



## 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 4 inches (100mm) to 13 feet (4m). PulStar TTL Sensors can easily be interfaced electronically and mechanically into an OEM's control system. They are C1D1/Intrinsically Safe, 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 5VDC, and they communicate with the customer's control system using asynchronous UART TTL signals. The TTL signal on one series of sensors operate at 1.8V levels, and another series operate at 3.0V 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 5VDC is briefly applied to the sensors to obtain distance measurements and then removed. This capability is particularly important in battery operated installations. The sensors are 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 PVC or PVDF housings. 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.

PulStar TTL Sensors allow the user to program the 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 waveforms. 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.



PulStar® TTL Sensor

### FEATURES

- 5V DC Operation
- Communication through Tx/Rx TTL (1.8 V & 3.0V levels)
- Quick Power Up Response with Level Measurement for Low Power Systems
- Plug & Play Setup
- C1D1/Intrinsically Safe, CE & 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



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





## PulStar® TTL Sensors - Performance Specifications

(Typical 5V DC, 22°C, and 50% RH Air)

Performance		
Target Detection Distances	<u>Medium Range (95 kHz)</u> 8 inches (200 mm) to 13 feet (4 m)	<u>Short Range (150 kHz)</u> 4 inches (100 mm) to 7 feet (2.13 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	
Transducer Surface	MassaPlast 102 (custom PPA) or PVDF	
Electrical Interface	Four (4) 22AWG Wires (1.8V Series) or Four (4) Pins (3.0V Series)	
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)	

## PulStar® TTL Sensors - User Interface Specifications

Interface	
Power Required	5V DC (± 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 ± 10% (1.8V Series) or 3.0V ± 10% (3.0V Series)
Communications Converters	USB to RS-232 Converter Massa Model E-440 RS-232 to TTL (1.8V or 3.0V) 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.



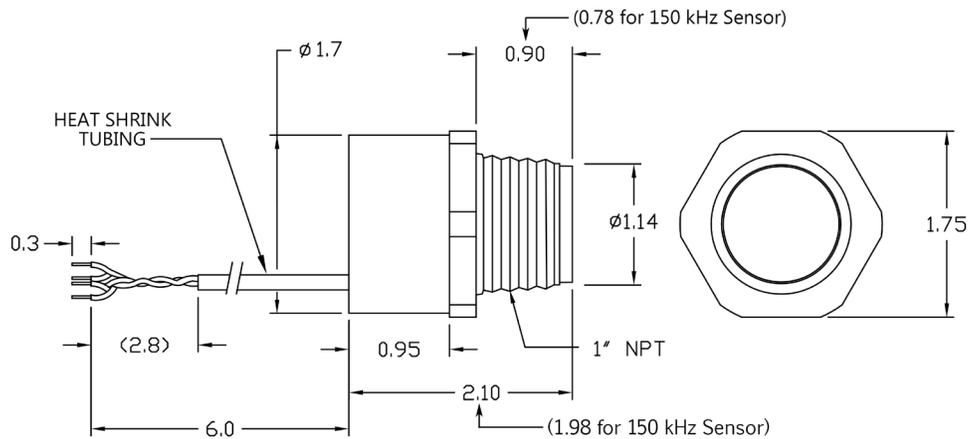
## PulStar® TTL Sensors - Mounting and Interface Information

The PulStar TTL Sensors are primarily intended for OEM customers that will integrate it mechanically and electrically with their control system. Massa has developed several trial versions of these sensors that OEM customers can use to properly design the electrical and mechanical interfaces and prove the feasibility of the combined system. If necessary, modifications can be made to the electrical and/or mechanical interface of the sensor in its the final OEM production design.

All trial versions of the PulStar TTL Sensors can be supplied with either PVC or PVDF housings that have the same 1.68 inch diameter by 0.95 inch long cylindrical surface for mechanically mounting onto the customer's control system. They also all contain four electrical connections for interfacing with the control system. Two of which are the ground and the 5 VDC power input for the sensor, and the other two are the asynchronous UART TTL Tx and Rx signal connections for communication between the control system and the sensor.

The trial sensors are available in two series. The trial PulStar 1.8V TTL Sensor Series uses a 1.8V level for the TTL communication signals, and the PulStar 3.0V TTL Sensor Series uses a 3.0V level. Each series contains both 95 kHz medium range (8 inches to 13 feet) sensors and 150 kHz short range (4 inches to 7 feet) sensors.

The figure below shows the mechanical dimensions of the trial version 95 kHz PulStar 1.8V TTL Sensor. The 150 kHz sensors have the same mechanical dimensions, except that they are 0.12 inches shorter, as shown in the figure. The 1.8V series utilizes a 6 inch long cable containing four (4) AWG wires to connect the sensor to the OEM customer's control system. The trial versions of the PulStar 3.0V TTL Sensors have the same dimensions as the 1.8V series. However, in the 3.0V series, the cable that makes the electrical interface connection to the control system is replaced with four (4) 0.22 inch long pins.



**Outline Dimensions of a 95 kHz PulStar 1.8V TTL Sensor  
With Variations for the 150 kHz Series Shown (inches)**

*(The 3.0V series are the same, except the cable is replaced with four (4) 0.22 inch long pins)*

## PulStar® TTL Sensors - Ordering Information

If you have an OEM application that requires a TTL interface between your control system and a non-contact level or distance measuring sensor, please contact us at [sensors@massa.com](mailto:sensors@massa.com); 781-740-6117 or 800-962-7543. One of our Application Specialists will help you select the best version of the PulStar TTL Sensors to optimize the performance of your system. Auxiliary equipment will also be explained, such as interface converters and MassaSonic Software that will allow you to make changes to various parameters of the sensor, observe target distances digitally, and obtain target echo diagnostic waveforms.

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