



# **FEATURES**

- ±60° total sensing range
- Internally damped
- Rugged plastic housing
- Connector or hard wire connection

#### **APPLICATIONS**

- Crawler / Blast Hole Drills
- Construction equipment
- Safe Load Indicators
- Oil well pump-off control

# **ANGLESTAR®**

## Electronic Clinometer

# **SPECIFICATIONS**

- +/-60° sensing range
- Ratiometric and Bipolar DC models
- Sturdy plastic housing

The AngleStar® Electronic Clinometer is an angle measurement device that produces a DC voltage output signal proportional to the level and direction of angular displacement. The sensing element, which is fluid filled, produces a variable resistance as it is tilted in the sensitive axis. This change in resistance is then translated into a smooth DC output signal.

Also see our other models, *AccuStar®-EA*, AccuStar® IP-66 (voltage or 2-wire current output, IP-66 rating), and the **AngleStar® Protractor System** (AngleStar® Electronic Clinometer with digital readout).

Measurement Specialties, Inc. offers many other types of sensors.



# PERFORMANCE SPECIFICATIONS (COMMON)

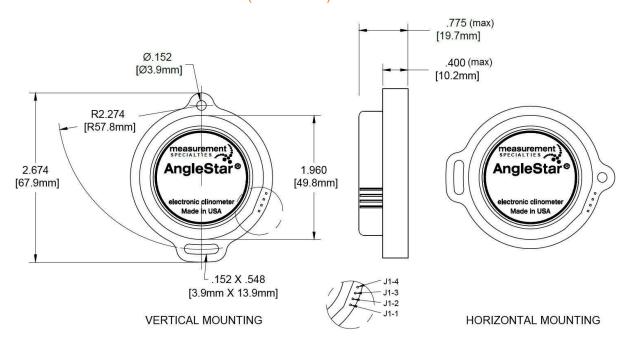
ELECTRICAL			
Total range	±60°		
Linear range	±45°		
Linearity			
Null to 10°	0.1°		
10° to 45°	±1% of reading		
45° to 60°	Monotonic		
Resolution	0.001°		
Null repeatability	0.05°		
Cross axis error	<1% up to 45°		
Time constant	0.3 seconds		
Frequency response	0.5Hz @ -3db		
ENVIRONMENTAL/MECHANICAL			
Operating temperature range	-40° to +85°C		
Storage temperature range	-55° to +85°C		
Temp. coefficient of null	0.008°/°C		
Temp. coefficient of scale factor	0.1% / ° C		
Electrical connection	Pin terminals (solderable)		
Mating connector	Shell = Molex #22-01-2041		
	Pins = Molex #08-50-0113		

#### Notes:

All values are nominal unless otherwise noted!

Dimensions are in inch [mm] unless otherwise noted

# DIMENSIONS AND CONNECTIONS (COMMON)

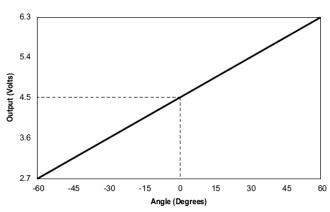


Dimensions are in inches [mm], and are nominal unless otherwise specified

## RATIOMETRIC OUTPUT MODEL

The Ratiometric clinometer is a signal conditioned sensor that has been designed to operate like a potentiometer. It is a three wire device: power; power ground; and signal. The signal is referenced to power ground. A regulated power supply is required since the output is supply dependent. The midscale output, zero degrees, is 1/2 the supply voltage, while the scale factor is also supply dependent

# Output with +9VDC (nominal) input voltage



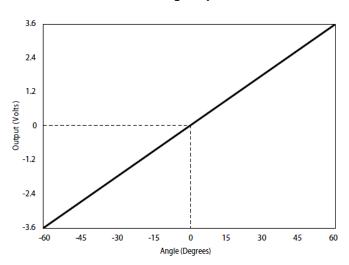
ELECTRICAL SPECIFICATIONS		
Input voltage (nominal)	+10VDC	
Input voltage range	+5 to +16VDC (regulated)	
Input current	3mA	
Scale factor (@ +10VDC input)	33.33mV / degree, ±10%	
Load resistance (min)	10kΩ	
Level output (0°)	½ Vcc	
ELECTRICAL CONNECTIONS		
J1-1	+ 5 to +16VDC (regulated)	
J1-2	Power ground	
J1-4	Signal output (referenced to power ground)	

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## ANALOG OUTPUT MODEL

The Analog clinometer is a signal conditioned tilt sensor designed for bipolar dc voltage operation. The clinometer requires a bipolar supply of  $\pm 8$  to  $\pm 20$  VDC and delivers an output of  $\pm 3.6$  VDC. This device is internally regulated for various applications. The output scale factor is fixed at a nominal 60mV per degree, and is not dependent upon supply voltage level.

## **Analog Output**



ELECTRICAL SPECIFICATIONS		
Input voltage (nominal)	±12VDC	
Input voltage range	±8 to ±20VDC (unregulated)	
Input current	3mA / supply	
Scale factor (@ +9VDC input)	60mV / degree, ±10%	
Load resistance (min)	10kΩ	
Level output (0°)	0 VDC	
ELECTRICAL CONNECTIONS		
J1-1	+ 8 to +20VDC	
J1-2	- 8 to -20VDC	
J1-3	Power ground	
J1-4	Signal output (referenced to power ground)	



## **ORDERING INFORMATION**

Model	Mounting Hole Orientation	Part Number	
Ratiometric	Vertical	02116009-000	
Ratiometric	Horizontal	02116109-000	
Analog	Vertical	02117009-000	
Accessories			
Mating Connector Kit (Shell and 4 pins)		04160003-000	

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