

Installation Instructions for the Quadrature Speed and Direction Sensors SNG-Q Series

32309314

Issue D

General Information

Honeywell's SNG-Q Series Quadrature Speed and Direction Sensors are designed to provide both speed and direction information. Speed information is provided from digital square wave outputs; direction is provided using a quadrature output with signals 90° phase shifted from each other. With the quadrature output, target direction is determined by output lead/lag phase shifting.

The product is designed for applications where enhanced accuracy is required to detect small target features. This accuracy is enabled by dual differential Hall-effect sensor IC technology. The SNG-Q Series is designed for a wide operating temperature range, robust electrical noise immunity and industry leading environmental sealing capability.

This product includes an O-ring seal for pressure applications, and a fixed mounting flange for simple installation using one fastener.

Table 1. Electrical Specifications

| Characteristic | Parameter | Comment |
|-----------------------------|-------------------|--|
| Supply voltage | 4.5 V to 26 V | — |
| Output signal: type | square wave | Two channel, phase shifted by 90° either channel, may lead or lag. |
| duty cycle ¹ | 50% ±10% | Dependent on target geometry and sensor-to-target orientation; see Figures 2, 3, 4, 5, 6, 7, 8, 9 for recommended orientation. |
| phase shift | 90° ±45° | Dependent on target geometry and sensor-to-target orientation; see Figures 2, 3, 4, 5, 6, 7, 8, 9 for recommended orientation. |
| high | ≥Vs - 0.5 V | — |
| low: | | — |
| SNG-QPLA/QPCA/ QPMB/QPDB | ≤0.5 V ≤1.75 V | |
| load current | 40 mA max. | Applies to each output at all conditions. |
| rise time | 10 us max. | 1 kOhm pull-up resistor, dependent on load resistor. |
| fall time | 5 us max. | 1 kOhm pull-up resistor, dependent on load resistor. |
| frequency | 3 Hz to 20 kHz | Frequencies >10 kHz may be dependent on target geometry and air gap. |
| Short circuit protection | 50 mA max. | — |
| Supply current: normal | 12 mA | all conditions |
| max. | 18 mA | |
| Reverse voltage | -26 V max. | 10 min duration |

¹Duty cycle = Time high/time total.

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Table 2. Mechanical Specifications

| Characteristic | Parameter |
|---|--|
| Sensing air gap | 0,0 mm to 2,0 mm [0.0 in to 0.08 in] |
| Target: width ¹ slot width ² tooth width ² tooth height ³ | >5,0 mm [0.20 in] recommended; 12,7 mm [0.5 in] typ. 2,0 mm [0.08 in] min. 2,0 mm [0.08 in] min. >3,0 mm [0.12 in] recommended; 5,0 mm [0.20 in] typ. |
| Materials: housing bushing O-ring cable ⁴ | PBT brass fluorocarbon with PTFE coating, Ø11,8 mm [Ø0.47 in] OD x Ø1,80 mm [Ø0.07 in] CS EVA, four conductor, 36 AWG, 28 strand, Ø5,2 mm [Ø0.20 in] jacket |
| Mounting: bore size ⁵ torque | Ø15,15 mm to Ø15,40 mm [Ø0.60 in to Ø0.61 in] 10 N m [88.5 in-lb] max. with M6 X 1.0 bolt |

¹Narrower targets may limit axial offsets.

²Other geometry may be suitable.

³Shorter tooth heights may limit maximum air gap performance.

⁴Applies to SNG-QPLA-001, SNG-QPCA-001, SNG-QPMB-000, SNG-QPDB-000, and SNG-QPDB-002.

⁵Application dependent.

Table 3. Environmental Specifications

| Characteristic | Condition | Parameter |
|--|---|--|
| EMI: radiated immunity bulk current injection ESD | ISO 11452-2, 400 MHz to 1 GHz ISO 11452-4, 1 MHz to 400 MHz ISO 10605, Section 9 conforms to CE Mark standards EN60947-5-2:2007 and EN 60947-5-2/A1:2012 | 100 V/m 100 mA ±8 kV contact, ±15 kV air |
| Operating temperature | — | -40°C to 150°C [-40°F to 302°F] |
| Thermal shock, air to air | -40°C to 150°C [-40°F to 302°F], 60 min. soak, <3 s transfer | 500 cycles |
| Humidity | 95% humidity at 38 °C [100 °F] | 240 hr |
| Salt fog | 5% salt solution by mass at 35 °C [95 °F] | 96 hr |
| Thermal saline dunk | 100°C to 25°C [212°F to 77°F] air to liquid, 5% saline | 10 cycles |
| High temperature exposure with power | 150°C [302°F], 13.5 Vdc, 1 kOhm load | 500 hr |
| Vibration | 3 perpendicular axes, 48 hr per axis | 29.28 GMS, 50 Hz to 2000 Hz MIL-STD-202-214 |
| Degree of protection | — | IP69K |
| Resistance to fluids | — | general under-the-hood automotive fluids |

