

9960-series

Hall Effect Rotary Position Sensor



Model 9960 Hall effect rotary position sensors are available in numerous standard configurations with fast, one week delivery. Available configurations include 7 termination options, single or dual outputs and 24 active electrical angles. With 360 degree turn capability, the 9960 can be used over a large range of rotary motion making it extremely versatile.

Packaged in a highly sealed (IP69K) housing and utilizing non-contacting Hall effect technology makes the 9960 an exceptionally rugged and reliable sensor.

Model 9960 is ideal for a variety of applications in harsh environments, including steering and pedal positioning for construction, agriculture and mining vehicles, marine steering and speed control, wheel and throttle position for material handling equipment, and valve position for process control.

- Opt. Redundant output
- Robust and up to IP69K
- Low weight
- Non-contacting Hall-Effect technology

ELECTRICAL SPECIFICATION

Active Electrical Angle	15-360° in 15° increments
Input Voltage	5VDC +/-5%, 9-30VDC or 15-30VDC
Input Current per channel	16mA maximum except for Current Loop option at 36mA max
Overvoltage	5V Input: 20VDC 9-30V Input: 70V per ISO 7637-2
Output Signal	Analog: 1) ratiometric 5% to 95% or 10% to 90% 2) non-ratiometric 0-10VDC, 0-5VDC, 0.5-4.5VDC PWM: duty cycle 5% to 95% or 10% to 90% Current: 4-20 mA (3-wire)
Minimum Load Resistance:	10kOhm resistive
Resolution	0.088 degrees (12-bit)
Accuracy	+/-0.6% of Active Electrical Angle

MECHANICAL SPECIFICATION

Mechanical Travel	continuous 360 degree and option for 180 degree mechanical stops
Operating Torque	0.11 N-m maximum
Weight	38mm mounting center
Drive	blade
Termination	Flying leads, wire harness w/connector or integral connector (see ordering options)

ENVIRONMENTAL SPECIFICATIONS

Sealing	IP67, IP69K
Side Load	1kg (1 million cycles)
Vibration	10G peak, 10-2000 Hz
Shock	50Gs, half sine pulse, 11 m sec duration
EMC	200 V/m
External Magnetic Susceptibility	20G
Operating Temperature	-40°C to +125°C 4-20mA versions 9J, 9K, & 9X1: -40°C to 85°C
Storage Temperature	-55°C to +150°C

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ISO 9001
BUREAU VERITAS
Certification



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ORDER INFORMATION

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1. Standard Active Electrical Angles

Standard angles: 015-360° in 15°
X: Programmable angle
NOTE: Other angles available

2. Spring / Rotor Return Direction

C= CLOCKWISE SPRING RETURN*
CC = COUNTERCLOCKWISE SPRING RETURN*
NS = NO SPRING RETURN,
CONTINUOUS ROTATION

* Spring return: available for active electrical angles 15° to 165°, not available from 180° to 360°.

3. Input / Output (I/O)

5 VDC IN, Ratiometric Voltage OUT

5A = SENSOR1: 5% to 95%; SENSOR2: 95% to 5%
5B = SENSOR1: 95% to 5%; SENSOR2: 5% to 95%
5C = SENSOR1: 10% to 90%; SENSOR2: 90% to 10%
5D = SENSOR1: 90% to 10%; SENSOR2: 10% to 90%
5X1 = SENSOR1 and SENSOR2: Programmable

5 VDC IN, PWM OUT

5E = SENSOR1: 5% to 95%; SENSOR2: 95% to 5%
5F = SENSOR1: 95% to 5%; SENSOR2: 5% to 95%
5G = SENSOR1: 10% to 90%; SENSOR2: 90% to 10%
5H = SENSOR1: 90% to 10%; SENSOR2: 10% to 90%
5X2 = SENSOR1 and SENSOR2: Programmable

9-30 VDC IN, CURRENT OUT

9J = SENSOR1: 4-20 mA; SENSOR2: 20-4 mA
9K = SENSOR1: 20-4 mA, SENSOR2: 4-20 mA
9X1 = SENSOR1 and SENSOR2: Programmable

9-30 VDC IN, VOLTAGE OUT

9L = SENSOR1: 0-5 VDC, SENSOR2: 5-0 VDC
9M = SENSOR1: 5-0 VDC, SENSOR2: 0-5 VDC
9N = SENSOR1: 0.5-4.5 VDC, SENSOR2: 4.5-0.5 VDC
9R = SENSOR1: 4.5-0.5 VDC, SENSOR2: 0.5-4.5 VDC
9X2 = SENSOR1 and SENSOR2: Programmable

