

# Instruction Manual

## SR-1600 Fish Counter

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# Model SR-1600 Electronic Fish Counter

## General Description

The Model SR-1600 Fish Counter features a balanced resistance bridge circuit using the tunnel elements to count fish in fresh water. Electronic counters simultaneously monitor all 16 tubes for downstream fish movements giving a "real time" readout for each tube showing count distribution. The counting heads are interchangeable and are available with tube diameters ranging from 1/2 to 3 inches.

## Principle of Operation

Operation of the SR-1600 Counter is based on the "Balanced Resistance Bridge Principle" using water in the count head as two elements of a four element Balanced Bridge. Passage of a fish through one of the tubes of the count head causes corresponding changes in that tube's conductance. These conductance changes are used by the SR-1600 to sense the presence of fish in the tubes of the counting head.

## Advanced Features

The SR-1600 employs numerous advanced features providing such functions as automatic balance which compensates for slow changes in water conductivity, ambient temperature, and marine growth. This makes possible truly "set it and forget it" unattended counting operations. Other new features of the SR-1600 include the ability to simultaneously monitor 16 different tunnels giving real time distribution of counts. The counts are displayed on liquid crystal displays (LCDs) which provide easy readability even in direct sunlight. The count is retained by internal batteries for up to 5 years if power to the fish counter is lost. Also included is a wide-range sensitivity control which provides the ability to set the size of the smallest fish that will be counted.

## **Water Conditions**

The counter is designed to work in fresh water with a conductivity of 10 to 500 micromhos. The 16 tube counting head must be completely submerged in fresh water and an appropriate water head developed to overcome the swimming ability of the fish to be counted. The fish are then crowded into the vicinity of the tube entrances where they are pulled through and counted. A 16 hole tapered overlay is supplied with each count head to provide a smooth entrance into each tube to prevent abrasive damage to the fish. With proper tube size and water flow, count accuracy is better than 98%.

## **Counting Head**

The SR-16-CH Counting Head is a single unit containing 16 separate counting tubes. Each tube in the counting head has a smooth tapered entrance to prevent abrasive damage to the fish. The tubes may have diameters ranging from 1/2 to 3 inches. Tubes are usually arranged in two rows of 8 tubes each. For the best accuracy, tube diameter should be no more than half the length of the fish to be counted.

## **Power Requirements**

The Model SR-1600 can be powered from 115VAC, 60 Hz or from a 12 volt internal battery. Battery life varies from 15 to 30 days depending on water conductivity. A low battery indicator is provided to determine proper time for battery change. An internal battery backup is provided to preserve count data during power failure and while changing the main battery.

## **Mechanical Construction**

The counter and sealed battery are housed in a weather-proof aluminum case for protection from the elements. The case measures 12.6 inches wide x 6.0 inches deep x 4.5 inches high. A water-tight plug provides a quick change connection for the submersible counting heads. Each head is supplied with 15 feet of cable and mating connector.

## **Connectors & Plugs**

All signals to and from the SR-1600 are made through a single multi-pin quick twist positive locking polarized connector. This insures easy and positive connections.

## Description of Controls & Indicators

Power Switch - Controls the DC power to operate the fish counter electronics. The DC may be supplied from the internal battery, from an external 12 volt DC source, or from the internal AC powered DC supply. This switch does not control the AC power to the battery charger circuit.

Battery Test Switch & Indicator - Press and hold the switch for 30 seconds. If the indicator stays green during this time, the battery is OK. If the indicator turns red or stays red during this time, the battery needs to be recharged. The internal battery will run the fish counter for 15 to 30 days, depending on water conductivity.

Sensitivity - The sensitivity control allows the user to set the size of the smallest fish that the fish counter will sense. Turning the control clockwise allows smaller fish to be detected.

Count Switch - When in the OFF position, all inputs to the counter are disabled. This prevents the accumulation of any erroneous counts while moving the count head from rearing pond to rearing pond. For normal operation, the switch should be in the COUNT position.

AC Power Connector & Indicator - Indicator lamp lights whenever the fish counter is connected to 120VAC, 60 Hz outlet.

Count Test - The switch is used to test the general functioning of the SR-1600. With the Power and Count switches ON and a count head connected, pressing this switch causes a single count to be registered on each display.

Count Reset - Resets all the displays to zero.

