ML Series

- **Non-contact micromeasurement level/distance**
- **± 0.0002” (±0.005 mm) accuracy**
- **No contact with material**
- **Miniature size fits anywhere**
- **Single or multi-channel**

DESCRIPTION

The Measurement Specialties 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” (± 0.19 mm). The ML system is based on a modular design which accommodates from 1 to 24 transducers per unit. The ML System is fully programmable through its serial port. 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. Measurements are not affected by liquid color or lack of color, there is no physical contact with the liquid so no disturbance of the sample occurs.

FEATURES

- Operating Range: 0.5 to 5” (12.7 to 127mm), consult factory for longer ranges
- Vessel / tube opening (diameter) as small as 1/8” (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” (±0.19 mm)
- Greater Accuracy ±0.0005” (±0.01 mm)
- High Accuracy ±0.0002” (±0.005 mm)

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

PERFORMANCE SPECIFICATIONS

Parameter	Typical Value
Operating Range	0.5 to 5" (12.7 to 127mm), consult factory for longer ranges
Accuracy	±0.0075" (±0.19 mm) or ±0.1% of measured range at constant room temperature. [Consult the factory for ±0.01mm (±0.0005") or greater accuracy].
Repeatability	±0.05% of range
Temperature Compensation	Automatic over full operating range (optional)
Temperature Range	Sensor: -20 to 160°F (-29 to 71°C) Electronics: -20 to160°F (-29 to 71°C)

Parameter	Typical Value
Input Power	115/230 VAC, 50/60 Hz, 24 VDC, 12 VDC
Output	Choice of 0-10 V, 4-20 mA, and RS-23 (See selection chart) RS-232 and alarm set point for each channel (ML-11/ML-04/ML-08)
Channels	Single, up to thirty-two
Setpoints/ Sample	Programmable
Sample Rate	Programmable
Sensor Size	Outer diameter 0.25, 0.312; See selection chart
Sensor Material	Epoxy, 316LSS
Cable Length	3m (10 ft.) standard, longer lengths available

MECHANICAL DIMENSIONS in inches [mm]

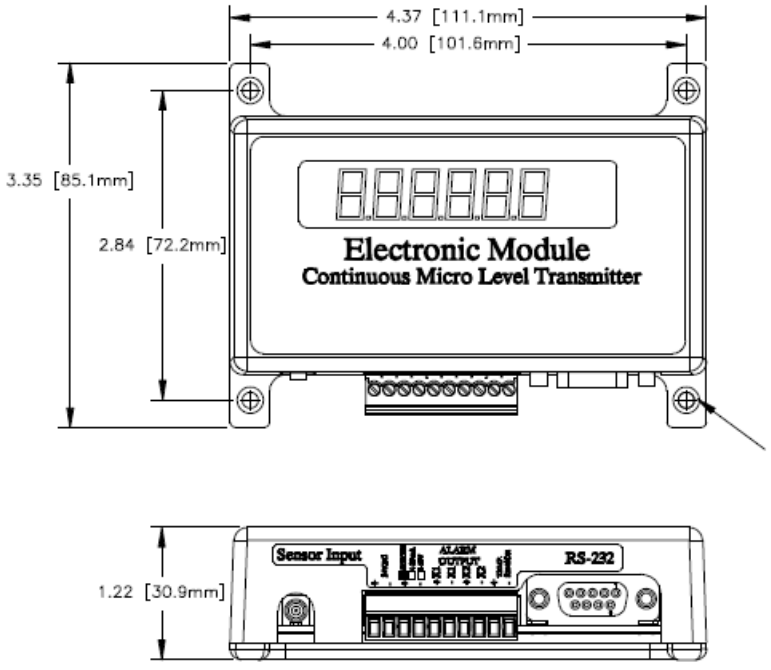


Figure 1: ML series elements electronic module

MECHANICAL DIMENSIONS in inches [mm]

