



SNDH-T4P-G01



Quadrature speed and direction sensor

Actual product appearance may vary.

Features

- Hall-effect magnetic sensing technology
- Advanced performance dynamic offset self calibration
- Air gap up to 2 mm [0.08 in]
- Near zero speed
- Automotive under-the-hood packaging integrity
- EMI hardened
- High frequency switching capability (up to 15 kHz)
- -40 °C to 150 °C [-40 °F to 302 °F] continuous operating temperature
- Multiple connector options
- Short circuit protection
- Reverse voltage protection
- Open collector output
- Low jitter output
- O-ring seal

Potential Applications

- Steering position
- Tachometers/counter
- Encoders
- Speed and direction of gears and shafts in transmissions, hydraulic motors, pumps and gear boxes

Description

The SNDH Series is a dual differential hall sensor that provides speed and direction information using a quadrature output with signals 90 degree phase shifted from each other. Target direction is determined by output lead/lag phase shifting.

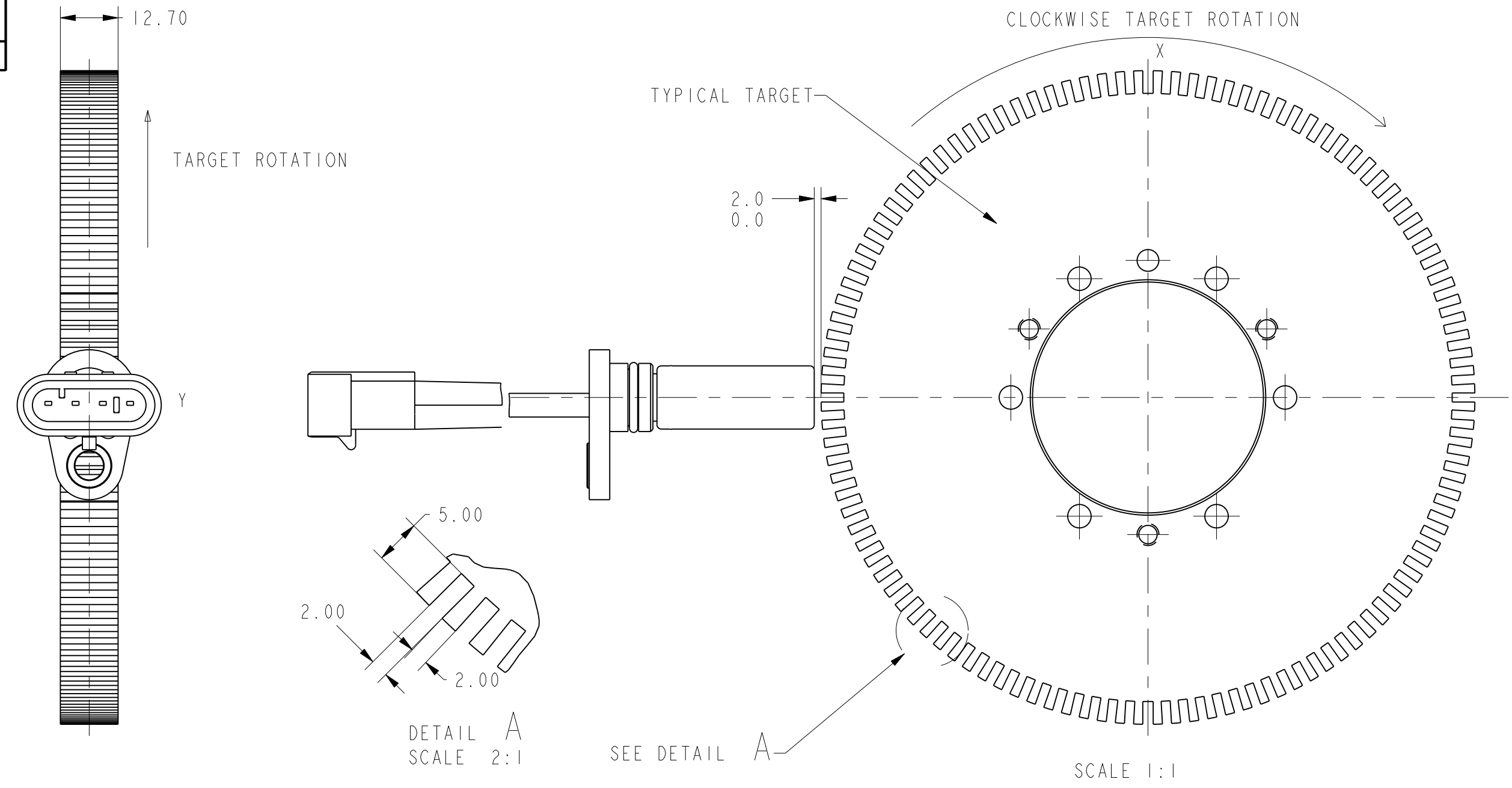
This product is designed for applications where extremely high resolution is required at wide frequency ranges, 0 kHz to 15 kHz, and large air gaps. BiCMOS (bipolar complementary metal-oxide-semiconductor) Hall-effect technology, using advanced digital signal processing for dynamic off-set cancellation, provides enhanced air gap performance and phase shift accuracy over most conditions. Unique patented (pending) IC (integrated circuit) packaging provides output phase shift tolerancing with enhanced accuracy.

The robust package is automotive under-the-hood grade for most environmental conditions as well as EMI (electromagnetic interference) hardened. Multiple connection options, including wire harness and integral connector versions using AMP super seal or AMP Jr. Timer connectors, are available. Package design includes an o-ring seal for pressure applications and a fixed mounting flange.

