

# SR II® Meters

## Repair Instructions

### INTRODUCTION

The Sensus Sealed Register Magnetic Drive Water Meter incorporates unique design features which greatly simplify maintenance. With just two primary elements—the hermetically sealed register and the oscillating piston measuring chamber (which has only two moving parts in the water), the Sensus SR II® Meter can be easily and economically repaired by the water utility.

### SUGGESTED PROCEDURE

In the event that repairs are required after an SR II® Meter has been in service, the following procedure is suggested:

1. Turn off the water supply and remove meter from service.
2. When the meter is removed from the line and brought into the meter shop, it is always advisable to run an accuracy test prior to disassembly. Note particularly the low flow test results (1/4 gpm for 5/8" size). Inaccuracy will normally show up first at low flows on an old meter.
3. Drain water from meter by tilting inlet and outlet spuds vertically, first one end up, then the other. After water is drained, blow through inlet spud to determine if piston moves through its cycle and the center sweepband of the register moves.
4. If piston does not move, the problem is within the measuring chamber. If piston moves and register sweepband fails to move, trouble is in register.
5. To correct a chamber problem, proceed as follows:
  - a. Remove bottom bolts and separate the bottom plate from the upper maincase.
  - b. Remove the measuring chamber from the maincase. The measuring chamber is locked into the maincase by the strainer (Ill. #13). Withdraw the strainer by lifting under the center tab with a screwdriver and the chamber will be free. Because there is no plastic to metal chamber fit in the SR II® Meter, the chamber can be removed easily, even after many years of service. The chamber outlet is sealed to the maincase outlet with the measuring chamber outlet gasket (Ill. #20). After long use, the gasket may adhere to the bronze maincase. Remove and dispose of the gasket.
  - c. With the chamber removed, rotate the drive magnet to move the piston through its cycle. If the piston fails to move freely, the trouble will be found inside the chamber. Excessive wear, pipe chips, chemical deposits and other foreign material will hinder the piston from moving freely through its cycle.
  - d. Open the chamber by removing the chamber top assembly (Ill. #15). This can be done by placing the tip of a screwdriver in the chamber slot and giving it a twist. Lift out the piston (Ill. #16). When doing this, be sure the control roller (Ill. #18) does not fall off its post and become lost. In normal clean water service, the control roller is usually the first part to show excessive wear. With the roller on its pin, check for excessive clearance between the pin and the inside diameter of the roller. The roller should be free on the pin, but with little detectable clearance. The simple replacement of a worn control roller, along with a chamber cleaning, will return the majority of SR II® Meters back to new meter accuracy specifications.

In cleaning the chamber, remove any foreign material that makes the chamber walls, edges or chamber corners rough. Laundry soap and a soft bristle brush will remove most deposits from the Rocksyn™ plastic chamber. Fine steel wool or emory cloth can be used to remove stubborn buildups. Do not use acid dips to clean measuring chamber parts. The chamber interior must be clean and smooth.

Clean the piston in the same manner as the chamber. Check the piston for any foreign matter or pipe chips that may have become imbedded in the walls.

If the division plate (Ill. #17) is severely scuffed or scored, replace with a new division plate. Slight scuffing may be due to a burr on the "V" slot of piston where it comes in contact with the division plate. Carefully remove any burrs with a small flat file or a sharp pointed scraper. Crocus cloth or fine emory cloth is also suitable, but be careful not to remove any of the piston material.

Check the piston loop (elongated opening in the piston). It is designed to clear the division plate slightly at all positions through the piston's cycle. Friction here will cause the meter to test poorly on low flow. You can scrape the loop with a sharp tool to make it clean, but **do not scrape too much** (do not remove any piston material) or you will destroy the water seal at this point. This will cause accuracy loss at high flows.

