

# GECKOTEC SYSTEMS - - SHIELDED SYSTEM

## Technical Help Manual

### Introduction

The shielded tank level monitoring system is a capacitance type continuous level detector used to measure the contents of the fresh water and holding tanks. It uses two metallic pads consisting of aluminum foil tape strips that are cemented to the outside vertical surface the tank wall. These two pads are mounted approximately two inches apart and extend from the empty water line of the tank to the full water line. Each of the two pads should have at least 65 square inches of area and at most 70 square inches of area.

On the two aluminum pads a copper pad with a wire soldered to it is attached. The purpose of the copper pads is simply to allow a reliable wire connection to be made to the aluminum sensor pads, (never attempt to solder wires directly to aluminum foil as the solder joint will corrode and the wires will fall off in about one week). The copper pads do not have to make a direct electrical connection to the aluminum foil, they make a *capacitive* connection instead.

The two aluminum foil pads on the tank walls effectively form the plates of a capacitor. An electronic AC signal is transmitted across the pads and as the water level rises in the tank, the electronic signal increases. This AC signal is sent back to the monitor panel where lights are turned on to indicate the level of water in the tank.

### Tank Measurement

To measure the level of a tank, simply push the button on the display panel corresponding to the tank you wish to measure. The lights on the panel will turn on in sequence, indicating the level of the tank.

### Calibration

The first thing to check in this system is the calibration of the tanks. First fill the suspected tank with water. If the reading goes to full before the tank is full or the tank fills completely and the reading never reaches full, the calibration is off. The procedure for re-calibration is simple, first fill the tank. Second, using an adjustment tool (this is supplied with the vehicle attached to the warranty/operating instruction card), simultaneously push the button for that tank and rotate the adjustment located above the button and behind the face plate counter-clockwise until some (but not all) of the lights turn off in sequence. Then slowly rotate the adjustment clockwise until the full light is completely on. Repeat this procedure as necessary for the remaining tanks. The system is now calibrated properly.

## Why We use Shielded Cable

Because a high frequency signal is being used to measure the capacitance of the water tank sensor, a shielded cable is used to keep the transmit (red side of the cable) and the receive (white side of the cable) from talking between cable sides. If this is not done, the transmit signal will make a U-turn as soon as it leaves the monitor panel circuit board and return straight back to the monitor panel. This condition is called cross talk and will make it impossible for the system to track the water level because the sensing signal never reaches the capacitive sensor. Any shielded panel which will calibrate but will not follow the water level in the tank probably has this problem. The Shielding is performed by two drain (shield) wires which are spiral wrapped around the two insulated center conductors and then all of this is foil wrapped. The drain wires are grounded through the circuit board which is what provides the shielding action. It should be noted that the drain wires are never hooked to the aluminum sensor pad connections, as this will short out the AC signal to ground, causing all the tanks to read empty all the time.

## Trouble Shooting a Malfunctioning System

If after calibration the system is still found to be malfunctioning, the following list of common symptoms and causes can be helpful in finding the problem. They are listed so that the most probable cause is listed first:

### **When the tank is full:**

#### **Panel reads empty.**

##### **Possible causes:**

- 1. Shield wires connected to sensor pads.**
- 2. Aluminum foil sensor pads shorted to ground.**
- 3. Open shielded tank cable center conductor.**
- 4. Shielded tank cable has short between center conductor and shield wire internally in cable.**
- 5. Bad panel.**

### **Will not adjust up to full.**

##### **Possible causes:**

- 1. Foil pads not large enough (minimum 65 sq. in. per pad, two pads per tank).**
- 2. Foil pads too far apart (maximum 4 in. apart).**
- 3. Partially open shielded tank cable.**
- 4. Tank cable run is too long.**
- 5. Bad panel.**

**Will not adjust down from full.**

**Possible causes:**

1. Open shield wire inside of tank cable.
2. Aluminum pads are too large.
3. Aluminum sensor pads are shorted together.
4. Tank cable center conductors are shorted together.
5. Bad panel.

**Some of the lights stay off out of sequence.**

**Possible causes:**

1. Bad Panel.

**When the tank is empty:**

**All of the lights stay on.**

**Possible causes:**

1. Tank cable center wires shorted together.
2. Open tank cable shield open (cross-talk).
3. Foil sensors touching or too close together (minimum 2" separation).
4. Bad Panel.

**Some of the lights stay on.**

**Possible causes:**

1. Aluminum sensor pad not cut 1/4 inch above bottom of the tank (1/4 light stays on).
2. Tank not empty.
3. Foil sensors too close together, or too large.
4. Bad panel.