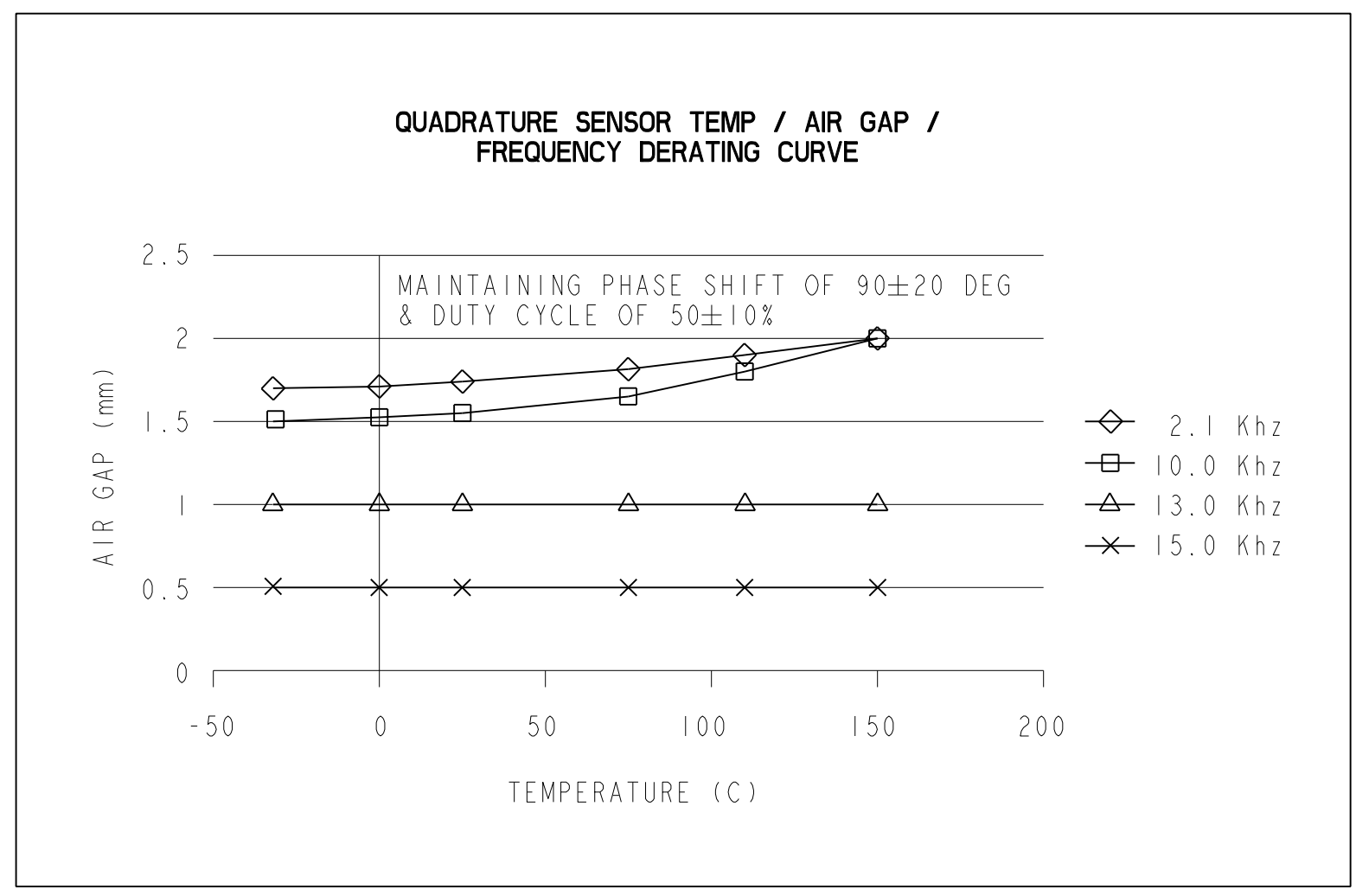
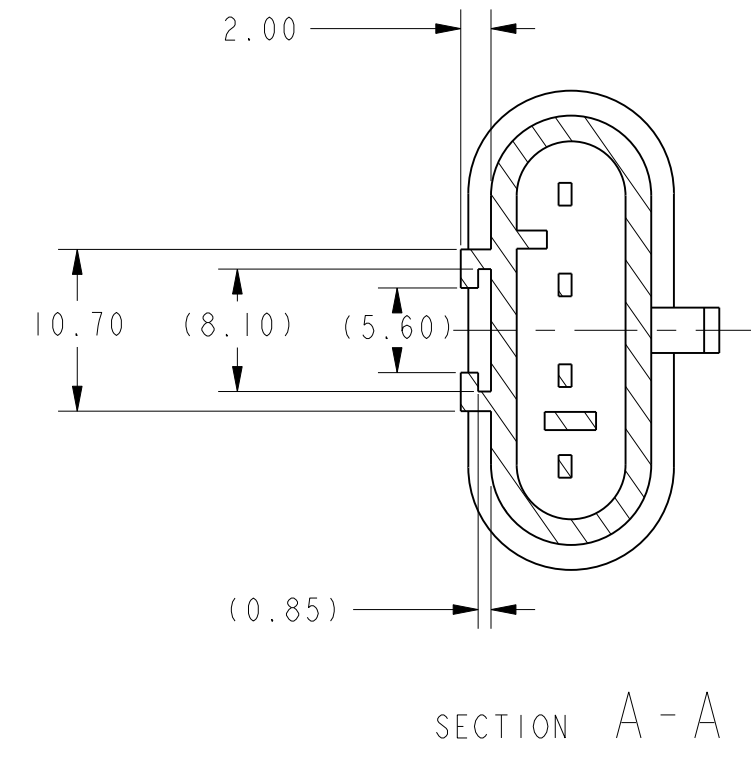
Product Specifications	
Sensing Type	Quadrature speed and direction
Housing Diameter	15 mm [0.6 in]
Barrel Length	45 mm [1.77 in]
Vdc Supply	4.5 Vdc to 18 Vdc
Operating Frequency Range	0 Hz to 15 kHz
Operating Temperature	-40° to 150° C [-40 °F to 302 °F]
Connections	AMP 4-pin connector
Availability	Global
UNSPSC Code	411121
UNSPSC Commodity	411121 Transducers
Series Name	SNDH

