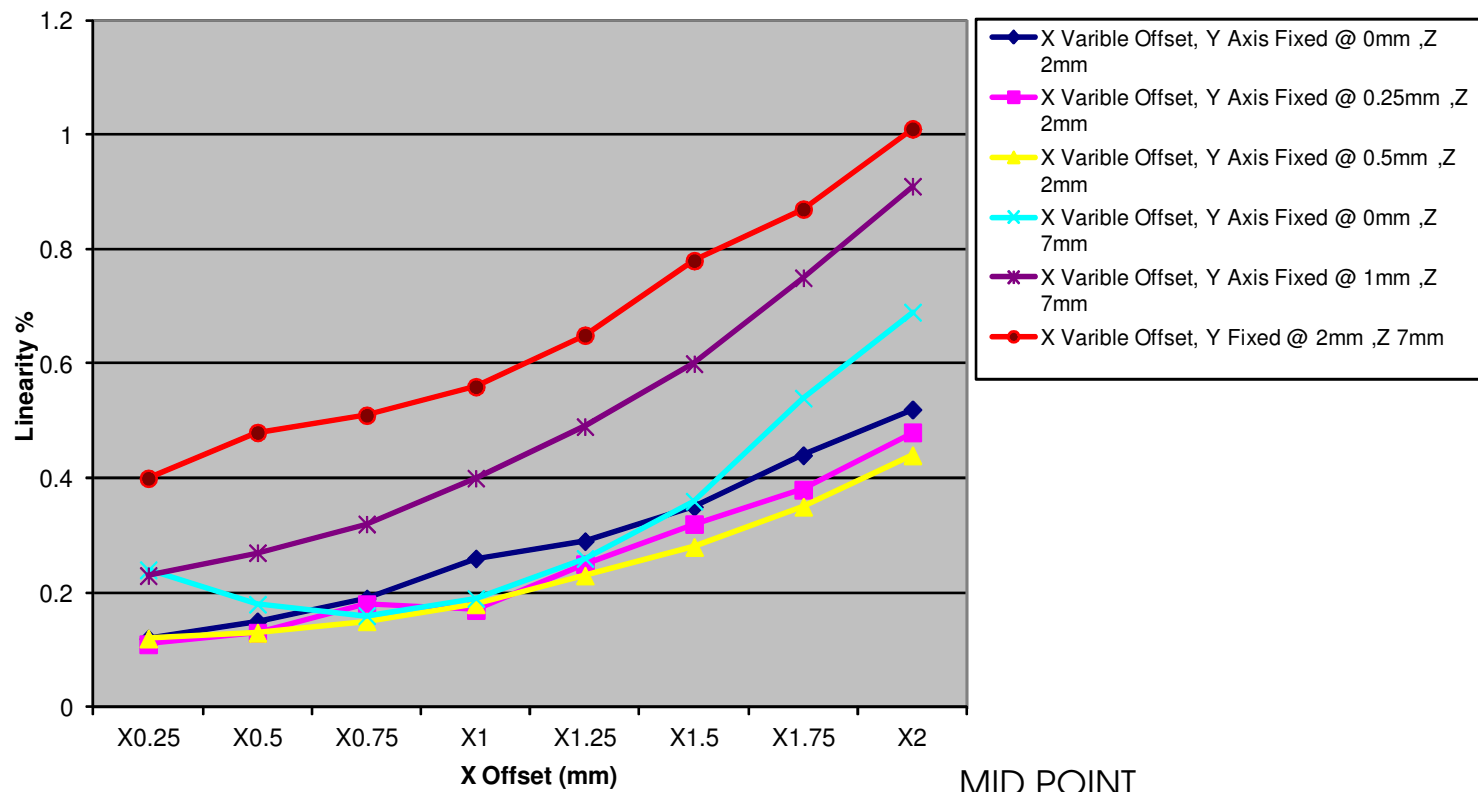
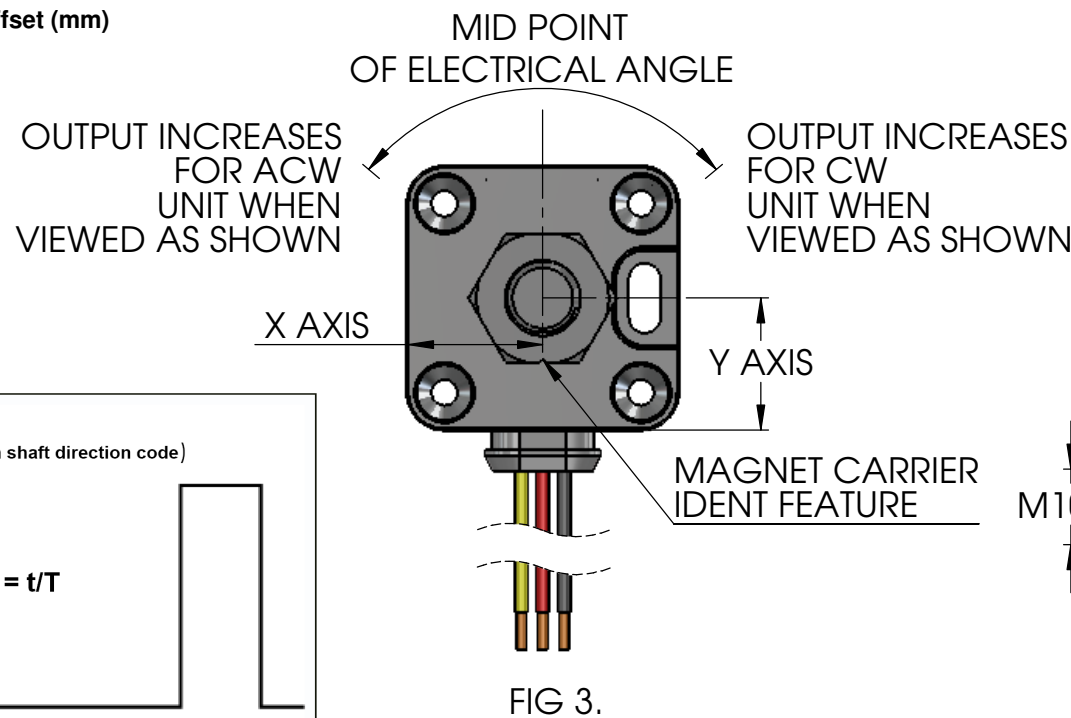
