



A1004-001SEN Sensor Replacement Kit

Installation Instructions

*** The switch should be checked using the following procedures before the bucket is disassembled to make sure the existing switch is defective.**

*** Push button is no longer supplied with repair kits. When troubleshooting the CM sensor, it is recommended to remove and discard the push button assembly to prevent any future false alarms. (A 1/2" diameter x 18" long rod can be used.)**

The Emco Wheaton CM style buckets have two basic types of switches. The early buckets (prior to 2010) have the switch in the sidewall of the secondary bellows. These buckets have a dipstick in the monitor tube that can be used to detect water in the interstitial space in addition to the switch. The later units have a monitor tube cap that is marked "remove to test".

A1004 - CM Switch Troubleshooting

1. Read VR (Veeder Root) fault codes. (Make notes.)
2. Inspect all buckets for water in interstitial space. If water is present, pump all water out, and test the interstitial integrity to determine where the problem is that allowed the water to enter.
3. Locate switch wires at VR panel or at the junction box (in the area of the bucket). Measure resistance of switch.
 - Good checks 1-2 ohms. OK at <10 ohms
 - Cut wire checks open (infinite resistance)
 - Switch activated (float up) checks 95-100k ohms
4. Check all bucket switch wires at the VR panel or junction box considering the possibility of wires being crossed or mislabeled (incorrect wiring at the VR panel or at the junction box).
5. If the switch checks open (wire cut) manipulate wire connections at the junction box of the problem bucket while monitoring ohmmeter at VR to see if an intermittent short exists.
6. Cycle the switch manually using one of the following methods:
 - Water method (early units <2010)
 - Remove the primary
 - Push the push button
 - Use a rod to push down into the monitor tube to activate float simulating fluid in the bucket, (if so equipped)Measure the resistance at the VR panel or junction box to confirm proper operation. If you activate the push button and do not see any change in the switch resistance that would indicate the switch has been made, it is likely that the push button (or rod) is not long enough to activate the switch. Adjust the push button by approximately 1/16" increments as required.
7. If the switch is being used on a non-Veeder Root system: check the System requirements. The standard Emco switch has a 100,000 ohm resistor across the switch leads as required by Veeder Root and some other systems. Some systems will fault out and show the system in alarm because of this resistor and would need to be changed to a non-resistor type switch.
8. Check the system by removing the push button to see if this removes the fault. If it does, the push button should be removed and tested manually with a rod, and the push button adjusted shorter, by 1/16" increments as required.
9. Determine course of action to correct the problem.

If switch replacement is required, proceed with the following steps.



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Required Tools:

- 5/32" Allen Wrench
- A0081-001 Adapter Wrench
- Chain Wrench
- Ratchet with Extension
- Socket with 5/16" Allen Wrench
- A0081-001H Wrench
- 5/16" Allen Wrench
- 3/4" Socket
- 3/8" Socket
- Screwdriver
- Caulk Gun
- Pipe Dope
- Urethane sealant
(such as Emco Z0839-001)
- ohm meter (or multi-meter)
- 18" x 1/2" dia. rod (can use 3/8" socket extension)



Step 1: Remove lid, cap and dipstick; set aside.



Step 2: Use a 5/32" allen wrench to loosen both set screws on adapter.



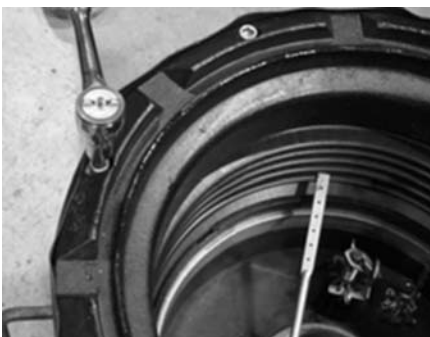
Step 3: Use the Emco Wheaton A0081-001 Adapter Wrench to remove the adapter; set aside. Mark the primary rim position on the rim and on the concrete as the primary rim must be returned to this orientation.



Step 4: Remove drop tube assembly from the unit; set aside.



Step 5: Use a chain wrench and ratchet with extension or equivalent to remove the 4" pipe nipple; set aside. (The unit may have the threads cast in place - new style.)



Step 6: Use a ratchet and socket with 1/4" or 5/16" Allen wrench or 3/8" socket to remove (8) 3/8" stainless steel bolts; set aside.



Step 7: Use the Emco Wheaton A0081-001H Wrench to remove the primary unit, following steps 8&9.



Step 8: Place long tang of wrench into drain cavity of primary base.



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Step 9: It may be necessary to use an extended lever to loosen, due to the tightness of the unit.



Step 10: Remove the primary unit. Mark the secondary unit position on the concrete to insure proper alignment during reinstallation.

