

## General

This operation and installation manual provides general guidelines and suggestions to assist you in using the SensComp, Inc. MINI-S ultra-sonic sensor module in many measurement applications. For additional information, please contact a SensComp Applications Engineer at (734) 953-4783 between 9 AM and 5 PM EST.

## General Installation Procedures

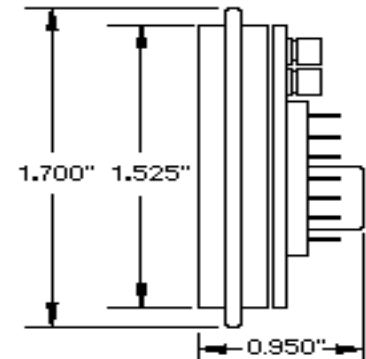
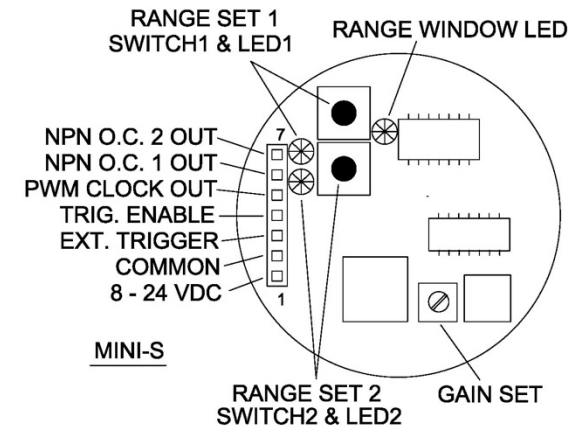
1. Always mount the MINI-S in a suitable dry location. The MINI-S is designed to be used in an indoor or protected environment only. The MINI-SE is suitable for harsher environments and higher humidity conditions. Excessive moisture on the circuit board (and the MINI-S transducer) will result in damage and improper operation, and will void all warranties.
2. Mount the MINI-S as far off the ground as practical.
3. Mount the MINI-S in a location where environmental interference sources are minimized (examples are EMI sources, air nozzles, excessive air turbulence, etc.).
4. Mount the MINI-S in a 1.575 inch diameter hole, using RTV silicone or edge clips to secure the sensor in place. You can also use our Series 600 Housing unit, PID# 619395, to house the MINI-S.
5. As supplied, the MINI-S has been calibrated and will function without further calibration.
6. The two (2) NPN open collector digital outputs need to be "pulled up" (through a resistance and/or impedance) to an external positive power source of less than 40 VDC. (typically 4700 ohms when connected to an external +5 VDC power source for testing or for interfacing to TTL Logic level circuits). The maximum output current is 600 mA. The Range Set LEDs do not require pull-up resistors, and can be used for setup calibration before connecting the MINI-S to external equipment.

## System Wiring Information

- Pin 1 – Power Supply – A +8 to +24 VDC regulated power source supplying 30 mA of current (2.0 Amperes during the 0.5 ms transmit pulse).
- Pin 2 – Power Supply Common (Ground) – Common Return for DC power supply, switched outputs, and clock signals.
- Pin 3 – External Trigger – Accepts TTL compatible logic level clock signals. A low to high (zero to +5 VDC) transition triggers the MINI-S
- Pin 4 – Trigger Enable – Allows the MINI-S to accept an external trigger signal. Enabled by connecting this pin (pin 4) to common (pin 2).
- Pin 5 – Clock Output – Delivers a TTL compatible Pulse Width Modulated (PWM) clock signal. This signal goes high at the start of a cycle, and returns to a low state when the returning echo is received.
- 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 Range Set 1 push button.
- 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 Range Set 2 push button.