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Figure 1. Sensor Output (All catalog listings)

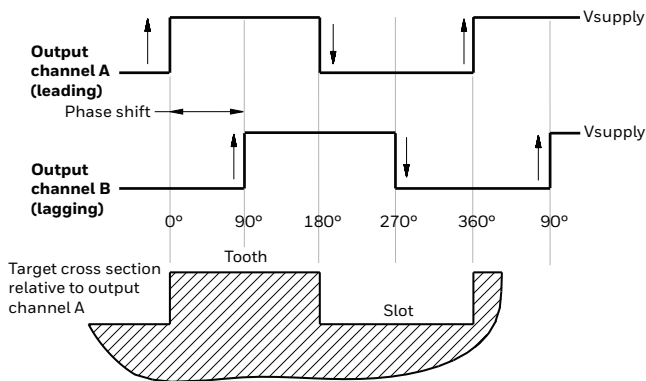


Figure 2. Possible Mounting Orientations

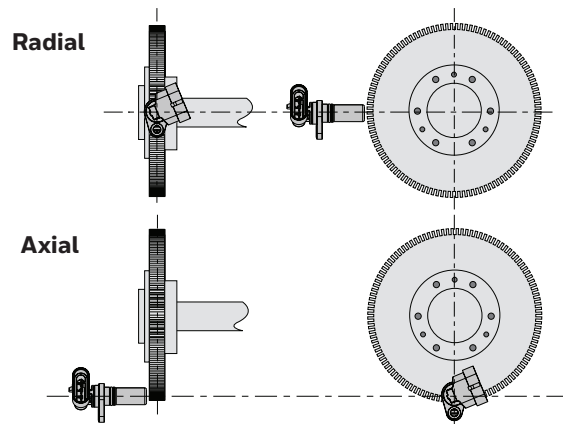
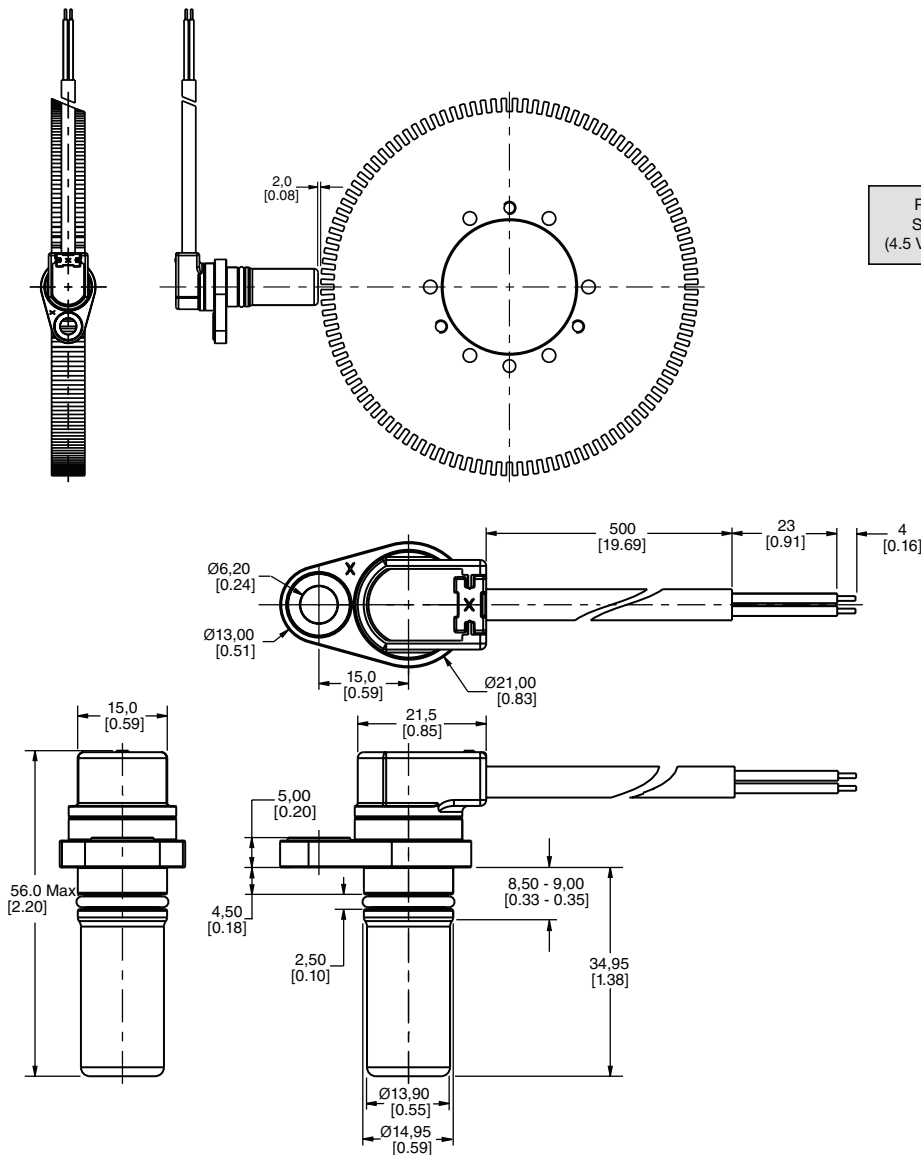
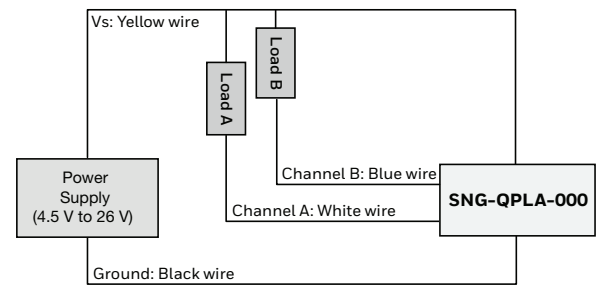


