Snake River Electronics
Ultra-8 Display Panel
Calibration Instructions

SNAKE RIVER ELECTRONICS

Description:
Calibration instructions for Ultra-8 display panel. Note: this is only a quick calibration guide. For installation, operation and troubleshooting information for this panel refer to its owners manual.

Tools Required:
None, panel is calibrated by pressing buttons on the panel.

Procedure:
Note: this procedure assumes that the panel and sensors are already installed in your vehicle. Refer to the owners manual for installation instructions.
(1) Fill or drain the tank that is to be re-calibrated.
(2) Turn off panel, press and hold **C** button, turn on panel, then release **C** button
(3) Press up and down arrow keys to the sensor channel to be calibrated.
(4) Press **C** button to enter calibration mode.
(5) Following the instructions on the display, press the up arrow key for full calibration or the down arrow key for empty calibration (whatever you did in step (1)).
(6) Again following the instructions on the display, press the up arrow if you are sure that you want to record the calibration value. If you are unsure press the down arrow to abort.
(7) Fill or drain the tank that is to be re-calibrated (opposite of what you did in step (1)).
(8) Repeat steps (2) through (6) to set this calibration level.
(9) Repeat all of the above steps for all tanks to be re-calibrated.

Trouble Shooting:
If you encounter an error message when you attempt to calibrate a tank, then try setting the opposite point (i.e.: if you attempted to set the full calibration point, drain the tank and try doing the empty point first). If you still get the error message you may need to check your sensor installation for problems; see troubleshooting guides in the Ultra-8 owners manual and sensor owners manuals
If the above procedure does not result in satisfactory panel operation, you may need to check the sensor installation for problems. Refer to the owners manuals and calibration sheets for the sensors you have installed. These manuals also have additional troubleshooting information that may be of assistance. If these do not fix your problems, contact Snake River Electronics Tech. Support for additional advice and information.

MODA Tank Sensor

The **MODA** senor module is a non-invasive fresh and waste tank level sensor. This sensor is attached to the *outside* of a plastic or fiberglass tank eliminating the possibility of sensor malfunction due to fouling by tank contents.

Due to its non-invasive nature, the **MODA** sensor module is simple to install. It is installed by applying 2 vertical strips of aluminum tape to the side of the tank, then sticking the **MODA's** copper patches over them. Installation is completed by sticking the module itself to the tank then extending the its wires to the display.

This sensor is compatible with all of our RV and Marine display panels.

acu·gage

MONITOR SYSTEM

MODA &
AutoCal
Sensors

EXTERNAL FRESH
& WASTE TANK
SENSOR MODULES

*Congratulations
on your purchase!*

You have selected the best holding tank
monitor system available. With proper
installation you will enjoy years of
accurate and trouble free operation.

