



Nanometer Resolution Precision
Position Sensor

DISPLACEMENT MEASUREMENT

MicroSense Mini



The MicroSense Mini, from KLA-Tencor's ADE Division, is a precision linear position sensor which delivers nanometer level resolution over measurement ranges up to a millimeter. It is ideal for short travel, precision positioning applications – providing position feedback in mechanisms such as piezo driven positioning stages, micro-actuators, and scanning probe microscope stages. Due to the fact that MicroSense Mini sensor heads are very small, they mount easily in space restricted areas, and require much less mounting space than an optical encoder or laser interferometer. Based on advanced capacitive sensing technology, the MicroSense Mini uses any grounded, conductive surface as a target – no linear scale or mirror is required – providing direct measurement of the moving target.

APPLICATIONS

Position feedback sensor for precision stage control including

- Piezo positioning stages and actuators
- Scanning probe microscope stages
- Z stages for wafer chuck positioning
- Magnetically levitated stages

Precision lens, mirror and optics position measurement and alignment

Vibration and gap measurement in lithography and e-beam systems

BENEFITS

High resolution non-contact position sensor – resolution to the sub-nanometer level

High accuracy, fast response – 0.02% full scale linearity is typical, with no cyclical error or hysteresis

Works with any conductive target, material or finish has no effect on accuracy

Directly measures the target with super-small sensor heads, eliminating Abbé offset errors

Easy installation – sensor head mounts in a simple precision hole

Serial communications port for “in machine” calibration

High long term stability, essentially zero thermal dissipation from the sensor head

Sensors for high vacuum environments available

MicroSense Mini

PRODUCT DESCRIPTION

The MicroSense Mini consists of a compact electronics module, with connections for power, analog output and a serial port. The sensor head, which detects the target, is connected to the electronics module via a 1.5 meter long cable. A variety of sensor sizes are available — sensor size is determined by the measurement range and resolution required. High stability sensor heads for operation in high vacuum and non-magnetic environments are available. An optional low noise isolated power supply is available.

SPECIFICATIONS

Standard Measurement Ranges	±25µm, ±50µm, ±100µm, ±200µm (calibration for custom ranges is available)
Analog Output	±10 volts full scale, single ended and differential (option – 0 to 10 volts)
Sensor Input	KLA-Tencor's 2800 series probes
Measurement Bandwidth (@-3dB)	3 kHz
Linearity	< 0.02% typical over full scale range
Thermal Stability	< 25 nm/°C, with high stability sensors
Target Material	Any conductive material
Communications	RS-232 Serial Port for calibration parameter download and remote calibration
Operating Environment	Temperature - 0° to 50°C, Humidity - <85%RH, non-condensing
Power Requirements	±15 volts DC, 150 mA Isolated, linear power supply recommended
Size	90 mm (L) x 90 mm (W) x 29 mm (H)
Weight	0.18 kg; optional power supply – 0.8 kg

MEASUREMENT RESOLUTION

Typical measurement resolution in nanometers r.m.s. at 3 kHz filter setting.

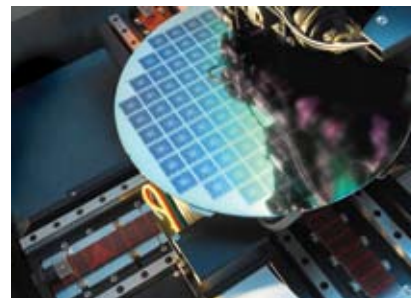
Probe Model	Sensor Diameter	Measurement Range	Resolution
2813	1.0mm	± 25µm	0.89 nm
2831	2.5mm	± 25µm	0.17 nm
2831	2.5mm	± 50µm	0.61 nm
2805	5.0mm	± 100µm	0.65 nm
2805	5.0mm	± 200µm	2.21 nm

Note: Sensor to target standoff at center of range is equal to total measurement range

KLA-TENCOR SERVICES

Customer service is an integral part of KLA-Tencor's portfolio that enables our customers to accelerate yield. Our vast customer service organization collaborates with worldwide customers to achieve the required productivity and performance at the lowest overall cost. K-T Services includes comprehensive contracts, time and materials, spares, asset relocations, customer training, and yield consulting.

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MicroSense Mini - achieve highest closed loop performance over short travels with KLA-Tencor's capacitive displacement sensors.

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