HONEYWELL
PART NUMBER
SNDH-T4P-G01

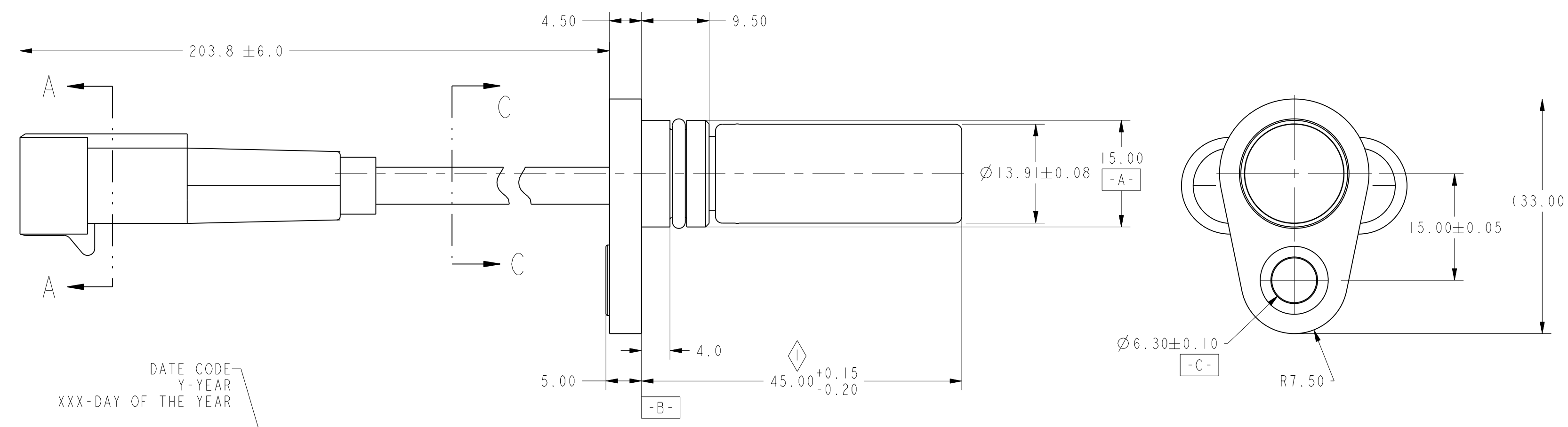
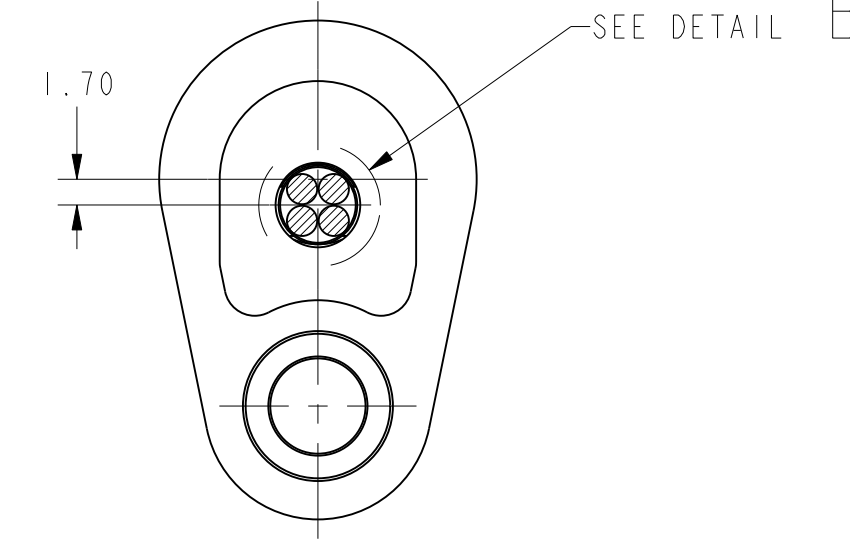
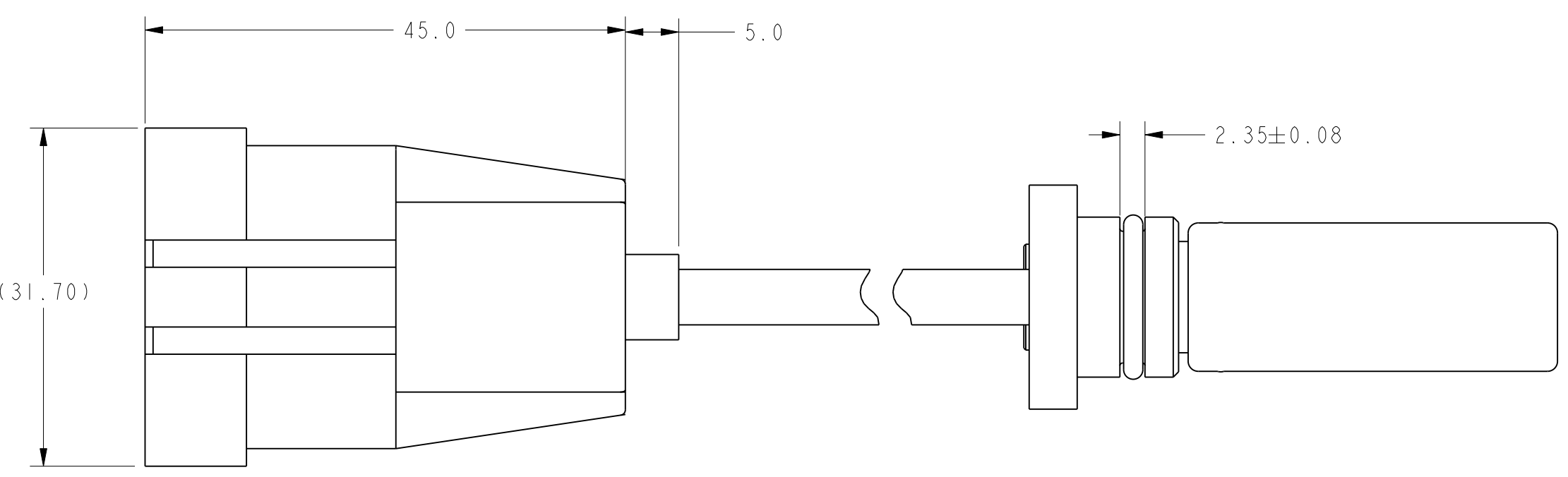
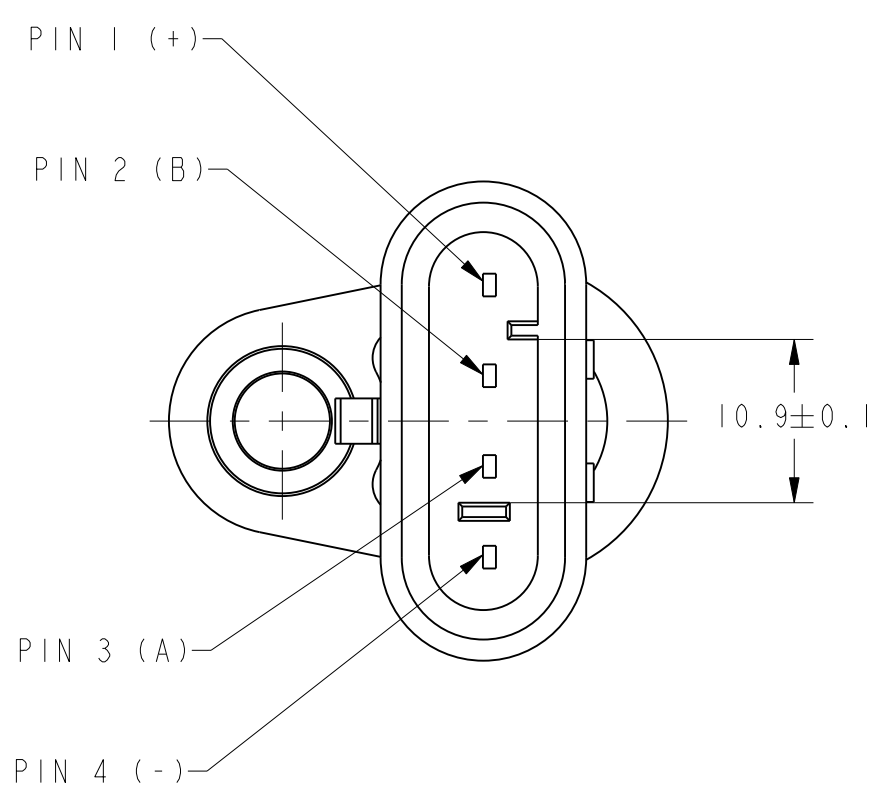
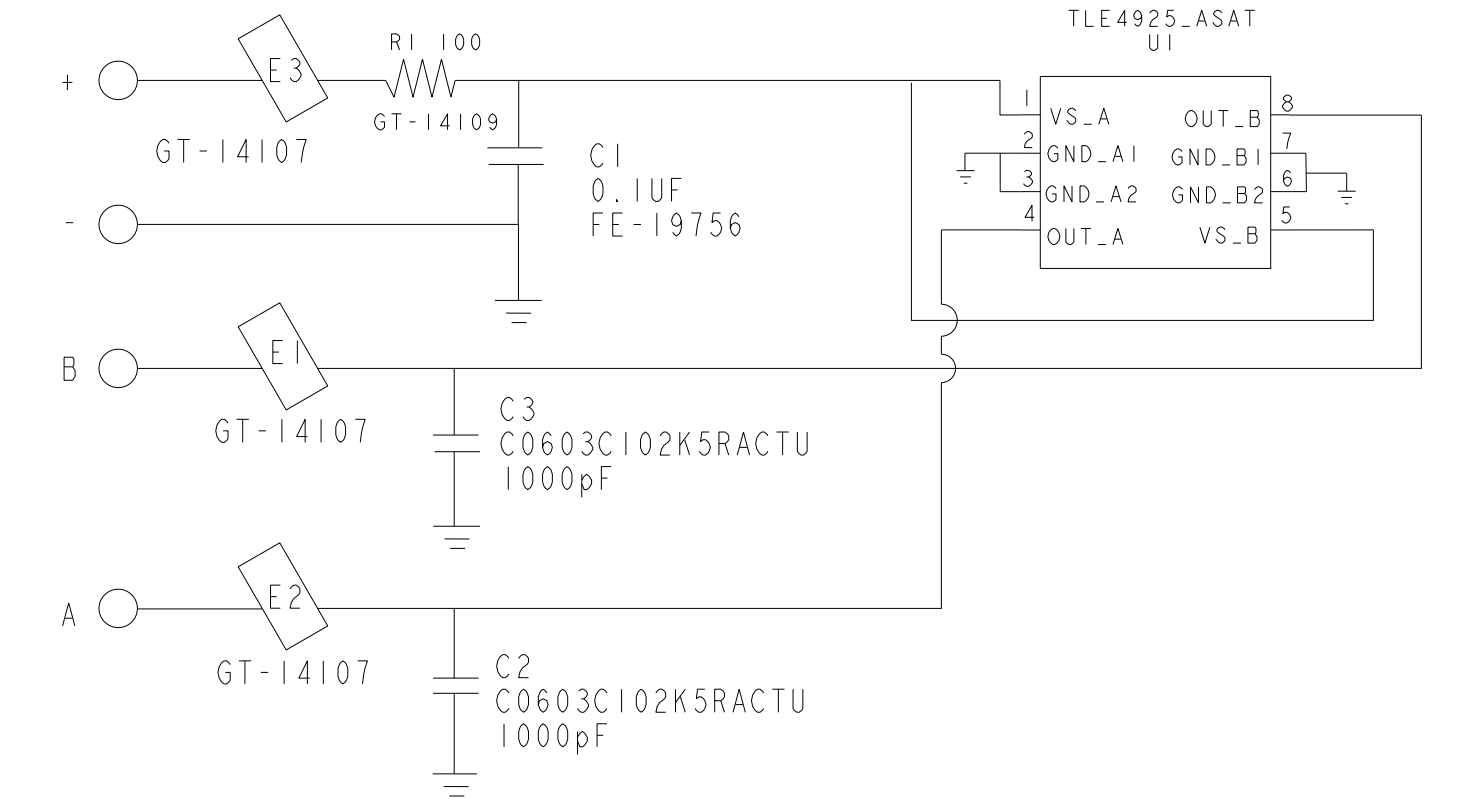
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