MEASUREMENT LIMITED

Type ELH107   Precision Sensing Head for High vacuum use

These precision tilt sensors are based on the **ELECTROLEVEL** a gravity sensing electronic inclinometer
The sensor is housed in a machined Aluminium alloy casing, allowing its use on spacecraft and wind tunnel testing installations where lightweight and ability to operate for long periods under high vacuum conditions are required.

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For high vacuum application the sensor has some special features.:-

- All components and materials used in sensor construction are selected for minimum outgassing under vacuum.

- An electronic buffer amplifier is incorporated in each sensing head. This provides a low impedance signal source to reduce the effect of the connecting cables on the calibration of the sensors.

- A temperature sensor built into the sensing head allows the correction of measurement errors caused by temperature drift in the sensors .

A custom designed multicore cable is used to connect to the sensors. Its PTFE insulation enables operation over a wide temperature range and gives low outgassing under vacuum.

The ELH107 is one of a family of sensors which use the **ELECTROLEVEL** tilt transducer. A curved glass tube holds a conducting fluid and a bubble of gas.
Just like a conventional spirit level, the bubble always settles at the highest point in the tube. Using electrodes built into the tube, the position of the bubble is measured electronically to a very high accuracy. In use , the smallest movement of the sensor will cause the fluid to flow and the output signal to change. the resolution of the sensor is thus effectively infinite, and unlike mechanical sensors, there is no stiction or friction or hysteresis to cause inaccuracy and nothing to wear out.
The smallest angle change which can be sensed by the **ELECTROLEVEL** depends on the noise level of the accompanying electronics, but is less than 0.01 arc seconds.
ELECTROLEVEL sensors have been used in demanding applications for more than 30 years .

SPECIFICATION   ELH107   Precision Sensing Head
                                                  for High vacuum Use

PARAMETER		UNITS
AS A TILT TRANSDUCER		
Linear Range (typical)	±5.0	Degrees
Linearity Error (max)	±3.0	%
Asymmetry Error (max)	±5.0	%
Discrimination	1.0	arc-seconds
Datum Change for ±5°Tilt about Cross Axis (max)	5.0	arc-minutes
Temperature co efficient with Matched Detector		
-10°C to 25°C (max)	+0.2	%/°C
+25°C to + 60°C (max)	-0.1	%/°C
Datum Temperature Drift (max)	3.0	arc-sec/°C
AS AN ACCELEROMETER		
Linear Range	±0.1	g Units
Equivalent Pendulum lengths	38	mm
Undamped Natural Frequency	2.5	Hz
Damping Factor at 25°C	0.9	
Physical Properties		
Datum Stability Long Term	15	arc-sec/month
Datum Stability Short Term	8	arc-sec/hour
Settling Time to <1%	20	seconds