

## Small Size Liquid Capacitive Electronic Analog Output Inclinometer Sensors



### Description

The N Series inclination sensors are liquid capacitive gravity based sensors with integrated sensor electronics. These sensors provide Analog DC output; the measuring principle assures a linear angle output equal to the measuring range of the sensor.

The sensor electronics require only minimal power - power consumption is very low (approx. 1mA) - and are in conjunction with the capacitive primary transformer, which is characterized by high accuracy, a high signal-to-noise ratio and long-term stability.

### Applications

These inclinometers are suitable for applications requiring a small, light sensor for measurement of relatively large inclinations.

Typical areas of application include measuring instruments and inspection systems, vehicle tilt monitoring, automation and safety engineering, scientific devices, medical and communications equipment as well as navigational systems. Commonly used as a component combined with OEM electronics.

### Features

- *Small housing, less than 1" dia.*
- *Measuring Ranges: ±10, ±30, ±70°*
- *Linear output characteristics*
- *Minimal zero offset drift*
- *Hysteresis free output signal*
- *High measurement accuracy*
- *Very low relative linearity errors*
- *Integrated sensor electronics*
- *Long-term stability*
- *Low power consumption*
- *Analog mV output signal*
- *Hermetically sealed to IP65*
- *Zero offset mechanically adjustable through 360 within mounting ring*
- *No interference by ambient electromagnetic fields*
- *Shockproof to 10,000g - no moving mechanical parts*
- *Sensor electrically isolated from point of measurement using high quality PBT plastic housing - no ground connections*

### MECHANICAL CHARACTERISTICS

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<b>HOUSING</b>	30% Glass Filled PBT Plastic
<b>MOUNTING</b>	Supplied Mounting Ring
<b>MOUNTING PLANE</b>	Vertical Surface
<b>OUTLINE DIMENSIONS</b>	Ø 0.976" (Ø 24.8mm) X .46" (11.7mm) h
	With Mounting Ring: Ø 1.46" (Ø 37mm) X .46" (11.7 mm) h
<b>ELECTRICAL CONNECTION</b>	3 highly flexible, color-coded wires Ø 0.04" (Ø 1.0mm) x 7.0" (18cm)
	Optional: Shielded cable Ø 0.083" (Ø 2.1mm) x 1.65' (0.5m)
<b>WEIGHT</b>	Approx. 0.653 ounces (18.5 grams) (not including mounting ring)
<b>OPERATING TEMPERATURE</b>	-40°F to +185°F (-40° to +85°C )
<b>STORAGE TEMPERATURE</b>	-49°F to +194°F (-45° to +90°C )

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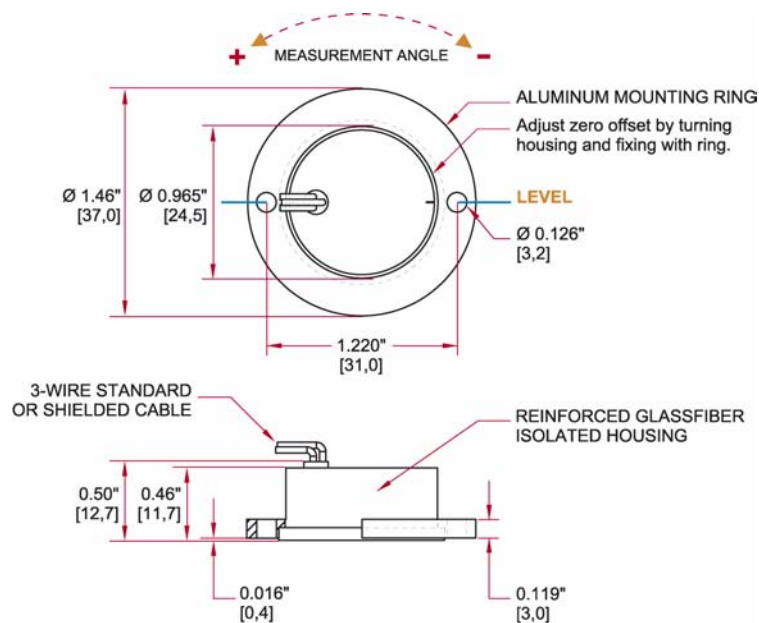
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N Model Specifications	N2	N3	N4
<b>Measuring range</b>	±10°	±30°	±70°
<b>Resolution</b>	< 0.002°	< 0.005°	0.01°
<b>Max. Non-linearity</b>	< 0.5% Full Range for ±10° model		
	< 0.2% Full Range for ±30°, ±70° models		
<b>Transverse Sensitivity</b>	<1% at 30° tilt		
<b>Response Time</b>	< 0.3 Sec. (<300mSec)		
<b>Power Supply U<sub>b</sub></b>	5 Volt regulated		
<b>Min ... Max. Supply U<sub>bz</sub></b>	3 ... 6 Volt		
<b>Current consumption U<sub>b</sub>=5Volt</b>	Approx. 1mA		
<b>Protection Degree</b>	IP65		
<b>VALUES FOR ANALOG DC OUTPUT MODEL AT U<sub>BN</sub>=5VOLT</b>			
<b>Sensitivity</b>	Approx. 12mV/°	Approx. 5mV/°	Approx. 3.2mV/°
<b>Temperature Drift of Sensitivity</b>	-0.17%/C	< -0.12%/C	
<b>Temperature Drift of Zero</b>	< ±0.05mV/C	< ±0.025mV/C	
<b>Zero Offset at U<sub>b</sub>=5V</b>	2.5 ±0.1 Volt - generally: 0.5U <sub>b</sub> ±4%		
<b>Output Impedance</b>	10kΩ		
<i>Digital pulse-width modulated output signal - linear to the degree of angle - available upon request.</i>			
<b>CABLE WIRING TABLE:</b>			
<b>3-WIRE (standard)</b>		<b>SHIELDED CABLE (optional)</b>	
<b>RED</b>	+5VDC Stable	<b>RED</b>	+5VDC Stable
<b>WHITE</b>	Output Signal	<b>BLUE</b>	Output Signal
<b>BLUE</b>	GND (Inside Shield)	<b>SHIELD</b>	GND (Inside Shield)

**Figure 1: Dimensions and Mounting Position (inches [mm])**



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