



## PulStar® TTL Sensors

Cost Effective | Non-Contact | Reliable | Distance Measurement

PulStar TTL Sensors are a new addition to the MassaSonic PulStar Series of ruggedly designed ultrasonic transmitter modules providing reliable continuous level or distance measurement of fluids, pastes, or solid bulk materials. These sensors are ideal for application ranges from 8 inches (200 mm) to 13 feet (4 m). PulStar TTL Sensors can easily be interfaced electronically and mechanically into an OEM's control system. They are C1D1, CE, and IP68 compliant components in a properly designed integrated complete system. Incorporating state-of-the-art ultrasonic technology and processing algorithms, PulStar TTL Sensors provide precision non-contact measurement for applications such as factory automation, process control or tank level monitoring.

PulStar TTL Sensors contain the advanced control features of the PulStar Plus units. They also include an advanced diagnostic feature that will retrieve the ultrasonic waveforms for analysis and display them on a computer to aid users when evaluating complex installations. They are RoHS compliant and IP68 Rated if properly mechanically connected to the housing of the control system.

PulStar TTL Sensors are powered by 5V DC, and they communicate with the customer's control system using asynchronous UART TTL signals operating at 1.8V levels. They have a very short (less than 500 msec.) power up time, which allows system integrators to develop very low power drain operation in which 5V DC is briefly applied to the sensors to obtain distance measurements and then removed. This capability is particularly important in battery operated installations. The sensor is protected from over-voltage and reverse polarity for both DC power and in the UART communications.

PulStar TTL Sensors have an integrated 1" NPT fitting in a PVC housing. Continuous temperature compensation is performed to achieve precise measurement accuracy. Other user friendly features include diagnostic waveforms which allow the user to adjust sensitivity settings in more challenging operations.

Operating at 5V DC, PulStar TTL Sensors provide user programmable sampling rate, average of sensing rate, sample and hold of last reported range, and adjustment of sensitivity levels at a variety of different ranges. Converters are available that allow the TTL signals from the sensors to communicate through a USB input with a computer using Massa's MassaSonic Software. This allows access to all of the features of the sensor, including obtaining target ranges, system status information, or diagnostic waveform. Adjustments can also be made to the sampling rate, averaging of measurements, loss of echo time out, or setpoint hysteresis. A software controlled sensor transmit trigger can also be used.

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.



GENERATIONS AHEAD IN SONAR & ULTRASONIC TECHNOLOGY

For more information, please visit [www.massa.com](http://www.massa.com), or contact one of our Applications Specialists at: [sensors@massa.com](mailto:sensors@massa.com) or 781-740-6117

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PulStar® TTL Sensor

### FEATURES

- Communication through Tx/Rx TTL (1.8V levels)
- 5V DC Operation
- Quick Power Up Response with Level Measurement for Low Power Systems
- Plug & Play Setup
- C1D1, CE and IP68 Compliant in Properly Designed Integrated System
- Temperature Compensated
- Narrow Beam and Short Dead Band
- Variety of Easy User Programmable Customizations
- Tamperproof & Rugged
- IP68 Enclosure Rating
- Accurate Under Demanding Environmental Conditions

### APPLICATIONS

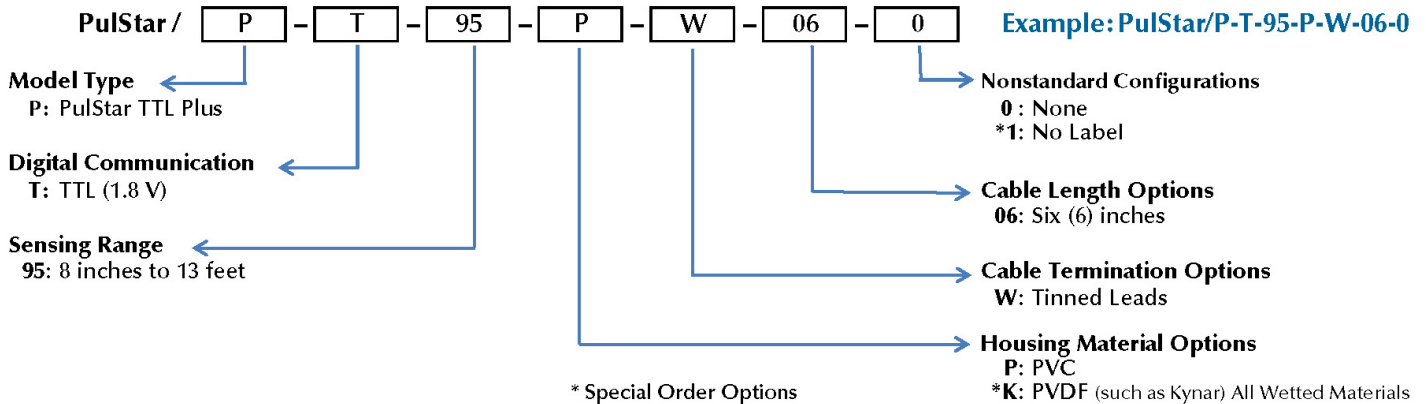
- Liquid and Solid Level Measurement
- Tanks, Totes, Processing
- Bulk Material Management
- Web Loop Monitoring
- Roll Diameter Measurement
- Automatic Packaging Operations
- Position Detection





