

## 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 <sup>1</sup>	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

<sup>1</sup>Duty 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 <sup>1</sup> slot width <sup>2</sup> tooth width <sup>2</sup> tooth height <sup>3</sup>	>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 <sup>4</sup>	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 <sup>5</sup> 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

<sup>1</sup>Narrower targets may limit axial offsets.

<sup>2</sup>Other geometry may be suitable.

<sup>3</sup>Shorter tooth heights may limit maximum air gap performance.

<sup>4</sup>Applies to SNG-QPLA-001, SNG-QPCA-001, SNG-QPMB-000, SNG-QPDB-000, and SNG-QPDB-002.

<sup>5</sup>Application dependent.

**Table 3. Environmental Specifications**

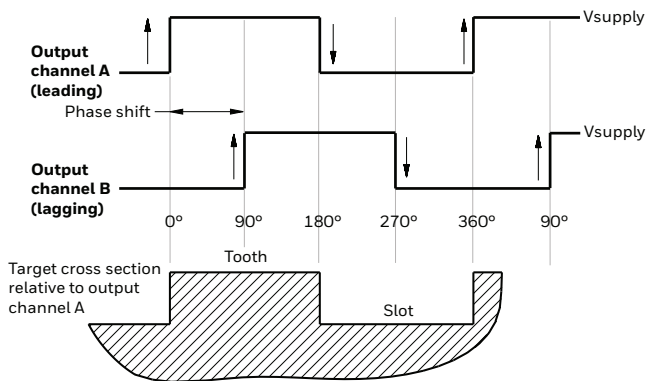
Characteristic	Condition	Parameter
EMI: radiated immunity bulk current injection ESD	ISO 11452-2, 400 MHz to 1 GHz ISO 11452-4, 1 MHz to 400 MHz ISO 10605, Section 9 conforms to CE Mark standards EN60947-5-2:2007 and EN 60947-5-2/A1:2012	100 V/m 100 mA ±8 kV contact, ±15 kV air
Operating temperature	—	-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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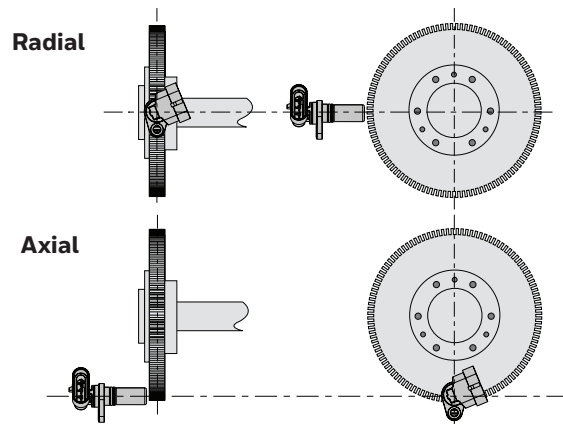
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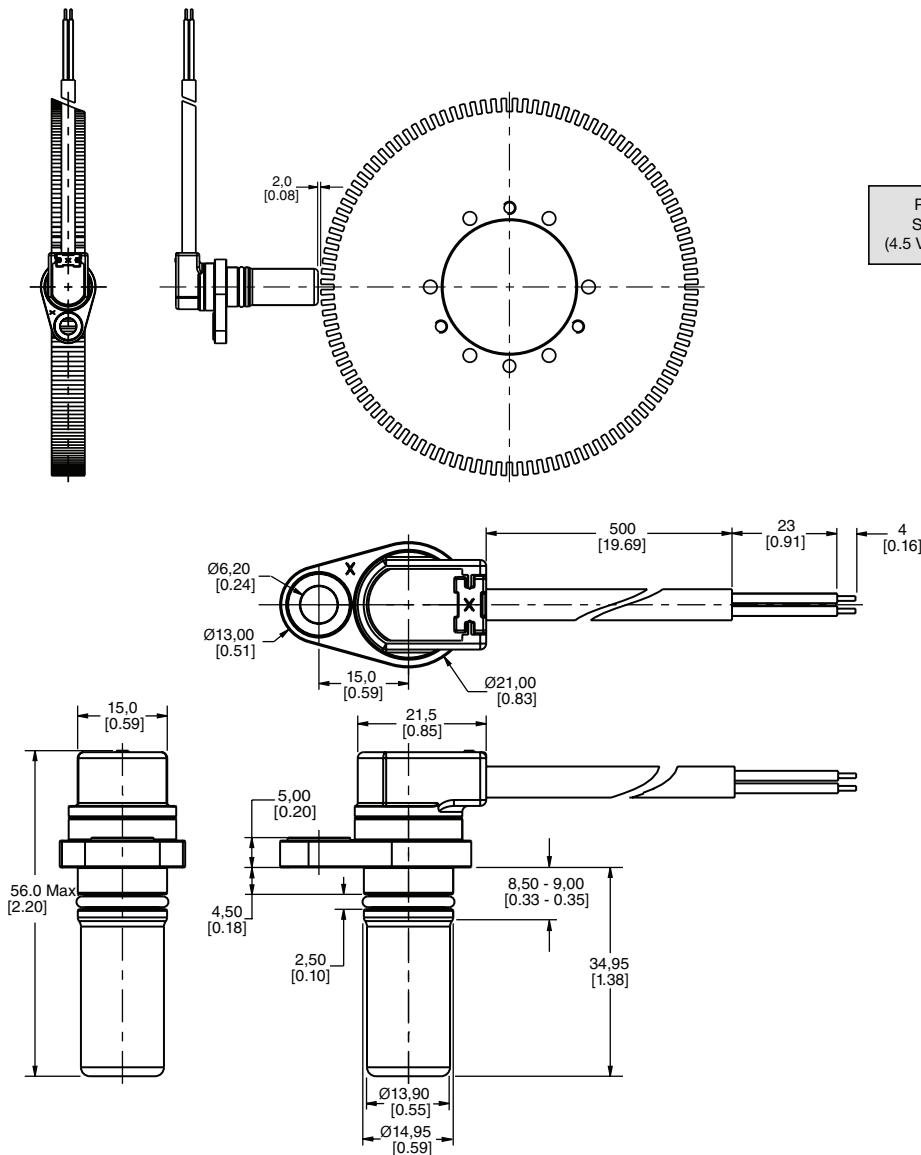
**Figure 1. Sensor Output (All catalog listings)**