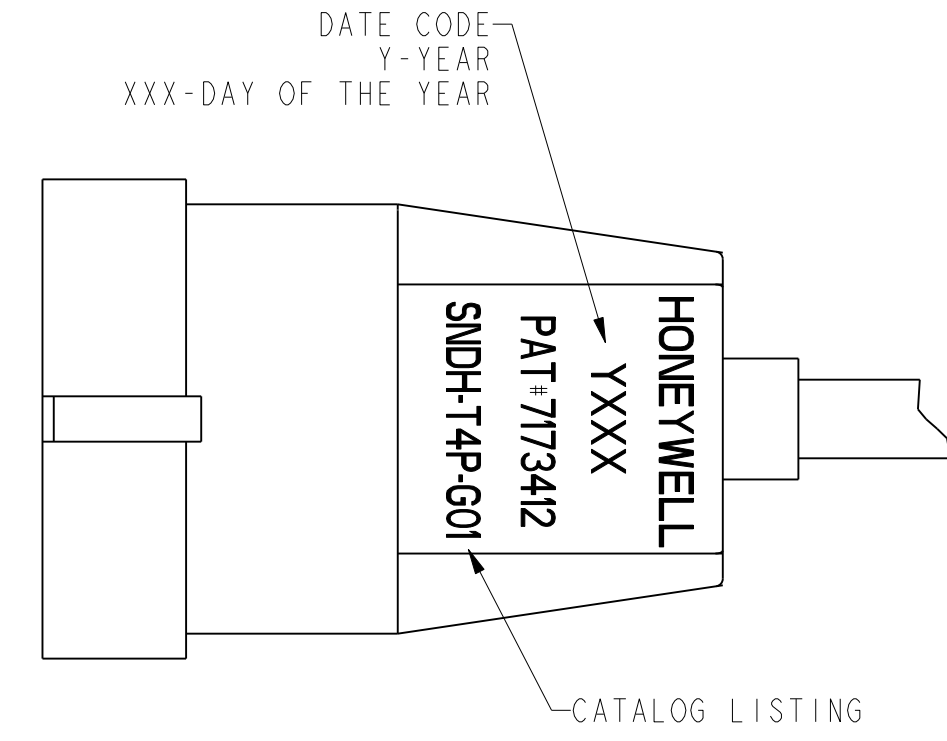
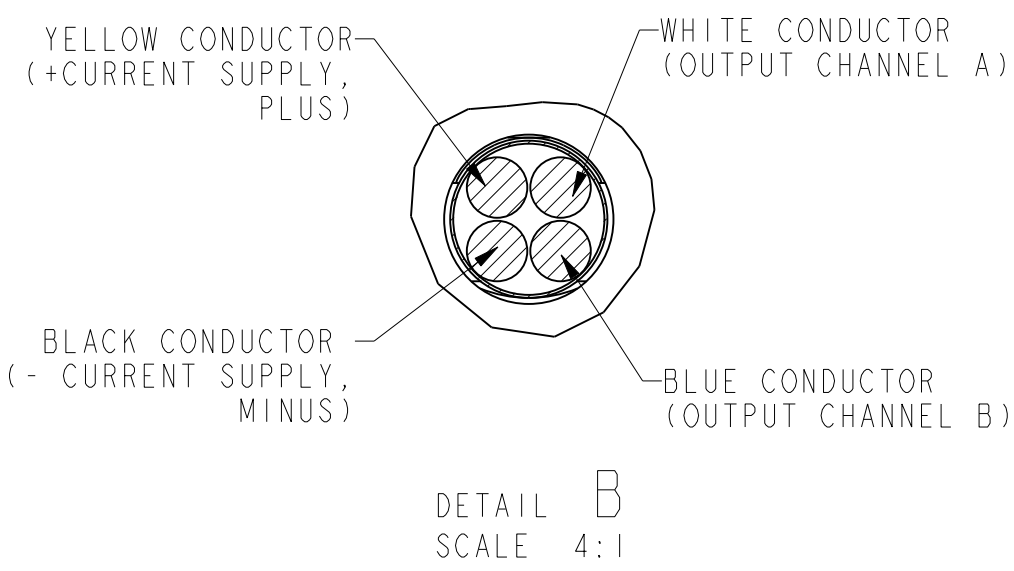
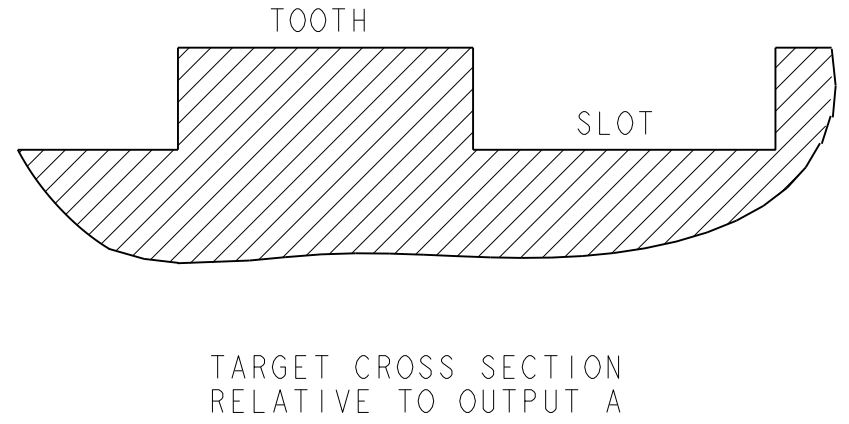
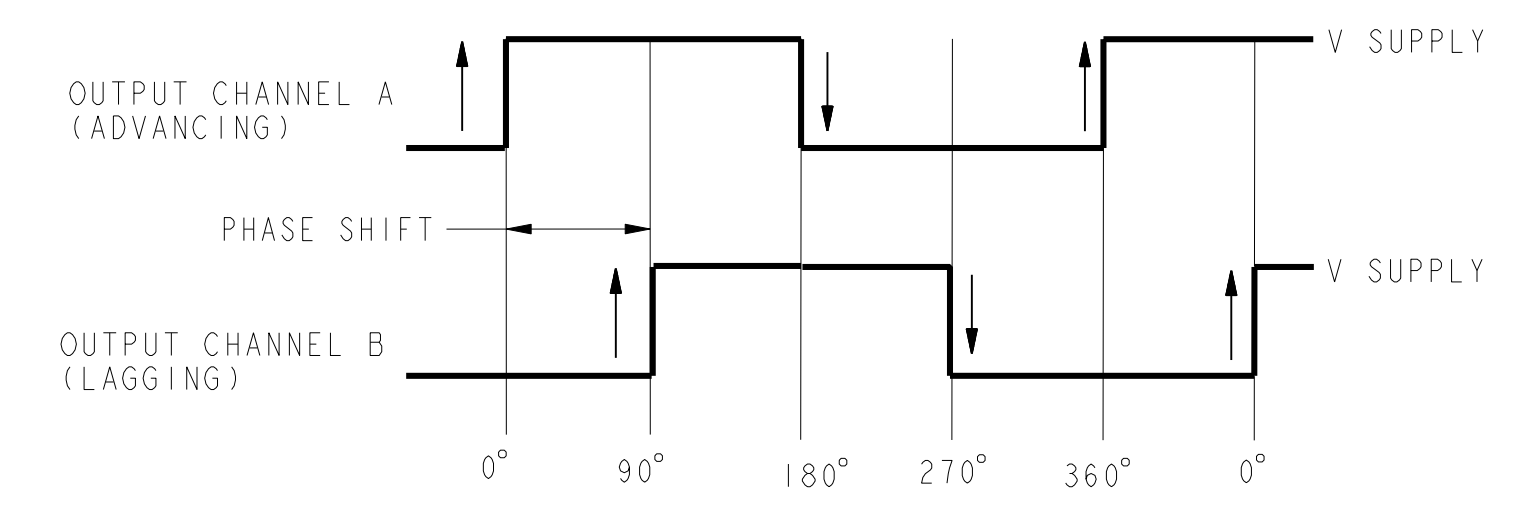
- NOTES
- MATERIALS:
 INSERT = PLASTIC VALOX K4560
 BUSHING = MACHINED BRASS
 O-RING = FLUOROCARBON (VITON)
 HOUSING = 304 STAINLESS STEEL
 WIRE HARNESS=XLPE CABLE JACKET; 24 AWG STRANDED CONDUCTORS
 TARGET = FY-4500-17W OR EQUIVALENT
 - CONNECTOR MATES WITH AMP SUPERSEAL P/N 282088
 - CONNECTOR MOUNTING FEATURES PER AMP PART NUMBER C-282106
 - RECOMENDED MOUNTING BORE 15.05^{+0.10}_{-0.00}