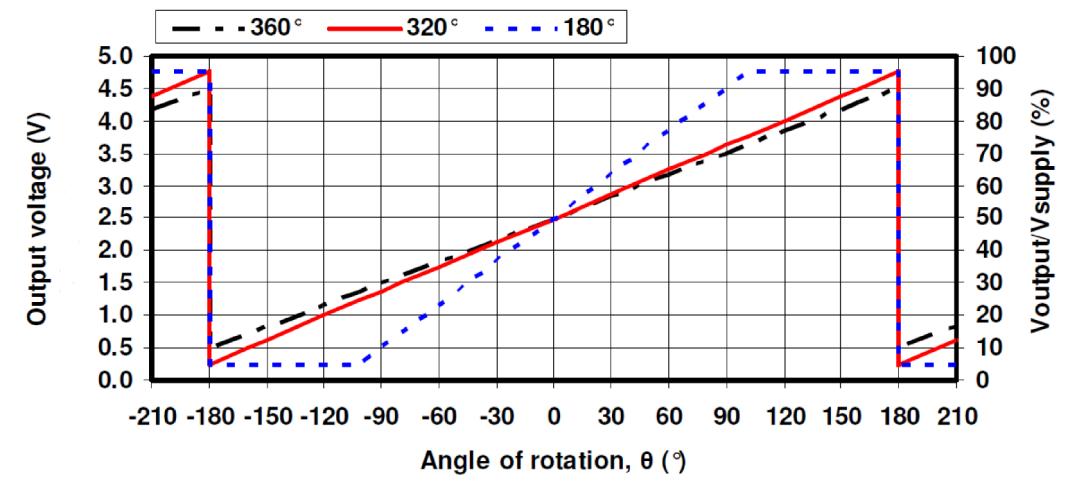
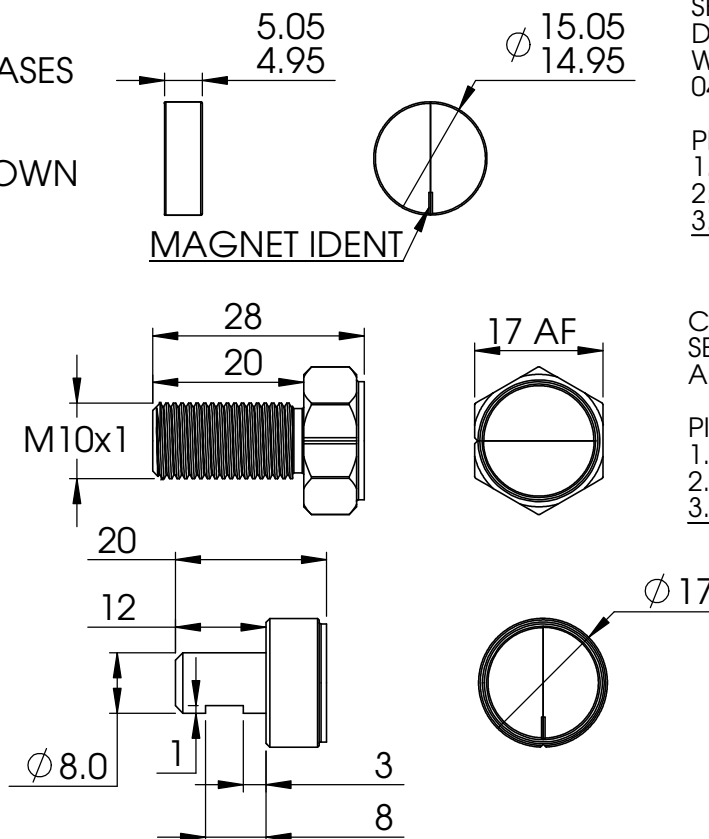


