USER'S GUIDE
1101 FISH COUNTER

SMITH-ROOT

07298.02 1101 Manual

CONTENTS

Items manufactured by companies other than Smith-Root carry the original manufacturer's warranty. Please contact product manufacturer for return instructions.

All Smith-Root, Inc. manufactured products are covered by a one year warranty.

Credit & Refund Policy: Customers returning equipment, in new condition, will be given credit five days from the date of the return. A return authorization must accompany returns. Valid equipment returns include, but are not limited to, ordering incorrect equipment, funding deficits, and defective equipment returned for reimbursement. All returns are subject to a restocking fee and applicable shipping charges. The restocking fee is figured at 10% of the purchase price but not less than $20.00. Customers receiving equipment in damaged condition will be referred to the shipping company for insurance reimbursement.

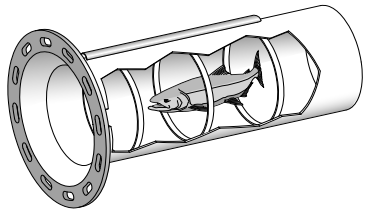
GENERAL DESCRIPTION

The 1101 Electronic Fish Counting System provides a state-of-the-art counting system designed to simultaneously monitor both upstream and downstream fish movements.

Completed fish passages are tallied on a pair of 6 digit LCD front panel displays. The Model 1101 is designed for simplicity of operation and ease of installation. This unit is provided with a rugged weather-proof case for protection from the elements.

PRINCIPLE OF OPERATION

Operation of the 1101 Counter is based on the Balanced Conductivity Bridge Principle, using water in a fish tunnel as two elements of a four element Balanced Bridge.



Passage of a fish through the tunnel causes corresponding changes in tunnel conductance. These conductance changes are used by the 1100 to sense the presence and directional movements of fish in the tunnel.

ADVANCED FEATURES

The counter 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 1101 include the ability to output fish directional information for a data logger or computer monitoring. The counts of completed fish passage are displayed on liquid crystal displays which provide easy readability even in direct sunlight. The count is retained 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 model 1101 is designed to work in fresh water within a conductivity range of 10 to 500 microsiemens.

The sensing tunnel must be completely filled with water. The water flow through the tunnel should be swift enough that the fish will not mill around and will complete their passage through the tunnel. The water also should be relatively free of air bubbles and debris. Water turbidity is not usually a factor to count accuracy; however, it may be useful to observe fish behavior within the sensing tunnel.

With the proper selection of the tube diameter to fish size and with sufficient waterflow, count accuracy is better than 98%.

COUNTING TUNNELS

The 1101 Fish Counter can be used with a wide variety of tunnel sizes and shapes. All counting tunnels are interchangeable and are supplied with 25 feet of cable. Additional cable lengths are available. Standard round tunnels are fabricated from PVC, ABS, or fiberglass, and they are available in diameters ranging from 1 to 24 inches. Various other square, round, and rectangular shapes are custom fabricated to meet special requirements as needed. Please consult the factory for further details.

POWER REQUIREMENTS

The Model 1101 is versatile. It can be powered either from 115/230 VAC, 50/60 Hz or from external 12 volts DC or from optional internal 12 volt rechargeable battery. The internal battery will provide 3.5 to 7 days of operation depending on water conductivity. When the counter is powered from AC, the optional battery is kept fully charged. An indicator automatically flashes when the battery condition is low. Battery recharge time is about 12 hours.