Figure 3. SNG-QPLA-000 Mounting Dimensions (For reference only: mm/[in.])



Circuit Diagram



Note: The load resistor values should be such that the output current does not exceed the maximum load current of 40 mA.

Use Ohm's Law to calculate the load resistor based on the supply/load voltage used:

$$R = V / 0.04 \text{ A}$$

Leadwire Assignment

| Yellow | Black | White | Blue |
|---------|--------|-----------|-----------|
| Vsupply | Ground | Channel A | Channel B |

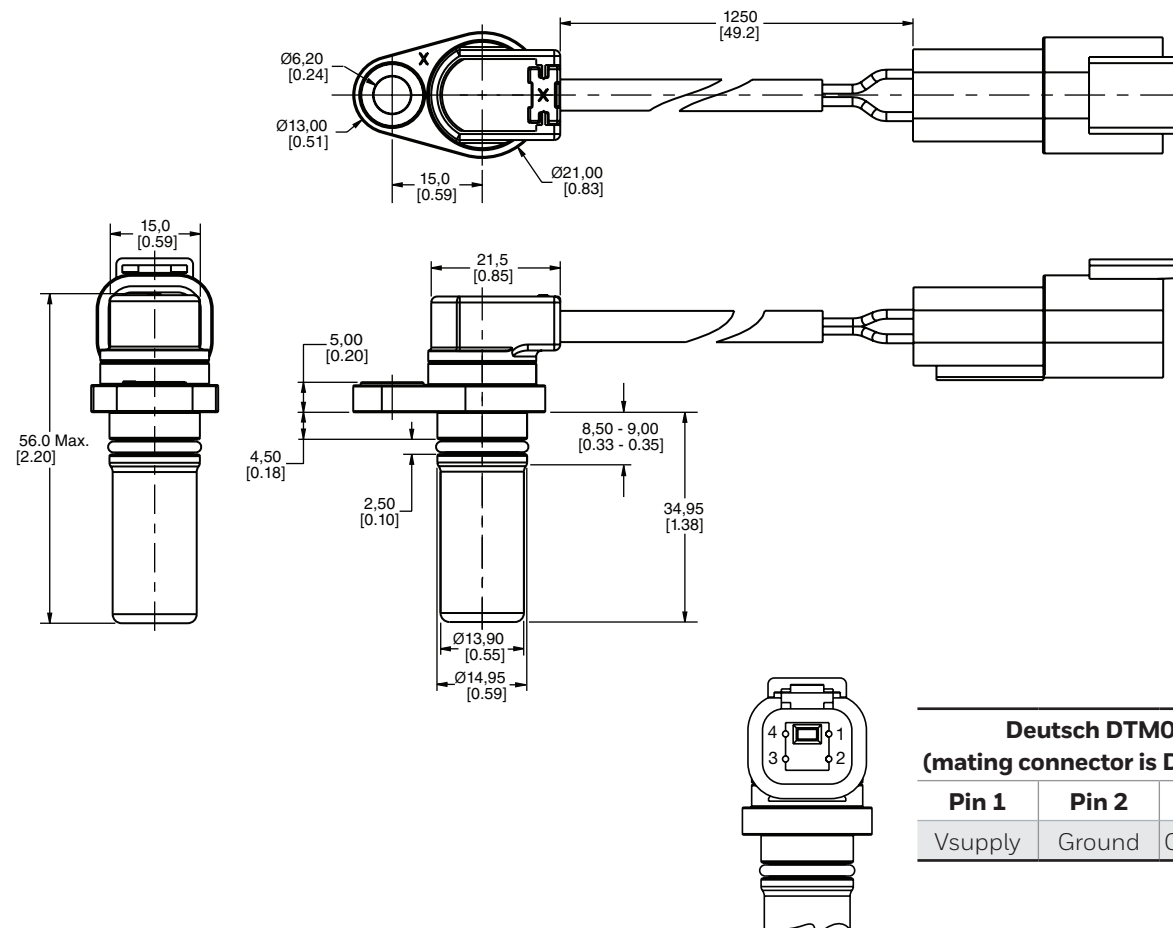
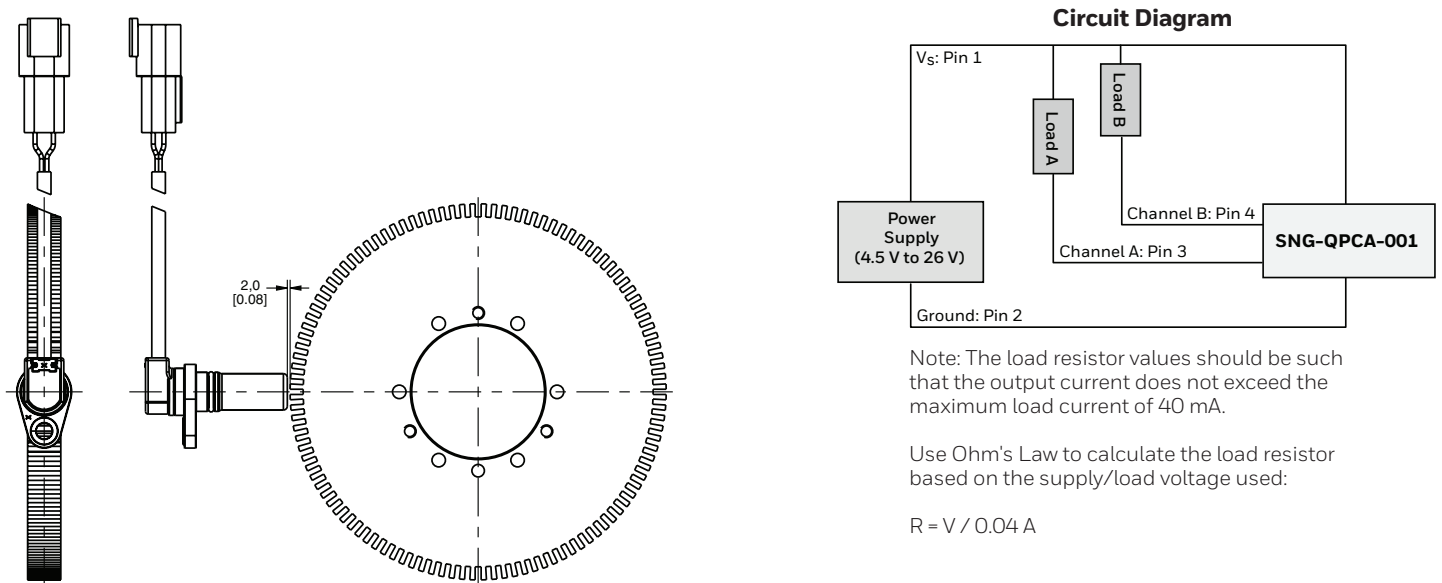
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Figure 4. SNG-QPCA-001 Mounting Dimensions (For reference only: mm/[in.])



