

# ToughSonic® Distance Sensors

## Waterproof, Two Outputs and Push-Button "Teachable"

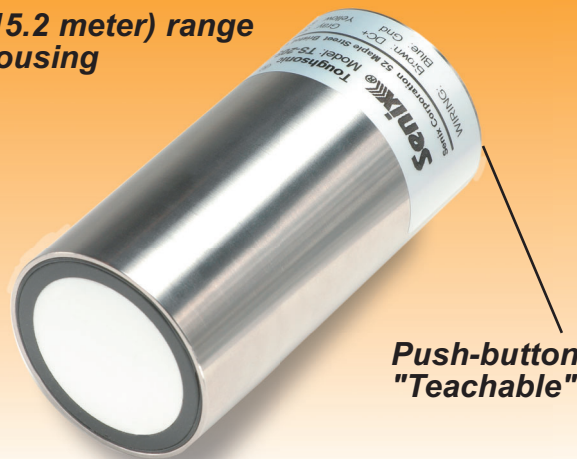
TS-21S Series

**Non-Contact  
Ultrasonic  
Air Distance  
Measurement**

TS-21S ultrasonic distance sensors contain a rugged transducer in a stainless steel case for long service life in tough environments. Typical applications include roll diameter, liquid level, motion control, positioning and dimensioning. They are excellent in tanks, drums and level applications.

Two outputs are available in many combinations, including analog 0-10/0-5 VDC, 4-20 ma. current loop, PNP (sourcing) switches, NPN (sinking) switches and RS-232/485 serial data. All outputs are relative to measured distance and adjustable anywhere in the sensor's range.

**50-ft (15.2 meter) range  
IP68 housing**



**Push-button  
"Teachable"**

### Features

- Sealed for ingress protection rating IP68 for washdown or outdoor applications like food processing or car washes
- Long 50-ft (15.2 m) measurement range
- Short 12-in (30.5 cm) dead-band
- Simple pushbutton "teachable" setup of many features, and calibration using actual targets
- Analog outputs are distance-proportional and reversible, anywhere in sensor's range
- Switch outputs have adjustable distance and polarity
- Output response filter for stability with poor targets
- Sync connection for several sensors in close proximity
- Security "Lock" prevents accidental mis-adjustment
- Status indicator for each output

### Reliable Operation

- Unaffected by optical factors like color and transparency
- Stable output if target is lost
- Overload and short circuit protected switch & analog outputs
- Heavy duty 303 stainless case, potted, waterproof IP68 rating

### Easy Installation

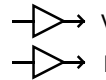
- Temperature compensated
- Body clamp or optional Senix UA-MB-SS bracket
- Permanently attached cable
- 3 rear LED's display target, fault and output status
- Simple push-button setup - no potentiometers!

### Output Options

Here are 3 common TS-21S output configurations. Eight other output combinations are available (see next page).

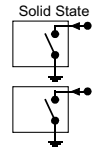
#### DUAL ANALOG

Both voltage and 4-20 ma. current loop (sourcing) outputs with teachable endpoints



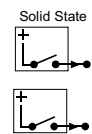
#### DUAL SINKING SWITCH

Two solid state "NPN" type outputs with independent teachable switch distances and ON/OFF polarities

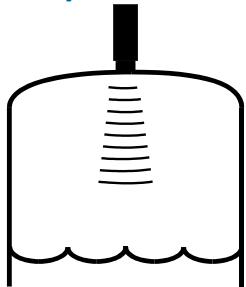


#### DUAL SOURCING SWITCH

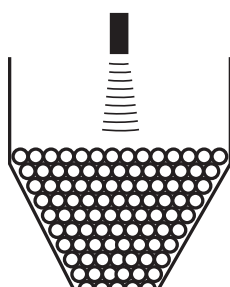
Two solid state "PNP" type outputs with independent teachable switch distances and ON/OFF polarities



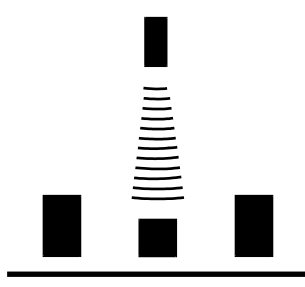
#### Liquid Levels



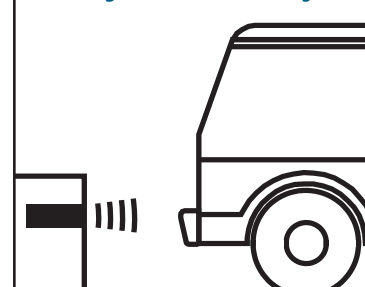
#### Solid Levels



#### Dimension/Sort



#### Object / Security



# TS-21S Two Output Teachable Distance Sensors

## Target Performance

### Color/Transparency

Unaffected by target's color, transparency or optical characteristics.