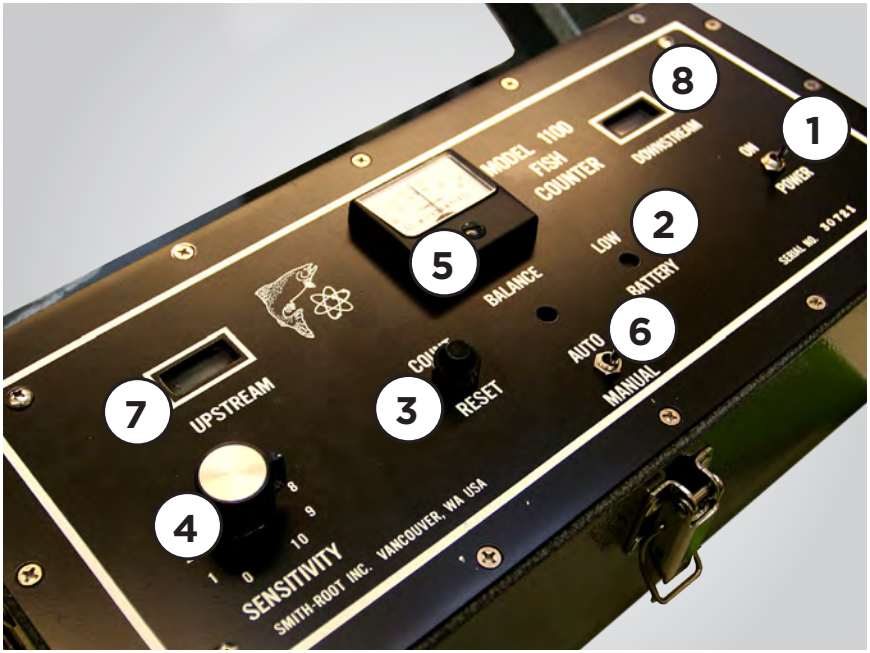
MECHANICAL CONSTRUCTION

Designed for outdoor environments, the 1101 enclosure is rain-tight and features rugged. 0.06" thick all-welded aluminum construction. The top cover is provided with a see-through window which allows observation of count read-out while still maintaining water-tight integrity. The case measures 12.6" wide X 6.0" deep X 4.5 inches high and is powder-coat painted.

OUTPUT CONNECTORS AND PLUGS

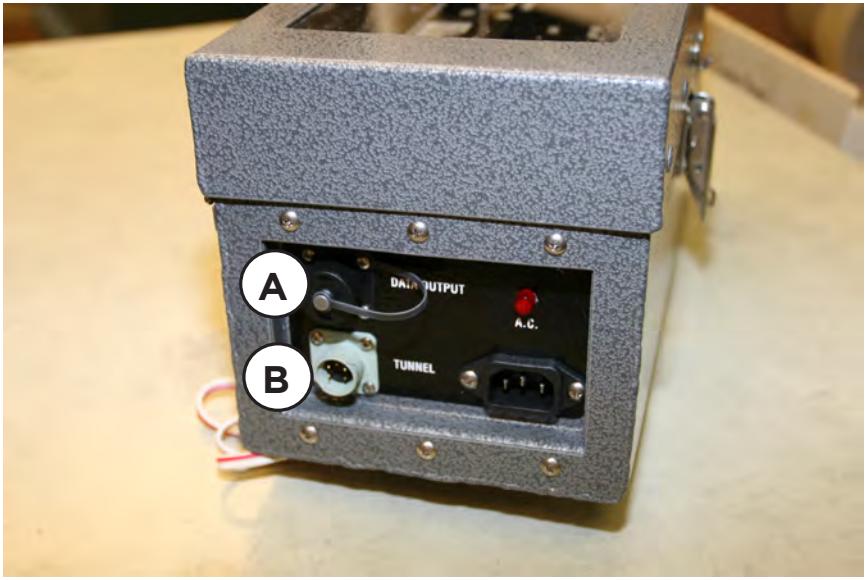
Outputs provided from the 1101 Counter may be used to drive remote counters. The 1101 also features quick-twist positive locking type polarized connectors to insure easy and positive connections.

DESCRIPTION OF CONTROLS AND INDICATORS



1. **Power Switch:** Controls the DC power to operate the fish counter electronics. The DC may be supplied from an internal battery, from an external 12 volt DC source, or from the internal AC powered DC supply. It does not control the AC power to the battery charger unit.
2. **Low Battery indicator:** The Low Battery LED indicator flashes when the optional internal battery needs to be recharged or when the external 12 volt source is too low. There is about 12 hours of operation left on the internal battery once the indicator begins flashing.
3. **Count Reset:** The Count Reset push button resets both the Upstream and Downstream LCD displays to zero.
4. **Sensitivity Control:** The front panel sensitivity control adjusts the system gain. A setting of 10 equals 100%, 5 equals 50%, etc.

5. **Balance Meter and Control:** The center scale meter indicates the balance condition of conductivity within the fish tunnel. Normally the meter sets in the center, but when fish are in the tunnel the meter deflects left or right depending on which end of the tunnel the fish are in. The Balance Control, (Below the meter and behind the front Panel) is used to compensate for slight differences between counting tunnels.
6. **Auto/Manual:** This switch turns the auto-balance circuits on and off. This switch must be in the manual position to align the fish counter.
7. **(& 8.) Upstream and Downstream Registers:** These registers indicate the total number of completed upstream and downstream fish passages through the counting tunnel.