| Deutsch DTM04-4P Pinout (mating connector is Deutsch DTM06-4S) | | | |
|---|--------|-----------|-----------|
| Pin 1 | Pin 2 | Pin 3 | Pin 4 |
| Vsupply | Ground | Channel A | Channel B |

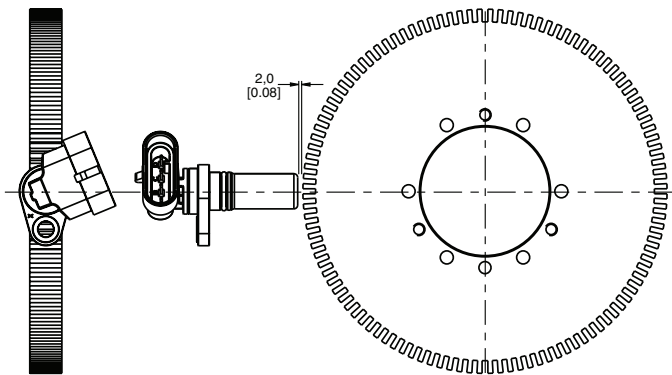
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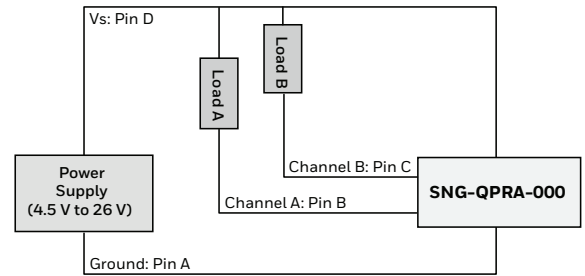
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Figure 5. SNG-QPRA-000 Mounting Dimensions (For reference only: mm/[in].)



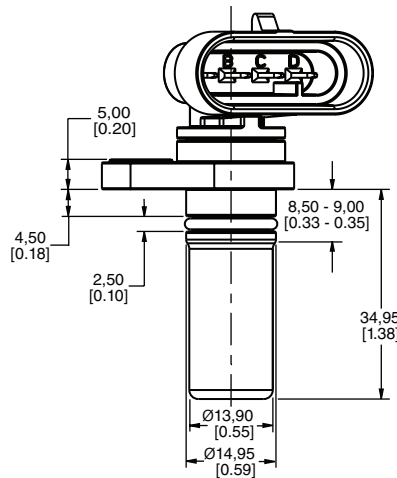
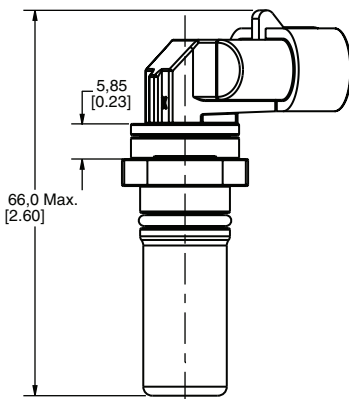
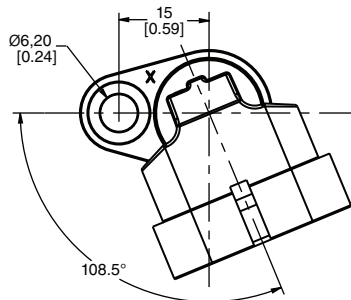
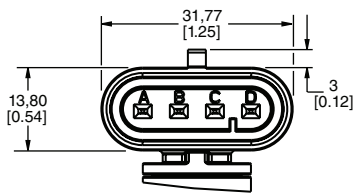
Circuit Diagram



Note: The load resistor values should be such that the output current does not exceed the maximum load current of 40 mA.