SNAKE RIVER
ELECTRONICS

You are a valued customer and we look forward to answering any questions you may have regarding the installation or operation of this system.
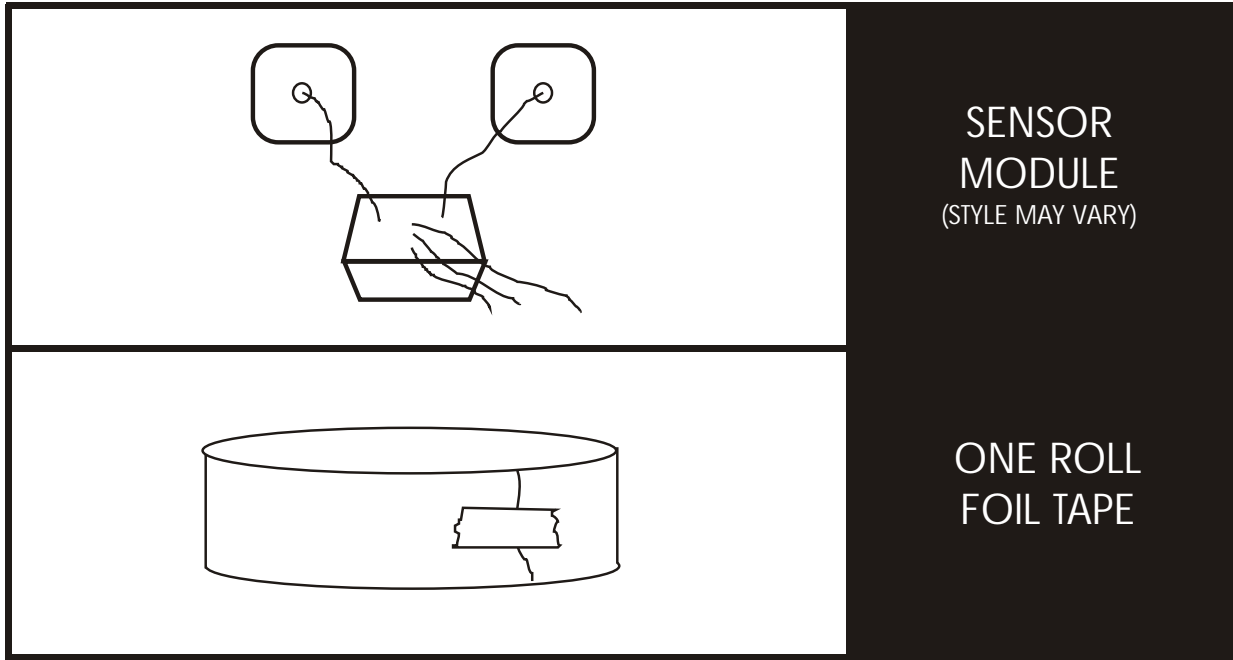
This manual covers installation, adjustment and usage of MODA and AutoCal external fresh and waste tank sensor modules.
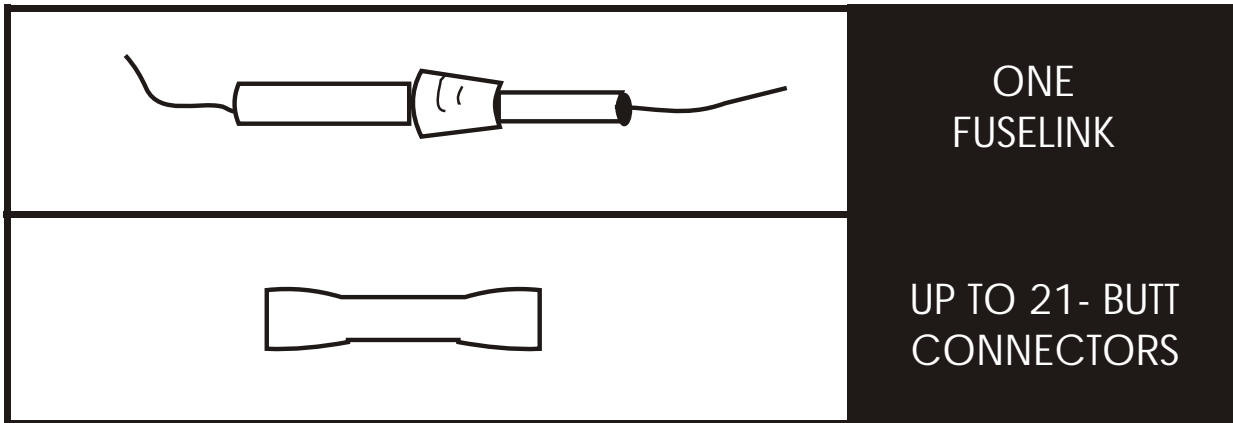
<u>TABLE OF CONTENTS</u>

INSTALLATION GUIDE

This kit includes a sensor module and aluminum foil tape:

**SENSOR
MODULE**
(STYLE MAY VARY)

**ONE ROLL
FOIL TAPE**

If you purchased your sensor kit as an aftermarket kit,
it may also include the following:

**ONE
FUSELINK**

**UP TO 21- BUTT
CONNECTORS**

YOU WILL NEED TO PROVIDE:
A. 18 Gauge Hookup Wire
B. Isopropyl alcohol

You will also need a display panel (sold separately) to display tank levels.

