



GENERATIONS AHEAD IN SONAR & ULTRASONIC TECHNOLOGY

Model M-320/150 Low Cost Sensor

4 - 20 mA Output

The Massa Model M-320/150 Sensor measures target distances over a range of 4 inches (100 mm) to 7 feet (2.1 meters). It is a member of the Massa M-300 family, which 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 13 feet (4 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 stands out over all other sensors because of its affordability, extraordinary ease of operation, genuinely user-friendly software, versatile 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 outputs dependent on the position of the target.

Operating from 15 to 24 V DC, the M-320/150 Sensor provides a linear output of 4 to 20 mA 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 4 and 20 mA DC. The corresponding target distance span can also be set to start and stop at any two target ranges. In addition, this output current can be programmed to operate as a digital switch within zones defined by specified target setpoint distances.

The measurement 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-320/150 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-320/150 Sensor's user-friendly software operates with MS Windows® operating systems using an USB/RS-485 or RS-232/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 (*PVDF also available*) 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

280 Lincoln Street, Hingham, MA 02043 U.S.A.

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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® 10, 8, 7, Vista, and 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-320/150 Sensor

P/N 300445-501: PVC Housing, 6 ft. Cable

P/N 300445-502: PVC Housing, 15 ft. Cable

P/N 300445-503: PVC Housing, 30 ft. Cable

For PVDF Housing, consult factory

Sensors Include:

Locknut (Qty. 1)

P/N 8195-1: For use when installing the sensor on a bracket or plate

OPTIONAL ITEMS

Mounting Bracket:

P/N 200671-1

Serial Port Converters:

USB/RS-485: P/N 8448-1

RS-232 (DB9)/RS-485: P/N 7868-1

Custom Tank Fitting PVC Adapter, 2" to 1" NPT: P/N 200758-1

M-300 Software & Manuals:

Go to: www.massa.com to
download the latest versions

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RoHS Compliant and CE Certified

M-320/150 SPECIFICATIONS

4 - 20 mA Output

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

Target Detection

Minimum Distance: 4 inches (100 mm)

Maximum Distance: Up to 7 feet (2.1 meters), dependent on target

Measurement Resolution: .01 inches (0.25 mm)

Measurement Accuracy: $\pm 0.1\%$ of target range (*uniform temperature*)

Echo Detection Sensitivity: User selectable

System Beam Angle: 8 degrees conical

Ultrasonic Frequency: 150 kHz, nominal

Power Required: 15 V DC to 24 V DC (reverse polarity protected),
30 mA, typical (not including I-OUT)

Temperature Compensation: Internal probe

PROGRAMMABLE CURRENT OUTPUTS

Proportional Current Output Mode

Current Loop Output: 0 to 20 mA or 4 to 20 mA DC sourcing,
10-bit resolution, invertible

Zero & Span Distance: Programmable from 4 inches to over 7 feet
(*factory default: 4 inches to 7 feet*)

Zero & Span Currents: Programmable from 0 to 20.5 mA DC
(*factory default: 4 to 20.0 mA DC*)

Loss of Echo Current: Programmable from 0 to 20.5 mA DC
(*factory default: 20.5mA DC*)

Response Time: 60 mS

Resolution: 10 bits

Switched Setpoint Output Mode

Setpoint Distances: Programmable from 4 inches to over 7 feet

Setpoint Current: 0 or 20.5 mA DC

Setpoint Hysteresis: Programmable from 0% to 75%

Response Time: < 1 ms

PROGRAMMABLE SAMPLING SETTINGS

Sampling Rate: .05 Hz to 25 Hz in 0.1 Hz increments
(*factory default: 10 Hz*)

Trigger Modes: Internal or software trigger

Target Distance Averaging: Rolling Average: from 1 to 32 samples, or
Boxcar Average: from 1 to 1,024 samples
(*factory default: 1 sample*)

Loss-of-Echo Time-out: From 1 to 254 consecutive samples missed
before time-out
(*factory default: 1 sample*)

MECHANICAL (see outline drawing)

Housing Material: PVC (standard) or PVDF (consult factory)

Transducer Surface: MassaPlast™102 (custom PPA)

Cable: 5 conductor, 24 AWG, shielded, PVC jacket,
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: USB/RS-485 or RS-232/RS-485 with automatic
send data control