15-30 VDC IN, VOLTAGE OUT

15S = SENSOR1: 0-10 VDC, SENSOR2: 10-0 VDC
15T = SENSOR1: 10-0 VDC, SENSOR2: 0-10 VDC
15X = SENSOR1 and SENSOR2: Programmable

NOTE: Output with clockwise rotation of rotor. SENSOR1 specifies single SENSOR option

4. PWM Frequency

(Used with 5E, 5F, 5G, 5H and 5X2 I/O options only; leave blank for other output options)

P1 = 100 Hz
P2 = 200 Hz
P3 = 500 Hz
P4 = 1000 Hz

5. Number of Outputs and Termination Options

SL = SINGLE OUTPUT, FLYING LEADS
DL = DUAL OUTPUT, FLYING LEADS
SA = SINGLE OUTPUT, CABLE W/TYCO AMP SUPERSEAL 1.5 SERIES*
DA = DUAL OUTPUT, CABLE W/ TYCO AMP SUPERSEAL 1.5 SERIES *
SD = SINGLE OUTPUT, CABLE W/DEUTSCH DT04 SERIES *
DD = DUAL OUTPUT, CABLE W/DEUTSCH DT04 SERIES *
SM = SINGLE OUTPUT, CABLE W/ PACKARD ELECTRIC METRIPACK 150 SERIES
DM = DUAL OUTPUT, CABLE W/ PACKARD ELECTRIC METRIPACK 150 SERIES
SW = SINGLE OUTPUT, INTEGRAL 3-PIN WEATHERPACK CONNECTOR (NO CABLE LENGTH NECESSARY)

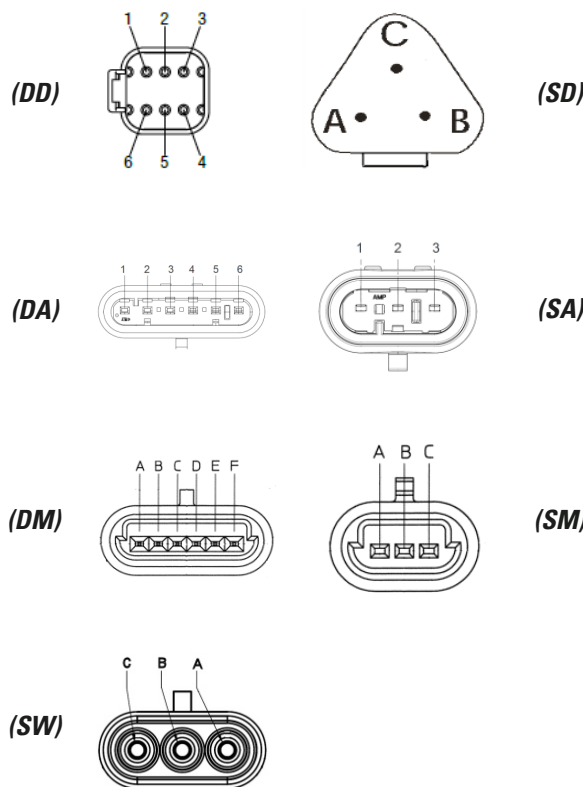
* SINGLE OUTPUTS= 3-PIN, DUAL OUTPUT= 6-PIN

6. Cable Length

150 = 150mm (~6 inches)
300 = 300mm (~12 inches)
450 = 450mm (~18 inches)

NOTE: Other lengths available

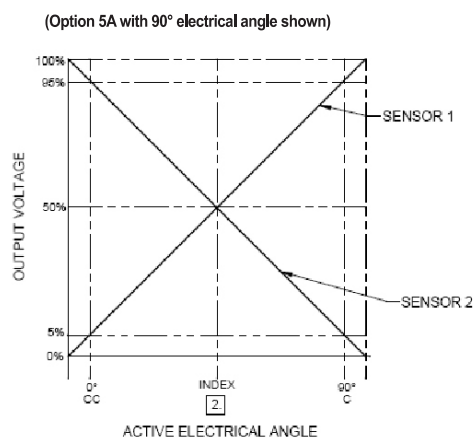
PIN OUT DRAWINGS



CONNECTOR AND MATES

Type	Connector	Mates to
DD	DT06-6S	DT06-6S
SD	Deutsch: DT04-3P	DT06-3S
DA	Amp Superseal: 1.5;282108-1	282090-1
SA	Amp Superseal: 1.5;282105-1	282087-1
DM	Packard Electric Metripack 150.2	12162210
SM	Packard Electric Metripack 150.2	12162182
SW	Packard Electric Weather Pack	12015793