Use Ohm's Law to calculate the load resistor based on the supply/load voltage used:

$$R = V / 0.04 \text{ A}$$



Amp Superseal 1.5 Connector Pinout (mating connector is Amp Superseal 1.5 282088)

| Pin A | Pin B | Pin C | Pin D |
|--------|-----------|-----------|---------|
| Ground | Channel A | Channel B | Vsupply |

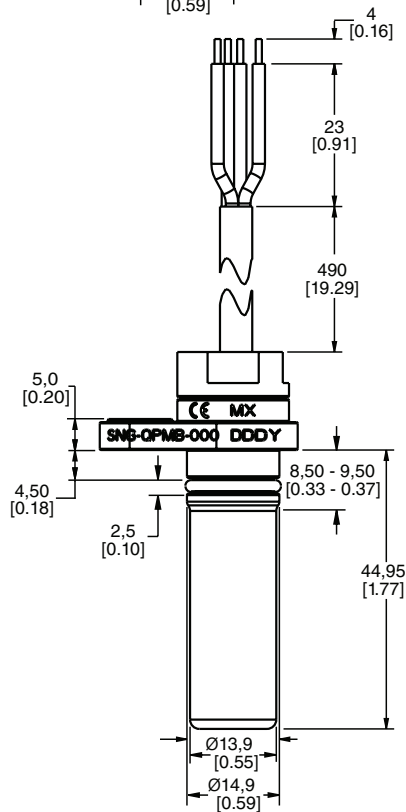
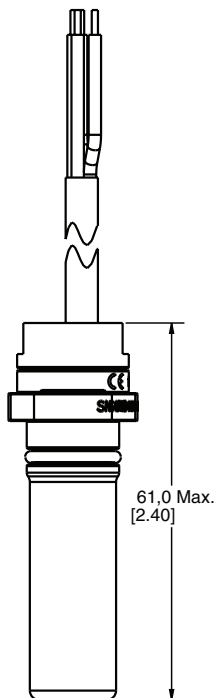
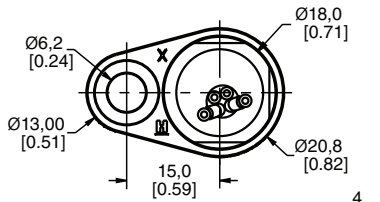
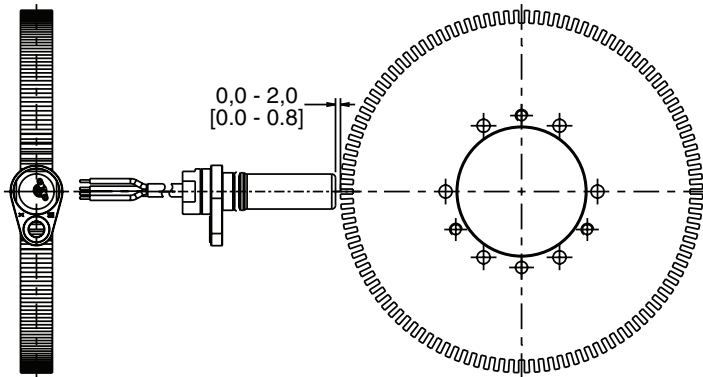
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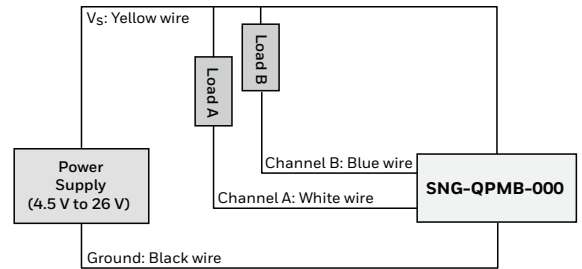
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Figure 6. SNG-QPMB-000 Mounting Dimensions (For reference only: mm/[in].)



Circuit Diagram



Note: The load resistor values should be such that the output current does not exceed the maximum load current of 40 mA.

Use Ohm's Law to calculate the load resistor based on the supply/load voltage used:

$$R = V / 0.04 \text{ A}$$

Leadwire Assignment

| Yellow | Black | White | Blue |
|---------|--------|-----------|-----------|
| Vsupply | Ground | Channel A | Channel B |

