



GENERATIONS AHEAD IN SONAR & ULTRASONIC TECHNOLOGY

Model M-300/95 Low Cost Sensor

(0 - 10 Volts Output)

The Massa Model M-300/95 Sensor measures target distances over a range of 1 foot (0.3 meters) to 15 feet (4.5 meters). It is a member of the Massa M-300 family that includes several models of RoHS compliant and CE certified low cost liquid level sensors that produce detection ranges from as close as 4 inches (100 mm) to 15 ft. (4.5 meters). Incorporating state-of-the-art ultrasonic technology, the sensors provide precision non-contact distance measurement for factory automation or industrial process control. The M-300 family of sensors stand out over all other systems because of their affordability, extraordinary ease of operation, genuinely user-friendly software, versatility in user-controlled outputs, and the ability to be set up without using a target. They transmit narrow beam sound pulses at a user-selected rate (or they can be software triggered), process return echoes, and produce several outputs dependent on the position of the target.

Operating from 12 to 24 V DC, the M-300/95 Sensor provides a linear output of 0 to 10 V DC, which is proportional to the measured distance to the target. This output voltage range can be easily reprogrammed to start and end anywhere between 0 and 10 V DC. The corresponding target distance span can be set to start and stop at any two target ranges. In addition, this output voltage can also be programmed to operate as a digital switch at a specified target setpoint distance.

The system parameters and outputs are programmable via an RS-485 data link, thereby eliminating problems associated with adjustment potentiometers or pushbuttons. Some additional programmable adjustments include: analog output slope, sampling rate, averaging of multiple distance measurements, loss-of-echo time-out, setpoint hysteresis when operating in the digital switch mode, and a software sensor transmit trigger.

The Model M-300/95 includes an advanced diagnostic feature that will retrieve the ultrasonic waveform for analysis and display it on a computer using the sensor's software. Users will find this very useful for debugging and correcting more difficult applications without using an oscilloscope.

The M-300/95 Sensor's user-friendly software operates with MS Windows® operating systems using an RS-232/RS-485 or USB/RS-485 converter. This data link allows up to 32 sensors to be connected in parallel onto the same multi-drop communication network using the supplied protocol. This network also allows users to remotely program their sensors and read target distances for quick integration into their process control application.

Other features include a totally sealed PVC housing containing an industry standard 1 inch NPT fitting for mounting, operation from -20°C to 65°C with built-in temperature compensation, diagnostic and monitoring outputs, and protection from over-voltage, short circuits, and reverse polarity.

For more information visit our web site at www.massa.com.

MASSA PRODUCTS CORPORATION

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FEATURES

- Low Cost
- 1" NPT Mounting Fitting
- Analog or Setpoint Outputs
- Plug & Play Setup
 - No Target Needed
- Software Set Span and Zero
 - No Pots or Pushbuttons
 - Tamperproof Settings
- Easy to Use Setup Software
 - Windows®
 - 98 / NT / 2000 / XP SP3
- Built-in Temperature/Sound Speed Compensation
- Up to 32 Sensors on RS-485 Multi-drop Network

APPLICATIONS

- Liquid Level Control
- Mechanical Positioning
- Roll Diameter Measurement
- Web Loop Monitoring
- Automatic Filling Operations
- Automatic Packaging
- Bulk Level Control
- Paper/Plastic Film Processing



ORDERING INFORMATION

Massa Model M-300/95 Sensor:
P/N 300420-501

OPTIONAL ITEMS:

Mounting Bracket:
P/N 200671-1

Locknut (*one included with each sensor*):
P/N 8195-1, For use when installing on a bracket or plate.

Serial Port Converter:
P/N 7868-1, RS-232 (DB9)/RS-485 Converter

USB Port Converter:
P/N 8220-1, USB/RS-485 Converter

M-300 Software:
Go to www.massa.com to download the latest version.