STEP ONE:
Location and Installation of Monitor Panel

Refer to owners manual for the display panel you have purchased for installation instructions for it.

STEP TWO:
Install Sensor(s) Onto The Tank(s)

This section covers the installation of external foil-stype sensors. If you have purchased sensors other than this style refer to installation instructions that came with them.

The tank sensors are comprised of two parts: The FOIL TAPE and the MODULE. Refer to Figure #1 on the following page and repeat the following steps for each tank:

(1) Descide where on the tank to apply the sensor foil. You should select a wall on the tank that allows sensing from the highest to deepest parts of the tank. IMPORTANT: The foil tape strips must be an inch or more away from large metal objects such as framework, metal siding, stored items, etc.
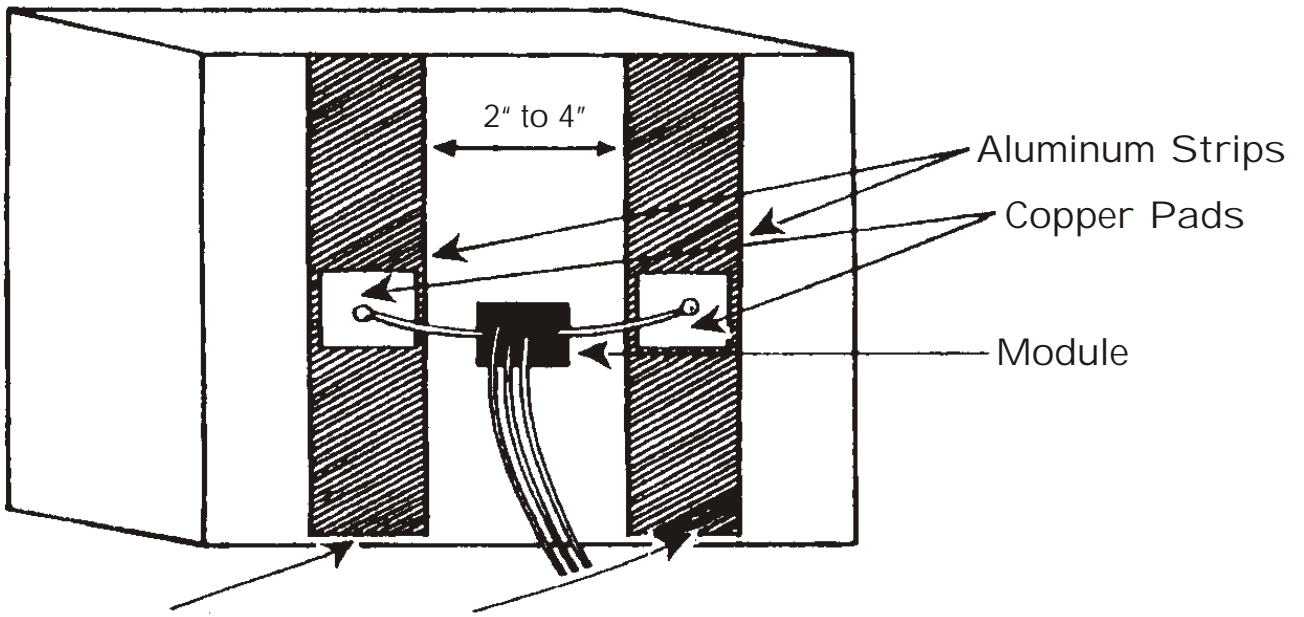
(2) Measure and cut to length two strips of foil tape. Each strip will run ½″ from the top of tank and ½″ from the bottom of tank (or to lowest realistic water level--see troubleshooting section for a discussion on this issue).   NOTE: Each strip of foil tape should be between 15 and 40 square inches (multiply the length times the width). It may be necessary to trim away or add to the tape width to stay within these parameters.

