

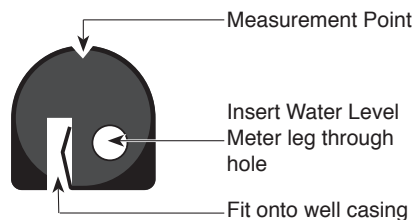
Equipment Check

1. Turn sensitivity switch **fully clockwise**.

Notes: 1. Clockwise rotation of sensitivity switch turns meter on and increases sensitivity.
2. Always set switch to highest sensitivity position, then decrease if necessary.

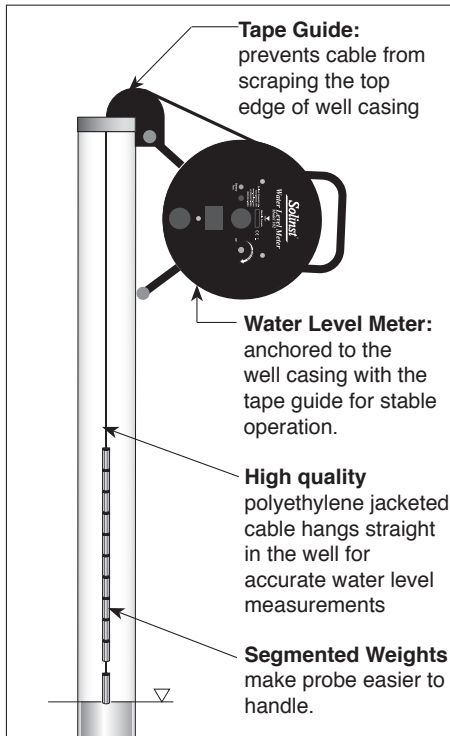
2. Depress the Battery Test button to test the battery and circuitry (excluding the probe).
3. Submerge the probe in tap water. This completes the circuit and activates the buzzer and light.

The Tape Guide



The Tape Guide has been designed to:

- Improve accuracy when reading water levels,
 - Easily obtain repeatable measurements,
 - Prevent cable damage on well casing,
 - Allow the cable and probe to hang straight from the side of the well.
1. Fit the small end of the Tape Guide onto the edge of well casing 2" dia. or larger.
 2. Insert the leg of the Water Level Meter into the hole on the Tape Guide and rest the Water Level Meter on the side of the well casing. (See diagram above).
 3. To store the Tape Guide after taking water level measurements, simply clip it onto the support bracket located on the back of the Water Level Meter.



Water Level Measurements

1. The zero measurement point on both P1 and P2 Probes is the tip.
2. For ease of operation the Tape Guide can be used to support the Water Level Meter. (See diagram above).
3. Feed the cable into and out of the well using the groove in the top of the Tape Guide. The light and buzzer activate when the probe tip enters water. To ensure accuracy, lower and raise the probe a few times and then record the depth measurement from the cable at the top of the well.
4. When using the Tape Guide, the measuring point is offset from the top of casing. To adjust your measurements to the top of the casing, simply subtract the amount indicated on the front of the Tape Guide (ie 6 cm or 2/10 ft).

Routine Care

1. After the depth to water has been recorded, the cable should be carefully rewound onto the reel, the probe wiped dry and placed into the probe holder.
2. The probe, weights, cable and reel can be cleaned with phosphate free (non-abrasive) detergent and warm water.
3. Use of a Water Level Meter Carrying Bag adds to the service life of the meter.
4. Use of the Tape Guide adds to the life of the cable.

Replacement Parts

The following parts can be provided should components become lost or damaged.

1. Splice kits
2. Lights, switches, etc.
3. Reels and/or faceplates
4. Replacement cable with probe (complete)
5. Assembled probes on 10 ft or 3 m lengths of cable
6. Probes and weights

Battery Replacement

- Battery type - alkaline, 9 volt.
1. The battery is housed in a convenient battery drawer located in the faceplate of the Water Level Meter.
 2. To replace the battery, simply press the drawer in, lift, then pull.
 3. The battery drawer should slide out of the faceplate enough to pull it out.
 4. Note the polarity. The positive (+) terminal should be towards the small notch in the end of the drawer. Place new battery in the drawer and slide it back into the faceplate.