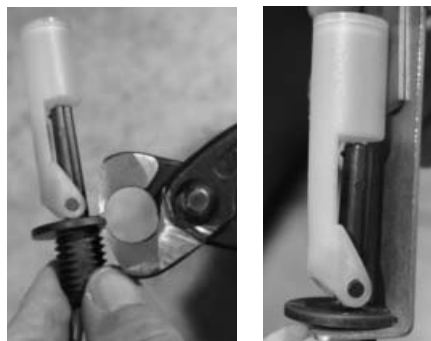


Step 11: Determine if the existing sensor is located in the bellows wall (an early vintage, prior to 2010) or on a bracket bolted in the base of the secondary unit. *If the sensor is located in the bellows wall (above photo), proceed to [Step 15](#).* If not, proceed to [Step 12](#).



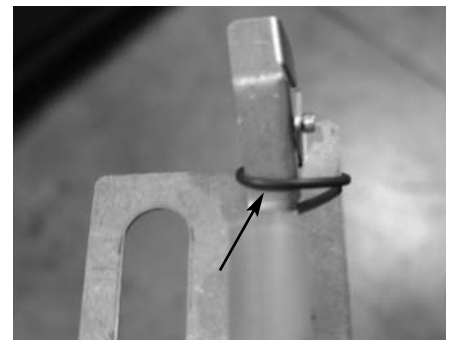
Step 12: If the sensor is located on a bracket bolted in the secondary, mark this position on the secondary bellows for exact positioning when re-installing sensor.

CRITICAL - This orientation must be maintained.



Step 13: Trim the lower plastic piece of the sensor as shown, so that the sensor will install flush against the bracket.

DO NOT perform this step if the sensor is located in the sidewall as it will not seal properly.



Step 14: Be sure the o-ring is present and in the position as shown. The o-ring is used as a spring to insure proper return of the rocker arm when manually tested. A rubber band can be used if the o-ring is damaged.



Step 15: Locate the junction box where cable connects and unhook cable. Remove the bolts from the bottom of the secondary unit. Use a screwdriver to pry the ring flange from the base.



Step 16: Pull the secondary unit approximately 2' out. Loosen the sensor's metal wire retaining clamp. Remove the secondary unit.

For sidewall mount, proceed to [Step 17A](#).

Step 17: Remove the defective sensor and replace with the new one. Test new sensor by connecting sensor cables to existing wires at junction box before pulling the wire through the conduit. Attach string or wire to end of sensor cable to allow new cable to be reinstalled. Pull cable through the conduit (if not using direct bury), leaving 2' length in between clamp and secondary unit. Ensure sensor is in closed position. Tighten clamp. Make all wire connections and seal properly using a seal pak. Sensor operation should be tested multiple times by moving the sensor float manually to insure proper operation before continuing.



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Step 17A: Loosen nut on outside of bellows. Pull switch out. Test new sensor by connecting sensor cables to existing wires at junction box before pulling the wire through the conduit.

Remove first rubber washer, metal washer, and nut from sensor. Feed the sensor wire through hole in the bellows from the inside out. Install the rubber washer which was removed. install metal flat washer and then the nut and tighten.

Attach string or wire to end of sensor cable to allow new cable to be reinstalled. Pull cable through the conduit (if not using direct bury), leaving 2' length in between clamp and secondary unit. Ensure sensor is in closed position. Tighten clamp. Make all wire connections and seal properly using a seal pak. Sensor operation should be tested multiple times by moving the sensor float manually to insure proper operation before continuing.



Step 18: Apply a thin bead of sealant to each o-ring groove. Re-install secondary unit, aligning as marked in step 10.



Step 19: Replace ring flange, lining up bolt holes.



Step 20: Locate the sensor bracket (if applicable) in exactly the same orientation as marked in step 12. Replace bolts and washers. Torque to 40 ft. lbs.



Step 21: Apply pipe dope to male threads of secondary unit. (If the secondary has female threads, no pipe dope is required.)



Step 22: Inspect the large o-ring seal under the primary rim; if damaged, replace with new o-ring seal. Install the primary unit into secondary unit. Screw down by hand.



Step 23: Line up holes in primary unit with holes in secondary rim, as marked in Step 3. If push button type (with sensor bracket), look through monitor tube with a flashlight to insure bracket rocker pad is directly below the monitor tube. Use 2 awls or screwdrivers to hold in place. Install bolts. Torque to 20 ft. lbs.



Step 24: Replace monitor tube cap. Check operation.



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Step 25: Apply pipe dope to lower half only of 4" pipe nipple.



Step 26: Start 4" pipe nipple by hand.



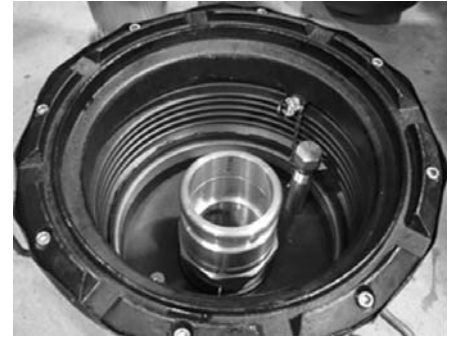
Step 27: Use chain wrench (or equivalent) to tighten 4" pipe nipple to 100 ft. lbs.