**Some of the lights stay on out of sequence.**

**Possible causes:**

1. Bad Panel.

**When tanks are full or empty.**

**Lights do not turn on when button is pushed.**

**Possible cause:**

1. No power to panel.
2. Bad panel.
3. Calibration potentiometer broken by using wrong adjustment tool.

**Lights stay on when buttons are not pushed.**

**Possible causes:**

1. Panel face plate warped due to incorrect mounting.
2. Bad panel.

**Empty light stays on all the time.**

**Possible causes:**

1. Red center conductor on tank cables is shorted to ground through it's shield wire. This cause all water tanks to also read empty all the time.
2. Bad Panel.

The causes listed above constitute the vast majority of problems occurring with our system. However, should any problems occur that cannot be solved using this manual, you may call our service department for additional help. Our toll free number is **1-800-456-4498** or **1-800-50-GECKO**

# Shielded Tank Sensor Installation Instructions

## Applying Aluminum Sensor Pads

1. Measure the tank height and use the formula below to obtain the width of both aluminum foil sensor pads. After calculations, round the answer to the nearest whole number to obtain the actual tank sensor pad width.

$$\text{Pad Width} = (65 / \text{Tank Height})$$

2. Clean the tank with an approved tank cleaner recommended by the tank manufacture to assure a good bond between the tank wall and the pad surface.

3. Layout the two pad areas on the tank wall with a marker. This will serve as a guide for applying the pad adhesive. Make sure there is a gap of 2 to 4 inches between the two tank pads.

4. Apply 3M "Scotch Grip" #4693 polyethelyne adhesive inside the areas outlined in step 3 and let it dry for 1 minute or until glue gets tacky. **DO NOT USE THIS ADHESIVE ON ABS OR FIBERGLASS TANKS.**

5. Peel the paper backing from the aluminum foil tape, position the tape strips and squeegee them with a plastic scraper to remove any air bubbles. If more than one strip of aluminum foil tape is needed to obtain the required pad width, overlap each strip 1/4 inch without gluing the overlap joints.

6. Repeat step 5 for the second aluminum foil sensor pad.

## Applying the Copper Pads

7. Peel the paper backing from each copper pad and apply one to each aluminum foil pad. Burnish these copper pads with a plastic scraper to ensure a secure fit. The copper pads have wires attached to them, which are butt spliced to the red and white center wires of the tank cables. **THE SHIELDS ARE TO BE TAPED BACK AND NOT HOOKED UP TO THE SENSOR PADS. TO DO SO WILL CAUSE ALL THE TANKS TO READ EMPTY BECAUSE THE SIGNAL WILL BE GROUNDED.**

THREE WIRE SYSTEM

FIG. 4

Rochester 90  
ohm sending  
unit

Red Wire  
(LPG)

Black Wire (Negative)

Purple Wire (Positive)

