

360° Non-Contacting Rotary Dual Output Hall Effect Sensor

9360 Series

The BEI Duncan 9360 Series rotary sensor is a non-contacting Hall effect device with 360° of rotation and dual outputs. This rugged design is ideally suited for infinite rotation applications where reliability and durability are a priority. The sensor provides absolute position at power on and offers two completely redundant outputs. The packaging is similar to other BEI devices and meets the severe durability requirements that are typical in off-highway and agriculture requirements. The new sensor incorporates a rotating Neodymium disk magnet that enables the sensing element to remain stationary, improving both accuracy and reliability. This combination of magnet, sensor and sealed packaging offers excellent temperature stability and corrosion resistance. The sensor can be configured for Analog (voltage) outputs or with a PWM output. These programmability features are configured at the factory and allow for greater flexibility in creating custom limited electrical angle outputs (i.e. 0-20 degrees for full scale) with short turnaround times.

Fully sealed, (meeting and/or exceeding IP66/IP67 standards) the 9360 is impervious to contamination and moisture. An integrally molded 6-pin connector makes a sealed connection with industry standard Packard Electric connector.

9360 Series Features

Rotating magnet / fixed sensor configuration

Provides improved accuracy and reliability

Fully programmable

The standard sensor provides 0-359.9° electrical degrees. Multiple outputs with limited electrical angles up to 359.9° temperature compensation are also available

Compression molded Neodymium magnets

Provide excellent temperature stability and corrosion resistance

Ratiometric analog output or PWM output

Factory programming through connector

Allows for quick turn-around on custom electrical angles

Sealed construction

IP66 / IP67, 6-pin I/O interface to Packard Electric Metri-Pack Pull-to-Seat 150.2 Series P/N 12162261 or P/N 12162260 connector

