

# AngleStar® Electronic Clinometer



- +/-60° sensing range
- Ratiometric and Bipolar DC models
- Sturdy plastic housing
- CE certification *pending*

## DESCRIPTION

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. Data sheets can be downloaded from our web site at: <http://www.meas-spec.com/datasheets.aspx>

## 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

## PERFORMANCE SPECIFICATIONS (COMMON)

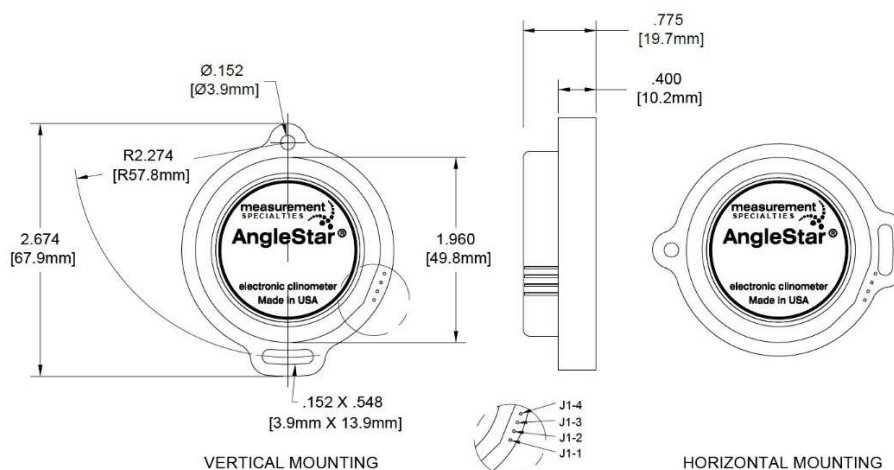
ELECTRICAL	
Total range	±60°
Linear range	±45°
Linearity	
Null to ±10°	0.1°
±10° to 45°	±1% of reading
±45° to 60°	Monotonic
Resolution	0.001°
Null repeatability	0.05°
Cross axis error	<1% up to 45°
Time constant	0.3 seconds
Frequency response	0.5Hz @ -3db
ENVIRONMENTAL/MECHANICAL	
Operating temperature 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
EMC (pending)	
Emissions	EN 61000-6-3
Immunity	EN 61000-6-2

**Notes:**

All values are nominal unless otherwise noted!

Dimensions are in inch [mm] unless otherwise noted

## DIMENSIONS AND CONNECTIONS (COMMON)

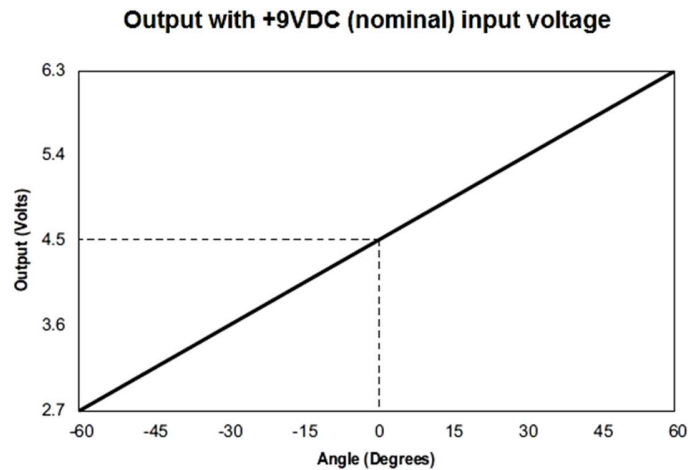


Dimensions are in inches [mm]

# AngleStar® Electronic Clinometer

## 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.



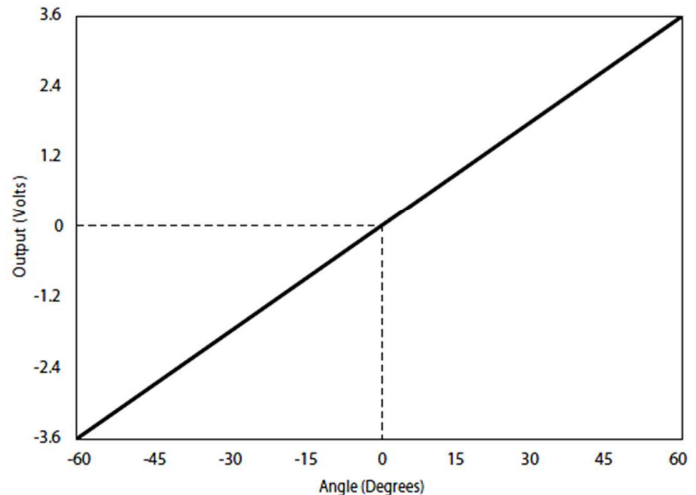
ELECTRICAL SPECIFICATIONS	
Input voltage (nominal)	+9VDC
Input voltage range	+5 to +20VDC (regulated)
Input current	0.5mA
Scale factor (@ +9VDC input)	30mV / degree, ±10%
Load resistance (min)	10kΩ
Level output (0°)	½ Vcc
ELECTRICAL CONNECTIONS	
J1	+ 5 to +16VDC (regulated)
J2	Power ground
J4	Signal output (referenced to power ground)

# AngleStar® Electronic Clinometer

## 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 is fixed at a nominal 60mV per degree, and is not dependent upon supply voltage level.

Analog Output



ELECTRICAL SPECIFICATIONS	
Input voltage (nominal)	$\pm 12$ VDC
Input voltage range	$\pm 8$ to $\pm 20$ VDC (unregulated)
Input current	5mA / supply
Scale factor (@ +9VDC input)	60mV / degree, $\pm 10\%$
Load resistance (min)	10k $\Omega$
Level output (0°)	0 VDC
ELECTRICAL CONNECTIONS	
J1	+ 8 to +20VDC
J2	- 8 to -20VDC
J3	Power ground
J4	Signal output (referenced to power ground)

# AngleStar® Electronic Clinometer

## ORDERING INFORMATION

Model	Mounting Hole Orientation	Part Number
Ratiometric	Vertical	02116009-000
Ratiometric	Horizontal	02116109-000
Analog	Vertical	02117009-000

OPTIONS	
NIST Calibration	0211XXXX-400

## TECHNICAL CONTACT INFORMATION

NORTH AMERICA	EUROPE	ASIA
Measurement Specialties, Inc. 1000 Lucas Way Hampton, VA 23666 United States Phone: +1-800-745-8008 Fax: +1-757-766-4297 Email: <a href="mailto:sales@meas-spec.com">sales@meas-spec.com</a> Web: <a href="http://www.meas-spec.com">www.meas-spec.com</a>	MEAS Deutschland GmbH Hauert 13 D-44227 Dortmund Germany Phone: +49-(0)231-9740-0 Fax: +49-(0)231-9740-20 Email: <a href="mailto:info.de@meas-spec.com">info.de@meas-spec.com</a> Web: <a href="http://www.meas-spec.com">www.meas-spec.com</a>	Measurement Specialties China Ltd. No. 26, Langshan Road High-tech Park (North) Nanshan District, Shenzhen 518057 China Phone: +86-755-33305088 Fax: +86-755-33305099 Email: <a href="mailto:info.cn@meas-spec.com">info.cn@meas-spec.com</a> Web: <a href="http://www.meas-spec.com">www.meas-spec.com</a>

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