(3) If your tank is less than 8″ tall, you will need to add additional tape width to make the surface area of the sensor foil equal the above surface area recommendation. See Figure #2 on the following page for how to do this.

(4) Prepare the tank area where the foil tape is to be placed by rubbing down with common isopropyl alcohol. Remove the paper backing from the foil tape strips and place them onto the tank in the designated areas. Smooth out any trapped air bubbles. See Figure #1 on the following page for proper foil spacing.

(5) Remove the paper backing from the double sided tape on the back of the module and install it in between the 2 aluminum sensor foils as shown in Figure #1 on the following page. Next, remove the paper backing from the copper pads. Place a copper pad onto each of the two foil tape strips as shown in Figure #1. NOTE: The copper pads can be trimmed if they exceed the width of the foil tape; they can also be placed anywhere up or down the length of the tape.

(6) Lastly, apply a thin coating of 3M-Spray 77 or any non-conductive adhesive (make sure that any adhesive is compatible with your tank material) over the top surface area and edges of the exposed aluminum tape and copper pads; this protects the pads from catching on things and getting pulled up off of the tank. IMPORTANT: PROVIDE ADEQUATE VENTILATION WHEN APPLYING THE ADHESIVE, particularly if working in a confined area.

2" to 4"

Aluminum Strips

Copper Pads

Module

Aluminum Strips
1/2" from top and
bottom of tank or
lowest water level
desired.

