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SonaSwitch® MINI-S Ultrasonic Sensor

The SensComp SonaSwitch® Series MINI-S electrostatic ultrasonic Sensor system provides a complete sensor solution to simplify your product design and packaging.

Features

50 KHz Electrostatic Ultrasonic sensor with Integrated SMT Electronic Circuitry

Two (2) Independent Push-button Settable Digital Outputs (Outputs are NPN Open Collector)

Outputs and Range LED Indications

Ranges from 1" to 12", 6" to 20', or from 12" to 40'

Temperature Compensated Switch Point Settings

Part No.

Part Numbers (PID#): SonaSwitch® MINI-S - Instrument Grade; SonaSwitch® MINI-SE - Environmental Grade; SonaSwitch® MINI-SO - Open Face

SonaSwitch®			
MINI-S	MINI-SE	MINI-SO	RANGE
*PID#616210LF	*PID#616310LF	*PID#616350LF	1 - 12 inch
*PID#616200LF	*PID#616300LF	*PID#616340LF	0.5 - 20 feet
*PID#616205LF	*PID#616305LF	*PID#616345LF	1 - 40 feet

*RoHS Compliant

Benefits

Self Contained Compact Design

Can be Triggered Internally or Externally

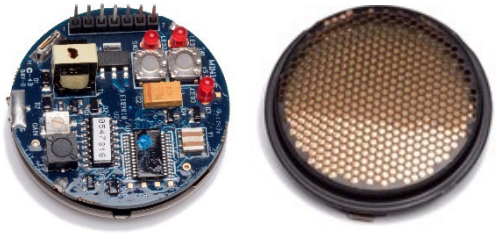
Excellent Receive Sensitivity

Push Button Range Settings for Quick and Easy Set-up

Applications

Level Measurement, Proximity Detection, Presence Detection, Robotics, Educational Products

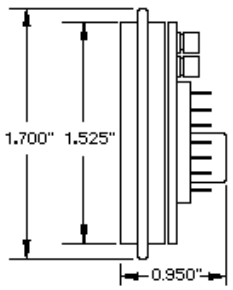
Specifications

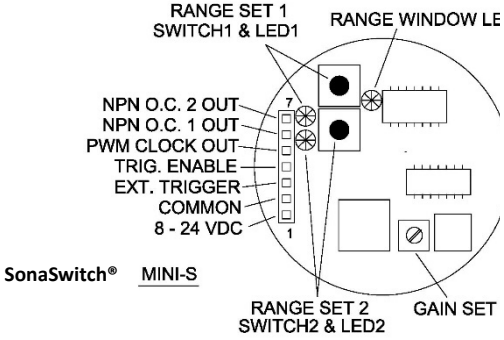


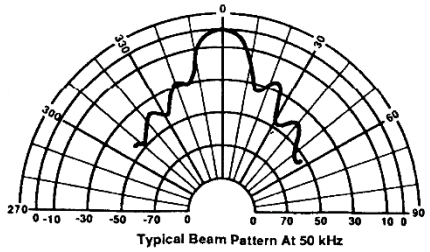
*PID# 616205LF Shown

Description

The SonaSwitch® MINI-S Sensor provides a total system in a compact package, containing an ultra-sensitive electrostatic ultrasonic sensor and supporting circuitry to provide two (2) independent outputs, each output settable to indicate the detection of a target at a distance between 1 inch to 12 inches, 6 inches to 20 feet, or between 12 inches to 40 feet away. The SonaSwitch® MINI-S can be externally triggered, or continually sense at a 10 Hz rate. The SonaSwitch® MINI-S is insensitive to temperature, humidity, and pressure changes. It can also withstand high audio and EMI/RFI levels.







Note: dB normalized to on-axis response.
Note: Curves are representative only. Individual responses may differ.