## PulStar® TTL Sensors - Ordering Information

### PulStar TTL Ordering Code



### Optional Items:

- USB to RS-232 Converter: P/N 8388-1 (54 inch Cable) or P/N 8388-2 (39 inch Cable)**
- Massa Model E-440 RS-232 to TTL (1.8V) Converter: P/N 300533-502**
- Custom Tank Fitting PVC Adapter, 2 inches to 1 inch NPT: P/N 200758-1**
- Massa Software & Manuals: Please visit [www.massa.com](http://www.massa.com) to download the latest versions**

## PulStar® TTL Sensors - Performance Specifications (Typical 5V DC, 22°C, and 50% RH Air)

Performance	
Target Detection Distances	8 inches (200 mm) to 13 feet (4 m)
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
Power Up Ready to Request Status	Less than 500 ms
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)
Wires	Four (4) 22AWG Wires
Environmental	
Operational Temperature	-40°C to 70°C
Storage Temperature	-40°C to 85°C
Relative Humidity	0 to 95%, non-condensing
C1D1, CE, and IP68 Compliant (in properly integrated system)	Total Capacitance: 1800 µF Transformer Inductance: 1 mH (primary); 350 mH (secondary)

All Specifications Subject to Change Without Notice

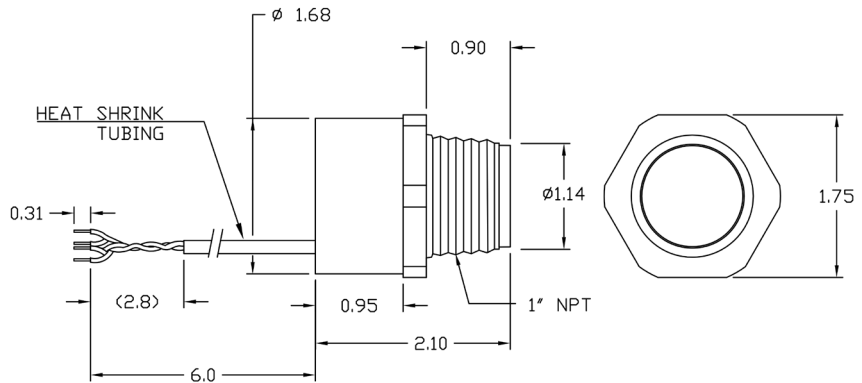
[www.massa.com](http://www.massa.com)

## PulStar® TTL Sensors - User Interface Specifications

Interface	
Power Required	5V DC ( $\pm 10\%$ ); 15 mA, typical
Trigger Modes	Internal or Software Trigger
Target Distance Averaging	Rolling Averages: from 1 to 32 samples, or Boxcar Average: from 1 to 1,024 samples <i>Factory Default: 1</i>
Loss of Echo Time-Out	Programmable from 1 to 254 consecutive samples missed before time-out <i>Factory Default: 1</i>
Sampling Rate	0.1 Hz to 20 Hz in 0.1 Hz increments <i>Factory Default: 10 Hz</i>
UART TTL Voltage Level	1.8V ( $\pm 10\%$ )
Communications Converters	USB to RS-232 Converter Massa Model E-440 RS-232 to TTL (1.8V) Converter
Operating System for MassaSonic Software	Windows 10, 8, 7, Vista, and XP SP3

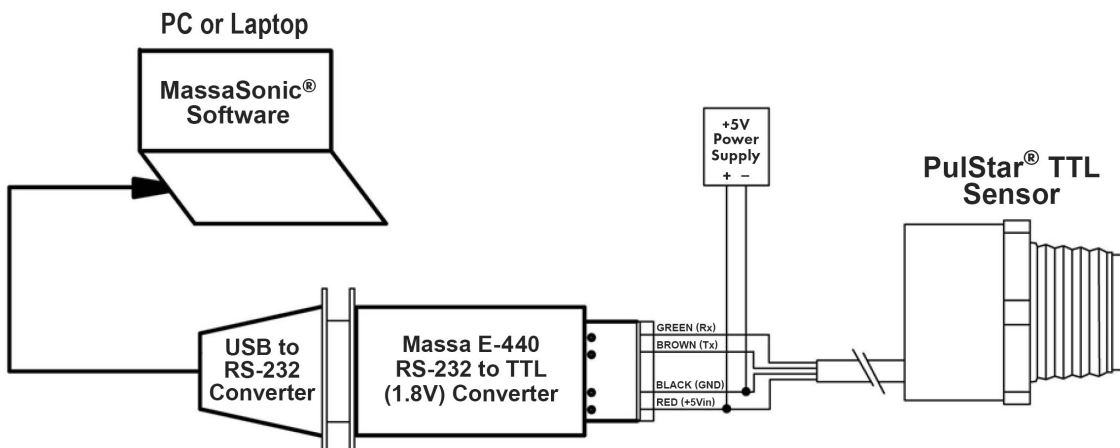
PulStar TTL Sensors also contain drop down menus to automatically ignore false echoes from certain types of stationary targets.

PulStar TTL Sensor  
Outline Dimensions  
(inches)



## PulStar® TTL Sensors - Wiring to Communicate with a PC

To communicate with a MassaSonic PulStar TTL Sensor using a PC, first download the MassaSonic Software. Then connect the red and black wires to a 5V DC power supply, and connect the white and green wires (Rx & Tx) to the Massa E-440 RS-232 to TTL Converter, as shown in the diagram below. Next connect one end of the USB to RS-232 Converter to the E-440 Converter, and the other end to a USB port of the PC. The MassaSonic Software will now allow the user to make changes to various parameters of the sensor, observe target distances digitally, and obtain diagnostic waveforms.



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