

## **2100-TSR ADAPTER REPLACEMENT SLIDER FOR USGS TOP-SET WADING ROD USED WITH MODEL 2100 AND 3000 CURRENT METERS**

The **2100-TSR Adapter** is an acetal resin plastic part designed to replace the sliding assembly on the U.S. Geological survey's Top Set wading rod. This replacement part allows use of the Top Set rod in the normal manner but with the added convenience and accuracy of the Model 2100 Sensor and 2100 or 3000 Indicator. The **2100-A22** Sensor slips easily in and out of the **TSR Adapter** for safe and easy transport.

**NOTE:** SWOFFER INSTRUMENTS, INC. DOES NOT SUPPLY THE USGS STYLE TOP-SET WADING RODS. THEY ARE READILY AVAILABLE THROUGH SEVERAL OTHER SOURCES.

### **INSTALLATION OF THE TSR ADAPTER**

1. Remove the original slider from your wading rod. This is accomplished by removing the bolt which holds the slider onto the round section of the wading rod. The "Foot", which is threaded onto the hex shaped rod, must also be removed.
2. Place the plastic washer that is supplied with the **TSR Adapter** into the recess at the top side of the slider (this part may already be installed in the **TSR Adapter** but may have come loose during shipping). (The "top" of the **TSR Adapter** has the slot for the cable).
3. Place the **TSR Adapter** onto the hex rod and slide it up until it contacts the round rod. *NOTE: Initial fit will be tight but will loosen with use.* If your wading rod has dings and scratches it may be necessary to remove any high spots by using a fine-toothed file on the hex rod before installing the **Adapter**. Also, older wading rods may have developed a flare at the bottom end where the foot is installed. Extra filing may be required there for installation of the **TSR Adapter**. Attach the **TSR Adapter** to the round rod using the original bolt but *do not use* the original split-ring lock washer. Snug the bolt but it is not necessary to get it too tight.
4. The Model 2100 Sensor (**2100-A22**) will now slip into the end of the **TSR Adapter**. With the cable oriented up through the slit in the top of the **TSR Adapter**, make sure that the set screw hole is properly aligned with the mating recess in the Sensor Body. Snug the set screw just enough so that it prevents the sensor body from being pulled out from the **TSR Adapter**; any more could crack the sensor body. Install the Rotor Assembly (**2100-A21**) in the Sensor and use the wading rod in the normal manner.
5. *Do not transport or store the wading rod with the sensor installed in the **TSR Adapter**. Remove Sensor and Rotor Assembly before storing the Wading Rod.*

### **CARE OF THE 2100-A21 and -A22 SENSOR**

The Sensor for the *Model 2100 and 3000* Current Meters is the single most important part of the instrument and great care must be observed for its continued accurate output.

Keep the Sensor/Propeller assembly above the stream bed when taking readings and avoid rocks and other hazards when moving from one measuring site to another. This will prevent damage to the Rotor, Rotor Shaft, Propeller and the Sensor Body.

***Never transport or store the sensor wand with the propeller rotor installed. Use the 1/16" hex screwdriver to loosen the setscrew and remove the entire rotor assembly when not using the Model 2100.***

Always replace the batteries in the Indicators with fresh ones.

1. During rough use check the propeller frequently for frayed leading edges and for cracks. Chipped or cracked props should be replaced. Frayed leading edges can be brought back to acceptable levels of operation by reshaping them with 150 grit (or finer) sandpaper. Propellers which show signs of being bent or misshapen should be discarded.
2. Rotational friction is by far the biggest cause of erroneous data especially at velocities below 2 feet per second. Check the freedom of rotation frequently especially in turbid water or after rough handling. In some measuring situations it may be necessary to completely disassemble the rotor and clean the parts with clear water after each immersion. Use spare rotor assemblies and interchange them often. ***Never leave the rotor assembly attached to the sensor after taking readings.***
3. Water is the lubricant for the *Model 2100* rotor. "Canned air" and spray type degreasers should be used to regularly clean the bore of the Rotor (**2100-A27**) and the polished surface of the Rotor Shaft (**2100-A26**). Avoid oil & grease if possible.
4. The Rotor Assembly (**2100-A21**) should spin very freely when held in the vertical position (propeller pointing up) and simply blow lightly on the propeller. If it does not, clean the bore of the Rotor and the surface of the Rotor Shaft thoroughly.  
One method to determine an acceptable level of low-velocity performance by a particular Rotor Assembly is to perform a "Spin Test" :  
Install the Rotor on the sensor, connect the sensor to the Model 3000 Indicator, and place the Indicator in the **COUNT** mode.  
**Model 3000:** Set the update time to 20-30 seconds. With the propeller pointing up blow very hard straight down on the propeller. *At the instant you stop blowing* hit the **ENTER** button on the indicator and allow the rotor to coast to a stop.  
**Model 2100:** Install the Rotor on the sensor, connect the sensor to the Indicator, and place the Indicator in the **COUNT** mode. With the propeller pointing up blow very hard straight down on the propeller. *At the instant you stop blowing* hit the **RESET** button on the indicator and allow the rotor to coast to a stop.  
  
***A rotor which will perform to the low velocity limits of its design produces counts on the indicator of at least 300.***
5. If the Rotor begins to "buzz" when spun by hand it means that the bore diameter of the Rotor (**2100-A27**) and the outside diameter of the Shaft (**2100-A26**) are too far apart. In this case it is advised to replace the Rotor with a new one. If the shaft shows visible signs of wear replace it also. Severe buzzing indicates that the rotor is bouncing off the shaft as it rotates around it. This slows the rotor significantly especially at velocities above 3 FPS and will cause readings to be slower than actual. **Note:** Some slight buzzing may be heard in the later versions of the rotor when it is spun "dry". This buzzing should cause no significant loss of efficiency.
6. Periodically examine the Thrust-Bearing Nut (**2100-A23**) and check inside on the bottom (the bearing surface). If a pronounced "cup" begins to form (wear from the ball-shaped end of the Rotor Shaft) the **2100-A23** should be replaced. This is especially necessary when using the *Model 2100* in low-flow situations, 2 FPS or lower.
7. The Photo-Optics in the sensor body must be kept clean. Use soap and water and a soft tooth brush to keep the "eyes" clean if necessary. *Be careful and do not scratch the Photo-optics as this could cause unwanted light scattering and therefore erroneous readings.* Likewise the Fiber optics "eyes" in the base of the Rotor (**2100-A27**) should also be kept clean.

Treat the *2100-A21* Rotor Assembly and Sensor with care and it will continue to produce accurate data with minimum maintenance.

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