Count Displays - The SR-1600 has 16 individual displays, one for each counter tube. They are 6-digit LCD displays which means they can be read even in direct sunlight. The 16 displays give a real time distribution of counts for each tube in the count head.

## Operation

1. Submerge the count head in water making sure that all of the tubes are completely filled with water. Connect the count head to the SR-1600 Fish Counter.
2. Press the Battery Test switch and check the condition of the battery.
3. Turn the Power Switch ON. It is normal for one or two counts to appear on the displays when the power switch is turned on and off.
4. Turn the Count Switch ON.
5. Allow a few fish to pass through the count head and adjust the sensitivity control clockwise until the counter reliably counts fish as they pass through the tubes. Turn the sensitivity control up one more mark.
6. Count accuracy may be checked by hand counting the fish that are passed through the count head. When you are satisfied that the sensitivity control is set correctly, reset the displays and begin counting fish.

**Note:** The water flow through the count head can have a dramatic affect on accuracy of the fish counter. The hydraulics must be such that the fish cannot resist the pull of the water as it passes through the tubes. Tube size is also important and must be such that only one fish at a time can pass through a particular tube. Fish may go through different tubes at the same time without any error occurring. Air bubbles and debris passing through the tubes must also be kept to a minimum. With proper tube size and water flow, count accuracy is better than 98%. Cable runs greater than 50 feet should be made in conduit.

## **In Case of Difficulty**

### **Counter will not count:**

1. Power Switch turned OFF.
2. Count Switch turned OFF.
3. Sensitivity Control set too low.
4. Battery dead or installed upside down.
5. Count head not connected to fish counter.

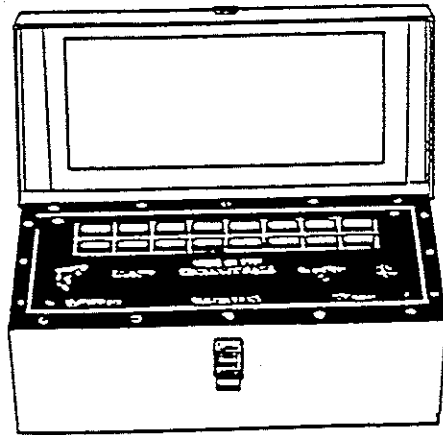
### **Counter not accurate:**

1. Battery low - check.
2. Sensitivity Control set too low.
3. Air bubbles accumulating in count head tubes.
4. Debris passing through tubes.
5. Attempting to count fish that are too small for the tube size. More than one fish at a time passing through tubes.
6. Insufficient draw through tubes. Fish able to resist going through tubes, or fish re-entering tubes after passing through. Increase the depth of the water on the upstream side of the count head. Be careful not to increase too much or fish may be damaged.

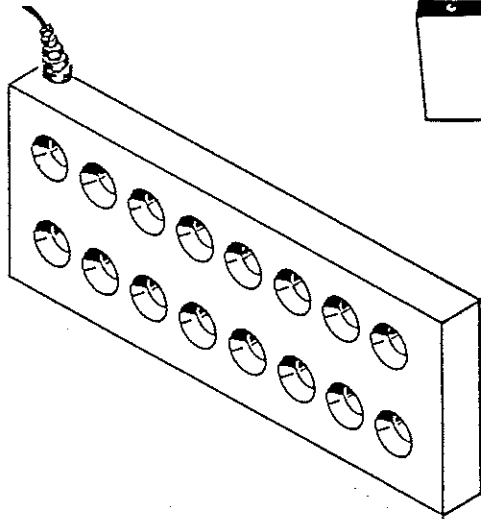
## **SR-1600 Specifications**

<b>Count Rate</b> .....	20 counts/second/tube(max).
<b>Count Capacity/Channel</b> .....	999,999 (6 digit).
<b>Count Sensitivity (max.)</b> .....	5% tube unbalance.
<b>Power Requirements</b> .....	120VAC 60 Hz or 12VDC.
<b>Battery Life</b> .....	15 to 30 days depending on water conductivity.
<b>Size</b> .....	13 7/8"L x 6 3/8" W x 7 1/2"H.
<b>Weight</b> .....	19 pounds, including battery.

