# ML SERIES

## Specifications

- Non-contact micromeasurement level/distance
- ± 0.0075 in (±0.19 mm) accuracy
- No contact with material
- Miniature size fits anywhere

The ML Series Precision Micromeasurement System uses very small sensor (VSS) technology to fit into those applications where ultrasonic sensors could not previously be used. The smaller size of the sensor enables the ML system to be used with autosamplers, robotic samplers, titration equipment, microsampling devices and test tube racks. The ML system performs high speed, multipoint, non-contact ultrasonic measurements with an accuracy of ± 0.0075 in (± 0.19 mm). Many operational settings are programmable through a serial port, allowing for application specific customization. A choice of 4-20 mA, 0-10 VDC or RS-232 output is available. Ultrasound has a number of advantages over other systems available since measurements are not affected by liquid color (or lack of color) and there is no physical contact with the liquid so no disturbance of the sample occurs

## Applications
- Adhesive Application
- Auto Sampler
- Bottle Filling
- Dimensional Profiling
- Drum/Tote Level
- Fill Verification
- Machine Run-Out
- Material Thickness
- Robotic Arm Position
- Shapes/Profiling
- Valve/Tool Position
- Wafer Counting
- Wafer Profiling

## Features

- Operating Range: 0.5 to 5 in (12.7 to 127 mm)
- Vessel / tube opening (diameter) as small as 1/8 in (3.2 mm)
- Non-contact, ultrasonic operation eliminates contamination of sample media, while maintaining high system throughput
- No calibration or special installation requirements
- PC Compatible
- Measurements are not affected by liquid color, density, opacity
- Fast response time – Programmable
- Standard Accuracy ±0.0075 in (±0.19 mm)

## Performance specifications

| Parameter | Typical Value |
|---|---|
| Operating Range | 0.5 to 5 in (12.7 to 127mm), |
| Accuracy | ±0.0075 in (±0.19 mm) or ±0.15% of measured range at constant room temperature. |
| Repeatability | ±0.05% of range |
| Temperature Compensation | Automatic over full operating range (optional) |
| Temperature Range | Sensor: -4 to 158°F (-20 to 70°C) Electronics: 32 to158°F (0 to 70°C) |

| Parameter | Typical Value |
|---|---|
| Input Power | 24 VDC, 12 VDC |
| Output | Choice of 0-10 V, 4-20 mA, and RS-232 and alarm set point (ML-11) (See selection chart) |
| Channels | Single |
| Setpoints/ Sample | Programmable |
| Sample Rate | Programmable |
| Sensor Size | Outer diameter 0.25, See selection chart |
| Sensor Material | Epoxy with Teflon® sensor face |
| Cable Length | Available in lengths of 2, 5, 10, 20, and 25 feet. |

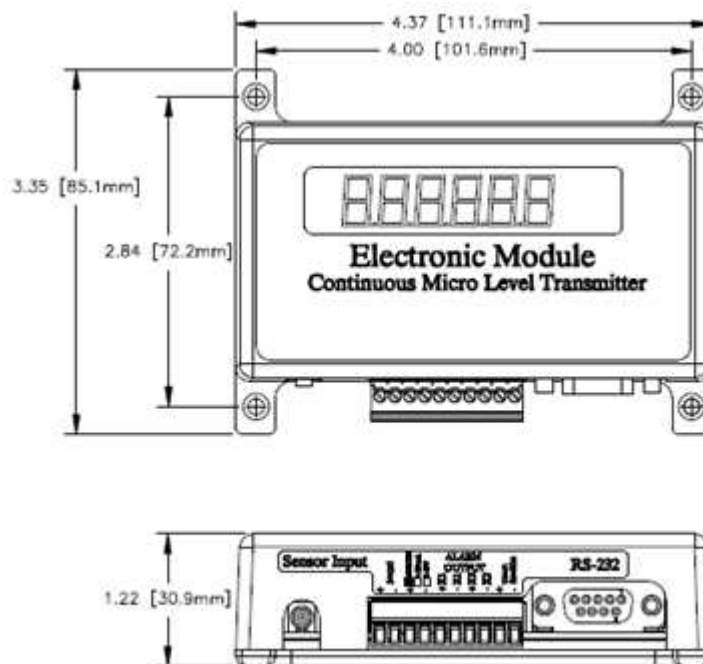## Mechanical dimensions in inches [mm]