Extended temperature range

-40° to +85°C standard, -40° to +125°C available optionally

Extended operating life

Maximum rotational speed limited to 300 RPM



Ordering Information

9360	XXX	y																																																																																																																																
	<p>*Standard Active Electrical Angles</p> <table border="0"> <tr><td>015 = 15 degrees</td><td>195 = 195 degrees</td></tr> <tr><td>030 = 30 degrees</td><td>210 = 210 degrees</td></tr> <tr><td>045 = 45 degrees</td><td>225 = 225 degrees</td></tr> <tr><td>060 = 60 degrees</td><td>240 = 240 degrees</td></tr> <tr><td>075 = 75 degrees</td><td>255 = 255 degrees</td></tr> <tr><td>090 = 90 degrees</td><td>270 = 270 degrees</td></tr> <tr><td>105 = 105 degrees</td><td>285 = 285 degrees</td></tr> <tr><td>120 = 120 degrees</td><td>300 = 300 degrees</td></tr> <tr><td>135 = 135 degrees</td><td>315 = 315 degrees</td></tr> <tr><td>150 = 150 degrees</td><td>330 = 330 degrees</td></tr> <tr><td>165 = 165 degrees</td><td>345 = 345 degrees</td></tr> <tr><td>180 = 180 degrees</td><td>360 = 360 degrees</td></tr> </table> <p><small>*Other angles available, consult factory.</small></p>	015 = 15 degrees	195 = 195 degrees	030 = 30 degrees	210 = 210 degrees	045 = 45 degrees	225 = 225 degrees	060 = 60 degrees	240 = 240 degrees	075 = 75 degrees	255 = 255 degrees	090 = 90 degrees	270 = 270 degrees	105 = 105 degrees	285 = 285 degrees	120 = 120 degrees	300 = 300 degrees	135 = 135 degrees	315 = 315 degrees	150 = 150 degrees	330 = 330 degrees	165 = 165 degrees	345 = 345 degrees	180 = 180 degrees	360 = 360 degrees	<p>Spring Return</p> <p>1 = Clockwise Rotation 2 = Counter Clockwise Rotation 3 = No Spring</p>																																																																																																								
015 = 15 degrees	195 = 195 degrees																																																																																																																																	
030 = 30 degrees	210 = 210 degrees																																																																																																																																	
045 = 45 degrees	225 = 225 degrees																																																																																																																																	
060 = 60 degrees	240 = 240 degrees																																																																																																																																	
075 = 75 degrees	255 = 255 degrees																																																																																																																																	
090 = 90 degrees	270 = 270 degrees																																																																																																																																	
105 = 105 degrees	285 = 285 degrees																																																																																																																																	
120 = 120 degrees	300 = 300 degrees																																																																																																																																	
135 = 135 degrees	315 = 315 degrees																																																																																																																																	
150 = 150 degrees	330 = 330 degrees																																																																																																																																	
165 = 165 degrees	345 = 345 degrees																																																																																																																																	
180 = 180 degrees	360 = 360 degrees																																																																																																																																	
		<p>Valid part numbers</p> <table border="1"> <thead> <tr> <th rowspan="2">xxx</th> <th colspan="3">y</th> <th rowspan="2">Active Electrical Angle</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr><td>015</td><td>X</td><td>X</td><td>X</td><td>15 degrees</td></tr> <tr><td>030</td><td>X</td><td>X</td><td>X</td><td>30 degrees</td></tr> <tr><td>045</td><td>X</td><td>X</td><td>X</td><td>45 degrees</td></tr> <tr><td>060</td><td>X</td><td>X</td><td>X</td><td>60 degrees</td></tr> <tr><td>075</td><td>X</td><td>X</td><td>X</td><td>75 degrees</td></tr> <tr><td>090</td><td>X</td><td>X</td><td>X</td><td>90 degrees</td></tr> <tr><td>105</td><td>X</td><td>X</td><td>X</td><td>105 degrees</td></tr> <tr><td>120</td><td>X</td><td>X</td><td>X</td><td>120 degrees</td></tr> <tr><td>135</td><td>X</td><td>X</td><td>X</td><td>135 degrees</td></tr> <tr><td>150</td><td>X</td><td>X</td><td>X</td><td>150 degrees</td></tr> <tr><td>165</td><td>X</td><td>X</td><td>X</td><td>165 degrees</td></tr> <tr><td>180</td><td></td><td></td><td>X</td><td>180 degrees</td></tr> <tr><td>195</td><td></td><td></td><td>X</td><td>195 degrees</td></tr> <tr><td>210</td><td></td><td></td><td>X</td><td>210 degrees</td></tr> <tr><td>225</td><td></td><td></td><td>X</td><td>225 degrees</td></tr> <tr><td>240</td><td></td><td></td><td>X</td><td>240 degrees</td></tr> <tr><td>255</td><td></td><td></td><td>X</td><td>255 degrees</td></tr> <tr><td>270</td><td></td><td></td><td>X</td><td>270 degrees</td></tr> <tr><td>285</td><td></td><td></td><td>X</td><td>285 degrees</td></tr> <tr><td>300</td><td></td><td></td><td>X</td><td>300 degrees</td></tr> <tr><td>315</td><td></td><td></td><td>X</td><td>315 degrees</td></tr> <tr><td>330</td><td></td><td></td><td>X</td><td>330 degrees</td></tr> <tr><td>345</td><td></td><td></td><td>X</td><td>345 degrees</td></tr> <tr><td>360</td><td></td><td></td><td>X</td><td>360 degrees</td></tr> </tbody> </table> <p><small>X = available</small></p>	xxx	y			Active Electrical Angle	1	2	3	015	X	X	X	15 degrees	030	X	X	X	30 degrees	045	X	X	X	45 degrees	060	X	X	X	60 degrees	075	X	X	X	75 degrees	090	X	X	X	90 degrees	105	X	X	X	105 degrees	120	X	X	X	120 degrees	135	X	X	X	135 degrees	150	X	X	X	150 degrees	165	X	X	X	165 degrees	180			X	180 degrees	195			X	195 degrees	210			X	210 degrees	225			X	225 degrees	240			X	240 degrees	255			X	255 degrees	270			X	270 degrees	285			X	285 degrees	300			X	300 degrees	315			X	315 degrees	330			X	330 degrees	345			X	345 degrees	360			X	360 degrees
xxx	y			Active Electrical Angle																																																																																																																														
	1	2	3																																																																																																																															
015	X	X	X	15 degrees																																																																																																																														
030	X	X	X	30 degrees																																																																																																																														
045	X	X	X	45 degrees																																																																																																																														
060	X	X	X	60 degrees																																																																																																																														
075	X	X	X	75 degrees																																																																																																																														
090	X	X	X	90 degrees																																																																																																																														
105	X	X	X	105 degrees																																																																																																																														
120	X	X	X	120 degrees																																																																																																																														
135	X	X	X	135 degrees																																																																																																																														
150	X	X	X	150 degrees																																																																																																																														
165	X	X	X	165 degrees																																																																																																																														
180			X	180 degrees																																																																																																																														
195			X	195 degrees																																																																																																																														
210			X	210 degrees																																																																																																																														
225			X	225 degrees																																																																																																																														
240			X	240 degrees																																																																																																																														
255			X	255 degrees																																																																																																																														
270			X	270 degrees																																																																																																																														
285			X	285 degrees																																																																																																																														
300			X	300 degrees																																																																																																																														
315			X	315 degrees																																																																																																																														
330			X	330 degrees																																																																																																																														
345			X	345 degrees																																																																																																																														
360			X	360 degrees																																																																																																																														
	<p>Consult factory for options including:</p> <ul style="list-style-type: none"> Non-standard output slope Clipped outputs Non-standard Active Electrical Angles PWM output (pulse width modulation) Special marking Non -standard linearity 																																																																																																																																	
	<p>Custom solutions can also be addressed, including:</p> <ul style="list-style-type: none"> CAN Bus output Single output 3-pin Wire harness 																																																																																																																																	
	<p>Example Part Number: 93602702</p> <p>270 degree active electrical angle and counter clockwise spring rotation</p>																																																																																																																																	



