

# ToughSonic® Level Sensor

## Liquids, Solids and Chemically Aggressive Environments

LVL-500 Series

**LVL** sensors and SenixVIEW software put the power of ultrasonics in your hands. You can quickly adjust, optimize, save and clone your applications quickly without calibration!

ToughSonic LVL models are housed in a rugged, chemically inert PVDF sealed housing for long life.

These sensors mount above the material surface and measure the distance down to it without contact. Outputs are set in response to that distance.

Applications include pump control, bulk inventory, batch processing, water management and hi/lo level alarms.



### PC Configured Non-Contact Ultrasonic Level Measurement

#### Features

##### Level Measurements

- Long or short measurements
- Unaffected by optical factors like color and transparency
- Computer (PC) software allows remote adjustment

##### Packaging & Performance

- Durable housing for long life
- Threaded at both ends
- Short & overload protected I/O
- Adjustable filters compensate for tank mixers or turbulence
- Temperature compensation for improved accuracy
- Adjustable sensitivity

##### Control Systems

Adjustable features like bi-level switches and time delays allow you to create complete control functions without paying for external hardware. One example is maintaining a level by controlling valves or pumps to fill or empty a vessel.

#### PC Setup Power!

Use SenixVIEW software (see separate data sheet) to adjust all sensor features. You can view, analyze or log data to optimize your application. Disconnect and the sensor retains the setup.



#### Copy without Calibration

Application setups can be saved for future recall and quick cloning without recalibration. Since the LVL-500 can be used in many applications, inventory part numbers are reduced.

#### Multiple Outputs

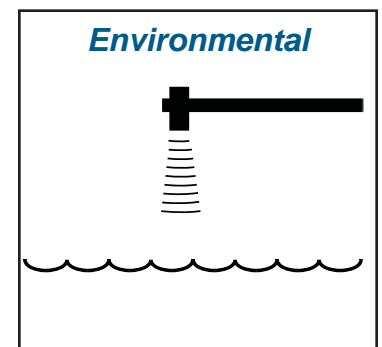
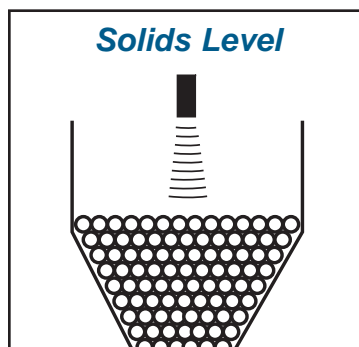
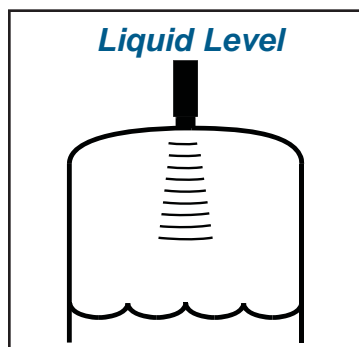
Each sensor has five outputs plus a serial data interface. Outputs have many SenixVIEW configured features for tailoring to any application.

##### Continuous Level

These include one analog 0-10 VDC output and two 4-20 mA current loop outputs (sinking and sourcing). These outputs can increase or decrease with distance, and many analog features are SenixVIEW adjustable.

##### Point Level Switches

Two switches are SenixVIEW configured as either "PNP" or "NPN" type (sourcing or sinking). Each has independently adjustable bi-level switching distances, windowing, initial conditions, ON/OFF polarity, time delays and loss of target responses. Easily create simple control and alarm systems!