9. **Plug and Connectors: Data output Plug (A)**- provides logic output pulses as fish pass through the tunnel. **Tunnel Plug (B)**- Provides all signals to and from the counting tunnel.

ALIGNMENT PROCEDURE

1. Fill the counting tunnel with water. Connect the counting tunnel plug to the 1101 Fish Counter.
2. Make sure the AUTO/MANUAL switch is in the MANUAL position, then turn the power switch ON.
3. If any counts are present on the LCD displays, press the COUNT RESET.
4. Preset the SENSITIVITY Control to 50% or 5 on the scale. The BALANCE meter should be reading near zero (Note: the tunnel must be completely full of water with no air bubbles, debris, or fish in it during this step). If the meter does not indicate zero, carefully adjust the BALANCE control with a small screwdriver until the meter reads zero. Increase the SENSITIVITY to 100% and readjust the balance control if necessary.
5. Put the AUTO/MANUAL switch in the AUTO position. The balance meter will deflect off scale but will move back to 0 in 2 minutes. The counter will now automatically compensate for slow changes in tunnel conditions.
6. Starting at the lowest setting, adjust the SENSITIVITY control clockwise until the 1101 counts the smallest fish expected, then turn the knob one division more. Count accuracy can be checked by hand-counting the fish in each direction.

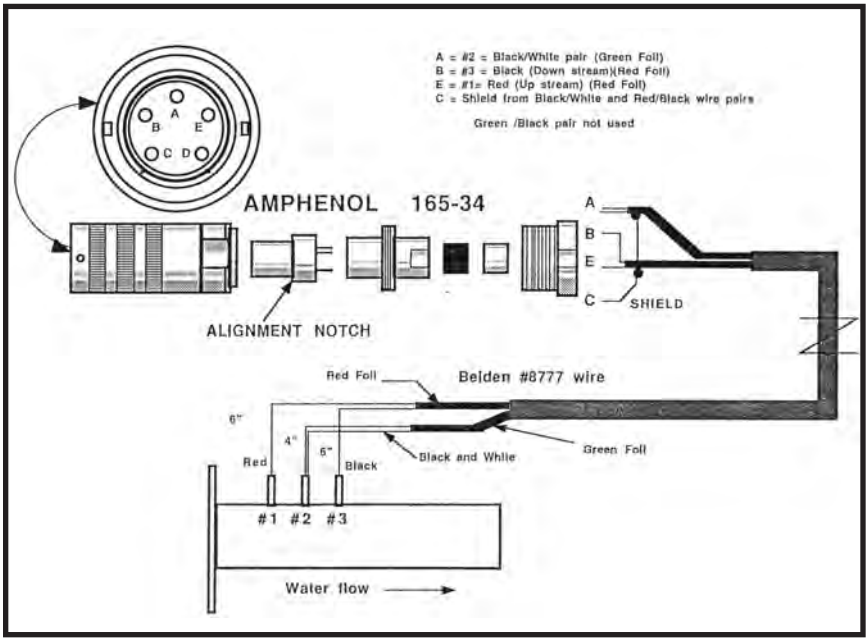
NOTE: The water flow through the tunnel can have a dramatic effect on the accuracy of the fish counter. The hydraulics must be such that the fish will not lie resting in the tunnel. Air bubbles and debris passing through the tunnel must be kept to a minimum, if accurate counts are to be obtained.

Cable runs between the fish counter tunnel and the 1101 which are longer than 50 feet should be run through metal conduit, especially if the counting system is located at a power dam or under high tension power lines.

SPECIFICATIONS

Count Rate:	20 counts per second
Count Capacity Per Channel:	999,999 (6 digit)
Count Sensitivity (Maximum):	1% Tunnel Unbalance
Data Output:	Positive logic: 1= +12 volts
Power Requirements:	115/230 VAC, 50/60 Hz or 12 Volt
Battery Life (Internal Battery):	7 Days (Approx.)
Dimensions:	13 7/8" L x 6 3/8"W x 7 1/2 H
Weight:	8 1/2 lbs.

SCHEMATIC



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