General

This operation and installation manual provides general guidelines and suggestions to assist you in using the SensComp, Inc. MINI-A ultrasonic 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-A in a suitable dry location. The MINI-A is designed to be used indoors or in protected environments only. The MINI-AE is suitable for harsher environments and higher humidity conditions. Excessive moisture on the circuit board (and the MINI-A transducer) will result in damage and improper operation, and will void all warranties.
2. Mount the MINI-A as far off the ground as practical.
3. Mount the MINI-A in a location where environmental interference sources are minimized (examples are EMI sources, air nozzles, excessive air turbulence, etc.).
4. Mount the MINI-A 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-A.
5. As supplied, the MINI-A has been calibrated and will function without further calibration.

System Wiring Information

Pin 1 – Power Supply – supplying 30 mA of current (2.0 Amperes during the 0.5 ms transmit pulse).
- The 0 to 5 VDC analog output model requires a +8 to +24 VDC regulated power source.
- The 0 to 10 VDC analog output model requires a +12 to +24 VDC regulated power source.

Pin 2 – Power Supply Common (Ground) – Common Return for DC power supply, analog output, 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-A

Pin 4 – Trigger Enable – Allows the MINI-A 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 – Analog Output – 0 to +5 VDC (or 0 to +10 VDC) analog voltage output. Maximum analog output current is 5 mA.

Pin 7 – no connection.

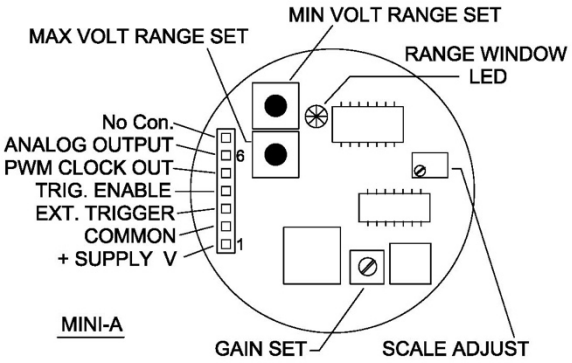
Calibration Procedures

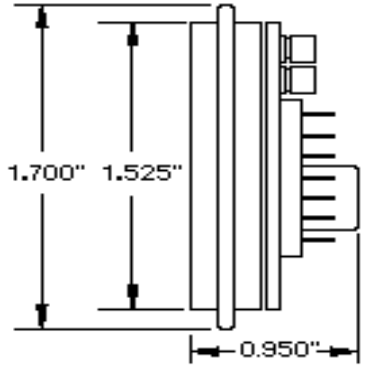
Note: The MINI-A Sensor is calibrated before it leaves the factory for the following settings:

- MINI-A - 12 inch version:
  [0 volts = 1 inch; max volts = 12 inches]
- MINI-A - 20 foot version:
  [0 volts = 6 inches; max volts = 20 feet]
- MINI-A - 40 foot version:
  [0 volts = 12 inches; max volts = 40 feet]

The following information provides calibration techniques to obtain a more precise analog voltage output, setting the minimum and maximum target points, and adjusting the receiver gain of the returning echo signal.

1. Apply DC power (see requirements above) to the MINI-A (connector header pin 1 & pin 2).
2. Connect a DC Digital Volt Meter's (DVM) Plus (+) lead to the Analog Output (pin 6) and the Minus (-) lead to Common (pin 2).
3. Allow five to ten minutes warm-up time for the MINI-A to reach operating temperature before calibrating the unit.





4. Analog output voltage adjustment (pin 6)
   - Press a stiff piece of flat paper tight against the sensor's face, covering the entire front of the sensor.
   - Verify the analog voltage output is 5.0 VDC (or 10.0 VDC).
   - Adjust the "SCALE ADJUST" potentiometer to the full-scale voltage desired (+5.00 VDC or +10.00 VDC).
5. Setting Minimum/Maximum Ranges
   Two push-button switches set the MINI-A output voltage. These independent range settings allow setting the analog voltage output to change from zero volts to full scale voltage output at desired minimum and maximum distances between the MINI-A sensor and the detected object.
6. Maximum Voltage Range Setting
   - Place the target at the desired distance for the full scale voltage output. This can be either the minimum distance or

the maximum distance between the sensor and the target (see step 5 above).

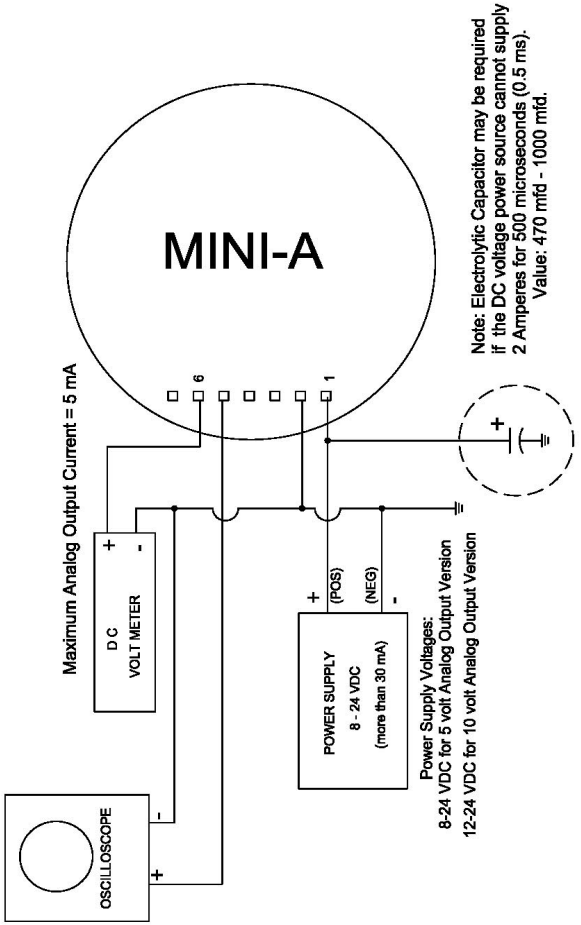
- Depress and hold the “MAX VOLT RANGE SET” push button, and wait for the “RANGE WINDOW LED” indicator to stop flashing and the transducer generates a “chirp” sound.
- The MINI-A is now calibrated to your desired target distance for full scale analog voltage output.

7. Minimum Voltage Range Setting.
   - Place the target at the desired distance for the minimum voltage output. This can be either the minimum distance or the maximum distance between the sensor and the target (see step 5 above).
   - Depress and hold the “MIN VOLT RANGE SET” push button, and wait for the “RANGE WINDOW LED” indicator to stop flashing and the transducer generates a “chirp” sound.
   - ✓ *Note: The minimum voltage output will be a value between 0.00 and 0.05 volts (50 mv), due to the analog output’s amplifier offset voltage.*
   - The MINI-A is now calibrated to your desired target distance for zero analog voltage output.
8. Gain Adjustment
   Note: The “GAIN SET” potentiometer has been preset at the factory to provide the best performance for the range of your MINI-A. 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 “GAIN SET” 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 “GAIN SET” 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, indicating that a target is detected between the “Minimum Volts Range Set” point and the “Maximum Volts Range Set” point. For targets outside this range, the LED will be off.



SensComp

The Electrostatic Ultrasonic Sensor Experts.

MINI-A & MINI-AE Push Button Settable Ultrasonic Sensor

Installation and Operation Manual

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