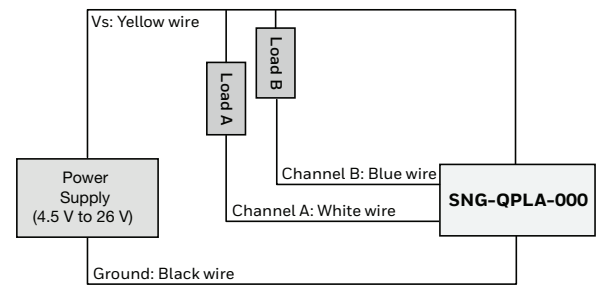
**Figure 2. Possible Mounting Orientations**



**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
V <sub>supply</sub>	Ground	Channel A	Channel B

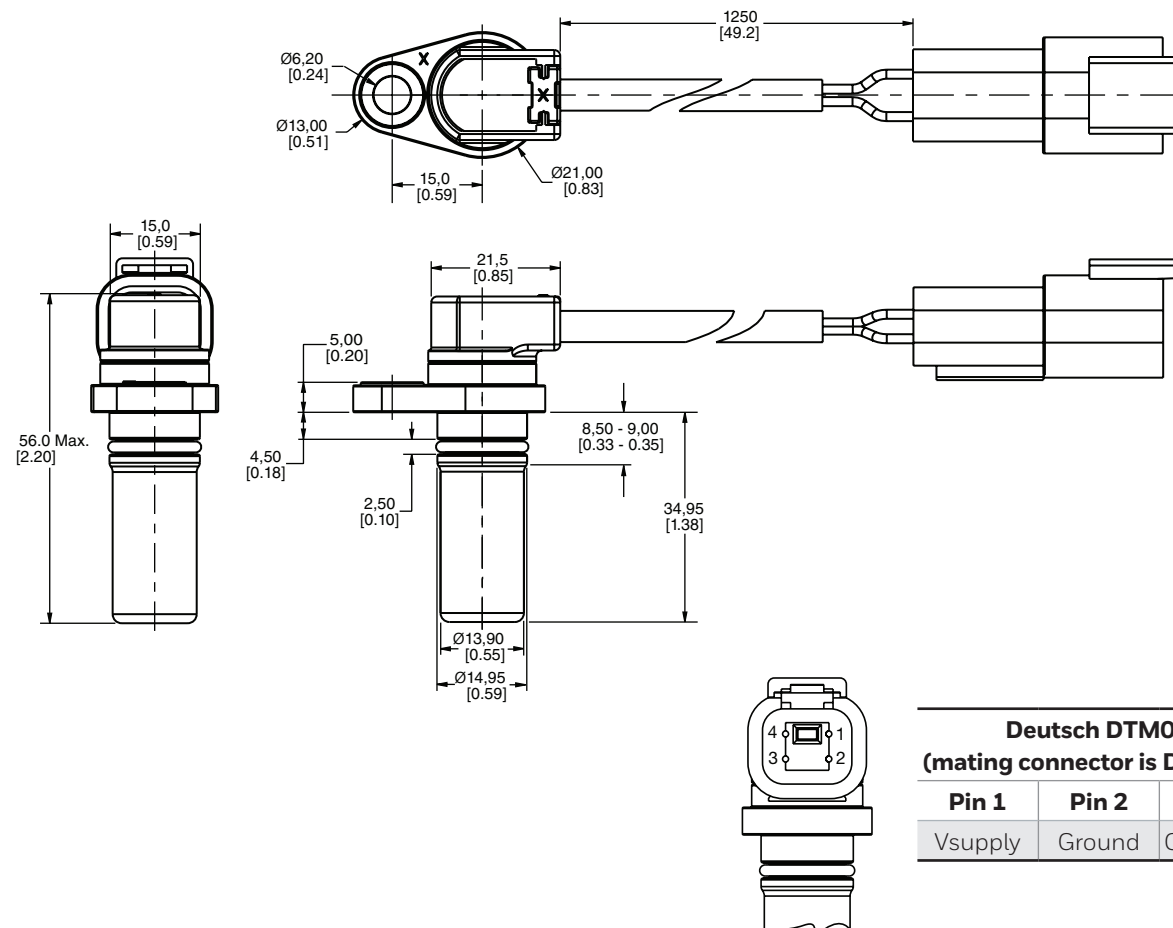
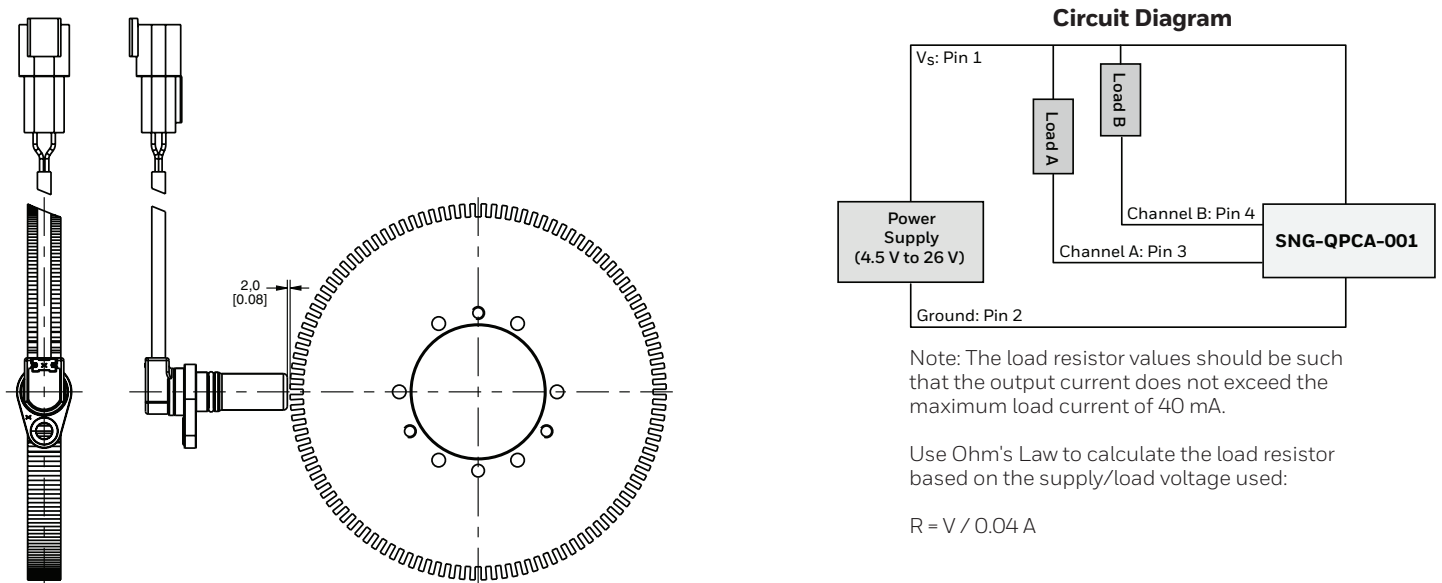
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Figure 4. SNG-QPCA-001 Mounting Dimensions (For reference only: mm/[in.] )