Beam Pattern

SonaSwitch® MINI-S Sensor Specifications

Distance Ranges:
0.025 - 0.3 M.....0.15 - 6.10 M .....0.3 -12.2 M
(1.0 - 12 inches).....(0.5 -20 feet)..... (1.0 - 40 feet)
Accuracy (over entire range) ..... ± 0.1%
(0.025-0.3 M range = ± 1.0%)
Beam Pattern..... See Graph (Typically 15° nominal)
Repetition Rate (astable)..... 10 Hz
May be externally triggered up to 50 Hz
Outputs (NPN Digital Open Collector)..... 2
Maximum Output Voltage..... 40 VDC
Maximum Output Current..... 600 ma
Maximum Power Dissipation..... 330 mW
Output Response Time:
On (goes high) – three (3) consecutive target hits
Off (goes low) – three (3) consecutive misses

Power Requirements ..... 8 to 24 VDC
(Maximum Current = 30 mA)
Operating Temperature ..... -40 to +85° C
(-40 to 185° F)
Weight..... 17 grams (0.6 oz)
Dimensions:
Thickness ..... 0.950 inch
Diameter..... 1.700 inch
Mounting Diameter..... 1.525 inch
Use RTV silicone or edge clips to secure in place
Housing, Standard Finish
Instrument Grade ..... Satin Black Painted 304 Stainless Steel
Environmental Grade..... 304 Stainless Steel
Open Face..... Parylene Coated 304 Stainless Steel

General Installation Procedures

1. Always mount the SonaSwitch® MINI-S in a suitable dry location. The SonaSwitch® MINI-S is designed to be used in indoors or protected environments only. Excessive moisture in the circuit board and ultrasonic sensor will result in damage and improper operation and will void all warranties.
2. Mount the SonaSwitch® MINI-S as far off the ground as practical.
3. Adjust the gain to the Minimum setting necessary to ensure reliable target detection (excessive gain can result in false detections).
4. Mount the SonaSwitch® MINI-S in a location where environmental interference sources are Minimized (examples are EMI sources, air nozzles, excessive air turbulence, etc.)
5. The two (2) NPN open collector digital outputs require pull-up resistors to an external positive power source of less than 40 VDC (typically 4700 ohms when connected to +5 VDC for interfacing to TTL circuits).
6. The Trigger Enable and External Trigger pins can be left un-connected when the External trigger option is not desired.

Calibration Procedures

1. Apply DC power (+8 to +24 VDC) to the SonaSwitch® MINI-S (connector header pin 1)
2. Allow several minutes warm-up time the SonaSwitch® MINI-S to reach operating temperature before calibrating the unit.
3. Setting Output 1: Place the target at the desired detection distance from the face of the SonaSwitch® MINI-S Depress the “RANGE SET 1” push button and wait for the LED indicator to stop flashing and the sensor’s ultrasonic sensor generates a “chirp” sound before releasing. The SonaSwitch® MINI-S is now calibrated to your desired target distance for Output 1.
4. Setting Output 2: Place the target at the desired detection distance from the face of the SonaSwitch® MINI-S. Depress the “RANGE SET 2” push button and wait for the LED indicator to stop flashing and the sensor’s ultrasonic sensor generates a “chirp” sound before releasing. The SonaSwitch® MINI-S is now calibrated to your desired target distance for Output 2.
5. Gain Control: The SonaSwitch® MINI-S gain was pre-set at the factory for optimum performance. To re-calibrate the GAIN potentiometer setting, place the target at the maximum desired detection distance. Rotate the GAIN potentiometer fully counterclockwise (CCW). Slowly rotate the GAIN control clockwise (CW) until detection occurs. Rotate the Gain control CW an additional 1/16 turn.
Note: Always calibrate the GAIN control for Minimum gain required for reliable detection. Excessive gain may result in false target detection.

System Wiring Information

Pin 1 – Power Supply -----Requires a +8 to +24 VDC regulated power source with a 30 mA current capacity.
Pin 2 – Common ----------Return for DC power supply, TTL outputs and clock signals.
Pin 3 – External Trigger --Accepts TTL compatible logic level clock signals (0-5 VDC). Trigger occurs on the Low to High logic transition.
Pin 4 – Trigger Enable----Allows the SonaSwitch® MINI-S to accept an external trigger signal. Enable by connecting pin 4 to pin 2.
Pin 5 – Clock Output ------Delivers a TTL compatible clock signal (0-5 VDC). This signal goes high at the start of a cycle and returns to a low state when the returned echo from a target is detected.
Pin 6 – NPN Output 1-----This NPN open collector output turns on and off when a target is detected (on) or missing (off) as set by the adjusted Range Control 1 setting.
Pin 7 – NPN Output 2-----This NPN open collector output turns on and off when a target is detected (on) or missing (off) as set by the adjusted Range Control 2 setting.

NPN open collector outputs are continuously energized during the detection period. The outputs switch on (NPN low output to common) when the sensor detects three consecutive target present at the range control set point. The outputs switch off (open collector output) when the sensor detects three consecutive missing targets at the range control set point.

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