Honeywell

Quadrature Speed and Direction Sensors
SNG-Q Series

32304260
Issue B

Datasheet

DESCRIPTION

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 SNG-Q Series are designed and manufactured using a platform-based approach that enables cost-competitiveness and mechanical and electrical configurability for customers. The Series are 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 provide 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.

FEATURES

- Wide operating temperature range: -40 ºC to 150 ºC [-40 °F to 302 °F]
- Environmental sealing: Moisture ingress protection rated to IP69K
- Robust electrical noise immunity: Electrical noise radiated immunity (EMC) rated to 100 V/m
- High frequency switching capability: 3 Hz to 20 kHz
- Direction information: From phase-shifted dual output signals
- O-ring seal: Enables environmental sealing to mounting surface
- Supply voltage range: 4.5 V to 26 V

POTENTIAL APPLICATIONS

Industrial

- AC induction motors in material handling, agriculture, and construction machines: May be used to help control power delivered by the ac induction motor
- Hydraulic pump motors in material handling, agriculture, and construction machines: May be used to help control power delivered by the hydraulic pump motor
- Escalators and elevators: May be used to help control speed and position

Transportation

- Hybrid electric transmissions in heavy duty trucks, buses, agriculture and construction machines: May be used to help control power regulation of the hybrid system
- Wheel speed detection in material handling, agriculture, and construction machines: May be used to detect the speed and direction of the wheels, which translates to the speed and direction of the machine
- Hybrid engines in heavy duty trucks, buses, agriculture and construction machines: May be used to help control power regulation of the hybrid system

Not recommended for Aerospace or Defense applications.

PORTFOLIO

The SNG-Q Series joins the 1GT Series, LCZ Series, ZH10 Series, 584XX Series, SNDH-T Series, and the SNDH-H Series.

Quadrature Speed and Direction Sensors, SNG-Q Series

Table 1. Order Guide

Catalog Listing	Availability	Description
SNG-QPLA-000	Now	SNG-Q Series, 4-wire quadrature speed and direction sensor, plastic housing, 500 mm [19.7 in] cable with leads, right angle exit, 35 mm [1.38 in] housing length
SNG-QPCA-001	Now	SNG-Q Series, 4-wire quadrature speed and direction sensor, plastic housing, 1,25 m [49.2 in] cable with Deutsch DTM04-4P connector, right angle exit, 35 mm [1.38 in] housing length
SNG-QPRA-000	Now	SNG-Q Series, 4-wire quadrature speed and direction sensor, plastic housing, integral Amp Superseal 1.5 connector, right angle exit, 35 mm [1.38 in] housing length
SNG-QPMB-000	Coming soon	SNG-Q Series, 4-wire quadrature speed and direction sensor, plastic housing, 500 mm [19.7 in] cable with leads, straight exit, 45 mm [1.77 in] housing length

Figure 1. Nomenclature Guide (All options available now, unless otherwise noted.)

For example, **SNG-QPLA-000** defines an SNG-Q Series quadrature speed and direction sensor, 500 mm [19.7 in] cable with leads, right angle exit, 35 mm [1.38 in] housing length.

SNG-Q	**P**	**L**	**A**	-	**000**
Series	Housing Material[1]	Connection Type[2]	Housing Length		For Internal Use Only

4-wire quadrature speed and direction sensor

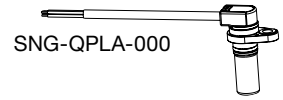
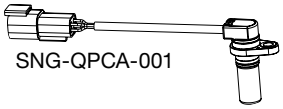
P	Plastic

S	Integral Amp Superseal 1.5 connector, straight exit[3]
R	Integral Amp Superseal 1.5 connector, right angle exit
L	500 mm [19.7 in] cable with leads, right angle exit
M	500 mm [19.7 in] cable with leads, straight exit (coming soon)
C	1,25 m [49.2 in] cable with Deutsch DTM04-MP connector, right angle exit
D	1,25 m [49.2 in] cable with Deutsch DTM04-MP connector, straight exit (coming soon)[3]

A	35 mm [1.38 in]
B	45 mm [1.77 in] (coming soon)

[1] Contact Honeywell for other Housing Material options.
[2] Other cable lengths available upon request.
[3] Contact Honeywell.