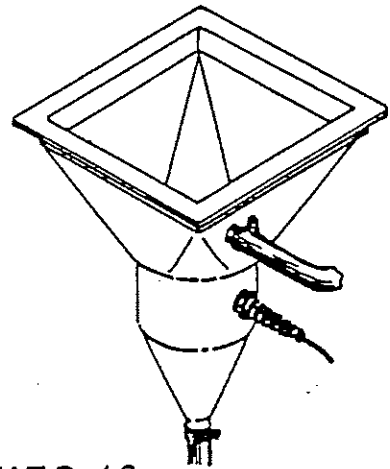
**Specifications subject to change without notice**



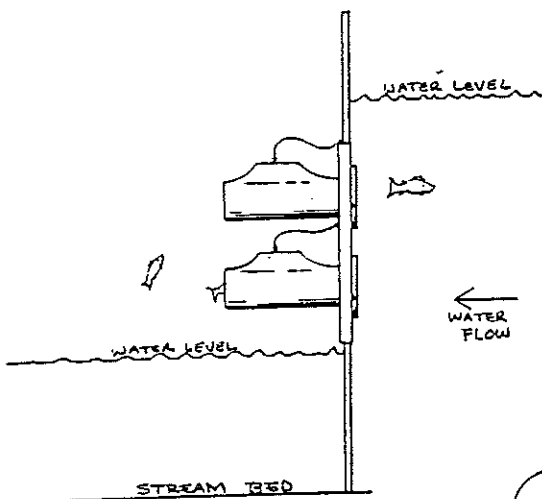
Model SR-1600  
Fish Counter



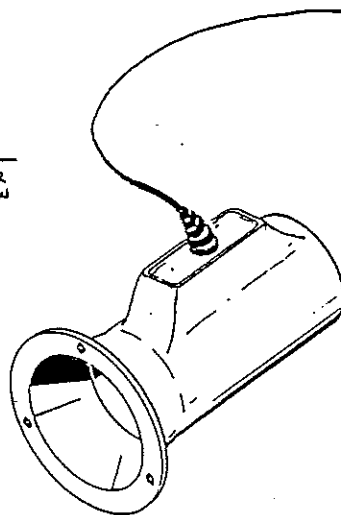
FCH-16  
Fry Counting Head



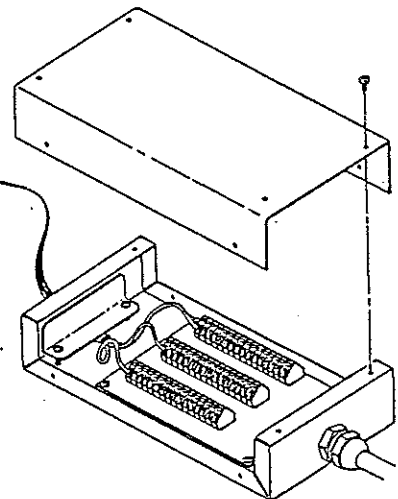
HEC-16  
Hatchery Egg Counter



TMP-16  
Tube Mounting Plate



SCT-3  
Smolt Counting Tube(3")