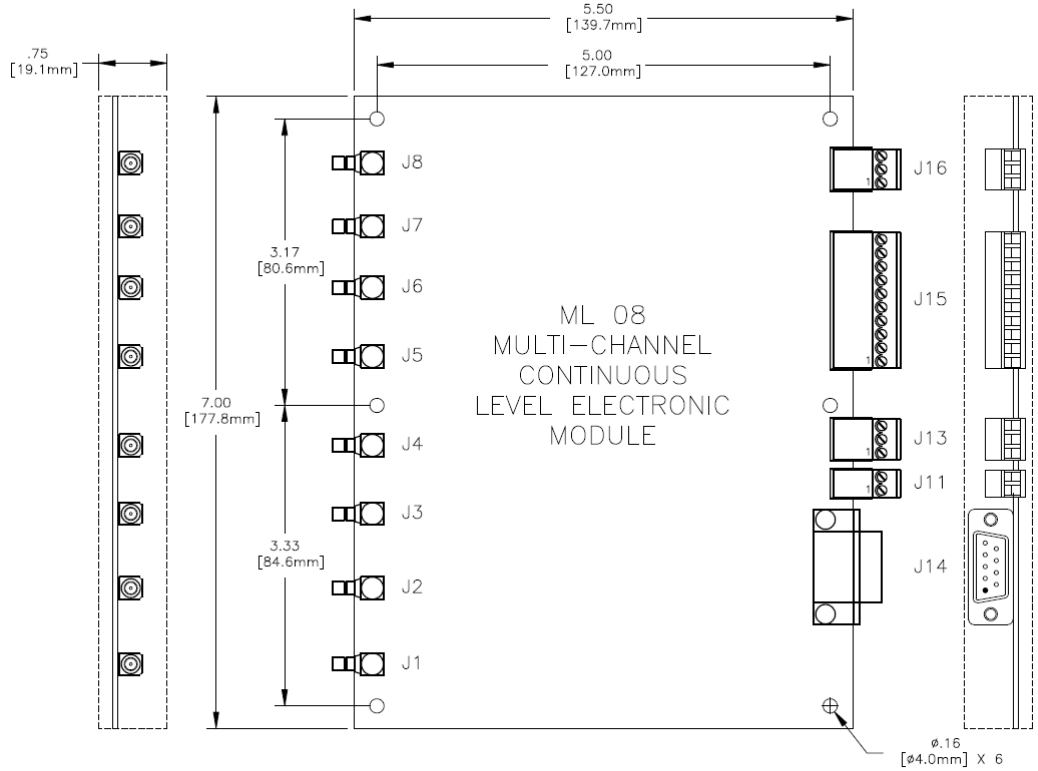


Figure 2: ML series elements multi-channel continuous level electronic module

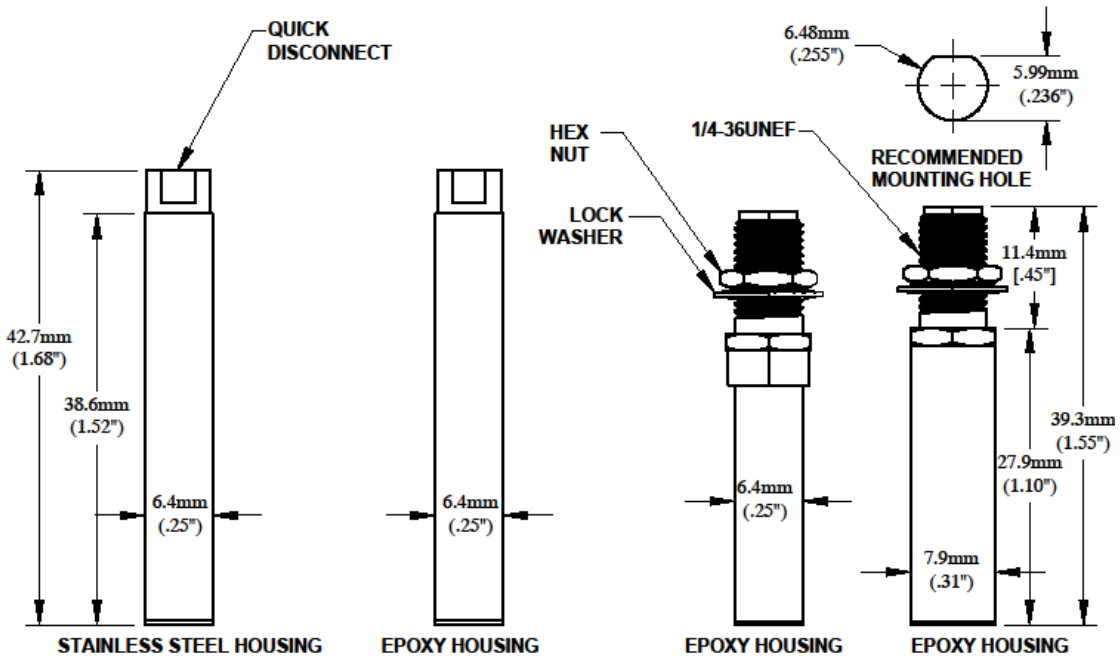
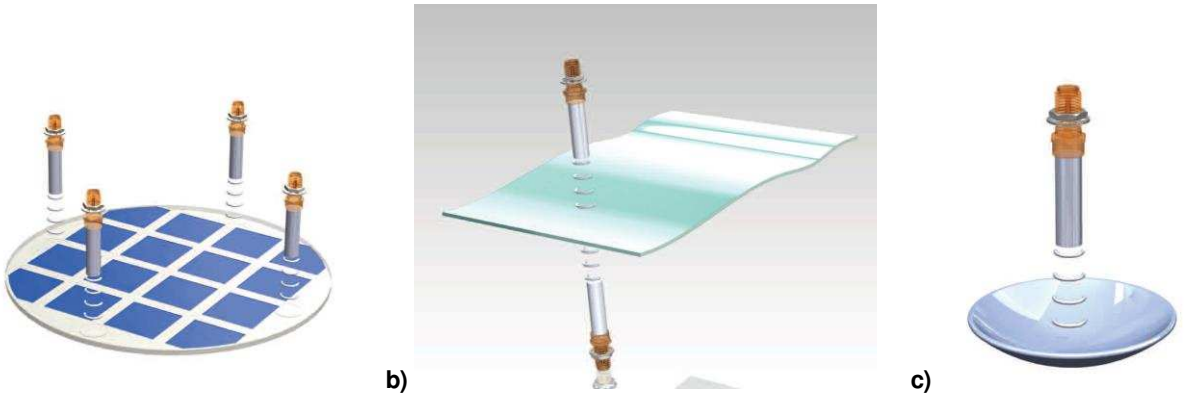