Monitor  
Panel

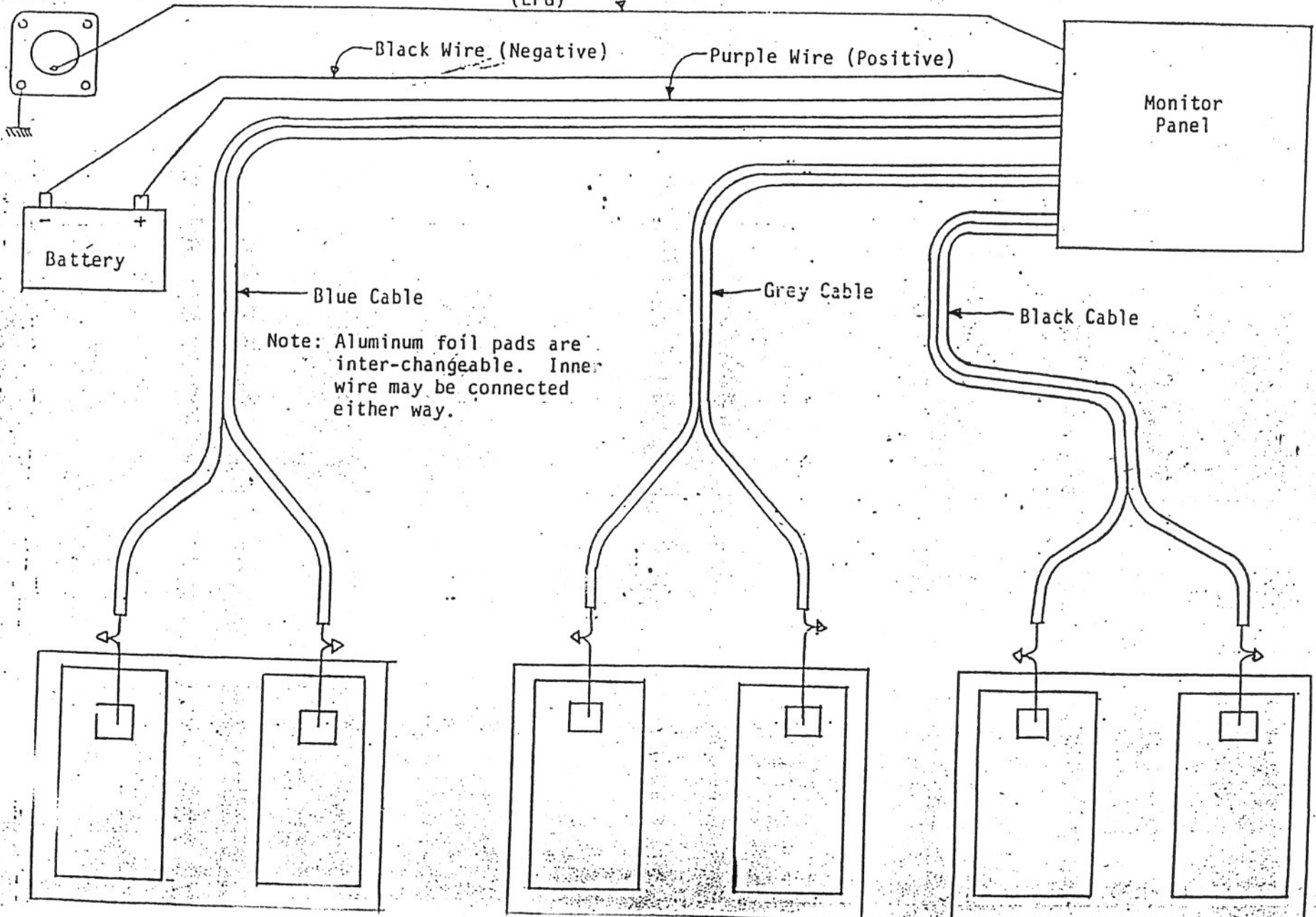
Battery

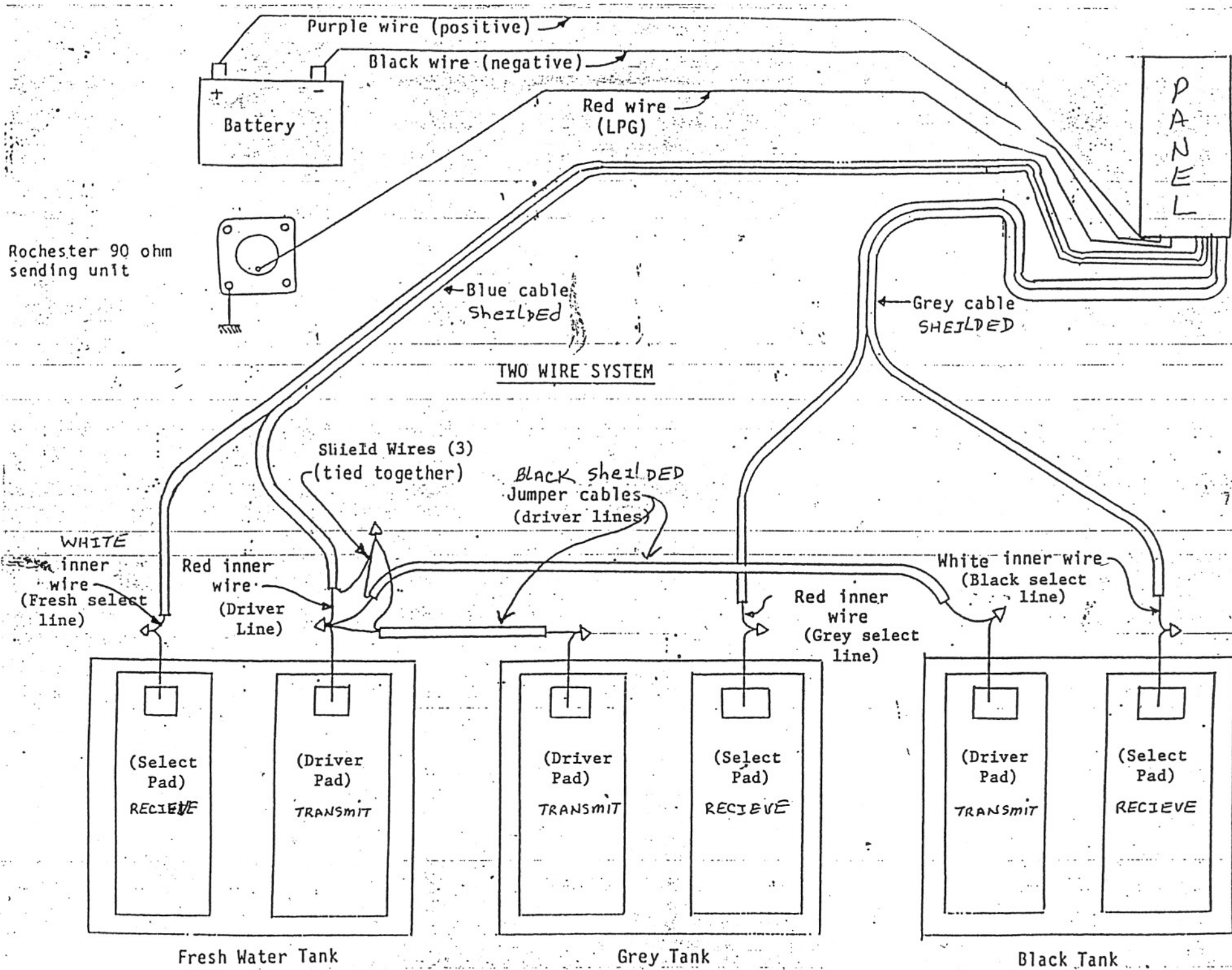
Blue Cable

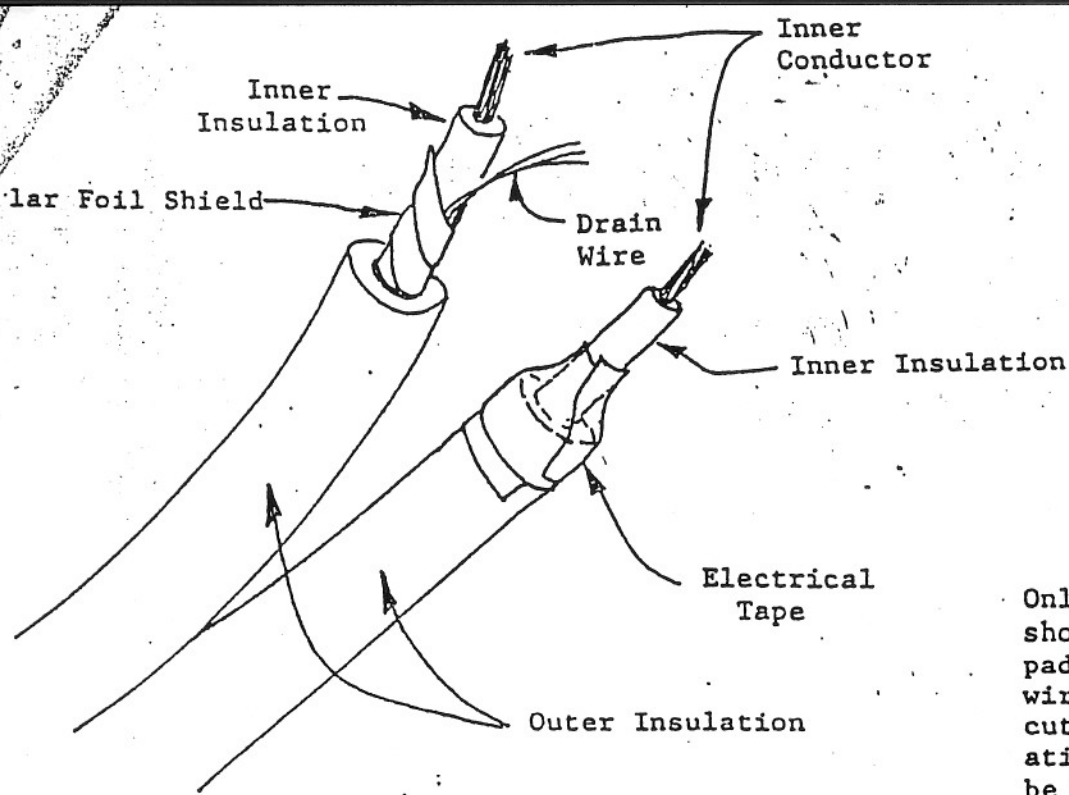
Gray Cable

Black Cable

Note: Aluminum foil pads are  
inter-changeable. Inner  
wire may be connected  
either way.