## Calibration Procedures

1. Apply DC power ( +8 to +24 VDC) to the MINI-S (connector header pins 1 and 2)
2. Allow five to ten minutes warm-up time for the MINI-S to reach operating temperature before calibrating the unit.
3. If desired for testing, connect the two NPN Open Collector Outputs to an external positive power supply through appropriate impedances. Since they are open collector, they will always read zero volts until connected to a pull-up load (See General Installation Procedures – Step 6).



4. NPN Output 1 Adjustment (pin 6)
  - Place the target at the desired detection distance from the face of the MINI-S.
  - Depress and hold the "Range Set 1" push button switch. Wait for the "Range Window" LED to flash three times, followed by a "chirp" sound from the sensor before releasing.
  - The NPN output 1 should now be set:
    - LED 1 ON – NPN output is a Logic Low (0 VDC) when target is detected.
    - LED 1 OFF – NPN output is a Logic High (+ power source) when target is not detected.

#### 5. NPN Output 2 Adjustment (pin 7)

- Place the target at the desired detection distance from the face of the MINI-S
- Depress and hold the “Range Set 2” push button switch. Wait for the “Range Window” LED to flash three times, followed by a “chirp” sound from the sensor before releasing.
- The NPN output 2 should now be set:
  - LED 2 ON – NPN output is a Logic Low (0 VDC) when target is detected.
  - LED 2 OFF – NPN output is a Logic High (+ power source) when target is not detected.

#### 6. Gain Adjustment

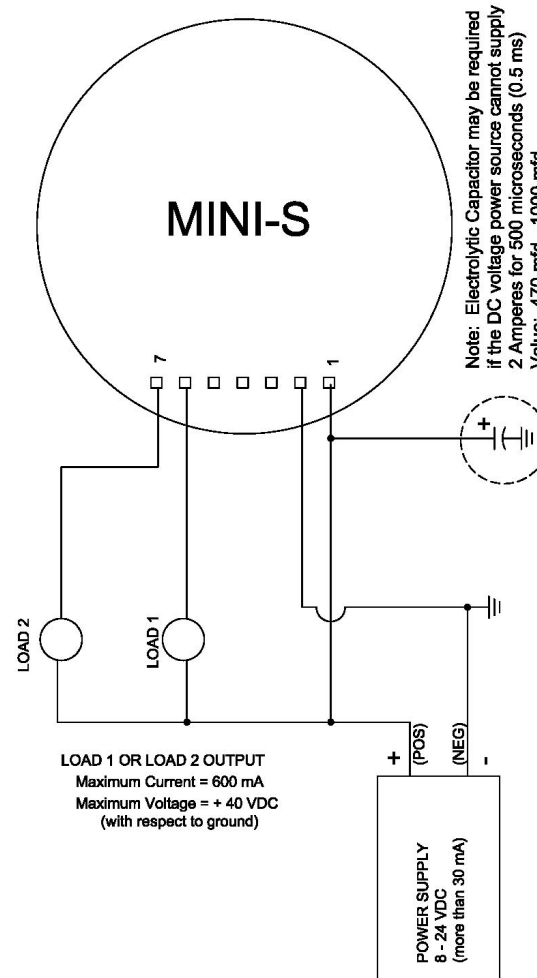
Note: The “Gain Set” potentiometer has been pre-set at the factory to provide the best performance for the range of your MINI-S. In the event that it is changed, the steps below will assist you in returning it to the proper value

- To calibrate “Gain Set”, place the target at the maximum desired detection distance.
  - Rotate the “Gain Set” potentiometer fully counterclockwise (CCW).
  - Slowly rotate “Gain Set” clockwise (CW) until detection occurs.
  - Rotate “Gain Set” clockwise (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.*

### Range Window LED

The Range Window LED performs two indication functions:

- During Setup procedures, the LED will flash as the set-up values are programmed into the sensor.
- During normal operation, the LED will illuminate (ON) when a target is detected between the two set points, and is off for targets outside this region.



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## MINI-S & MINI-SE Push Button Settable Ultrasonic Sensor

### Installation and Operation Manual

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