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

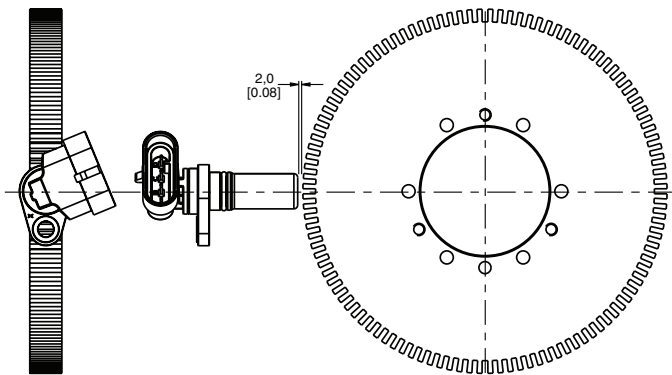
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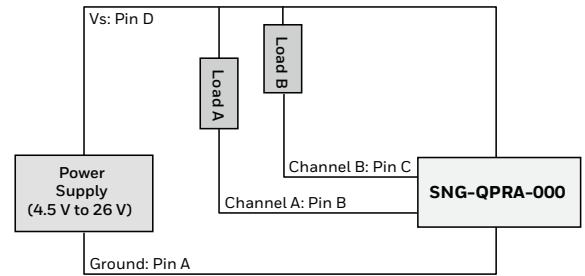
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Figure 5. SNG-QPRA-000 Mounting Dimensions (For reference only: mm/[in.] )



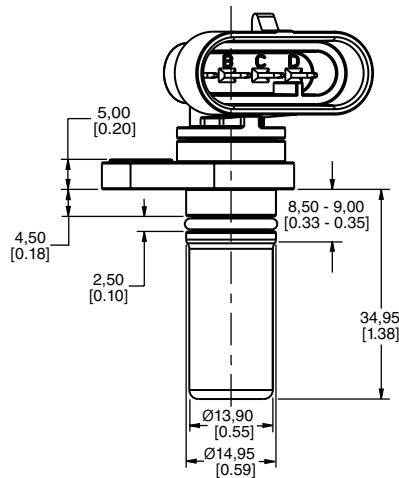
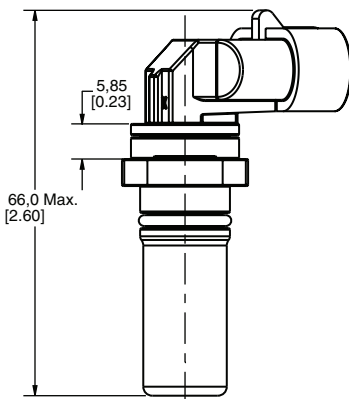
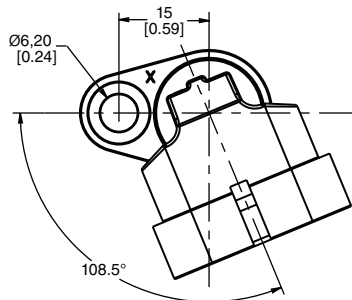
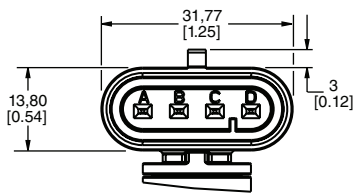
### Circuit Diagram