OUTPUT EXAMPLE



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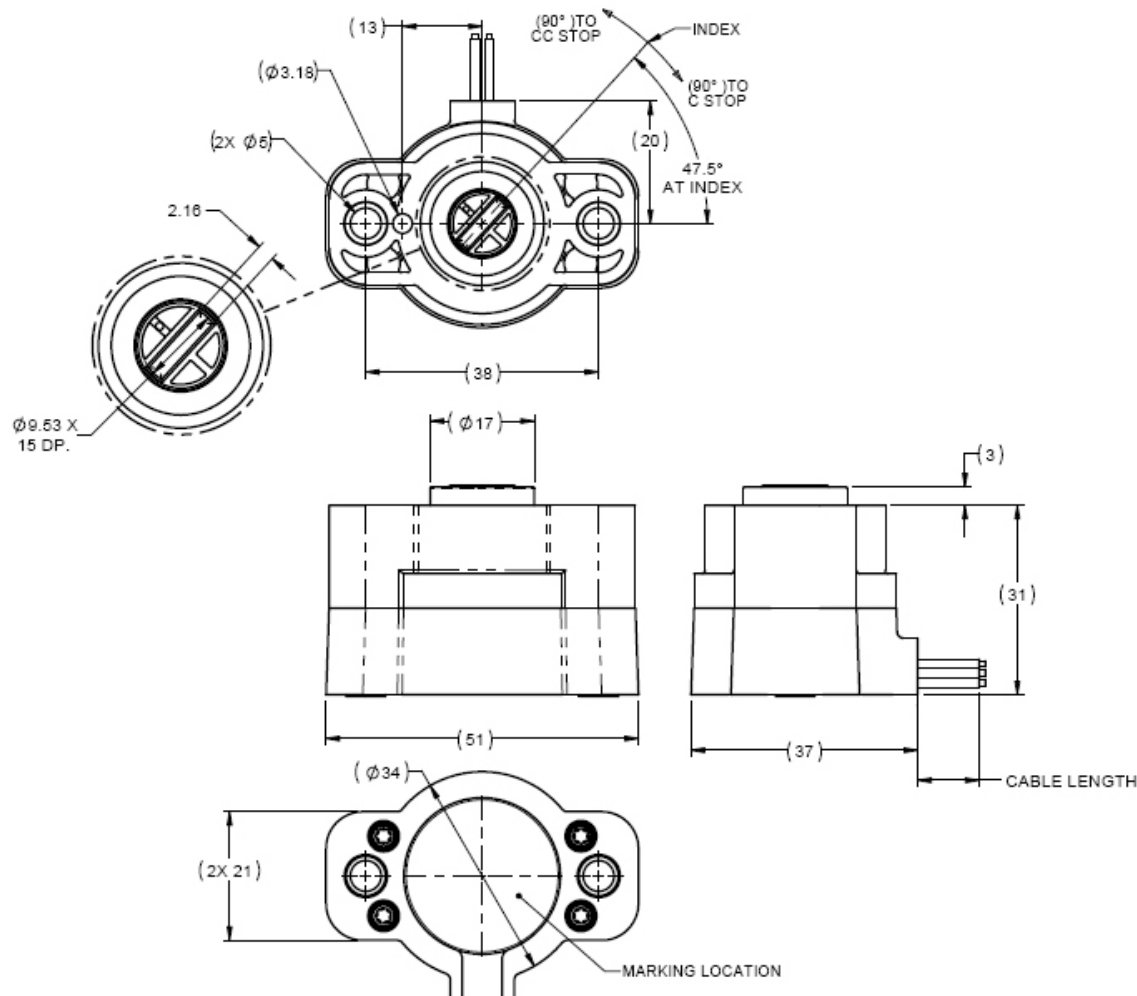


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DIMENSIONS 9960-SERIES



(mm)

CONNECTOR PIN OUT

DD	SD	DA	SA	DM	SM	SW	Flying Lead	Flying Lead	Wire Color	Function
Pin Number							3-Wire	6-Wire	Wire Color	Function
1	A	1	1	E	A	A	•	•	Brown	GND 1
2	B	2	2	F	B	C	•	•	Red	Supply Voltage 1
3	C	3	3	C	C	B	•	•	Orange	Sensor 1 Output
4		4		A				•	Green	Ground 2
5		5		B				•	Blue	Supply Voltage
6		6		D				•	Yellow	Sensor 2 Output

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