

Changing Batteries and Removing Debris from End Cone on INW Smart Sensors

APPLICATION NOTE / 1/6/2016 / 9C0155r10.1

Introduction

Purpose of this document is two-fold:

- 1) To detail the steps for changing batteries in the INW Smart Sensors – applies to tube versions of PT2X, PT2X-BV, CT2X, and TempHion.
- 2) To detail removal of debris from end cones on INW Smart Pressure Sensors, starting on page 9.

Prevent Battery Leakage!!

Under some circumstances the internal batteries can leak, causing damage to the sensor. To prevent leakage, the following is recommended. (Does not apply to lithium batteries.)

- Change the batteries at least every 18 months (every 12 months for a CT2X).
- If the sensor will not be deployed for 3 months or more, remove the batteries.

Changing Batteries

To change batteries, the housing for the sensor must be opened. Because there is sensitive electronic circuitry inside the housing, **battery changing must be done in a clean, dry environment to avoid contamination or moisture damage to the circuitry.**

The sensor uses two standard AA batteries.

**For PT2X and PT2X-BV with firmware 2.13 and later
– see important note on page 7!!**

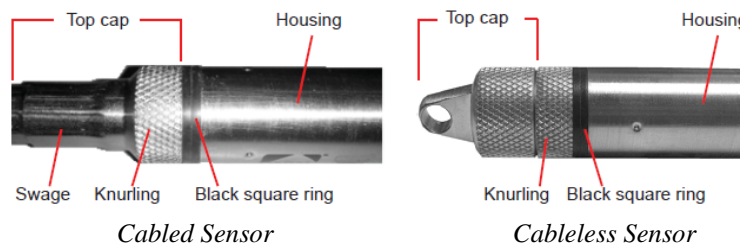
Twist Open Housing

Tips

- Never place a tool on the sensor body, it is very thin and will deform causing leaks at o-ring seals and potentially crushing the circuit board!
- Always twist the sensor body off the top cap assembly rather than twisting the top cap off of the sensor body.
- For cabled sensors, always clamp the sensor on the swaged area when applicable, the shoulder above it will allow you to press down without the worry of the sensor slipping out of the clamping device.
- If the sensor body is slippery or you are unable to grip it hard enough to twist, try a piece of rubber cabinet liner for additional friction.

Opening the Housing

There is a black, compressible square ring near the top of the sensor. This ring acts as a spring to lock the cable in. This needs to be compressed in order to allow removal of the top cap. Once this ring is compressed, a gentle counterclockwise twist is all that is needed to remove the cable from the sensor body. Compressing the black square ring does take force, **twisting does not.**



Care must be taken to compress the black square ring before attempting to twist the housing. **Forceful twisting of the housing can permanently damage the sensor.**

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Securing the Sensor

In order to compress the black square ring, the sensor must be secured so that you can apply downward pressure to compress the ring. This can be done by holding in your hand, using a vise, or using pliers, as detailed below.

By Hand - cabled version only

1. Tightly grasp the top cap in one hand.
2. Brace your hand against something such as a table or the ground. (Do not allow the cable to be pinched against the brace.)

Continue to **Removing the Housing** on the next page.

With Vise - recommended method

Cabled Sensor

1. If possible, use a set of soft jaws as shown to prevent marring the surfaces of the top cap assembly.
2. Place the sensor in a vise clamping gently on the swaged area. You do not need to clamp the vise very hard.

Continue to **Removing the Housing** on the next page.

Cableless Sensor

1. If possible, use a set of soft jaws as shown to prevent marring the surfaces of the top cap assembly.
2. Remove the cableless top cap.
3. Place the sensor in a vise clamping gently on the knurled area. You do not need to clamp the vise very hard.

Continue to **Removing the Housing** on the next page.



Cabled Sensor – gripping on swage



Cableless Sensor – gripping on knurled area

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With Pliers or Vise Grips – good for field use

Cabled Sensor

1. Grasp the pliers on the swaged area (do not grab the knurled diameter).
2. Find a hard edge and place the tips or side of the jaws of the pliers onto this edge as shown. This will allow you to press down with your weight to compress the square ring.

Continue to **Removing the Housing** below.