Table 2. Electrical Specifications

	Parameter		
	Available Now	**Coming Soon**	**Comment**
	SNG-QPLA-000  SNG-QPCA-001  SNG-QPRA-000 	SNG-QPMB-000 	
Supply voltage	4.5 V to 26 V	4.5 V to 26 V	—
Output signal:			
type	square wave	square wave	Two channel, phase shifted by 90° either channel, may lead or lag.
duty cycle[1]	50% ±10%	50% ±10%	Dependent on target geometry and sensor-to-target orientation; see Figures 2, 3, 4, 5 for recommended orientation.
phase shift	90° ±45°	90° ±45°	Dependent on target geometry and sensor-to-target orientation; see Figures 2, 3, 4, 5 for recommended orientation.
high	≥Vs - 0.5 V	≥Vs - 0.5 V	—
low	≤0.5 V (SNG-QPLA/QPCA), ≤1.75 V (SNG-QPRA)	≤0.5 V	—
load current	40 mA max.	40 mA max.	Each output at all conditions
rise time	10 µs max.	10 µs max.	1 kOhm pull-up resistor, dependent on load resistor.
fall time	5 µs max.	5 µs max.	1 kOhm pull-up resistor, dependent on load resistor.
frequency	3 Hz to 20 kHz	3 Hz to 20 kHz	Frequencies >10 kHz may be dependent on target geometry and air gap.
Short circuit protection	50 mA max.	50 mA max.	—
Supply current	12 mA normal, 18 mA max.	12 mA normal, 18 mA max.	all conditions
Reverse voltage	-26 V max.	-26 V max.	10 min duration

[1]Duty cycle = Time high/time total.

Table 3. Environmental Specifications

Characteristic	Condition	Parameter	
		SNG-QPLA-000 SNG-QPCA-001 SNG-QPRA-000 (Available Now)	**SNG-QPMB-000** (Coming Soon)
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	100 V/m 100 mA ±8 kV contact, ±15 kV air
Operating temperature	—	-40 °C to 150 °C [-40 °F to 302 °F]	-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	500 cycles
Humidity	95% humidity at 38 °C [100 °F]	240 hr	240 hr
Salt fog	5% salt solution by mass at 35 °C [95 °F]	96 hr	96 hr
Thermal saline dunk	100 °C to 25 °C [212 °F to 77 °F] air to liquid, 5% saline	10 cycles	10 cycles
High temperature exposure with power	150 °C [302 °F], 13.5 Vdc, 1 kOhm load	500 hr	500 hr
Vibration	3 perpendicular axes, 48 hr per axis	29.28 GMS, 50 Hz to 2000 Hz MIL-STD-202-214	29.28 GMS, 50 Hz to 2000 Hz MIL-STD-202-214
Sensor degree of protection	—	IP69K	IP69K
Resistance to fluids	—	general under-the-hood automotive fluids	general under-the-hood automotive fluids

Table 4. Mechanical Specifications

Character-istic	Parameter	
	SNG-QPLA-000 SNG-QPRA-000 SNG-QPCA-001 (Available Now)	**SNG-QPMB-000 (Coming Soon)**
Sensing air gap	0,0 mm to 2,0 mm [0.0 in to 0.08 in]	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.	 >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[5]	 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	 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[4] 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	 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

[1]Narrower targets may limit axial offsets.
[2]Other geometry may be suitable.
[3]Shorter tooth heights may limit maximum air gap performance.
[4]Application dependent.
[5]Applies to SNG-QPLA-001, SNG-QPCA-001, SNG-QPMB-001.