FIGURE # 1

Foil Tape

Added Foil Tape

Do Not Glue Underneath
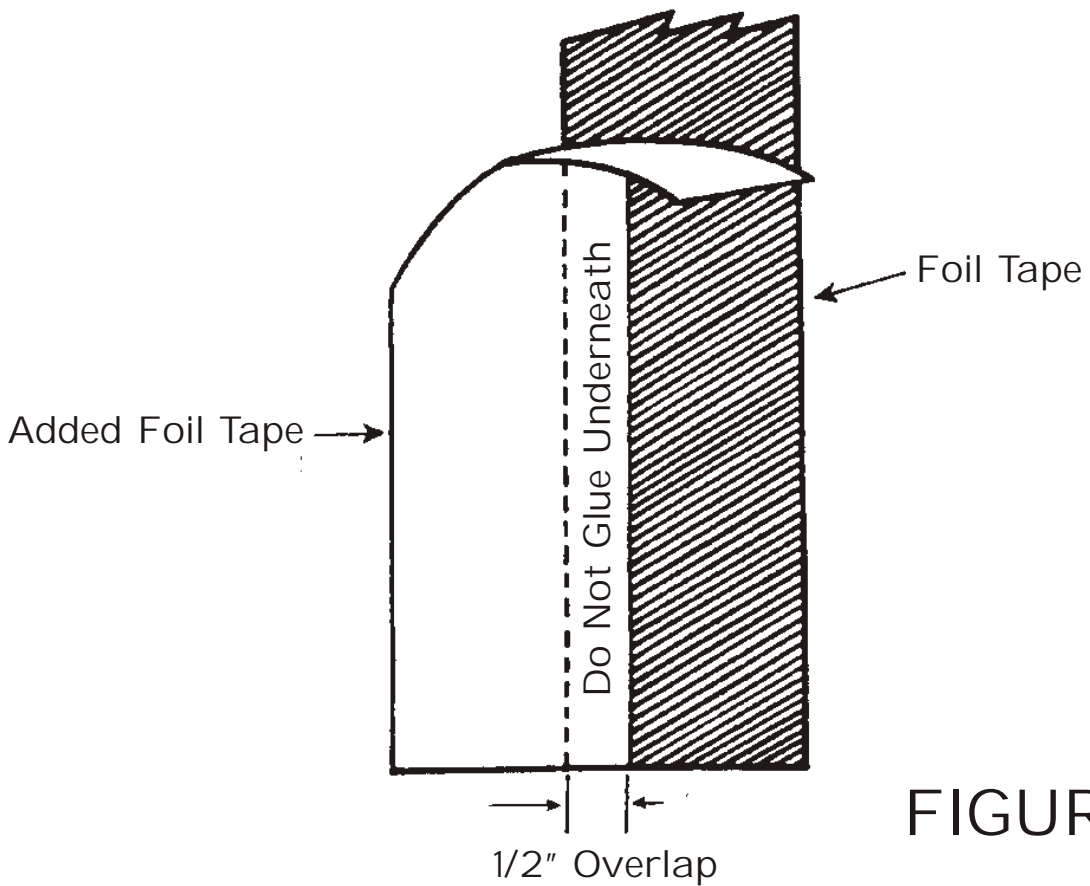
1/2" Overlap

FIGURE # 2

STEP THREE:
Wiring Installation

NOTE: READ CAREFULLY. DO NOT use staples or nails to secure wiring. Route wires so they do not interfere with storage areas and are away from potential sources of heat (oven, exhaust pipes, etc.). Due to the vast range of application possibilities it is not practical for us to include hookup wire in the kit. It is , however, commonly available and inexpensive. Use 18 gauge stranded wire and make certain you have enough to make all connections.

The hookup wire is used to make connections to a 12 volt D.C. power source and for connecting the panel to the tank sensor(s). After studying the wiring installation procedures, cut the hookup wires to required lengths, strip the insulation off all wire ends approximately 1/4" and use the supplied butt connectors to join wires between display panel pigtail and modules
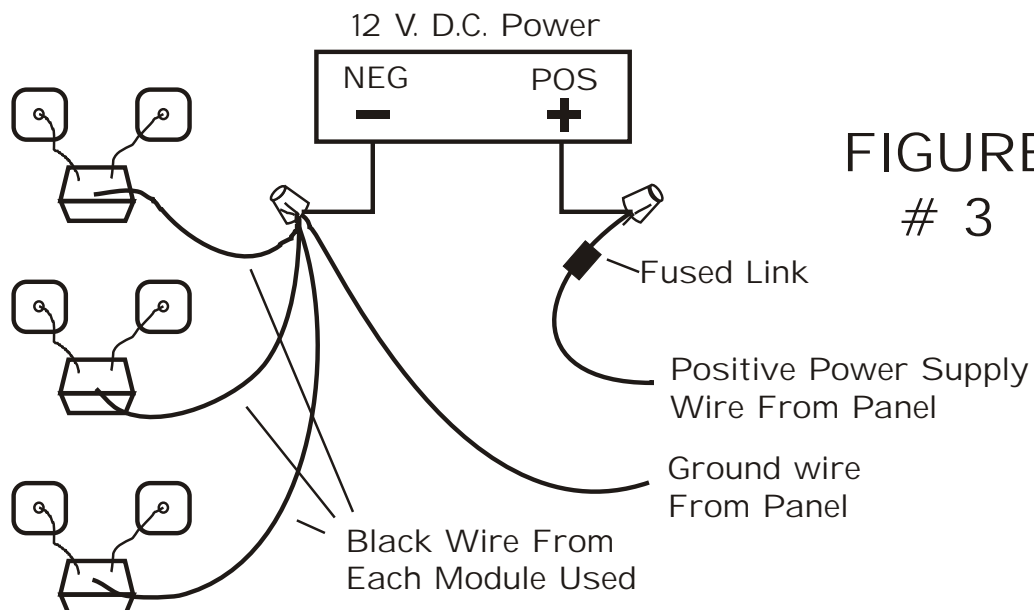.

Proceedure:

(1). Familiarize yourself with the wiring instructions found in your display panel owners manual. Much of the wiring instructions here in this manual are also in the display panel manual, but there might be additional wiring instructions you need to be aware of.