Cabled Sensor

Cableless Sensor

1. Leave the cableless cap on in order to protect the pins inside.
2. Grasp the pliers on the knurled area tightly being careful to avoid grabbing the knurled cap.
3. Find a hard surface and place the cableless cap down onto it. This will allow you to press down with your weight to compress the square ring.

Continue to **Removing the Housing** below.



Cableless Sensor

Removing the Housing

1. With your free hand, grasp the sensor body. Press down to compress the square ring. Twist gently. Once the body begins to twist, you can stop the compression action.
2. Finish gently twisting until the sensor body is removed.
3. Carefully disconnect the wiring connector inside from the circuit board in the top cap.

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Replacing the Batteries and Resealing the Sensor

1. Gently pull wiring to one side in order to allow batteries to fall out. Shake gently if needed.
2. Replace batteries with button (+) facing open end.
3. Reinstall wiring connector — it only goes in one way, so make sure not to force it.

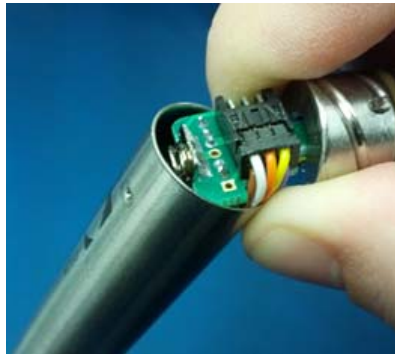


Pull wires gently to the side to allow battery removal



Connector properly connected

4. Hold the top cap assembly at 90° to the housing opening as shown. Depress the spring with your fingertip and tuck the wiring into the cutaway on the circuit board with your thumb to protect it while being installed back into the housing.
5. Rotate the top cap assembly into the opening in the housing being very careful not to nick or pinch any wires.
6. Gently press down until the assembly stops and then twist it into place. It will click in and decompress the gasket when it is fully engaged.



Wires tucked into slot and spring tucked into housing



Push top cap in before twisting and locking



Properly completed – black ring uncompressed

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Set Screw Housing

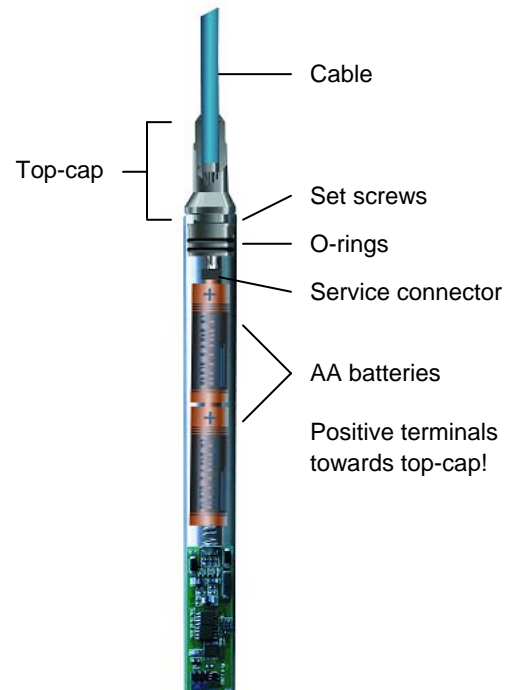
Opening the Housing

Open the housing by removing the top-cap, as outlined below. The top-cap is the connector between the tube housing the sensor and the cable.

1. Remove the two set screws at the top of the housing tube, using a 1/16" allen wrench.
2. Very gently work the top cap loose. Note: Two O-rings provide a watertight seal for the sensor housing and often seal tightly. Inserting the blade of a flat screwdriver between the top-cap and the housing and twisting gently can help to release the O-rings' seal. Then rock the top-cap back and forth, while applying a steady, but controlled, upward pressure.

Caution! Pulling forcefully on the top-cap can pull the insides out of the sensor or snap the connections inside. Removing the circuit board or pushing on the surface of the pressure element **may void your warranty**.

Note: O-rings provide a water-tight seal for the sensor housing. Take care not to nick or otherwise damage these O-rings.