Figure 1. Sensor Output (All catalog listings)

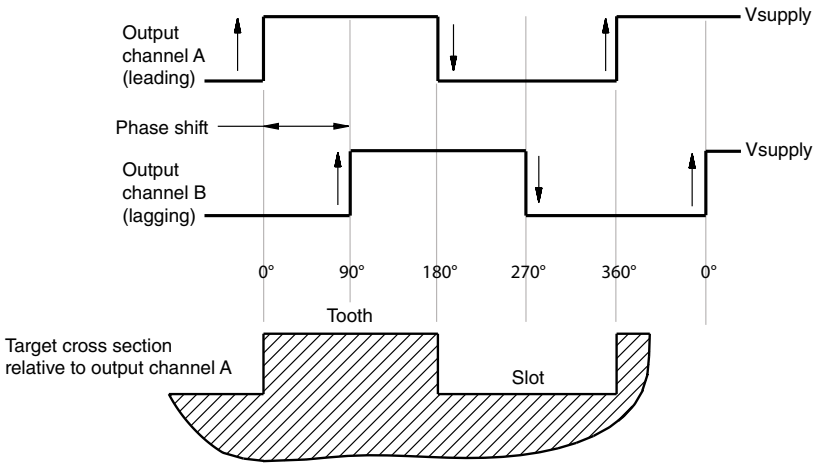
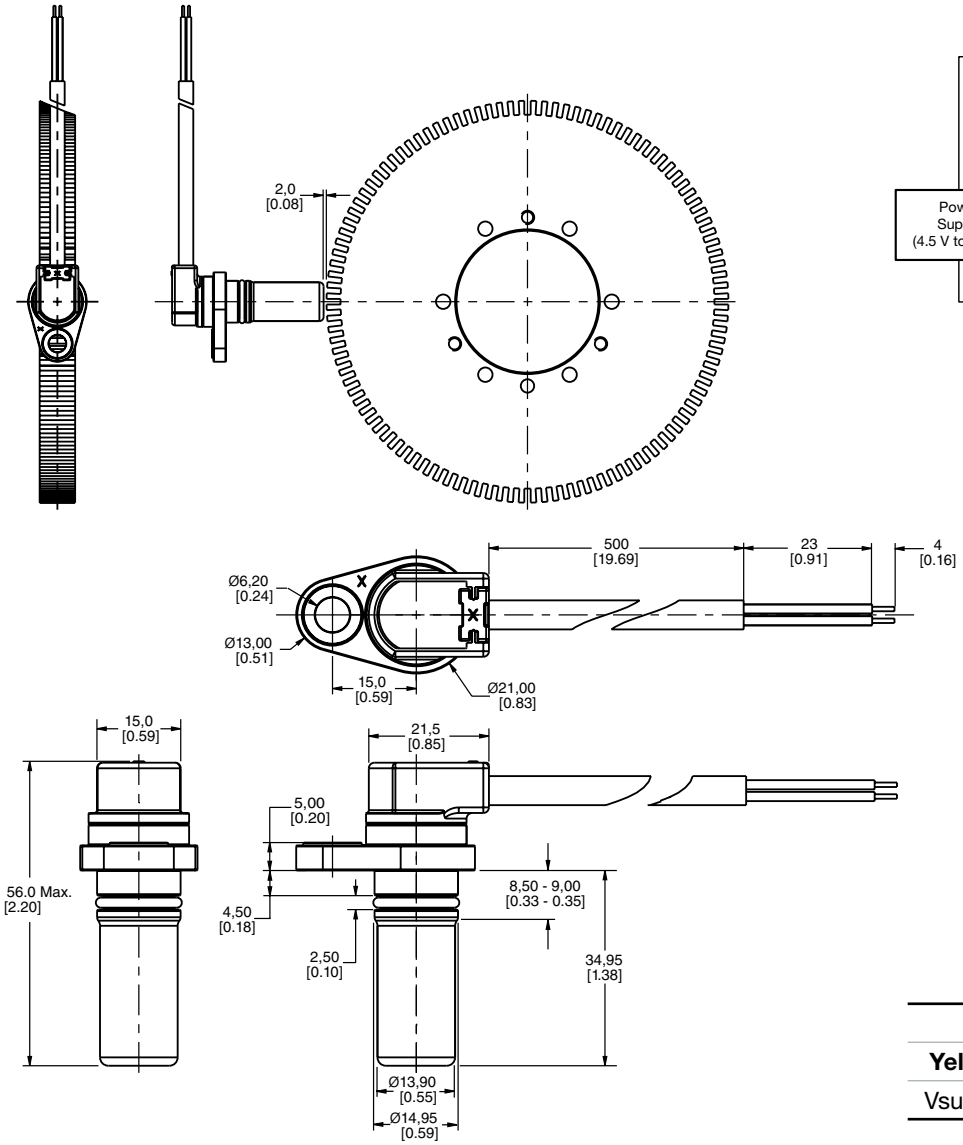
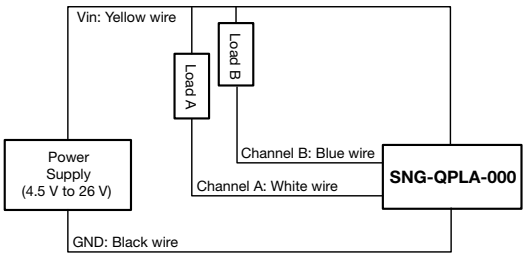