(2) Using instructions for your display panel, attach each sensor modules blue output wire to the appropriate display panel sensor input wire. Then attach each sensor modules red power wire to the appropriate display panel sensor power output wire (see manual for your display panel for input/output wire locations and colors.

(3) Refer to Figure #3 below for sensor module and display panel power connections. Finish system wiring by connecting the display panels power supply wire to 12 volt D.C. Positive, then wire the display panels ground wire together with all the black sensor module wires to 12 Volt D.C. Negative (see display panels manual for location and color of power supply and ground wires). If you are using more than one module, use the larger wire nut to accommodate the extra wires. NOTE: it is recommended that the power wires (red and black) be hooked to a battery voltage source. The O.5 amp fused link is wired in line on the red wire as shown in Figure #3.

If possible, avoid wiring to a convertor power source or to wires that power flourescent lights. This could result in electrical "noise" which may effect accurate panel readings.

12 V. D.C. Power

NEG   POS
—   +

FIGURE
3

Fused Link

Positive Power Supply
Wire From Panel

Ground wire
From Panel

Black Wire From
Each Module Used

CALIBRATION GUIDE

When installation of the system is complete, it is necessary to calibrate each tank.

Each Model of display panel calibrates differently. Refer to your display panels owners guide for instructions.

Note: Where appropriate, tank sensor modules should be calibrated prior to calibrating the display panel.

MODA modules cannot be calibrated at the tank. AutoCal modules require calibration at the tank (in addition to calibrating the display panel). The procedure for this calibrating AutoCal sensor modules is listed below:

(1) With the tank EMPTY and power OFF, attach the GREY wire to the BLACK wire (this indicates to the microprocessor in the sensor that the tank reading is to be recorded as empty).

(2) Apply power to the module. Note that the red light comes on indicating that the microprocessor has successfully recorded the empty condition of the tank. The voltmeter reading (if checked) out of the BLUE output wire should be zero volts (or reasonably close to zero volts).

(3) Turn power to the module off and disconnect the GREY and BLACK wires

(4) Fill the tank with fluid.

(5) Attach the WHITE wire to the BLACK wire (this indicates to the microprocessor in the sensor that the tank reading is to be recorded as full).

(6) Apply power to the module. Note that now the green light comes on indicating that the microprocessor has successfully recorded the full condition of the tank. The voltmeter reading (if checked) out of the output wire should now be 3 volts (or reasonably close to 3 volts).

(7) Turn power to the module off and disconnect the WHITE and BLACK wires. Note: all of the calibration wires (WHITE, GREY, and BLACK) are now to be left disconnected.

If you do not see the lights as described above, or if the output voltages for empty and full are not as listed above, contact Snake River Electronics Tech. Support for additional advice or instructions.

The AutoCal sensor module is now calibrated. Repeat the above for all Autocal modules on your system. Then calibrate your display panel (refer to its owners manual for specific instructions).

TROUBLESHOOTING

Factors affecting accuracy of readings and calibration:

Sensor modules and display panels should be calibrated with the vehicle as close to level as possible. Depending on where the sensor strips are located on the tank, the reading may be somewhat sensitive to the pitch of the vehicle (due to fluid sloshing either against or away from the sensor elements mounted to the tank wall). Keep this in mind when interpreting what otherwise might be considered a malfunctioning sensor or display.

Some tanks, particularly those mounted below the decks in boats, may be impossible to completely drain or may refill with a small amount of fluid after pumping out (due to fluid left in the drain plumbing, which may drain back into the tank). If you calibrated empty on such a tank when it was completely dry (as in a factory installation) it may read that there is some fluid in the tank even when pumped empty. If this is the case simply recalibrate the empty point after pumping out and allowing to "settle" to an actual "empty" level.