Step 28: Replace drop tube assembly into 4" pipe nipple.



Step 29: Do not apply pipe dope to adapter threads. Adapter is equipped with a gasket for sealing.



Step 30: Hand tighten adapter onto 4" pipe nipple.



Step 31: Use the A0081-001 Adapter Wrench to tighten adapter. Do not overtighten.



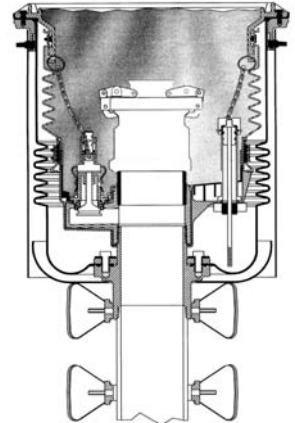
Step 32: Use a 5/32" Allen Wrench to tighten 2 set screws on adapter.



Step 33: Replace cap.

Step 34: Per local requirements, perform hydrostatic test as follows:

1. Ensure dipstick and cap are tight.
2. Fill primary bucket with water to 1" below the top of the rim.
3. Make a mark on the rim to indicate the water line.
4. Replace lid and leave for a minimum of 3 hours to test the integrity of the primary unit.
5. Remove lid and check for water loss. If loss is observed, ensure integrity of drain valve by removing excess water from primary, then remove drain valve and replace with drain plug. Retest. If test fails a second time, primary unit must be replaced.



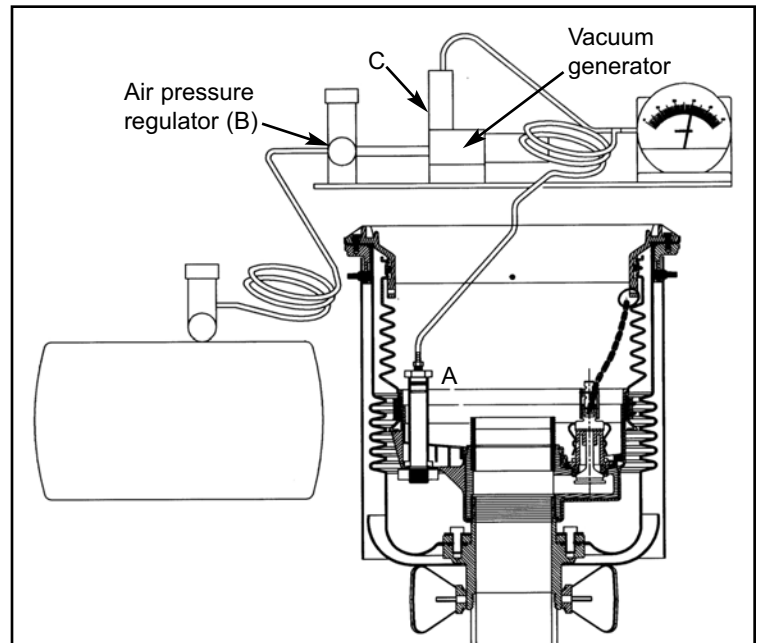
Step 35: Perform vacuum integrity test for primary and secondary containments.

Required Equipment:

- Emco A1004-210TEST, vacuum apparatus (includes test adapter 494343)
- Timer
- Air supply

Procedure

1. Remove the dipstick, gage or push button from the inspection port and install the test adapter, 494343 (A).
2. Attach air pressure source to air pressure regulator (B) on vacuum apparatus.
3. Slowly apply vacuum of 30" water column to the interstitial space, by moving the toggle switch (C). Wait 30 seconds. Reapply 30" water column.
4. Ensure switch is in off (center) position, start timer and record remaining vacuum after 1 minute.
5. If the remaining vacuum after 1 minute is 26" water column or greater, both the primary and the secondary containment vessels are tight.
6. If the test fails, allow the bellows to equalize for one minute and repeat test, starting at step 3.
7. If test fails a second time, refer to Emco Wheaton Retail Test Procedures TP-160 and TP-161.
8. Replace components or repair as necessary.



Tank Operator Responsibilities

Tank operator must ensure that all Federal, Provincial and local codes are being met during the filling of the tank. All operators must be familiar with proper filling procedures.

The operator responsible for transferring product to an above ground storage tank must take all reasonable steps to prevent spillage.

The delivery hose from the tank's fill pipe must not be disconnected before the hose has been drained completely.

When tank vehicles are being unloaded, the vehicle operators must remain (a) in constant view of the transfer nozzle and fill pipe; and (b) in constant attendance at the discharge control valve.