CAUTION

Only the inner conductor should connect to the copper pad. Be sure that the drain wire and shield are both cut back to the outer insulation. Electrical tape should be wrapped at this point to make sure the shield and drain wire do not touch anything.

FIG. 2  
CABLE  
CONSTRUCTION

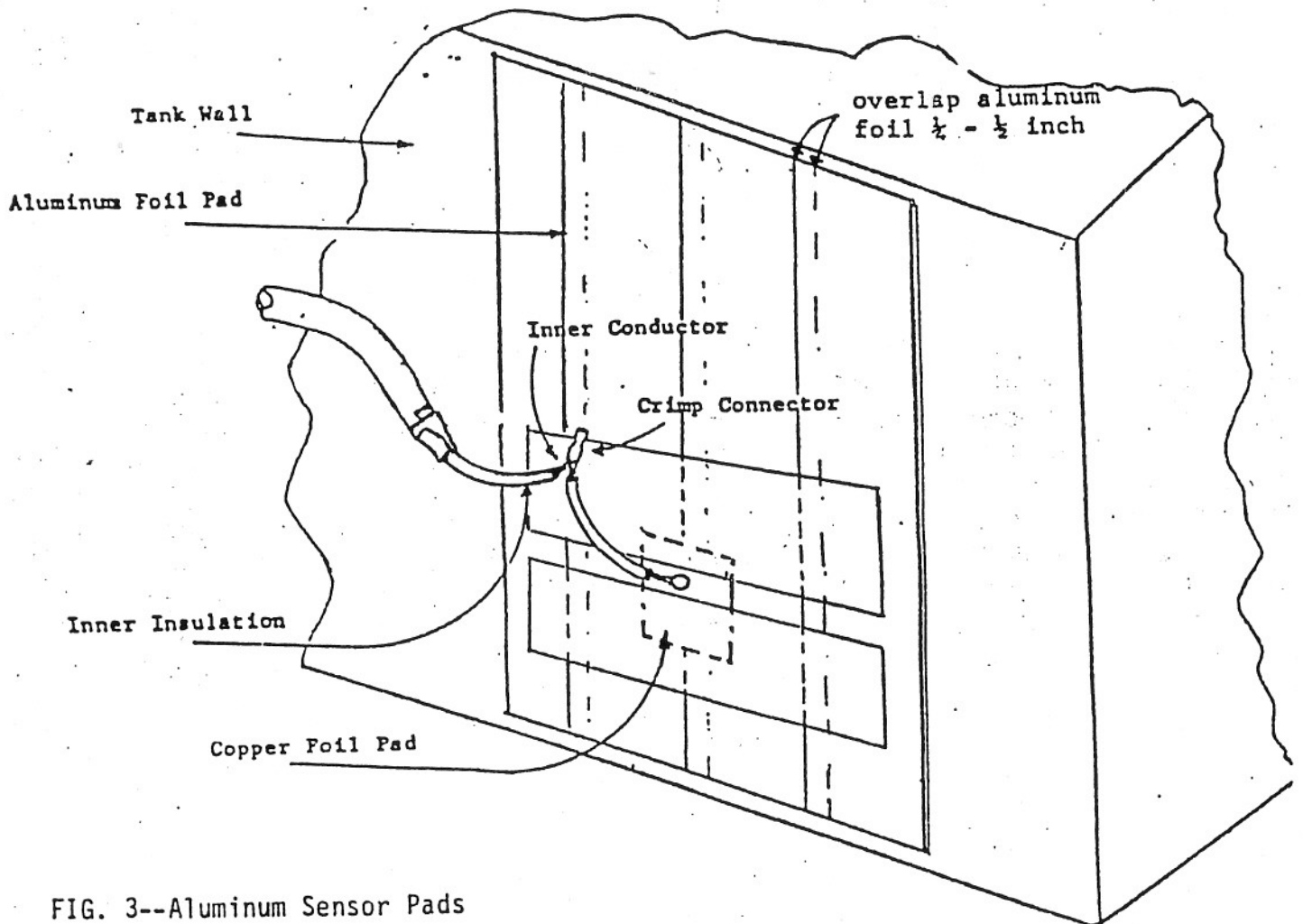


FIG. 3--Aluminum Sensor Pads