Operating System: Windows® 10, 8, 7, Vista, or XP SP3

All Specifications Subject to Change Without Notice

Massa Model M-320/150 Sensor

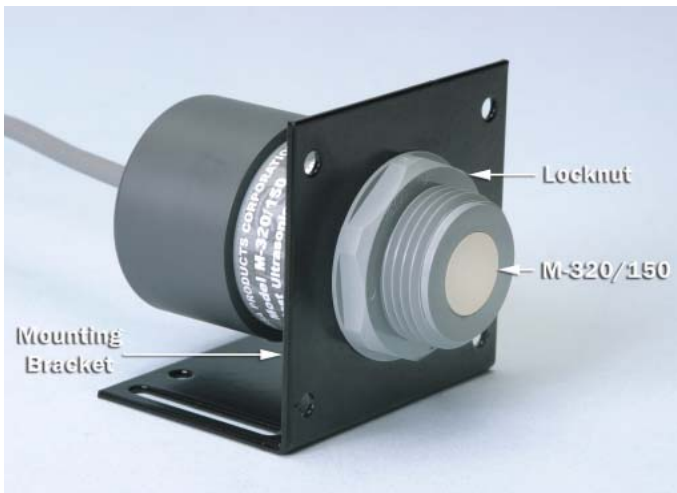
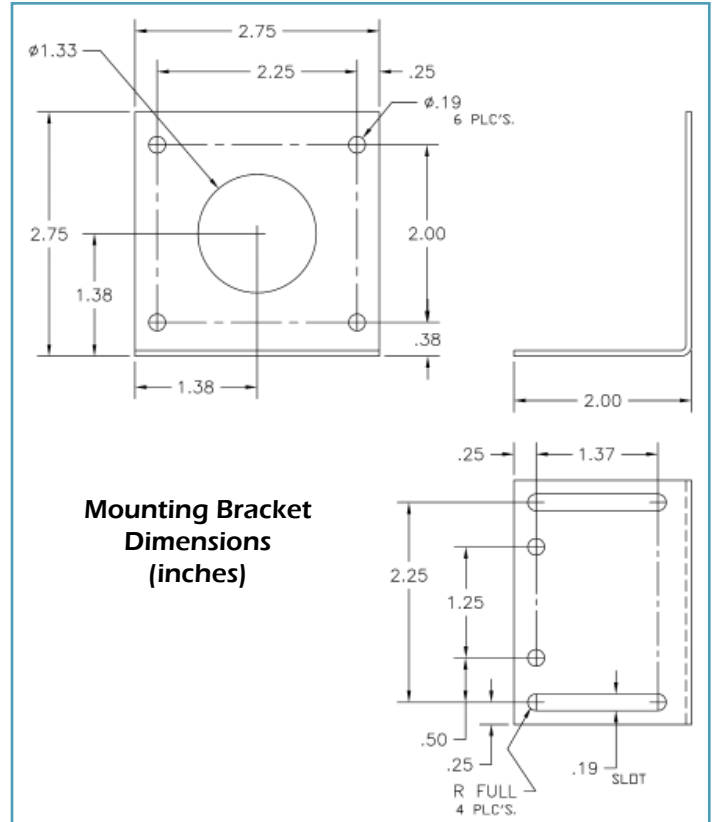
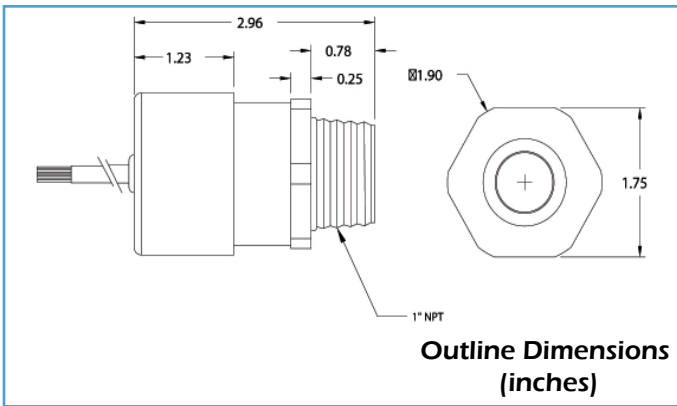
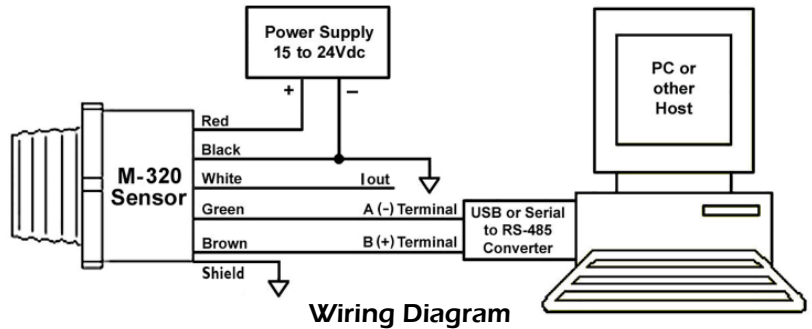
4 - 20 mA Output

WIRING AND MOUNTING INFORMATION

Guide for Connecting an M-320 Sensor to a Power Supply and a Computer

To operate the Massa M-320 Sensor, it is only necessary to connect its red and black wires to a 15 to 24 V DC battery or power supply, as shown in the diagram below. The current 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-320 Sensor can be connected to a computer or other host system with either an optionally supplied USB/RS-485 converter or RS-232/RS-485 converter. Before more than one M-320 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-320 Sensors should all be connected in parallel. Terminating resistors are not required for the RS-485 Network.



Photograph of an M-320/150 Sensor on a Mounting Bracket

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