

# LILY Self-Leveling Borehole Tiltmeter

The LILY Self-Leveling Borehole Tiltmeter is a precision, dual axis sensor package designed for specialized applications and research. Applications include volcanic and tectonic research, hydraulic fracture mapping, micro-deformation monitoring, deep ocean geophysics, and more.

Using a high-precision electrolytic tilt sensor, units deliver resolution to 5 nanoradians; dynamic range is  $\pm 330 \mu\text{radians}$ . Units also feature a  $\pm 10$  deg. leveling range for easy installation downhole. Output is RS232 or RS422 (RS485 full duplex) and includes timestamp and compass bearing. Data can be saved to file externally or to LILY's on-board flash memory (75,000 sample max) using fill/stop or cyclic memory modes.

Units are fully submersible to 3000 psi. Titanium is also available for +5000 psi applications. The culmination of over 30 years of tilt sensor experience and expertise, the LILY represents the pinnacle in precision sensor engineering. Contact Jewell Instruments today for more information about this powerful instrument.



Specifications	
Channels	X tilt, Y tilt, azimuth, temperature
Resolution	< 5 nanoradians
Repeatability	Same as resolution under static conditions
Dynamic Range	$\pm 330 \mu\text{radians}$
Self-Leveling Range	$\pm 10$ degrees
Non-Linearity	0.2% of full span
Frequency Resonse	< 1 Hz
Ks Temp Coefficient (%/°C)	$\pm 0.02\%/^{\circ}\text{C}$
Kz Temp Coefficient (bias/°C)	$\pm 3 \mu\text{radian}/^{\circ}\text{C}$
Azimuth detection	On-board magnetic compass, 0° to 360° output
Output	RS232 and RS422 standard (user selectable)
Baud rate	9600, 19200 (default), 28800, 57600, 115200, 230400
Sample rate	User programmable from 10 samples/sec to 1 sample/day
Output Format	NMEA XDR, Trimble TCM, Ashtech, Simple (Timestamp, X, Y, Temp, Compass, S/N)
On-board Memory	2 Megabytes nonvolatile Flash memory (64,000 samples)
Real-time Clock	Accurate to 10 minutes/year or better
Power	7 to 28 VDC @ 30 mA (< 10 mA sleep); 250 mV ripple max., reverse polarity protected
Environmental	-25°C to +85°C operational, -30°C to +100°C storage. 3000 psi
Dimensions	51mm O.D. x 915mm (2 x 36 in); handle length 150mm (6 inches); 4.5 kg (10 lb)
Materials	304 stainless steel, nonmagnetic (6Al-4V Titanium available on request: to +5000 psi)

*Specifications subject to change without notice as the result of ongoing development*