# Senix® LVL-500 ToughSonic® Level Sensor

## Specifications

<b>Optimum Range</b>	30.5 cm - 7.6 m (12 in. - 25 ft.)	<b>Max Range</b>	10.7 meters (35 feet)
<b>Case Material</b>	PVDF	<b>Adjustment</b>	SenixVIEW software
<b>Temperature</b>	-40 to 70 C (-40 to 158 F)	<b>Configuration</b>	Stored in non-volatile memory
<b>Humidity</b>	0 to 100% operating	<b>Transducer</b>	Rugged piezoelectric
<b>Compensation</b>	Temperature compensated	<b>Protection</b>	NEMA-4X, NEMA-6P, IP68
<b>Resolution</b>	Digital: 0.344 mm (0.013536 in.); Analog: 4099 steps (over full 0-10 VDC or 0-20 mA)		
<b>Repeatability</b>	Nominal 0.2% of range @ constant temp. Affected by target, distance, environment		
<b>Update Rate</b>	200 ms, SenixVIEW adjustable; affected by SenixVIEW filter selections		
<b>Voltage Output</b>	0-10, 0-5 VDC or PC customized; 10 mA max. (*)		
<b>Current Loop #1</b>	Current sourcing 4-20 mA or PC customized, max. loop 500Ω (*)		
<b>Current Loop #2</b>	Current sinking 4-20 mA or PC customized, max. loop 500Ω (*)		
<b>Sinking Switch</b>	150 mA max. @ 40 VDC max., teachable set point & polarity, fault indication		
<b>Sourcing Switch</b>	150 mA max. @ input voltage, teachable set point & polarity, fault indication		
<b>RS-232, RS-485</b>	Modbus protocol, 9600-19200-38400 baud (selectable), 8 data bits, 1 stop, no parity		
<b>Target Performance</b>			
<b>Target</b>	Detects flat or irregular surfaces. Target surface must reflect sound back to sensor.		
<b>Max. Distance</b>	Affected by vapor environment and target size, shape and orientation		
<b>Granular Solids</b>	De-rate max range by 50%; range affected by material density and orientation		
<b>Orientation</b>	Orient sensor beam perpendicular to target surface for best performance		
<b>Optical</b>	Unaffected by target color, transparency or other optical characteristics		

## Connections

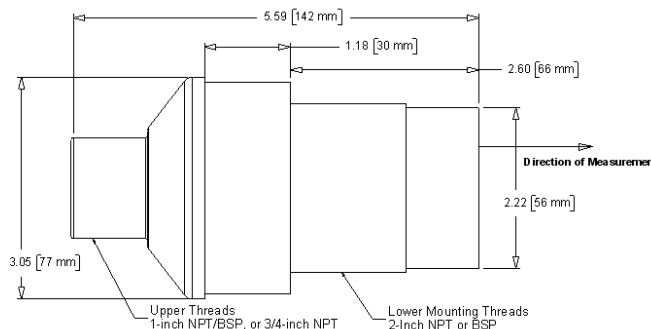
Cable Connection	Wire	Description
Power	Brown	10-30 VDC @ 50 mA max (sensitivity reduced below 15 VDC)
Ground	Blue	Power and interface common
Voltage Output *	Violet	0-10 VDC, 0-5 VDC or custom range values between 0 and 10 VDC
Current Loop Output *	Green	4-20 mA sourcing (adjustable range values between 0 and 20 mA)
Current Loop Output *	Orange	4-20 mA sinking (adjustable range values between 0 and 20 mA)
Switch #1 Output	Black	Sinking ("NPN") or Sourcing ("PNP"), user selected
Switch #2 Output	White	Sinking ("NPN") or Sourcing ("PNP"), user selected
RS-232 out / RS-485-	Gray	Serial data connection (depends on model - see model selection)
RS-232 in / RS-485+	Yellow	Serial data connection (depends on model - see model selection)

(\*) All 3 analog outputs share the distance calibration (factory default is Optimum Range, SenixVIEW adjustable). The 0 and 10 VDC output voltage values, and the 4 and 20 mA output current values, are SenixVIEW adjustable. Changes to current values apply to both current loops.

## Part Numbers

Model Number	Serial Interface - For SenixVIEW or User Applications
LVL-500-232	Serial RS-232 interface (PC COM port)
LVL-500-485	Serial RS-485 interface (allows addressable multi-sensor networks)

## Dimensions



### Mechanical

Mounting: Lower 2-in. or upper 1-in. NPT threads

Attached Cable: PUR jacket, 6-ft (2 m) long