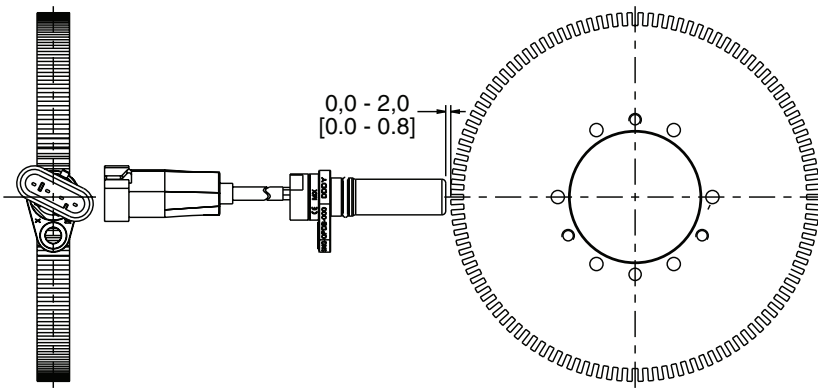
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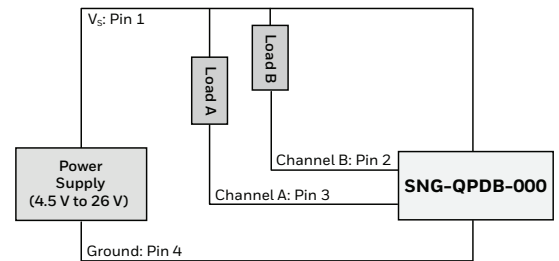
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Figure 7. SNG-QPDB-000 Mounting Dimensions (For reference only: mm/[in].)



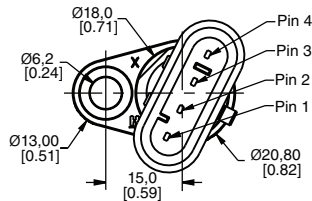
Circuit Diagram



Note: The load resistor values should be such that the output current does not exceed the maximum load current of 40 mA.

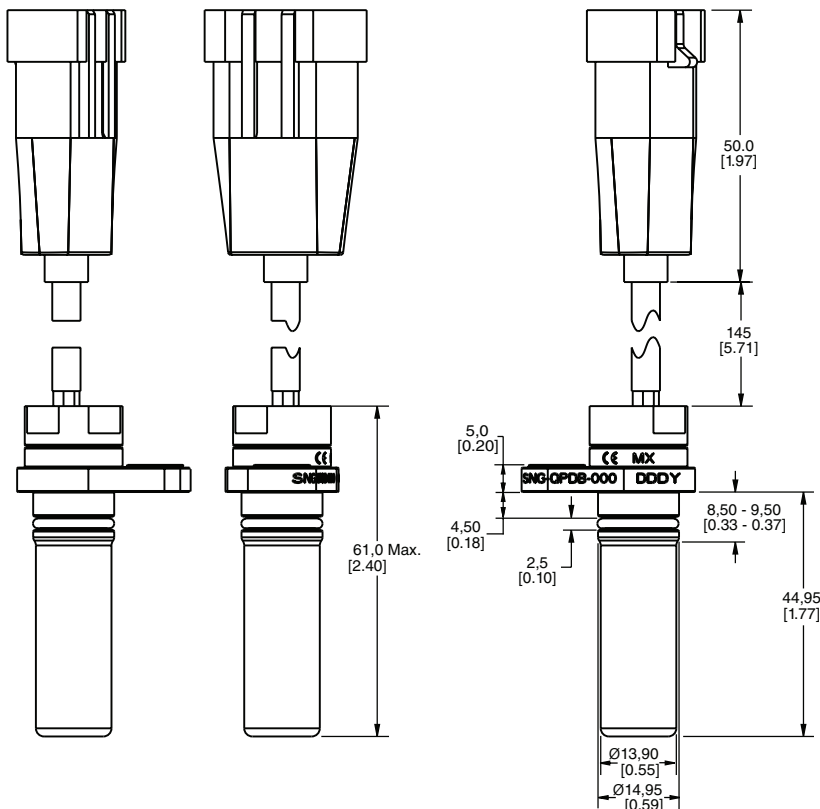
Use Ohm's Law to calculate the load resistor based on the supply/load voltage used:

$$R = V / 0.04 \text{ A}$$



Amp Superseal 1.5 282106 Pinout (mating connector is Amp Superseal 1.5 282088)

| Pin 1 | Pin 2 | Pin 3 | Pin 4 |
|---------|-----------|-----------|--------|
| Vsupply | Channel B | Channel A | Ground |