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

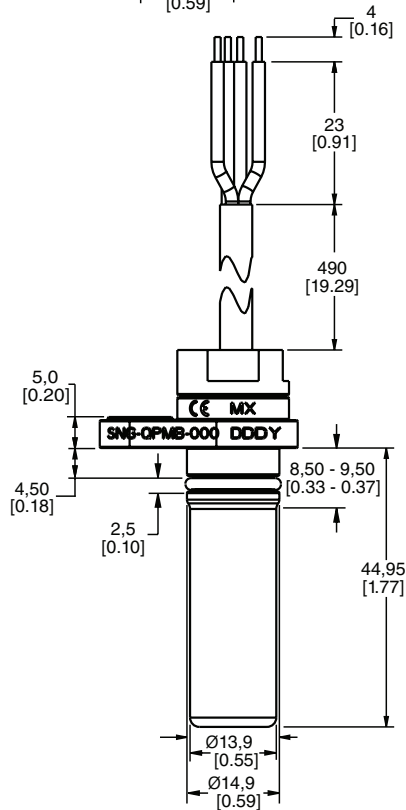
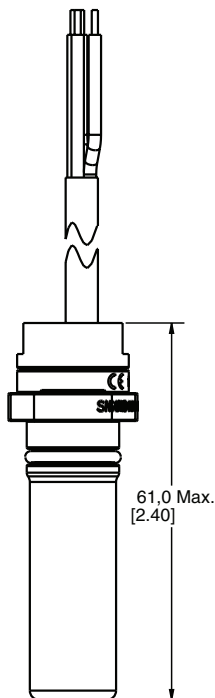
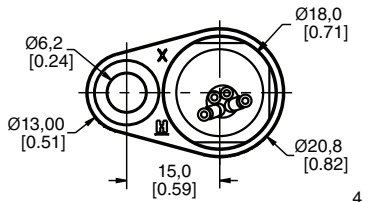
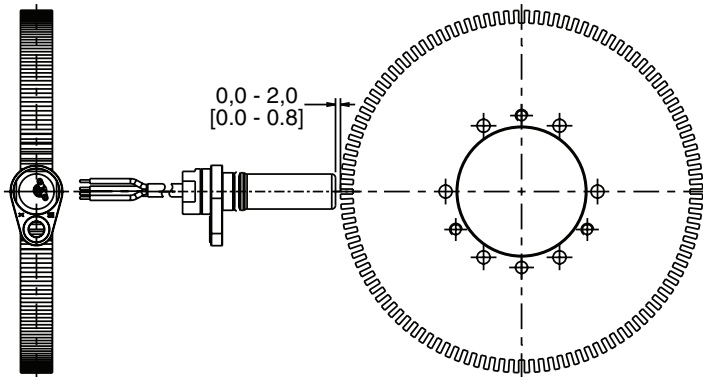
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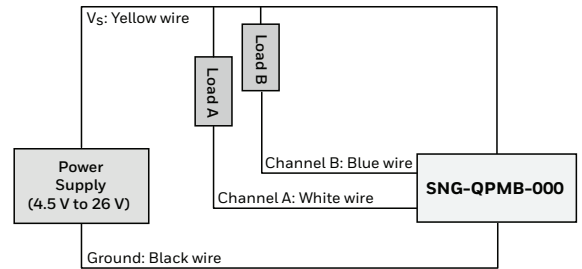
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Figure 6. SNG-QPMB-000 Mounting Dimensions (For reference only: mm/[in].)