Set Screw Housing

Replacing the Batteries

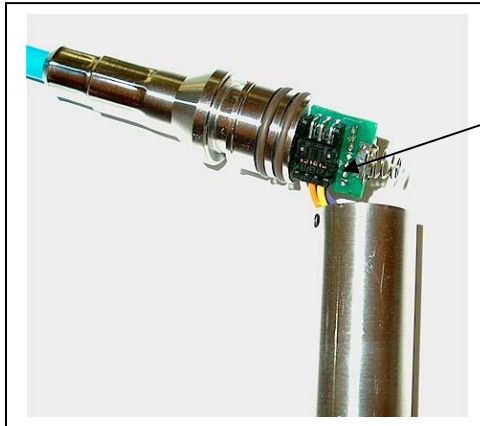
1. Remove the black service connector. (See pictures on next page.)
2. Tip housing over and gently slide batteries out.
3. Insert new batteries - positive terminals towards the top-cap.

Changing Batteries and Removing Debris from End Cone on INW Smart Sensors

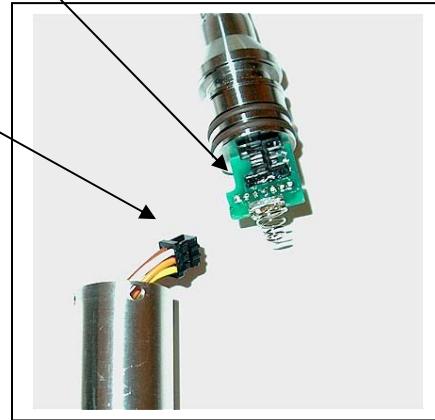
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Re-sealing Housing

1. Replace service connector. Note: this connector is keyed and can only be connected in one direction.
2. Carefully wrap the cable around the slot in the connector board.
3. Replace top-cap and secure with set screws.



Service Connector Connected



Service Connector Released

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Battery Life Calculator

IMPORTANT NOTE for PT2X and PT2X-BV with firmware 2.13 and later!!

When changing batteries in PT2X and PT2X-BV sensors with firmware 2.13 or later, it is important to reset the Battery Life Calculator. ***If the Battery Life Calculator is not reset, the remaining life information will be incorrect.*** Note: This only applies when using Aqua4Plus 1.9.7 or later or Aqua4Plus Lite 2.1.1 or later.

From Aqua4Plus, access the Battery Life Calculator from the Configure menu.

From Aqua4Plus Lite, access the Battery Life Calculator from the Sensor Configuration menu.

- Checkmark the box “I have just put in fresh batteries.”
- Select the battery type from the dropdown box.
- Click “Save and Close.”


Battery Information and Reset

PT2X: INW Smart Sensor

Checkmark the box below if you have just put in fresh batteries. Be sure the correct battery type is selected below.

I have just put in fresh batteries.

Battery Type: "Alkaline AA (Long-Life)"

Percent Battery Life Remaining:  100 %

Current Battery Voltage: 2.3 V

Date Batteries Last Changed: 29-Apr-2015

Save and Redisplay Save and Close Cancel

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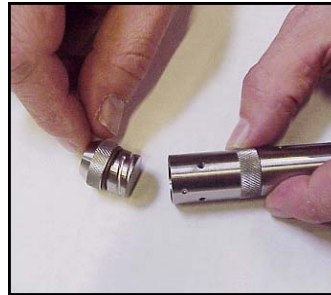
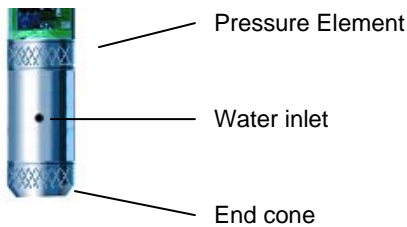
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Removing Debris from End Cone (Pressure Sensors Only)

At times mud, silt, or other debris may foul the water inlets to the pressure sensor. The end cone can be removed to clean out the debris.

Twist Open Housing

1. Gently twist off end cone portion only – do not twist off pressure element!
2. Remove debris. **Taking care not to poke anything into sensor.** This can damage the sensor element and void the warranty.
3. Replace and retighten end cone.



Set Screw Housing

1. Remove the two set screws at the bottom of the housing tube, using a 1/16" allen wrench.
2. Gently remove the end cone.
3. Remove debris. **Taking care not to poke anything into sensor.** This can damage the sensor element and void the warranty.
4. Replace end cone and secure with set screws.