Figure 2. SNG-QPLA-000 Mounting Dimensions (For reference only: mm/[in].) (Available now.)



Circuit Diagram



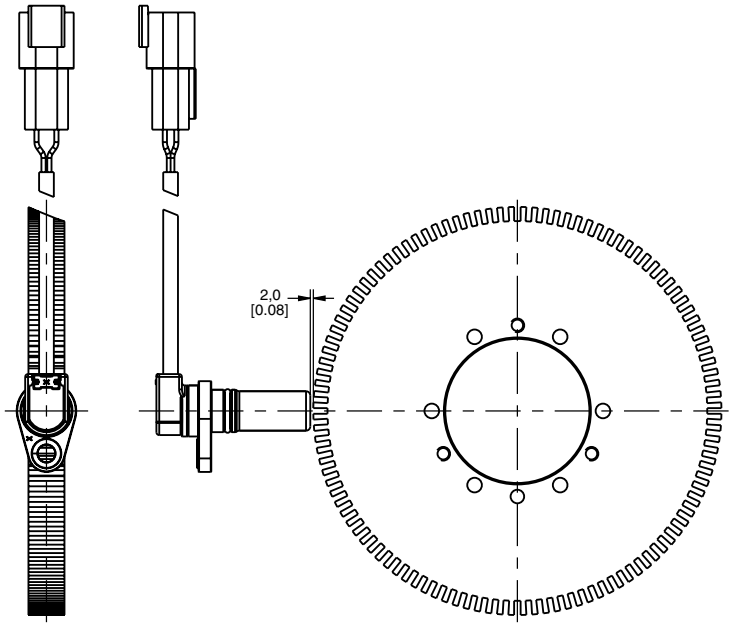
Note: The load resistor values should be such that the output current does not exceed the maximum load current of 40 mA.

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

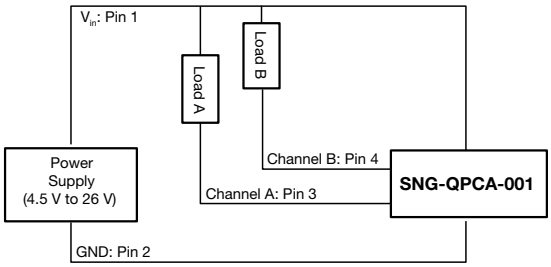
R = V / 0.04 A

Leadwire Assignment			
Yellow	**Black**	**White**	**Blue**
Vsupply	ground	channel A	channel B

Figure 3. SNG-QPCA-001 Mounting Dimensions (For reference only: mm/[in].) (Available now.)