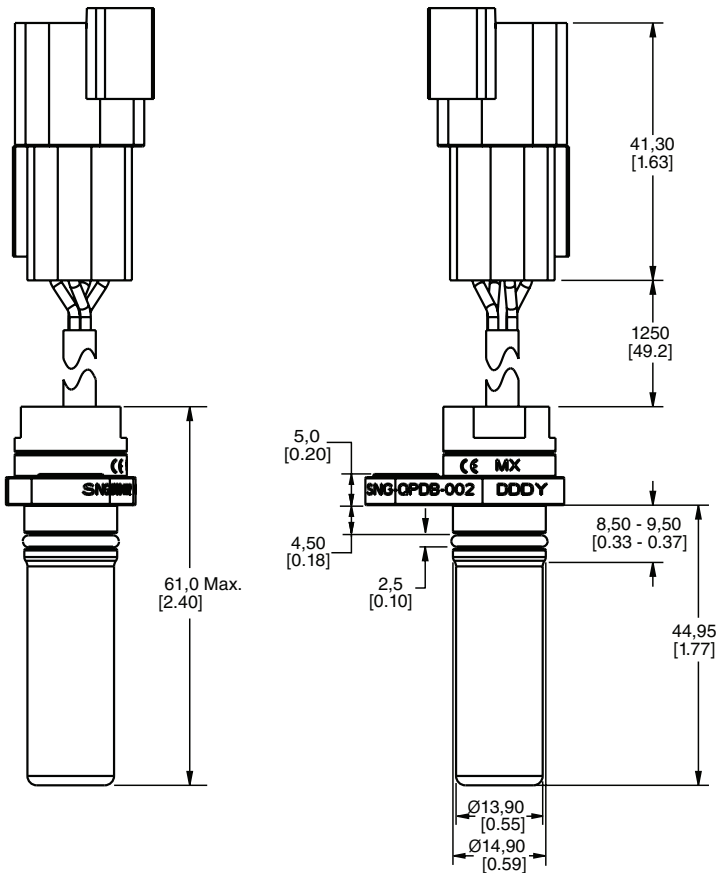
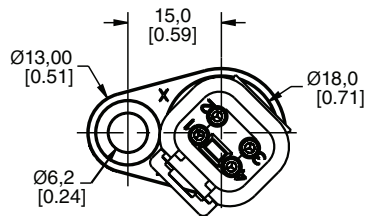
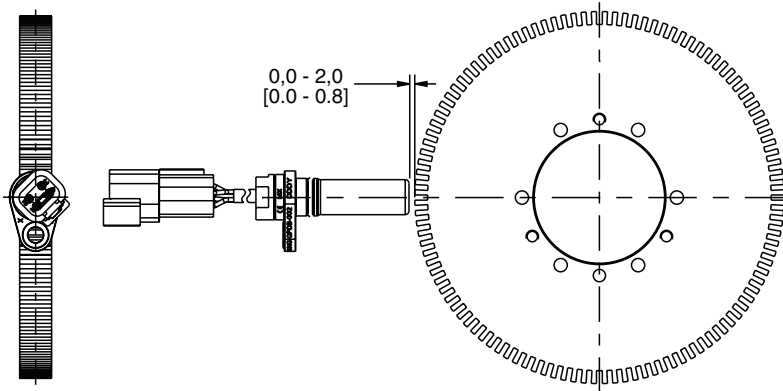
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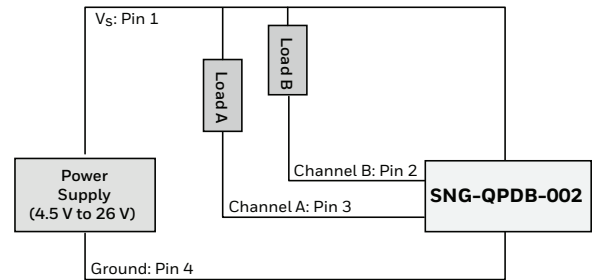
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Figure 8. SNG-QPDB-002 Mounting Dimensions (For reference only: mm/[in].)



Circuit Diagram



Note: The load resistor values should be such that the output current does not exceed the maximum load current of 40 mA.

Use Ohm's Law to calculate the load resistor based on the supply/load voltage used:

$$R = V / 0,04 \text{ A}$$

Deutsch DTM04-4P Pinout

(mating connector is Deutsch DTM06-4S)

| Pin 1 | Pin 2 | Pin 3 | Pin 4 |
|---------|-----------|-----------|--------|
| Vsupply | Channel B | Channel A | Ground |

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▲ WARNING **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

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32309314-D-EN | D | 05/18
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