### 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

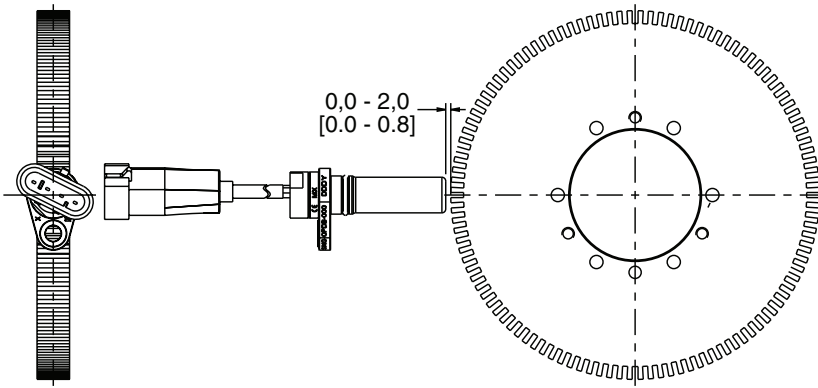
Yellow	Black	White	Blue
Vsupply	Ground	Channel A	Channel B

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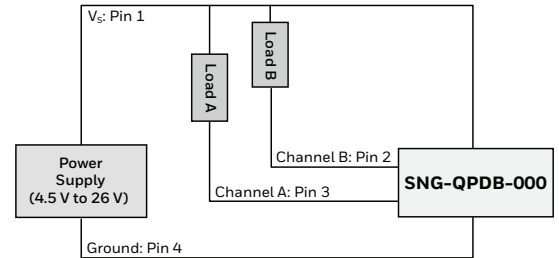
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Figure 7. SNG-QPDB-000 Mounting Dimensions (For reference only: mm/[in].)



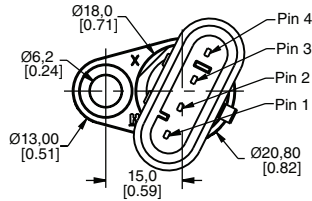
### Circuit Diagram



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

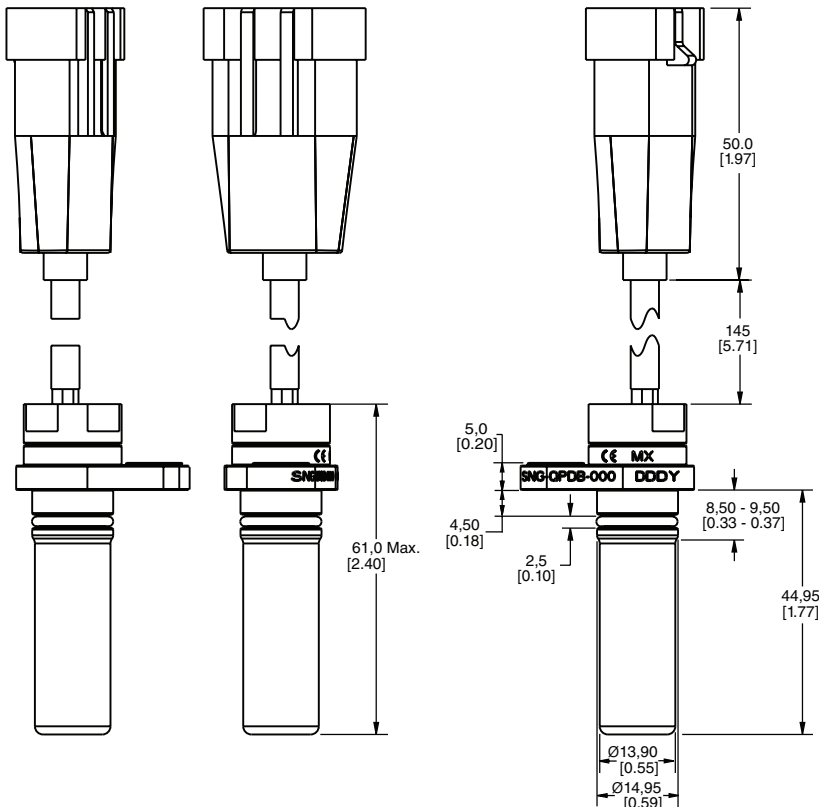
Use Ohm's Law to calculate the load resistor based on the supply/load voltage used:

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



### 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



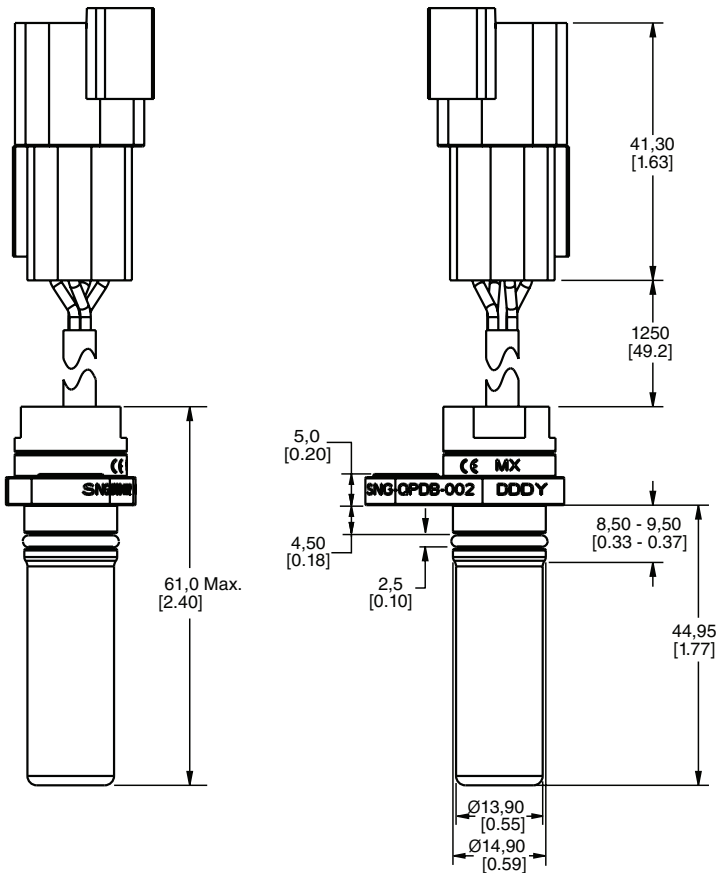
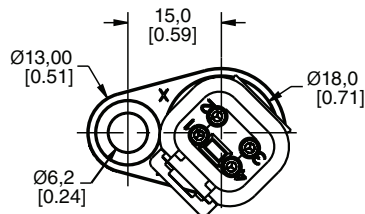
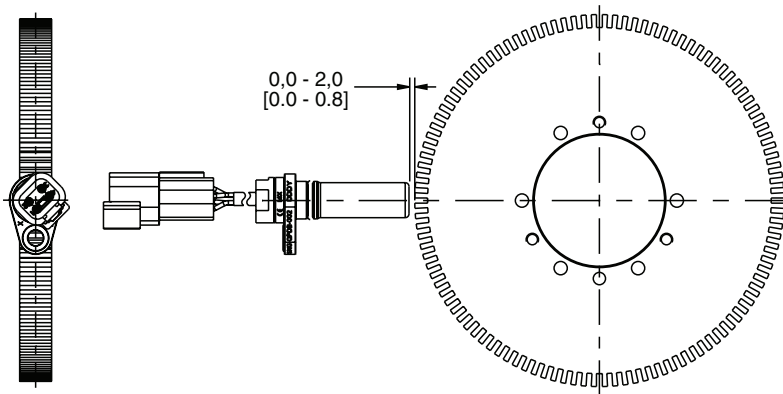
# Quadrature Speed and Direction Sensors

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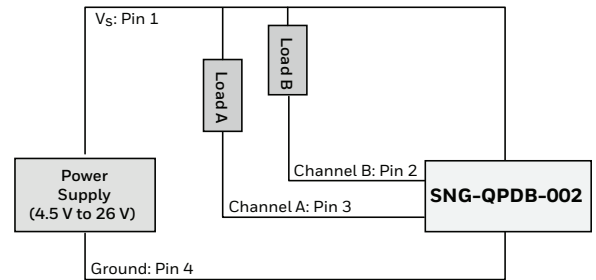
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Figure 8. SNG-QPDB-002 Mounting Dimensions (For reference only: mm/[in].)



### 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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