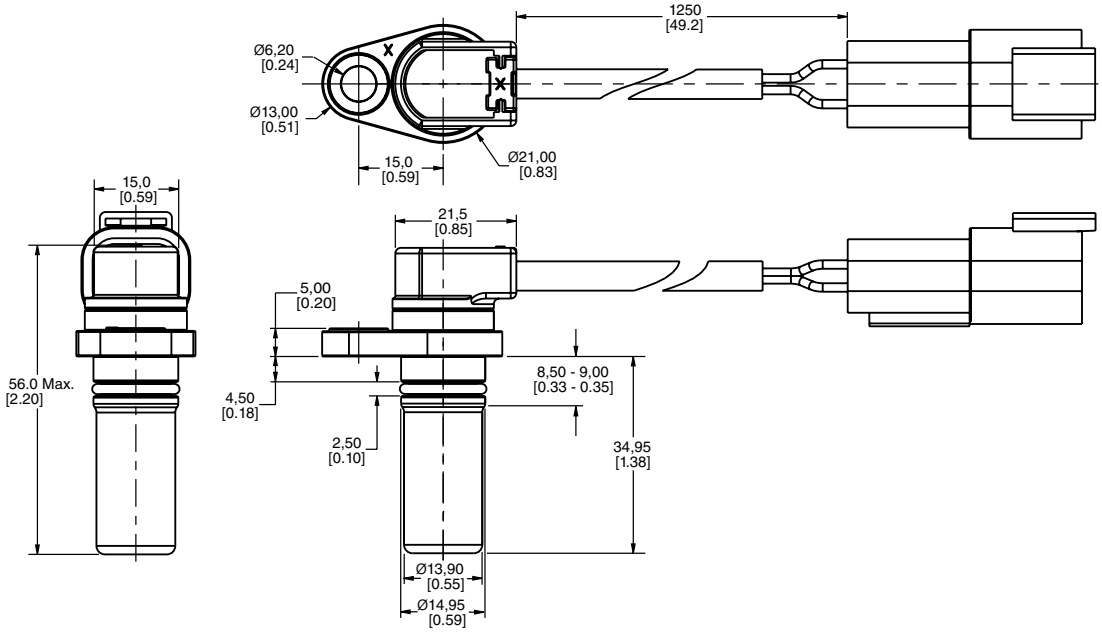
Circuit Diagram

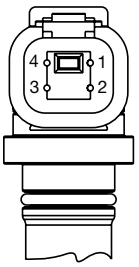


Note: The load resistor values should be such that the output current does not exceed the maximum load current of 40 mA.

