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Knowledgeable biologists depend upon Smith-Root equipment.

USER'S MANUAL

SR-1101 FISH COUNTER



SMITH-ROOT, INC.
Technology For Fisheries Conservation

smith-root.com

#07298

SR-1101

FISH COUNTER

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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 within 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.

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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.

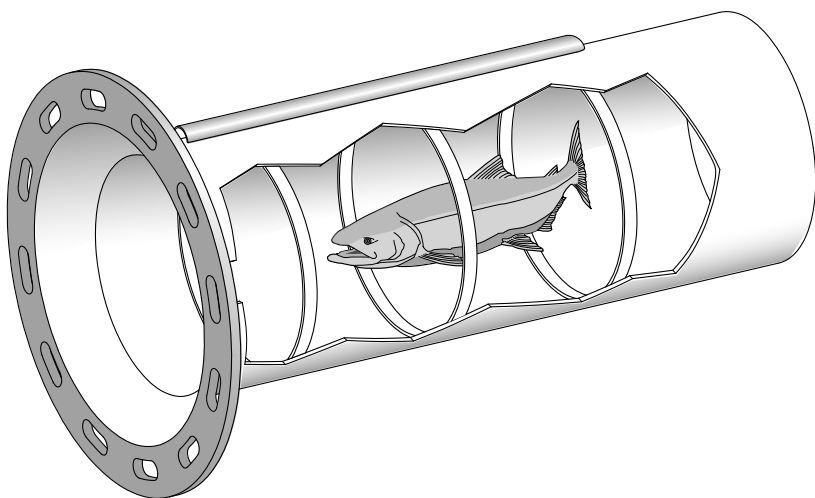
Completed fish passages are tallied on a pair of 6 digit LCD front panel displays. The Model 1101 is designed for simplicity of operation and ease of installation. This unit is provided with a rugged weather-proof case for protection from the elements.

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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.

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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.

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Water Conditions:

The model 1101 is designed to work in fresh water within a conductivity range of 10 to 500 microohms. 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 need. Please consult the factory for further details.

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Power Requirements:

The Model 1101 is versatile. It can be powered either from 115 VAC, 60 Hz or from external 12 volts DC or from optional internal 12 volt rechargeable battery. The battery will provide 7 to 14 days of operation depending on water conductivity. When the counter is powered from 115 VAC, 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.



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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 24 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- provides logic output pulses as fish pass through the tunnel. Tunnel Plug- Provides all signals to and from the counting tunnel.

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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.

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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	120VAC, 60 Hz or 12 Volt
Battery Life (Internal Battery)	14 Days Approx.
Size	13 7/8" L x 6 3/8" W x 7 1/2" H
Weight	8 1/2 lbs.

WARRANTY

Smith-Root, Inc. original products have a 1-Year Limited Warranty.

Smith-Root, Inc. warrants that it's Products are free from defects in material and workmanship that result in Product failure during normal usage, according to the following terms and conditions:

1. The limited warranty for the Product extends for the length of ownership beginning on the date of the purchase of the Product by the original purchaser ("Consumer") of the Product and is not assignable or transferable to any subsequent purchaser or user.
2. The limited warranty extends only to Consumers who purchase the Product from Smith-Root, Inc. or an authorized distributor.
3. During the 1-year limited warranty period, Smith-Root, Inc. will repair, or replace, at Smith-Root, Inc.'s sole option, any defective parts, or any parts that will not properly operate for their intended use with new or refurbished replacement items if such repair or replacement is needed because of product malfunction or failure during normal usage. No charge will be made to the Consumer for any such parts. Smith-Root, Inc. will also pay for the labor charges incurred by Smith-Root, Inc. in repairing or replacing the defective parts. The limited warranty does not cover defects in appearance, cosmetic, labels or structural items, including framing, and any non-operative parts. Smith-Root, Inc.'s limit of liability under the limited warranty shall be the actual cash value of the Product at the time the Consumer returns the Product for repair, determined by the price paid by the Consumer for the Product less a reasonable amount for usage. Smith-Root, Inc. shall not be liable for any other losses or damages. These remedies are the Consumer's exclusive remedies for breach of warranty.
4. Upon request from Smith-Root, Inc., the Consumer must prove the date of the original purchase of the Product by a dated bill of sale or dated itemized receipt.
5. The Consumer shall bear the cost of shipping the Product to Smith-Root, Inc. Smith-Root, Inc. shall bear the cost of shipping the Product back to the Consumer after the completion of service under this limited warranty.
6. The Consumer shall have no coverage or benefits under this limited warranty if any of the following conditions are applicable:
 - a) The Product has been subjected to abnormal use, abnormal conditions, improper storage, exposure to moisture or dampness, unauthorized modifications, unauthorized connections, unauthorized repair, misuse, neglect, abuse, accident, alteration, improper installation, or other acts which are not the fault of Smith-Root, Inc., including damage caused by shipping.
 - b) The Product has been damaged from external causes such as collision with an object, or from fire, flooding, sand, dirt, windstorm, lightning, earthquake or damage from exposure to weather conditions, an Act of God, or battery leakage, theft, blown fuse, or improper use of any electrical source, or damage caused by the connection to other products not recommended for interconnection by Smith-Root, Inc.
 - c) Smith-Root, Inc. was not advised in writing by the Consumer of the alleged defect or malfunction of the Product within fifteen (15) days after the expiration of the applicable limited warranty period.
 - d) The Product serial number plate or the accessory data code has been removed, defaced or altered.
7. If a problem develops during the limited warranty period, the Consumer shall take the following step-by-step procedure:
 - a) The Consumer shall return the Product to Smith-Root, Inc. for repair or replacement processing.
 - b) The Consumer contacts the Customer Service Department at Smith-Root, Inc., at the number listed on the bottom of this page, for repair or replacement processing.
 - c) The Consumer shall ship the Product prepaid and insured. Expenses related to removing the Product from an installation are not covered under this limited warranty.
 - d) The Consumer will be billed for any parts or labor charges not covered by this limited warranty. The Consumer will be responsible for any expenses related to reinstallation of the Product.
 - e) Smith-Root, Inc. will repair the Product under the limited warranty within 30 days after receipt of the Product. If Smith-Root, Inc. cannot perform repairs covered under this limited warranty within 30 days, or after a reasonable number of attempts to repair the same defect, Smith-Root, Inc. at its sole option, will provide a replacement Product or refund the purchase price of the Product less a reasonable amount for usage.
 - f) If the Product is returned during the limited warranty period, but the problem with the Product is not covered under the terms and conditions of this limited warranty, the Consumer will be notified and given an estimate of the charges the Consumer must pay to have the Product repaired, with all shipping charges billed to the Consumer. If the estimate is refused, the Product will be returned freight collect. If the Product is returned after the expiration of the limited warranty period, Smith-Root, Inc.'s normal service policies shall apply and the Consumer will be responsible for all shipping charges.
8. The Product consists of newly assembled equipment that may contain used components that have been reprocessed to allow machine compliance with Product performance and reliability specifications.
9. ANY IMPLIED WARRANTY OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE OR USE, SHALL BE LIMITED TO THE DURATION OF THE FOREGOING LIMITED WRITTEN WARRANTY. OTHERWISE, THE FOREGOING LIMITED WARRANTY IS THE CONSUMER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. SMITH-ROOT, INC. SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF ANTICIPATED BENEFITS OR PROFITS, LOSS OF SAVINGS OR REVENUE, PUNITIVE DAMAGES, LOSS OF USE OF THE PRODUCT OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF ANY SUBSTITUTE EQUIPMENT OR FACILITIES, DOWNTIME, THE CLAIMS OF ANY THIRD PARTIES, INCLUDING CUSTOMERS, AND INJURY TO PROPERTY, RESULTING FROM THE PURCHASE OR USE OF THE PRODUCT OR ARISING FROM BREACH OF THE WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT, OR ANY OTHER LEGAL OR EQUITABLE THEORY, EVEN IF SMITH-ROOT, INC. KNEW OF THE LIKELIHOOD OF SUCH DAMAGES. SMITH-ROOT, INC. SHALL NOT BE LIABLE FOR DELAY IN RENDERING SERVICE UNDER THE LIMITED WARRANTY, OR LOSS OF USE DURING THE PERIOD THAT THE PRODUCT IS BEING REPAIRED.
10. Some states do not allow limitation of how long an implied warranty lasts, so the above warranty limitation may not apply to you (the Consumer). Some states do not allow the exclusion or limitation of incidental and consequential damages, so certain of the above limitations or exclusions may not apply to you (the Consumer). This limited warranty gives the Consumer specific legal rights and the Consumer may also have other rights which vary from state to state.
11. Smith-Root, Inc. neither assumes nor authorizes any authorized service center or any other person or entity to assume for it any other obligation or liability beyond that which is expressly provided for in this limited warranty including the provider or seller of any extended warranty or service agreement.
12. This is the entire warranty between the Smith-Root, Inc. and the Consumer, and supercedes all prior and contemporaneous agreements or understandings, oral or written, relating to the Product, and no representation, promise or condition not contained herein shall modify these terms.
13. This limited warranty allocates the risk of failure of the Product between the Consumer and Smith-Root, Inc. The allocation is recognized by the Consumer and is reflected in the purchase price.
14. Questions concerning this limited warranty may be directed to:

Smith-Root, Inc.
14014 NE Salmon Creek Ave.
Vancouver, WA 98686
(360) 573-0202

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