If the piston is badly worn or distorted by heat (due to operating the meter dry or from hot water backup), it will be necessary to replace it. Greatest wear takes place on the underside of the piston where it rubs on the chamber bottom. Heat distortion can be checked by placing a straight edge or ordinary ruler across the bottom and outside wall of the piston. The piston should be perfectly flat in these areas. If the straight edge can be rocked or light can be seen between the piston and straight edge, the piston is warped and must be replaced. **When installing a new piston, always use a new control roller.**

The measuring chamber top assembly (Ill. #15) should fit snugly (“snap fit”), into the chamber. The fit should be tight enough so that the top assembly remains assembled to the chamber without dropping off of its own weight. If it is loose, it is possible that the meter has been frozen and the chamber is spread slightly. In this event, the measuring chamber must be replaced, as the internal volume will be too great and the piston motion will be impaired because the control roller may not be centered. If excessive wear is evident in the measuring chamber, it must be replaced.

- e. After cleaning and repairing the chamber, reassemble and repeat step 5-c. The piston should oscillate freely. An effective check of piston freedom is to hold the measuring chamber on its side and slowly rotate it. Observe that the piston freely moves through its cycle in the chamber
6. If trouble was not found in the chamber, check the sealed register. The register can be checked on the maincase or can be removed for easier handling. To remove the register, remove the seal screw, or if the tamper resistant screw is used, use the Sensus security socket (Ill. #27) (available from your Sensus Sales Representative). Pliers or other makeshift tools should not be used. Rotate the register bonnet with the register counterclockwise to remove. An SR II® wrench (Ill. #36) may be used to increase leverage.

The register can then be removed from the bonnet by holding the register stationary and rotating the bonnet counterclockwise. A convenient way to hold the register is to leave the bonnet, with the register in place, on the meter’s maincase and then rotating the bonnet counterclockwise (beyond the rotation needed to loosen the bonnet from the maincase). If, in the process of removing the register, the white plastic register retaining ring (Ill. #7) becomes broken, replace with a new one. If a Sensus motorized register tester (Ill. #32) is not available, proceed as follows:

Note the exact position of the sweep hand in relation to one of the lines on the register face. A spare measuring chamber top assembly with the drive magnet in place can be used to check the register. If this magnet is held next to the register bottom, as it would be in the meter, and is rotated, the follower magnet, which is inside the register, should follow the motion causing the register sweep hand to move. Rotate the drive magnet 20 or 30 revolutions to cause the register sweep hand to move 2 or 3 increments from its initial position. If the sweep hand has failed to move, it can be assumed that the trouble is within the register. If the register sweep hand moves, but is jerky, the register is defective.

A Sensus Standard register is covered by a 25-year warranty. (Encoder registers carry a 10-year warranty.) If the register fails within this period, replace it with a new register and return the old register to the nearest Sensus District Sales Office or authorized Sensus Distributor serving your area. They will replace it on a no-charge basis. (If you wish, you may retain any SR II® registers which fail to operate properly until the next visit by your Sensus Sales Representative. He or she will make arrangements for their replacement.)

7. After the measuring chamber and register have been checked and the chamber put in good working condition, reassemble the meter. Install the measuring chamber assembly with the arrow (on the underside), lined up with the arrow cast on the underside of the outlet spud of the maincase. Insure that the chamber gasket is seated against the maincase interior wall at the outlet. Inspect the strainer to see that it is clean. Push it into place between the chamber and maincase on the inlet side of the meter. The strainer serves the secondary purpose of locking the chamber in its proper location in the maincase.

Before bolting on the bottom plate, check the condition of the bottom gasket or bottom plate liner (Ill. #21 or 22). Unless the rubber or plastic has deteriorated due to unusual water conditions, the gasket or liner can be reused. Tighten the bottom cap screws evenly to avoid distortion and leaks, but do not overtighten. The Sensus spanner wrench (Ill. #26) provides sufficient leverage to ensure proper tightening.

The register is installed by setting the register retaining ring, register, and bonnet on the maincase with the register facing in the desired direction. (The register may be mounted so that it can be read from upstream, downstream, or from either side, at 90° from the meter’s centerline.) By hand or using the SR II® wrench, rotate the bonnet until it stops with the seal screw lined up with the centerline of the meter. Tighten the seal screw.

8. After reassembly, the meter should be tested for accuracy at the flow rates specified by AWWA’s Manual M6 for that size meter.