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

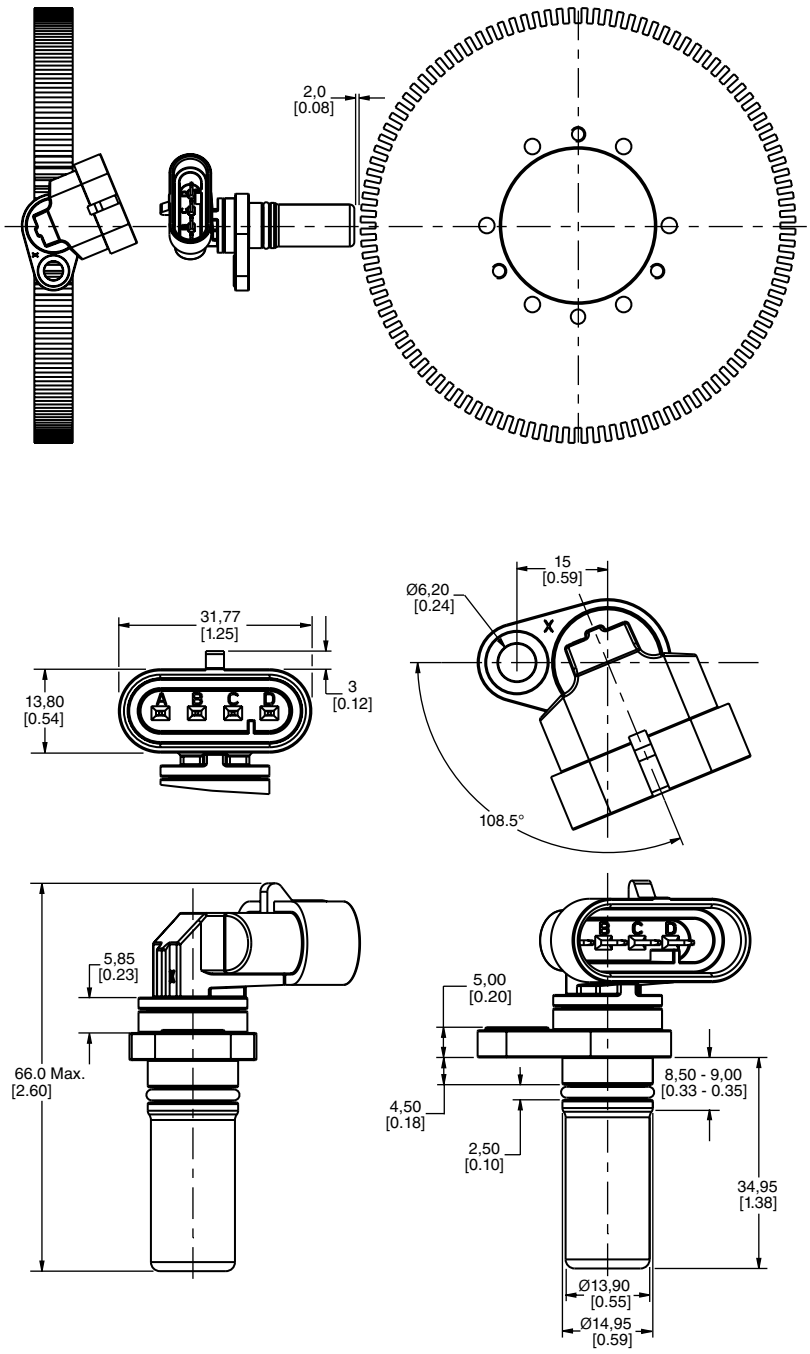
R = V / 0.04 A



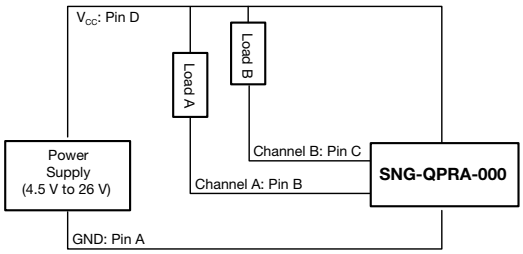


Deutsch DTM04-4P Pinout (mating connector Deutsch DTM06-4S)			
1	**2**	**3**	**4**
Vin	ground	channel A	channel B

Figure 4. SNG-QPRA-000 Mounting Dimensions (For reference only: mm/[in].) (Available now.)