Note: 90 percent of Tech. support calls we take for malfunctioning sensors or display panels can be traced back to faulty wiring or bad wiring connections. Therefore a good place to begin trouble shooting is to check the integrity of wiring between the display panel and a troublesome tank. Check for continuity on each wire between the sensor and display (the power and signal return wires); include checking integrity of the butt connectors in this check. Check that there are no staples or screws through any wires. Finally, check that there is a good ground to each sensor module and that the display is properly grounded as well. Most system problems will be fixed by just making these checks. If you are still experiencing problems continue on.

AutoCal sensor modules should output approximately 0VDC (zero) for an empty tank and 3VDC for a full tank (after calibration procedure is followed). Do not be too concerned for readings that are not exactly 0VDC or 3VDC if they are close to these values it should be OK. If you have followed the calibration procedure and you do not see readings close to 0VDC and 3VDC for empty and full tanks then contact Snake River Electronics Tech. Support for additional advice.

Occasionally MODA sensor modules attached to one of our LED based display panels will show that an empty tank is 1/4 full (or more) even when it is empty. Check to be certain that the bottom of the foil sensor elements is 1/2″ above the lowest water line for an empty tank (in the case that not all fluid is drained out of the tank when "empty"). If the tape extends below the empty water line, cut a line through the foil at the desired line with a sharp knife then peel up the excess foil. If the MODA still outputs a 1/4 reading for an empty tank you can continue cutting off the bottom edge of the foil sensor strips in 1/4″ to 1/2″ increments, re-testing the tank after each adjustment.

Also re-check the total surface area of each sensor strip. Refer to the surface area guidelines on page 3 in step 1. If the surface area is too large cut the strips back a bit until they fall within the recommendations. If the surface area is too small, add tape as shown in Figure 2 on page 4.

Make sure that there is no wiring or metal objects in close proximity to the sensor foils. Adjust the location of such objects or wiring if possible, or if that is not possible, re-apply the sensor foils in a more appropriate location on the tank.

If the above do not correct your problems with your MODA sensor module, it may be necessary to replace it with an AutoCal module which can digitally compensate for many problems that the MODA module cannot. Contact Snake River Electronics Tech. Support for additional information.

LIMITED WARRANTY

Snake River Electronics warrants this product to be free from defects in material and workmanship under normal use for a period of one year from the date of purchase. This includes the replacement of parts and the labor involved to repair or replace the part.

This warranty is valid for the original retail purchaser and is NOT TRANSFERABLE. Keep original sales receipt and validate warranty by filling out and returning the enclosed warranty registration card. Proof of purchase is required to obtain warranty.

This warranty does not cover damages resulting from accident, misuse, abuse, improper installation, or lack of reasonable care. If the product was damaged in transit, file a claim with the carrier.

Snake River Electronics is not responsible for incidental or consequential damages resulting from installation or use of product.

Except as provided above, no warranty or affirmation of fact, expressed or implied, is made or authorized by Snake River Electronics, and Snake River Electronics' liability in all events is limited to the purchase price.

This warranty gives purchasers specific legal rights. Purchasers may also have rights which vary from state to state. Certain aspects of disclaimers are not applicable to consumer products; e.g. (A) Some states do not allow the exclusion of limitation of accidental or consequential damages, so the above limitation or exclusion may not apply to you, (B) Also, some states do not allow the exclusion or limitations on how long an implied warranty lasts, consequently the above limitation may not apply to you; and copyright by law, during the period of this warranty, any implied warranties or merchantability of fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

PROMPT DISPOSITION: Snake River Electronics will make a good faith effort for prompt correction or other adjustments with respect to any Acugage Monitor System which proves to be defective within warranty.

WARRANTY PROCEDURE: Should you discover a defect in the Acugage Monitor System during the warranty period, YOU MUST FIRST CONTACT SNAKE RIVER ELECTRONICS AT 208-233-7290. At our discretion we will request the part be sent to us or we may direct you to the nearest authorized service center for repair. Parts returned to Snake River Electronics must be postage paid, and include check or money order for $7.00 to cover the cost of return shipping and handling. RETURN TO: Snake River Electronics, 1850 North Arthur Pocatello, ID 83204.