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M-3(00/95 SPECIFICATIONS (0-10 Volts Output)

PERFORMANCE *(Typical at 24 V DC, 22° C, and 50% RH)*

| | |
|-----------------------------|--|
| Ultrasonic Frequency: | 95 kHz, nominal |
| System Beam Angle: | 8 degrees conical |
| Target Detection | |
| Minimum Distance: | 1 foot (0.3 meters) |
| Maximum Distance: | Up to 15 feet (4.5 meters), dependent on target |
| Measurement Resolution: | .01 inches (0.25 mm) |
| Echo Detection Sensitivity: | User selectable |
| Power Required: | 12 V DC to 24 V DC (reverse polarity protected), 30 mA, typical |
| Temperature Compensation: | Internal probe |

PROGRAMMABLE VOLTAGE OUTPUTS

Output Impedance: 100 ohms for both modes of operation

Proportional Voltage Output Mode

| | |
|-----------------------|---|
| Zero & Span Distance: | Programmable from 1 foot to over 15 feet <i>(factory default: 1 foot to 13 feet)</i> |
| Zero & Span Voltages: | Programmable from 0 to 10.25 V DC <i>(factory default: 0 to 10.0 V DC)</i> |
| Loss of Echo Voltage: | Programmable from 0 to 10.25 V DC <i>(factory default: 10.25 V DC)</i> |
| Response Time: | 60 ms |
| Resolution: | 10 bits |

Switched Setpoint Output Mode

| | |
|----------------------|--|
| Setpoint Distances: | Programmable from 1 foot to over 15 feet |
| Setpoint Voltages: | 0 or 10.25 V DC |
| Setpoint Hysteresis: | Programmable from 0% to 75% |
| Response Time: | < 1 ms |

PROGRAMMABLE SAMPLING SETTINGS

| | |
|----------------------------|--|
| Sampling Rate: | 0.1 Hz to 20 Hz in 0.1 Hz increments <i>(factory default: 10 Hz)</i> |
| Trigger Modes: | Internal, software trigger |
| Target Distance Averaging: | Rolling Average: from 1 to 32 samples, or Boxcar Average: from 1 to 1,024 samples <i>(factory default: 1 sample)</i> |
| Loss-of-Echo Time-out: | From 1 to 254 consecutive samples missed before time-out <i>(factory default: 1 sample)</i> |

MECHANICAL *(see outline drawing)*

| | |
|---------------------|---|
| Housing Material: | PVC |
| Transducer Surface: | MassaPlast™102 (custom PPA) |
| Cable: | 5 conductor, PVC jacket, 22 AWG, 18" (460 mm) pigtail [user-extendable for RS-485 Communication to 5,000 ft. (1,500 m)] |

ENVIRONMENTAL

| | |
|------------------------|--------------------------|
| Operating Temperature: | -20°C to 65°C |
| Storage Temperature: | -40°C to 85°C |
| Relative Humidity: | 0 to 95%, non-condensing |
| Enclosure Rating: | IP67 |

PROGRAMMING REQUIREMENTS

| | |
|---------------------------|---|
| Communications Converter: | RS-232 (or USB)/RS-485 with automatic send data control |
| Operating System: | Windows® 95/98/NT/2000/XP SP3 |

All Specifications subject to change without notice.