Figure 1: ML series elements electronic module

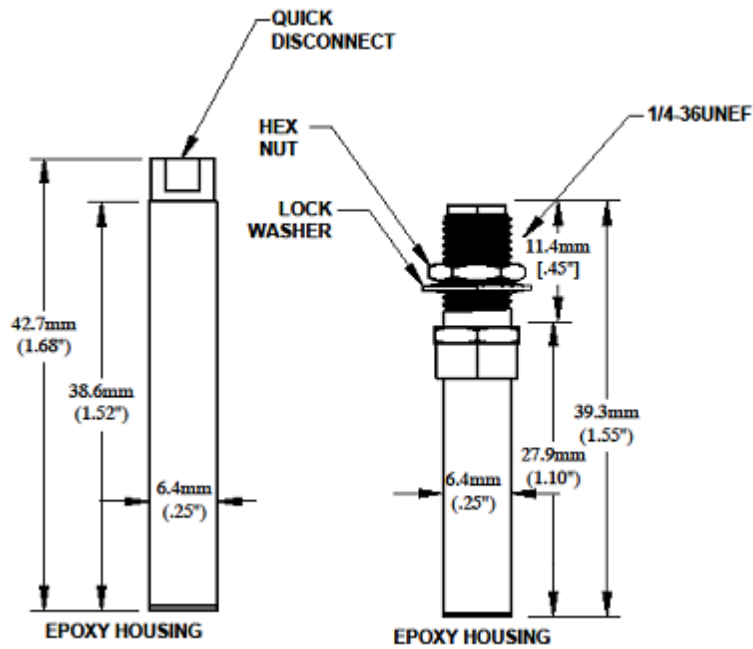## Mechanical dimensions in inches [mm]



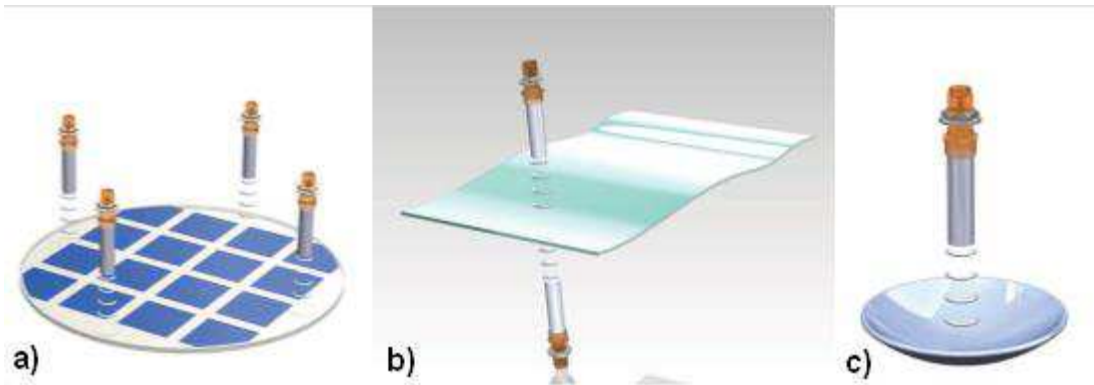Figure 2: ML series elements sensors

## Applications



Figure 3: Applications of ML series elements; a) Semiconductor wafer profile, evenness, flatness, bow, warpage; b) Thickness measurement; c) Optics and contacts and lens thickness and curvature on-line inspection