BLOCK DIAGRAM



SENSOR OUTPUT



KEY PRODUCT CHARACTERISTICS			
⊕	SAFETY/COMPLIANCE	◇	FIT/FUNCTION
⊕	S/C CHECKPOINTS	◇	F/F CHECKPOINTS
NO. & TYPE	DESCRIPTION	RATIONALE	PTS.
◇	SENSOR FACE TO MOUNTING FLANGE DISTANCE	MAJOR CONTRIBUTOR TO AIR GAP DISTANCE	

DESIGN UNITS: MM
 TOLERANCES UNLESS NOTED:
 NO PLACES .x ± 1.000
 ONE PLACE .x ± 0.4
 TWO PLACE .xx ± 0.15
 THREE PLACE .xxx ± 0.005
 FOUR PLACE .xxxx ± 0.0050
 ANGLES x ± 3

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Honeywell			
TITLE SENSOR,SPEED& DIRECTION WITH SS CONNECTOR			
SIZE	TYPE	DRAWING NAME	REV
D	I	SNDH-T4P-G01	D
Pro/ENGINEER 3D SCALE 2:1		SHEET 1 OF 2	

SPECIFICATIONS		
MECHANICAL CONDITIONS		
CONDITION	LIMITS	COMMENTS
SENSING AIR GAP	0.0 - 2.0 MM	MAY ACHIEVE LARGER GAPS WITH TESTING OF ACTUAL TARGET
TARGET TOOTH WIDTH	2.0 MM (RECOMMENDED)	OTHER GEOMETRY MAY BE SUITABLE
TARGET SLOT WIDTH	2.0 MM (RECOMMENDED)	OTHER GEOMETRY MAY BE SUITABLE
TOOTH HEIGHT	> 3.0 MM	TOOTH HEIGHTS UNDER 5MM MAY LIMIT MAX AIR GAP PERFORMANCE
TARGET WIDTH	> 5.0 MM	WIDTH UNDER 10.0 MM MAY LIMIT AXIAL OFFSETS AND AIR GAP PERFORMANCE
SENSOR MISPOSITION TO TARGET	+/- 1.5 MM	DEPENDENT ON TARGET GEOMETRY
ELECTRICAL CONDITIONS		
CONDITION	LIMITS	COMMENTS
SUPPLY VOLTAGE	4.5 - 18 V	
OUTPUT SIGNAL:		
SIGNAL TYPE	SQUARE WAVE	2 CHANNEL, PHASE SHIFTED BY 90 DEG.
DUTY CYCLE	50% +/- 10%	
PHASE SHIFT	90° +/- 20°	USING RECOMMENDED TARGET TOOTH/SLOT
OUTPUT HIGH	>/= VS - 0.5 VOLTS	
OUTPUT LOW	</= 0.5 VOLTS	
LOAD CURRENT	20 MA MAX	EACH OUTPUT AT ALL CONDITIONS
RISE TIME	10 US (TYPICAL)	DEPENDENT ON LOAD RESISTANCE
FALL TIME	1 US (TYPICAL)	
FREQUENCY	0 TO 15 KHZ	FREQUENCIES ABOVE 10KHZ MAY LIMIT AIR GAP PERFORMANCE DEPENDING ON TARGET GEOMETRY
SHORT CIRCUIT PROTECTION	80MA	
SUPPLY:		
CURRENT (NORMAL)	13.6MA	
CURRENT (MAX)	18 MA	
REVERSE VOLTAGE	-18V MAX	
ENVIRONMENTAL CONDITIONS		
CONDITION	TEST PARAMETER	COMMENTS
EMI:		
RADIATED IMMUNITY	100 V/M PEAK	400-2,500MHZ, 1KV SINE @ 80 % AM
BULK CURRENT INJECTION	100 MA	10-400MHZ
ESD	16 KV AIR/8KV CONTACT AGAINST THE CONNECTOR	(150PF, 330 OHMS) IEC 61000-4-2
FAST TRANSIENT BURST	EN-61000-4-4 LEVEL 4	
EMISSION	EN-61000-6-4	
AUTOMOTIVE TRANSIENTS	ISO 7636/3, TEST PULSE A&B @ +/- 80V	
OPERATING TEMPERATURE	-40° TO 150 °C	CONTINUOUS
THERMOSHOCK	-40° TO 150 °C	AIR TO AIR, 1/2 HOUR DWELL, < 10S TRANSITION
HUMIDITY	95% HUMIDITY AT 90°C	168 HOURS
SALT FOG	DIN IEC 6872-10	96 HOURS
THERMAL SALINE DUNK	105°C TO 0°C AIR TO LIQUID, 5% SALINE	10 CYCLES
MECHANICAL SHOCK	PER IEC 68-2-27 TEST Ea	50G, 11MS
VIBRATION	PER IEC 68-2-6	30G, 5-2KHz
BUMP	PER IEC 68-2-29 TEST Eb	25G, 6MS
DEGREE OF PROTECTION	IP68	2M FOR 24 HOURS
HIGH PRESSURE WASH	IP69K	
RESISTANCE TO FLUIDS	GENERAL AUTOMOTIVE UNDER THE HOOD FLUIDS	

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	SIZE	TYPE	DRAWING NAME
	D	I	SNDH-T4P-G01
SCALE	2:1	SHEET	2 OF 2

SNDH Series

Quadrature General Industrial Speed and Direction Sensors



DESCRIPTION

The SNDH Series is a dual differential hall sensor that provides speed and direction information using a quadrature output with signals 90° phase shifted from each other. Target direction is determined by output lead/lag phase shifting.

This product is designed for applications where extremely high resolution is required at wide frequency ranges, 0 kHz to 15 kHz, and large air gaps. BiCMOS (bipolar complementary metal-oxide-semiconductor) Hall-effect technology, using advanced digital signal processing for dynamic off-set cancellation, provides enhanced air gap performance and phase shift accuracy over most conditions.

FEATURES

- Hall-effect magnetic sensing technology
- Dual differential Hall provides enhanced target resolution
- Advanced performance dynamic offset self calibration
- Air gap up to 2 mm [0.08 in]
- Near zero speed
- Automotive under-the-hood packaging integrity
- EMI hardened
- High frequency switching capability (up to 15 kHz)
- -40 °C to 150 °C [-40 °F to 302 °F] continuous operating temperature
- Multiple connector options
- Short circuit protection
- Reverse voltage protection
- Open collector output
- Low jitter output
- O-ring seal

Unique patented (pending) IC (integrated circuit) packaging provides output phase shift tolerancing with enhanced accuracy.

The robust package is automotive under-the-hood grade for most environmental conditions as well as EMI (electromagnetic interference) hardened. Multiple connection options, including wire harness and integral connector versions using AMP super seal or AMP Jr. Timer connectors, are available. Package design includes an o-ring seal for pressure applications and a fixed mounting flange.

