MassaSonic PulStar Series Sensors are ruggedly designed ultrasonic transmitter modules that provide reliable continuous level or distance measurement of fluids, pastes, or solid bulk materials for application ranges from 4 inches (100 mm) to 20 feet (6 meters). Incorporating state-of-the-art ultrasonic technology and processing algorithms, all PulStar models provide precision non-contact measurement for applications such as factory automation, process control or tank level monitoring.

PulStar Series Sensors include an advanced diagnostic feature that will retrieve the ultrasonic waveforms for analysis and display it on a computer to aid users when evaluating complex installations. They are RoHS compliant, CE Certified, and IP68 Rated. Three versions of the PulStar Sensor are available, PulStar, PulStar Plus, and PulStar TTL.

**PulStar** *(standard)*

The lower cost standard models in the series are ideal if false echoes from sound reflecting structures between the sensor and the surface being measured are not encountered, and where extended detection ranges are not required.

*(The PulStar TTL Sensor is detailed in a separate Datasheet - see www.massa.com)*

PulStar Series Sensors have NPT mounting fittings and come in PVC or PVDF housings for use in different environments. All models are equipped with continuous temperature compensation to achieve precise measurement accuracy. Other user friendly features include: diagnostic and monitoring outputs, along with protection from over voltage, short circuits, and reverse polarity.

Operating from 12 to 24 V DC, PulStar Sensors provide user programmable linear outputs of 0 to 10 V DC or 4 to 20 mA, which are proportional to the measured distance to the target. The output can also be set to operate as a digital switch within zones defined by specified target setpoint distances.

Compatible with MS Windows operating systems, and when using USB/RS-485 or RS-232/RS-485 converters, up to 32 sensors can be connected in parallel onto the same multi-drop communication network. This network also enables users to remotely program their sensors and read target distances for quick integration into control applications. All PulStar Sensors are adjustable for sampling rate, averaging measurement, analog output slope, loss-of-echo time-out, setpoint hysteresis, and provide a software sensor transmit trigger.

PulStar Series Sensors stand out over other sensors because of their user friendly set up, versatile control options, field proven reliability, and affordable cost of ownership.

**FEATURES**
- Continuous or Switch Mode
- Plug & Play Setup
- Temperature Compensated
- Narrow Beam and Short Dead Band
- Up to 32 Sensors on RS-485 Multi-Drop Network
- Variety of Easy User Programmable Customizations
- Low Cost of Ownership (CoO)
- Tamperproof & Rugged
- IP68 Enclosure Rating
- Accurate Under Demanding Environmental Conditions

**APPLICATIONS**
- Liquid & Solid Level Control
- Tanks, Totes, Processing
- Bulk Material Management
- Web Loop Monitoring
- Roll Diameter Measurement
- Automatic Packaging Operations
- Position Detection

For more information, please visit [www.massa.com](http://www.massa.com), or contact one of our Applications Specialists at: sales@massa.com
PulStar® Series Ordering Code

PulStar / V - 150 - P - W - 6 - 0

- Model Type
  - S: PulStar (standard)
  - P: PulStar Plus

- Analog Output Options
  - V: 0-10 Volt
  - I: 4-20 mA

- Sensing Range Options
  - 95: 12 inches to 13 feet for PulStar (standard)
  - 8 inches to 20 feet for PulStar Plus
  - 150: 4 inches to 7 feet for PulStar (standard)
  - 4 inches to 9 feet for PulStar Plus

Example: PulStar/P-V-150-P-W-6-0

Optional Items:
- Mounting Bracket: P/N 2000671-1
- Serial Port Converters: USB/RS-485, P/N 8448-1 or RS-232(DB9)/RS-485, P/N 7868-1
- Custom Tank Fitting PVC Adapter, 2 inches to 1 inch NPT: P/N 200758-1
- Massa Software & Manuals: Go to www.massa.com to download the latest versions

PulStar® Series Performance Specifications
(Typical 24 VDC, 22°C, and 50% RH Air)