FIG 2. **Output law for 3 different angles**

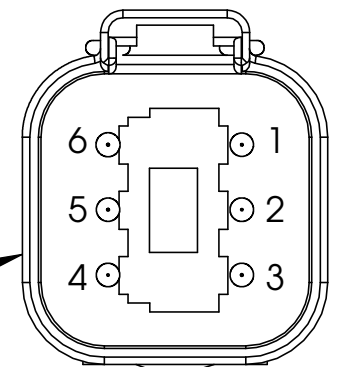


MAGNET CARRIERS



CONNECTOR OPTION C1
SENSOR FITTED WITH
DEUTSCH DT04 6P-CE03
WITH GOLD CONTACT
0460-202-1631

PIN OUT
1. GND (1) 4. GND(2)
2. V+(1) 5. V+(2)
3. VOUT(1) 6. VOUT(2)



CONNECTOR OPTIONS C2
SENSOR FITTED WITH
AMP 1.5 SUPERSEAL 282108-1

PIN OUT
1. GND (1) 4. GND(2)
2. V+(1) 5. V+(2)
3. VOUT(1) 6. VOUT(2)

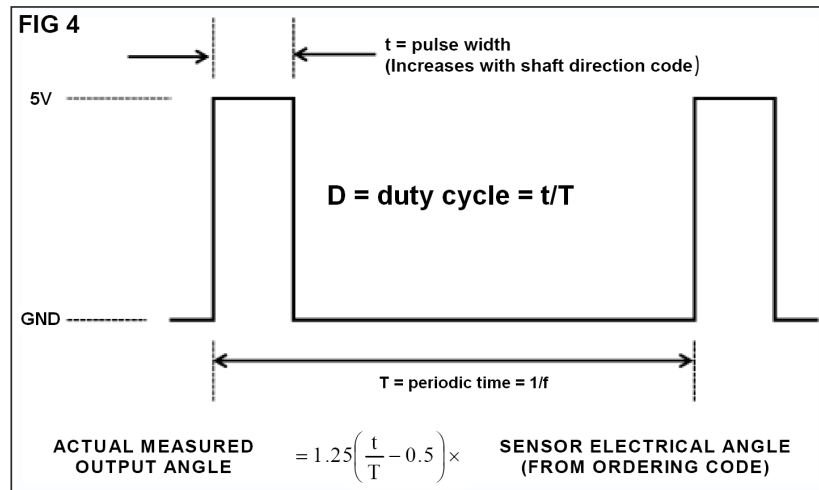
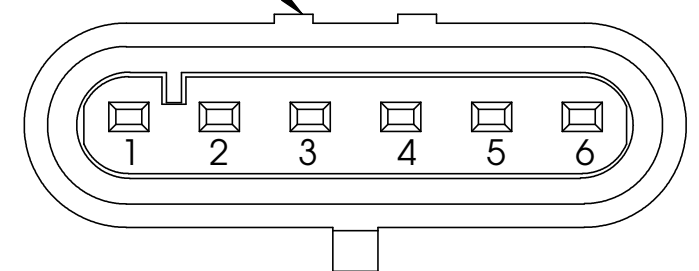


FIG 3.

| | | | | | | | |
|-----------------------------------|--|---------------|--|--|--|---------------------------------|-----------------------|
| SCALE 1:1 UNLESS STATED | IF CONTROL DIMENSIONS (Kc) ARE SPECIFIED THEY ARE TO BE SUBJECT TO 100% INSPECTION OR STATISTICAL PROCESS CONTROL. | D No | MATERIAL BODY / CARRIER POLYMER WITH METAL INSERTS | TOLERANCES: IN-LINE WITH PENNY & GILES STANDARDS 55-301 SURFACE TEXTURE VALUES IN MICROMETRES (µm) TO BS1134:PT2. ALL MACHINED SURFACES TO BE 1.6 ALL SCREW THREADS TO BS3643 PT2: EXTERNAL CLASS: 6g INTERNAL CLASS: 6H | TITLE NON CONTACT ROTARY HALL SENSOR | PENNY + GILES | A3 |
| THIRD ANGLE PROJECTION TO BS 8888 | MASS (g) | FIRST USED ON | FINISH | ANGULAR ± 1° | BREAK EDGE 0.05 - 0.15mm | PART NUMBER: NRH275DR | SHT 2 OF 2 SHTS |
| | VOL. (mm ³) | REF. | | LINEAR (MACHINING) 0, mm +/- 0.5 mm 0,0 mm +/- 0.2 mm 0,00mm +/- 0,1mm 0,000mm +/- 0,01mm | FILLET RADS 0.1 - 0.3mm | | |



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