Figure 3: ML series elements sensors.

APPLICATIONS



a) b) c)

Figure 4: 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

ORDERING INFORMATION

Electronics, sensor, cable and temperature sensors are sold separately. Please submit separate part numbers.

A. Electronics

	Channels	Input Voltage	Output	Enclosure	Display	Part Number
ML-01	1	24 VDC	RS-232/Strobe	Nema 1	No	17608
ML-11	1	24 VDC	RS-232/4-20 mA	Nema 1	Yes	17621
ML-11	1	24 VDC	RS-232/0-10 V	Nema 1	Yes	17622
ML-11	1	24 VDC	RS-232/Strobe	Nema 1	Yes	17623
ML-11	1	24 VDC	RS-232/4-20 mA	Nema 1	No	17624
ML-11	1	24 VDC	RS-232/0-10 V	Nema 1	No	17625
ML-04	4	24 VDC	RS-232/Strobe	None	No	18304
ML-08	8	24 VDC	RS-232/Strobe	None	No	18308

B. Sensor

Outer Diameter	Sensor Housing	Connection	Part Number
0.25”	Epoxy	Quick Disconnect	098-10001
0.25”	Epoxy	SMA	098-10060

ORDERING INFORMATION

C. Cable

Cable Type	Part Number
Quick disconnect to SMB connection	CBL-Q1A0S2-XX
SMA to SMB connection	CBL-A2A0S2-XX

* Standard is 10 feet, custom length options are 2, 5, 10 and 20 feet. Replace –XX in part number with the number of feet requested

D. Temperature Sensor (if required)

Part	Part Number
Temperature sensor	076-10005-XX

* Specify 2, 5 or 10 feet. Replace –XX in part number with the number of feet requested

TECHNICAL CONTACT INFORMATION

North America

Measurement Specialties, Inc.
1000 Lucas Way
Hampton, VA 23666
Tel: 1-800-745-8008
Fax: 1-757-766-4297
Sales: piezo@meas-spec.com

Europe

MEAS Deutschland GmbH
Hauert 13
44227 Dortmund
Germany
Sales & Customer Service: +49 (0)231 9740 21
Technical Support: +44 (0)138 38700 01
Email: piezoeurope@meas-spec.com

Asia

Measurement Specialties (China) Ltd.
No. 26 Langshan Road,
High-Tech Park (North)
Nanshan District, Shenzhen 518057
Tel: +86 755 3330 5068
Email: sales.china@meas-spec.com