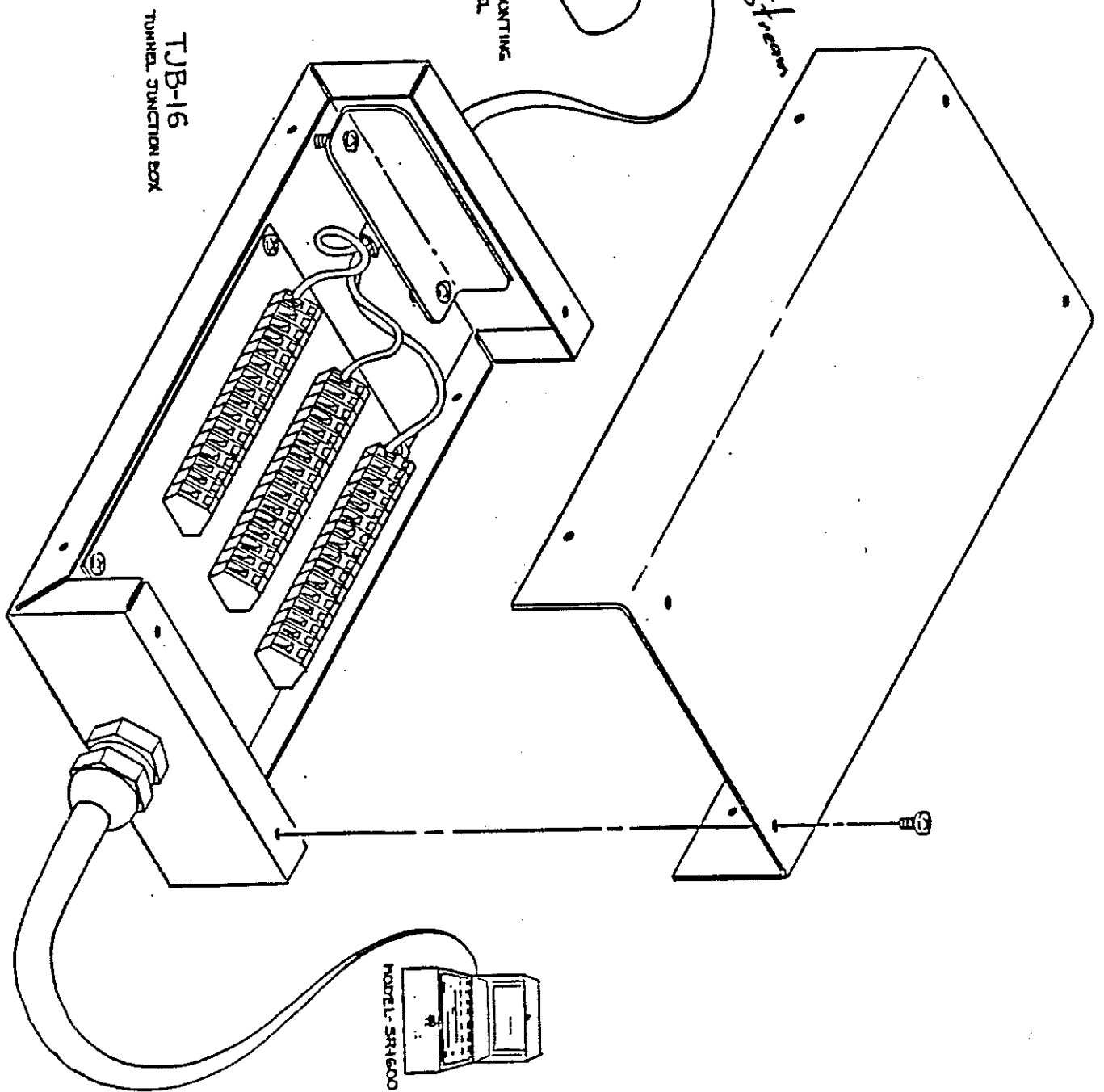
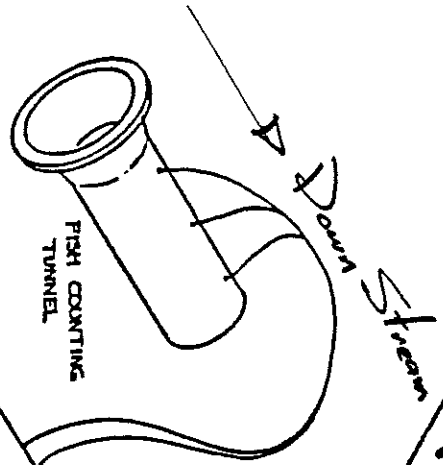
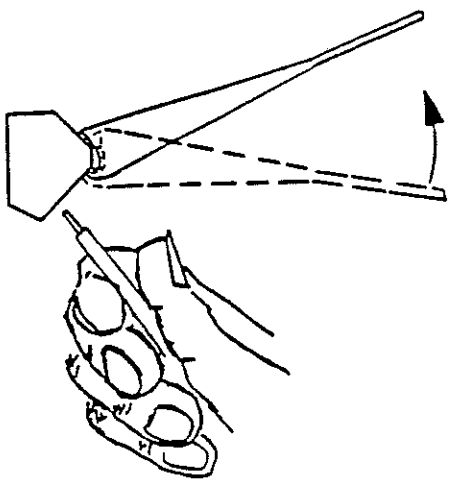


TTB-16  
Tube Terminating Box



WIRE COLOR

- Connect Red to Downstream TS
- Connect Black to Upstream TS
- Connect Green & White to Center TS



TJB-16  
TUNNEL JUNCTION BOX

MODEL SR4600