POTENTIAL APPLICATIONS

- Steering position
- Tachometers/counters
- Encoders
- Speed and direction of gears and shafts in transmissions, hydraulic motors, pumps, and gear boxes

SNDH Series

TABLE 1. SPECIFICATIONS

Characteristic	Parameter	Note
Sensing air gap	0 mm to 2,0 mm [0 in to 0.08 in]	may achieve larger gaps with testing of actual target
Target tooth width	2,0 mm [0.08 in] (recommended)	other geometry may be suitable
Target slot width	2,0 mm [0.08 in] (recommended)	other geometry may be suitable
Tooth height	>3,0 mm [0.12] (recommended)	shorter tooth heights may limit max. air gap performance
Target width	>5,0 mm [0.20] (recommended)	narrow targets may limit axial offsets
Sensor misposition to target	±1,5 mm [0.06]	dependent on target geometry
EMI radiated immunity	100 V/m peak	400 Hz to 2 GHz
EMI bulk current injection	60 mA	20 MHz to 400 MHz
EMI ESD	16/8 KV air/contact	against the connector (150 pF, 330 Ohm)
EMI fast transient burst	EN61000-4-4 Level 4	—
Operating temperature	-40 °C to 150 °C [-40 °F to 302 °F]	continuous
Thermoshock	-40 °C to 150 °C [-40 °F to 302 °F]	—
Humidity	168 hr	95% humidity at 90 °C [194 °F]
Salt fog	96 hr	DIN IEC 6872-11
Thermosaline dunk	5 dunks	105 °C to 0 °C [221 °F to 32 °F] air to liquid, 5% saline
High temp exposure with power	1000 hs at 150 °C [302 °F]	—
Mechanical shock	50 g	—
Vibration	30 g, 10 Hz to 2 kHz	—
Resistance to fluids	general automotive under the hood fluids	—
Supply voltage	4.5 V to 18 V	—
Max. continuous supply voltage	18 V	—
Reverse voltage	-18 V max.	continuous
Current (normal)	13.6 mA	all conditions
Current (max.)	18 mA	all conditions
Short circuit protection	80 mA	—
Output signal type	square wave	two channel, phase shifted by 90°, either channel can lead or lag, push/pull
Duty cycle	50% ±10%	—
Phase shift	90% ±20%	using recommended target tooth/slot
Output high	≥Vs - 0.5 V	—
Output low	≤0.5 V	—
Load current	20 mA max.	each output at all conditions
Output low	≤0.5 V	—
Rise time	10 μs typ.	dependent on load resistor
Fall time	1 μs typ.	—
Frequency	0 Hz to 15 kHz	higher frequencies about 10 kHz may be dependent on target geometry and air gap

FIGURE 1. WIRING DIAGRAM

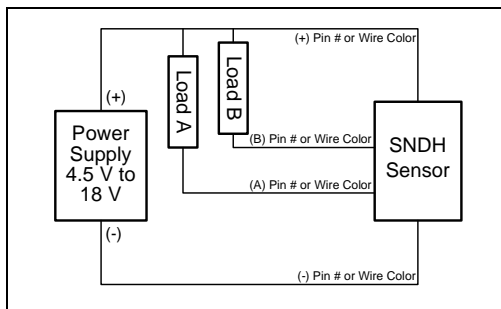


FIGURE 2. SENSOR OUTPUT

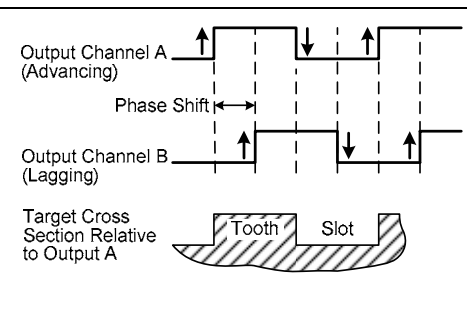
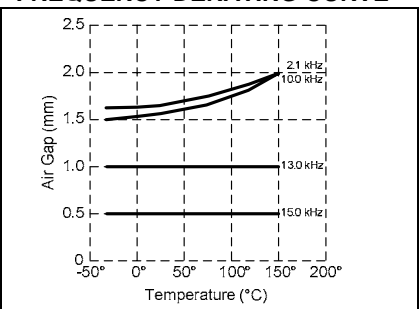


FIG. 3. TEMPERATURE/AIR GAP/FREQUENCY DERATING CURVE



Quadrature Speed and Direction Sensors

MOUNTING DIMENSIONS (For reference only: mm [in])