### Orientation

Detects flat or curved objects. Surface must reflect back to sensor. Flat surfaces are best when perpendicular to beam axis, and may not be detected at high angles of incidence.

### Typical Distance

Object	Max Range (ft.)
Liquid surface	50

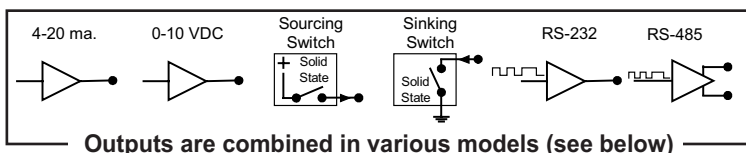
(Performance may be reduced at input voltages less than 18 VDC)

## Specifications

<b>Range</b>	12 inches - 50 feet 305 mm - 15.2 meters	<b>Input Power</b>	10-30 VDC @ 50-70 ma. nominal 15-30 VDC if using analog output
<b>Case Material</b>	303 stainless steel	<b>Transducer</b>	Ruggedized piezoelectric
<b>Temperature</b>	-40 to 70 C (-40 to 158 F)	<b>Adjustments</b>	Push-button, permanently stored
<b>Protection</b>	NEMA-4X, NEMA-6P, IP68	<b>Humidity</b>	0 to 100% operating
<b>Resolution</b>	0.014 in. (.34 mm) max.; Analog 12 bits (4095 steps) over spanned distance		
<b>Repeatability</b>	Nominal 0.1% of range @ constant temp. Affected by target, distance, environment		
<b>Compensation</b>	Temperature compensated, internal temperature sensor		
<b>Update Rate*</b>	5 (default), 8, 12.5 or 50 per second, selectable* output response time filter		
<b>Voltage Output*</b>	0-10 and 0-5 VDC (user selectable), 10 ma. max., reversible teachable endpoints		
<b>Current Loop*</b>	4-20 ma. (sourcing), 500Ω max. @ >15 VDC, reversible teachable endpoints		
<b>Switch Outputs</b>	150 ma. max, sinking 40 VDC max., teachable setpoint and polarity, fault indication		
<b>RS-232, RS-485</b>	6 bytes, 9600 baud, 8 data bits, 1 stop bit, no parity, transmitted at update rate		
<b>SYNC feature</b>	Permits up to 32 sensors to be wired together for operation in the same area		

Asterisk (\*) indicates user teachable using pushbutton.

## Models & Outputs



Outputs are combined in various models (see below)

### Wiring (6-wire cable)

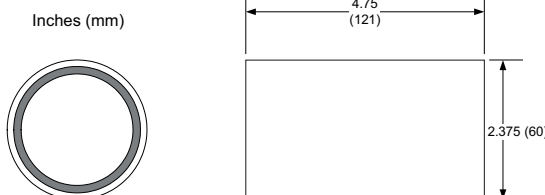
Brown	DC+ IN
Blue	GND
Gray	SYNC out or below
Yellow	SYNC in or below
Black	see below
White	see below

MODEL NUMBER	Output #1 (BLACK wire)	Output #2 (WHITE wire)
TS-21S-IV	4-20 ma. current loop	0-10 / 0-5 VDC
TS-21S-ISK	4-20 ma current loop	Sinking Switch
TS-21S-ISR	4-20 ma. current loop	Sourcing Switch
TS-21S-SKV	Sinking Switch	0-10 / 0-5 VDC *
TS-21S-SRV	Sourcing Switch	0-10 / 0-5 VDC *
TS-21S-SKSK	Sinking Switch	Sinking Switch
TS-21S-SRSR	Sourcing Switch	Sourcing Switch
TS-21S-SKSR	Sinking Switch	Sourcing Switch
TS-21S-SK232	Sinking Switch	RS-232 Output (Gray wire)
TS-21S-SR232	Sourcing Switch	RS-232 Output (Gray wire)
TS-21S-485	RS-485+ Output (Yellow wire)	RS-485- Output (Gray wire)

Asterisk (\*) indicates user teachable using pushbutton.

Each sensor ships with installation instructions and a plastic Klik bracket. Options available.

## Dimensions



### Mechanical

Mounting: Senix UA-MB-SS bracket or other body clamp

Attached Cable: 6-ft (2 m)  
Total Weight: 25.9 oz (0.73 kg)