<table>
<thead>
<tr>
<th>Performance</th>
<th>Short Range (150 kHz)</th>
<th>Medium Range (95 kHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Detection Distances</td>
<td>PulStar 4 inches (100 mm) to 7 feet (2.1 m)</td>
<td>PulStar 12 inches (300 mm) to 13 feet (4 m)</td>
</tr>
<tr>
<td></td>
<td>PulStar Plus 4 inches (100 mm) to 9 feet (2.7 m)</td>
<td>PulStar Plus 8 inches (200 mm) to 20 feet (6 m)</td>
</tr>
</tbody>
</table>

- Measurement Resolution: 0.01 inches (0.25 mm)
- Measurement Accuracy: ± 0.1% of Target Range
- Echo Detection Sensitivity: User Selectable
- System Beam Angle: 8° Conical
- Response Time (after target determination): 60 mS
- Resolution: 11 bit
- Temperature Compensation: Internal Probe

Mechanical (See Outline Drawing)
- Housing Material: PVC or PVDF (See Ordering Information)
- Transducer Surface: MassaPlast 102 (custom PPA); or PVDF (See Ordering Information)
- Cable (For length and termination, see Ordering Information): 5 Conductor, 24 AWG, Shielded, PVC Jacket
  [User Extendable for RS-485 Communication to 5,000 feet (1,500 m)]

Environmental
- Operational Temperature: -40°C to 70°C
- Storage Temperature: -40°C to 85°C
- Relative Humidity: 0 to 95%, non-condensing
- Enclosure Rating: IP68

All Specifications Subject to Change Without Notice
www.massa.com
### PulStar® Series User Interface Specifications

<table>
<thead>
<tr>
<th>All Voltage Output Models</th>
<th>All Current Output Models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Programmable Outputs</strong></td>
<td>0-10 V DC</td>
</tr>
<tr>
<td><strong>Power Required</strong></td>
<td>12 to 24 V DC (inverse polarity protected), 30 mA, typical</td>
</tr>
<tr>
<td><strong>Setpoints</strong></td>
<td>0 or 10.25 V DC</td>
</tr>
<tr>
<td><strong>Output Impedance</strong></td>
<td>100 ohms (both operational modes)</td>
</tr>
<tr>
<td><strong>Current Loop Output</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Zero &amp; Span Voltage or Current</strong></td>
<td>Programmable from 0 to 10.25 V DC</td>
</tr>
<tr>
<td><strong>Loss of Echo Voltage or Current</strong></td>
<td>Programmable from 0 to 10.25 V DC</td>
</tr>
<tr>
<td><strong>Zero &amp; Span Distance</strong></td>
<td>Each programmable over a range from min. distance to greater than max. distance</td>
</tr>
<tr>
<td><strong>Trigger Modes</strong></td>
<td>Internal or Software Trigger</td>
</tr>
<tr>
<td><strong>Target Distance Averaging</strong></td>
<td>Rolling Averages: from 1 to 32 samples, or Boxcar Average: from 1 to 1,024 samples</td>
</tr>
<tr>
<td><strong>Loss of Echo Time-Out</strong></td>
<td>Programmable from 1 to 254 consecutive samples missed before time-out</td>
</tr>
<tr>
<td><strong>Sampling Rate</strong></td>
<td>0.1 Hz to 20 Hz in 0.1 Hz increments</td>
</tr>
<tr>
<td><strong>Communications Converter</strong></td>
<td>USB/RS-485 or RS-232/RS-485 with automatic send data control</td>
</tr>
<tr>
<td><strong>Operating System</strong></td>
<td>Windows 10, 8, 7, Vista, and XP SP3</td>
</tr>
</tbody>
</table>

All PulStar Plus models additionally include an extended range high-power setting, and drop down menus to automatically ignore false echoes from certain types of stationary targets.

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**PLEASE NOTE:** PulStar Series Sensors can be used as direct “drop in” replacements for our Legacy M-300 and M-320 Sensors.
To operate MassaSonic™ PulStar Series Sensors, it is only necessary to connect its red and black wires to a DC battery or power supply as shown in the diagram below. 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 sensor can be connected to a computer or other host system with either an optionally supplied USB/RS-485 or RS-232/RS-485 converter. Before more than one PulStar Series 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 PulStar Series Sensors should be connected in parallel. Terminating resistors are not required for the RS-485 Network.