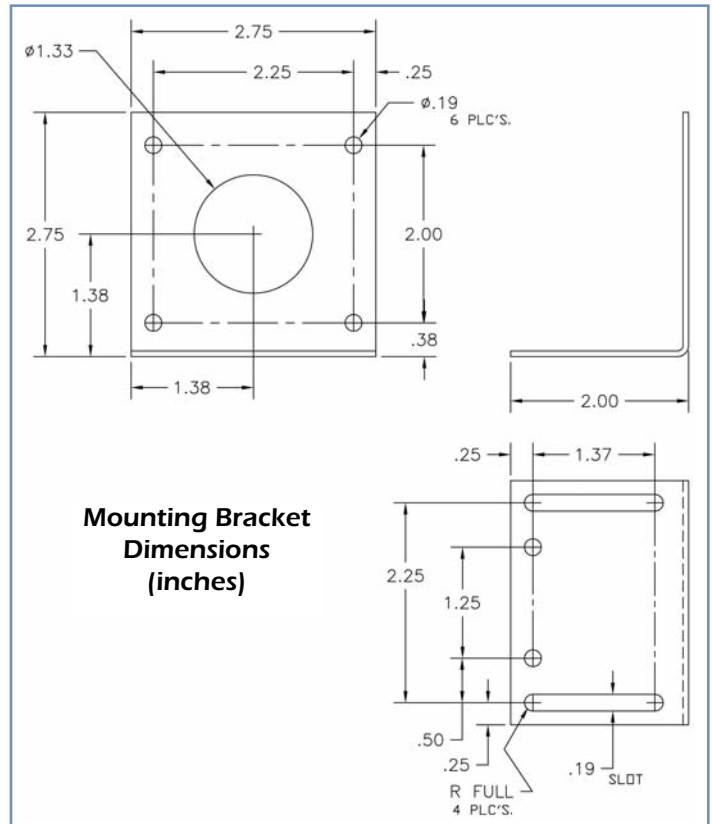
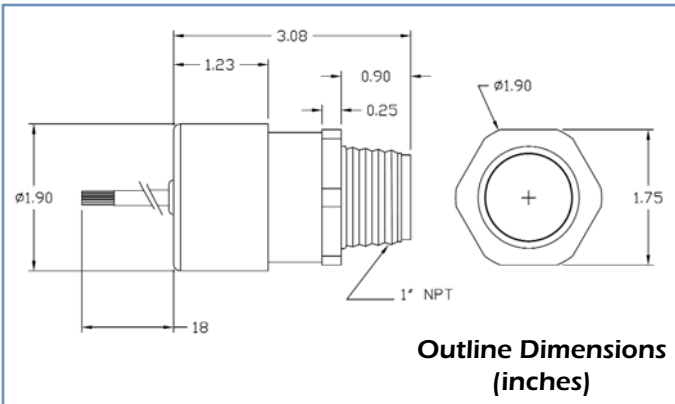
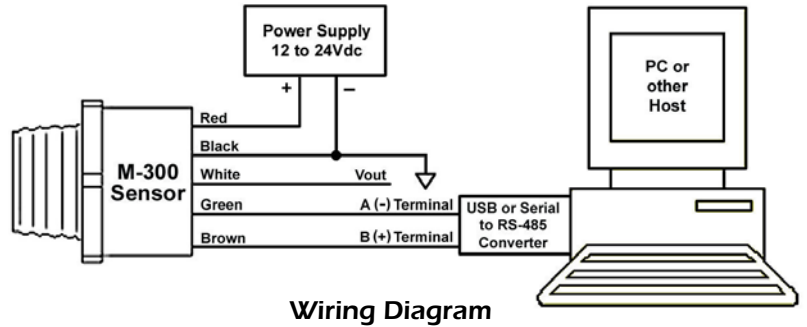
Massa Model M-300/95 Sensor (0-10 Volt Output)

WIRING AND MOUNTING INFORMATION

Guide for Connecting an M-300 Sensor to a Power Supply and a Computer

To operate any of the Massa M-300 Family of Low Cost Liquid Level Sensors, it is only necessary to connect its red and black wires to a 12 to 24 V DC battery or power supply, as shown in the diagram below. The voltage output on the white wire will then indicate the distance to the target or its position relative to the setpoint.

To change the programmable parameters or to observe the target distance digitally with the user-friendly software, the M-300 Sensor can be connected to a computer or other host system with either an optionally supplied RS-485/RS-232 Serial Converter or an RS-485/USB Converter. Before more than one M-300 Sensor can be used simultaneously on the same RS-485 Communication Bus, each sensor must first be programmed with its own unique ID Tag. After this has been completed, the green and brown communication wires for all of the M-300 Sensors should all be connected in parallel. Terminating resistors are not required for the RS-485 Network.



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