Circuit Diagram



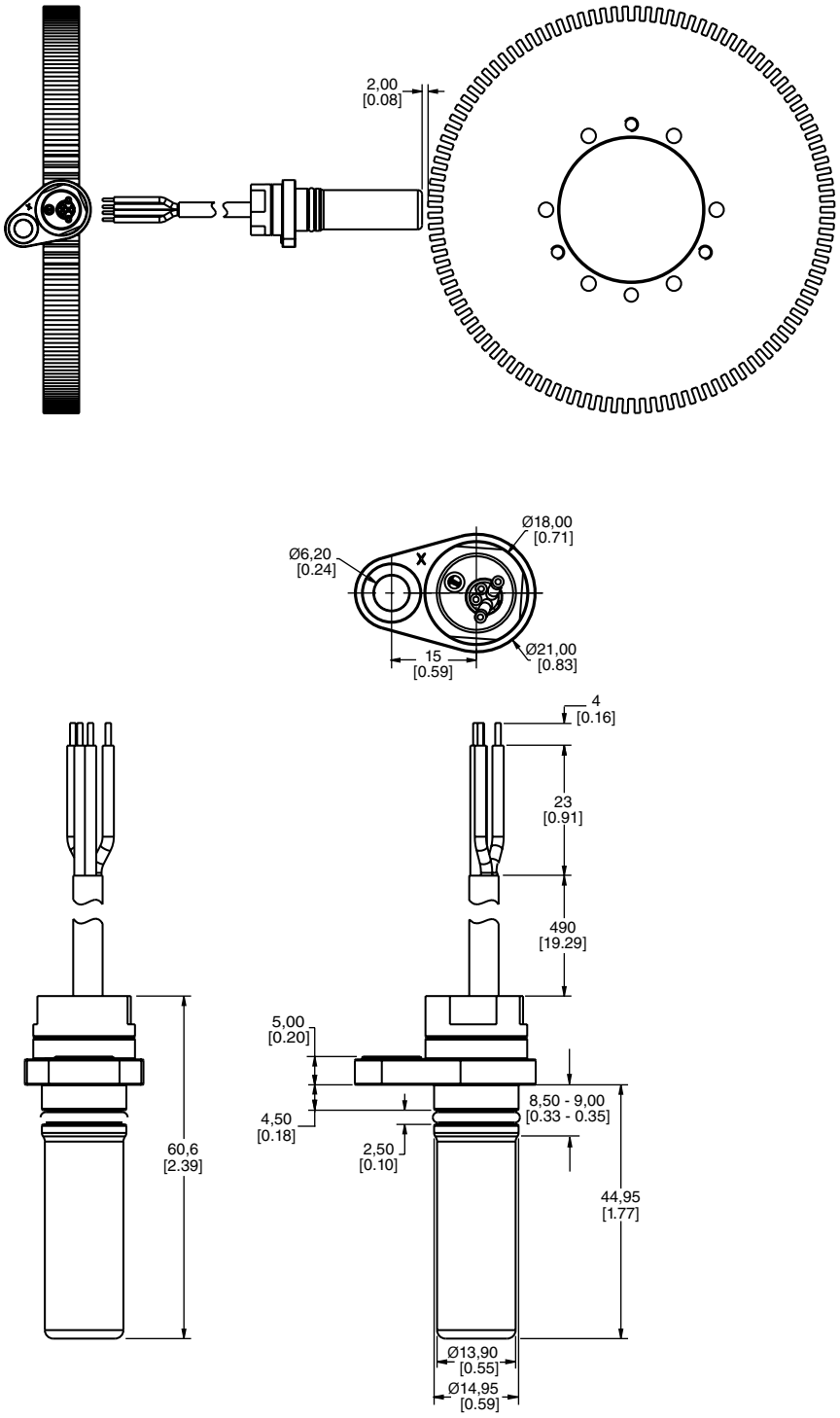
Note: The load resistor values should be such that the output current does not exceed the maximum load current of 40 mA.

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

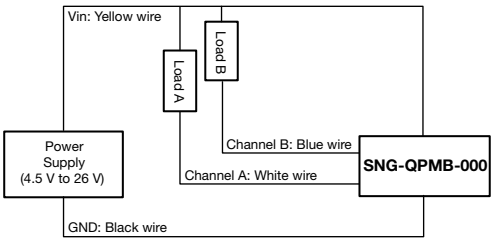
R = V / 0.04 A

Amp Superseal 1.5 Connector Pinout (mating connector 282088)			
A	**B**	**C**	**D**
ground	channel A	channel B	V_{cc}

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



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 A

Leadwire Assignment			
Yellow	**Black**	**White**	**Blue**
Vsupply	ground	channel A	channel B

ADDITIONAL INFORMATION

The following associated literature is available on the Honeywell web site at sensing.honeywell.com:

- Product Range Guide
- Product Line Guide
- Product Installation Instructions
- Technical Information

For SNG-QPLA-000, SNG-QPCA-001, SNG-QPRA-000 (Available now.)

⚠ 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.

⚠ WARNING
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- The information presented in this datasheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

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Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

For SNG-QPMB-000 (Coming soon.)

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