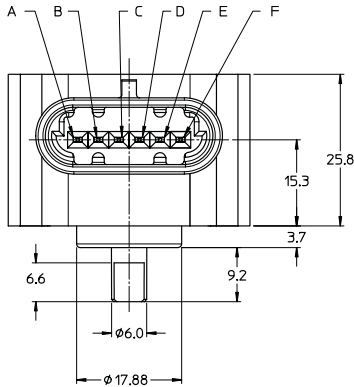
170 Technology Drive West
Irvine, CA 92618-2401
(949) 341-9530 Fax: (949) 453-2700
email: sales@beiduncan.com
www.beiduncan.com


ISO9001

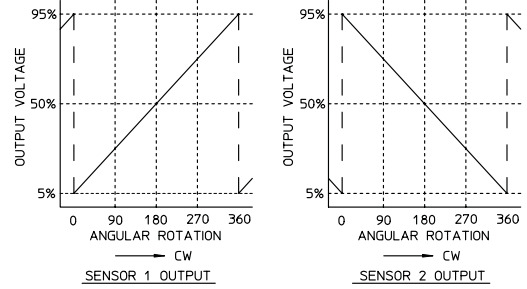
Certified

360° Non-Contacting Rotary Dual Output Hall Effect Sensor

9360 Series



Note: All dimensions are shown in millimeters
 Note : Shaft is positioned at 50% voltage output



CONNECTOR PIN OUTPUT		
	SENSOR 1	SENSOR 2
V _s (INPUT)	F	B
GROUND	E	A
OUTPUT	C	D

Mechanical Specifications

Mechanical travel	0° to +360° with no stops, allowing for infinite rotations
Frequency response	1,000Hz minimum
Rotational torque	0.025 – 0.110 N-m
Weight	35 grams (approx.)

Electrical Specifications

Mechanical input range	0° to +360° (other, custom limited angle ranges available)
Input voltage	5.0 V \pm 0.25V DC
Input current	18mA maximum per output 36mA maximum total (both channels)
Sensor	0.25V – 4.75V for Analog at 5.0V input 5% – 95% duty cycle for PWM (Different outputs and mechanical range(s) available as a custom option)
Accuracy	\pm 0.6% of full scale at room temperature \pm 0.9% of full scale over operating temperature range
Resolution	Analog (continuous)

Environmental Specifications

Electromagnetic compatibility	100V/meter, 14kHz – 1GHz range
Vibration	10G peak, 20 – 2,000 Hz
Shock	50Gs, half sine pulse, 5 m sec duration
Side load	1kg for 1 million cycles
Operating temperature range	-40°C to +85°C (wider operating temperature -40° to +125 C° available)
Storage temperature range	-55°C to +105°C

© Copyright 2007 BEI Duncan Electronics. Specifications subject to change without notice.



170 Technology Drive West
 Irvine, CA 92618-2401
 (949) 341-9530 Fax: (949) 453-2700
 email: sales@beiduncan.com
 www.beiduncan.com

ISO9001

Certified

Ordering Information

9360

XXX

***Standard Active Electrical Angles**

015 = 15 degrees	195 = 195 degrees
030 = 30 degrees	210 = 210 degrees
045 = 45 degrees	225 = 225 degrees
060 = 60 degrees	240 = 240 degrees
075 = 75 degrees	255 = 255 degrees
090 = 90 degrees	270 = 270 degrees
105 = 105 degrees	285 = 285 degrees
120 = 120 degrees	300 = 300 degrees
135 = 135 degrees	315 = 315 degrees
150 = 150 degrees	330 = 330 degrees
165 = 165 degrees	345 = 345 degrees
180 = 180 degrees	360 = 360 degrees

*Other angles available, consult factory.

Consult factory for options including:

- Non-standard output slope
- Clipped outputs
- Non-standard Active Electrical Angles
- PWM output (pulse width modulation)
- Special marking
- Non -standard linearity

Custom solutions can also be addressed, including:

- CAN Bus output
- Single output 3-pin
- Wire harness

Example Part Number: 93602702

270 degree active electrical angle
and counter clockwise spring rotation

y

Spring Return

- 1 = Clockwise Rotation
- 2 = Counter Clockwise Rotation
- 3 = No Spring

Valid part numbers

XXX	y			Active Electrical Angle
	1	2	3	
015	X	X	X	15 degrees
030	X	X	X	30 degrees
045	X	X	X	45 degrees
060	X	X	X	60 degrees
075	X	X	X	75 degrees
090	X	X	X	90 degrees
105	X	X	X	105 degrees
120	X	X	X	120 degrees
135	X	X	X	135 degrees
150	X	X	X	150 degrees
165	X	X	X	165 degrees
180			X	180 degrees
195			X	195 degrees
210			X	210 degrees
225			X	225 degrees
240			X	240 degrees
255			X	255 degrees
270			X	270 degrees
285			X	285 degrees
300			X	300 degrees
315			X	315 degrees
330			X	330 degrees
345			X	345 degrees
360			X	360 degrees

X = available