FIGURE 4. SNDH-T4C-G01

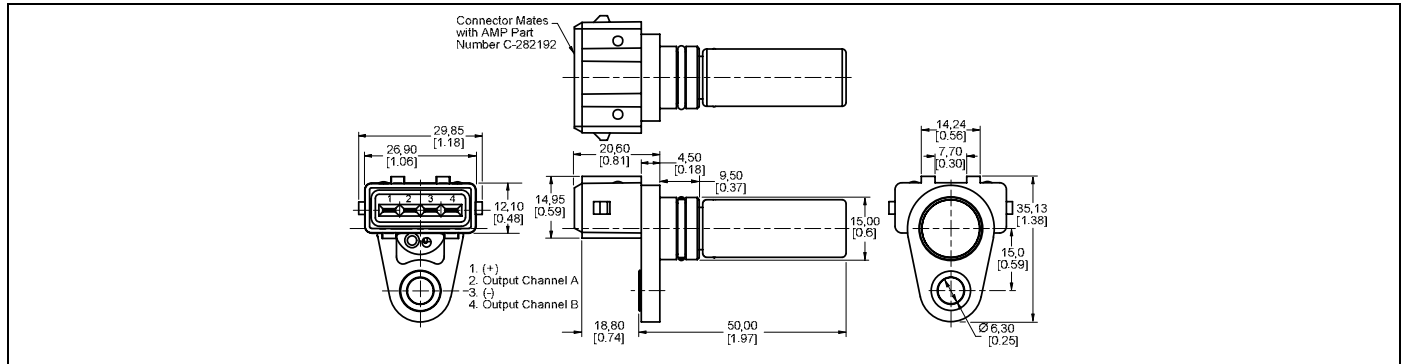


FIGURE 5. SNDH-T4L-G01

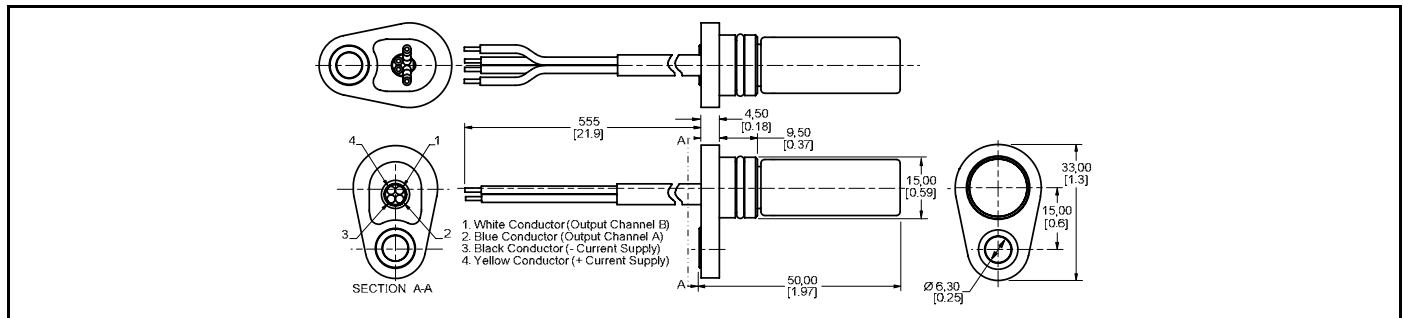


FIGURE 6. SNDH-T4P-G01

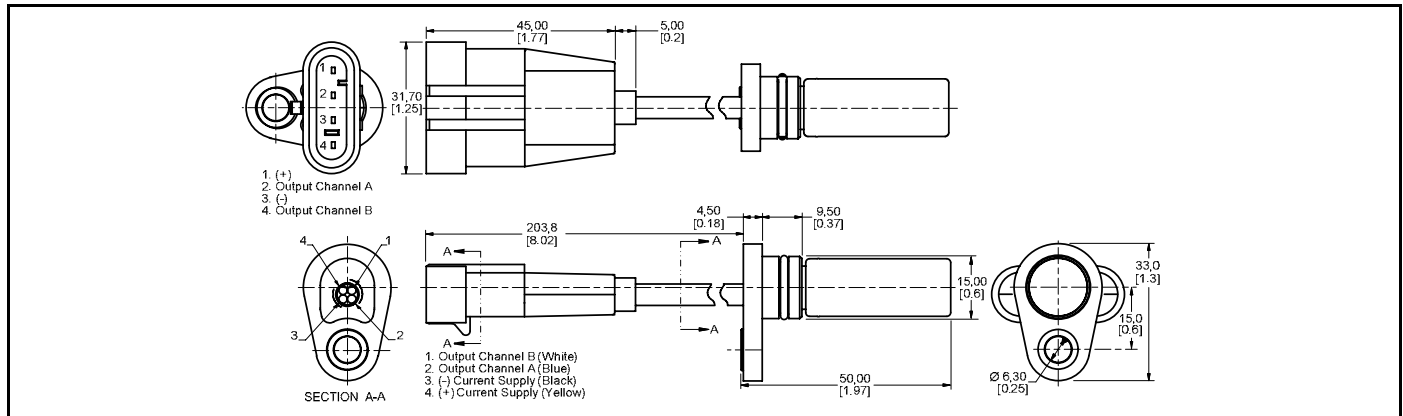


FIGURE 7. SNDH-T4P-G02

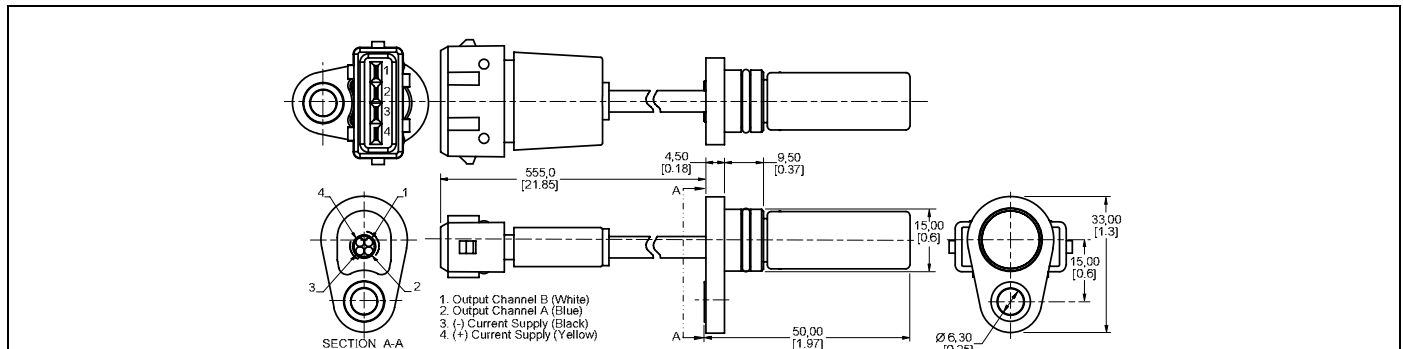
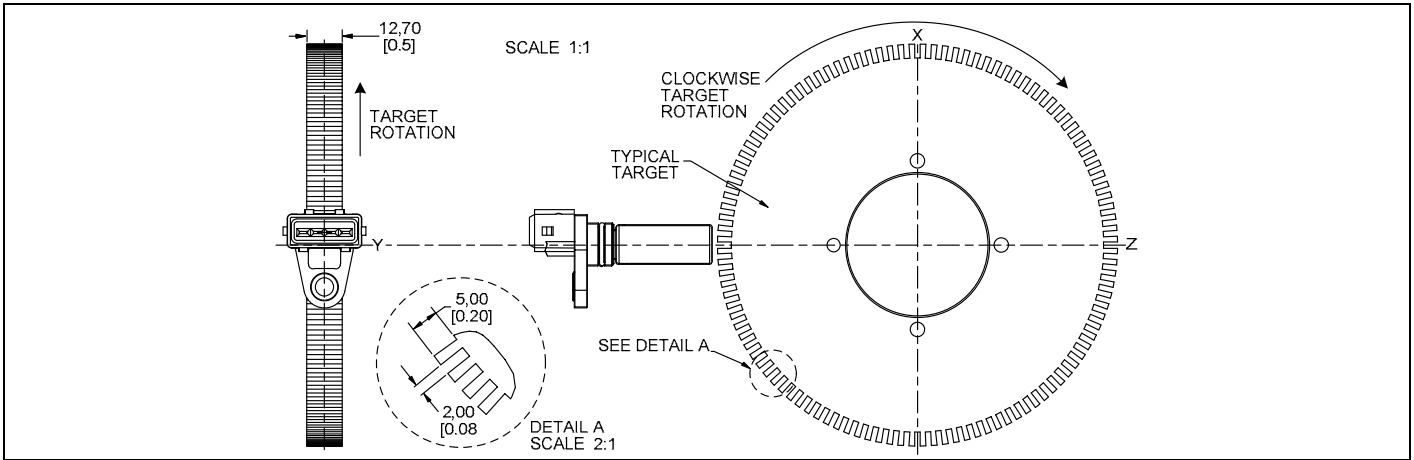


FIGURE 8. GENERAL MOUNTING GEOMETRY



ORDER GUIDE

Catalog Listing	Description
SNDH-T4C-G01	SNDH Series, dual hall speed and position sensor, 4 wire output, connector
SNDH-T4L-G01	SNDH Series, dual hall speed and position sensor, 4 wire output, leadwire
SNDH-T4P-G01	SNDH Series, dual hall speed and position sensor, 4 wire output, pigtail with rectangular connector
SNDH-T4P-G02	SNDH Series, dual hall speed and position sensor, 4 wire output, pigtail with oval connector