Troubleshooting

SYMPTOM	CAUSE	REMEDY
No sound when probe immersed in water.	Dead battery.	Replace with 9V Alkaline.
	Water Conductivity is very low.	Increase sensitivity switch setting (turn clockwise) or call Solinst for assistance.
	Disconnected wires on circuit board.	Check all connections inside hub of reel for loose/disconnected wires - solder or reconnect.
	Broken wire in cable.	Locate break in cable - splice and seal. (Contact Solinst)
Instrument continuously sounds after being immersed in water.	Disconnected wire inside probe.	Contact Solinst to obtain parts/repair instructions.
	Water in probe. Probe may be dirty which could interfere with the circuit connection.	Contact Solinst for instructions to remove, clean and reseal the probe.

Laser Marked Cable Accuracy Statement

Solinst #102/102M Water Level Meters are certified traceable to National Standards.

Our reference standard is verified by the **NIST Metrology Laboratory** (National Institute of Standards and Technology). NIST Test # 821/278129-09

Accuracy specifications of our marked cables meet or are better than tolerances outlined in the following international standard:

EU Measurement Instruments Directive 2004/22/EC, Accuracy Class III, (European Union Standard).

Specifically, all Solinst #102 Water Level Meters are marked to an accuracy of at least 0.03%.



Cable is marked every 1/100ft or each millimeter

102 Cable Specifications:

- Break Strength: ~190 lbs (86Kg)
- Coefficient of linear thermal expansion: 9.6 μ in / in °F
- 7 stranded 304 Stainless Steel central conductor
- PTFE dielectric
- Tinned Cu (Copper) braid external conductor
- MDPE (Medium Density Polyethylene) jacket

Solinst® Connecting Laser Marked Replacement Cable to Reel

Model 102 and 102M

Tools and Materials Needed

1. Model 102 or 102M Replacement Cable
 - Comes with P1 or P2 Probe attached
 - 2 Pin Cable Molex Connector
 - Grommet
2. Phillips or Robertson Screwdriver
3. Wire Cutters

Instructions

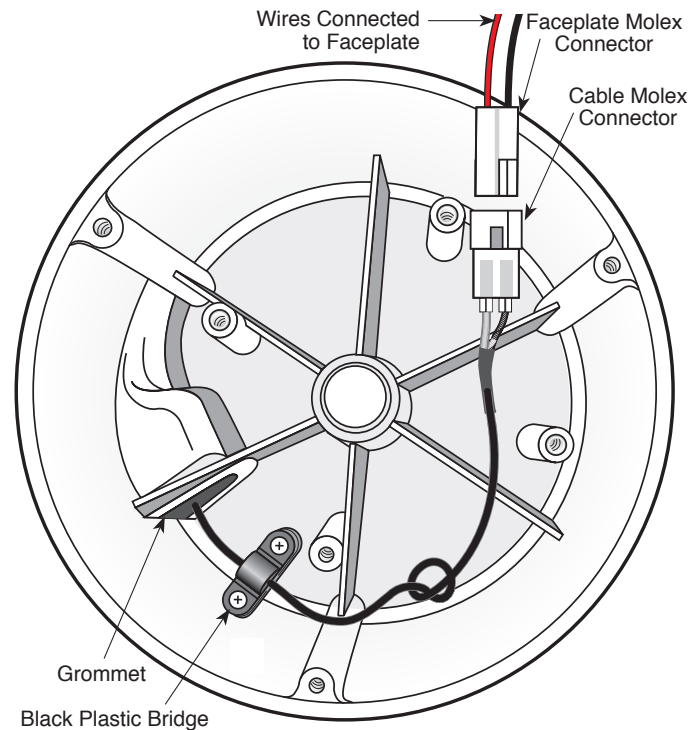
1. Place the Reel on a flat workbench with the Faceplate up and remove the battery. Unwind the old cable, and cut the cable at the end near the Grommet.
2. Undo the three screws from the Faceplate, and slowly remove it from the Reel.
3. Disconnect old Cable Molex Connector from the Faceplate Molex Connector.
4. Undo the two screws from the Black Plastic Bridge holding the Cable inside the Reel Hub, and remove the top piece of the bridge.

Note: There is no Black Plastic Bridge in a 102M Mini reel.

5. Pull the Cable through the Grommet and remove from the Reel.

Note: The Replacement Cable comes with a new Grommet. The old Grommet may be replaced with the new one, or left in if not damaged.

6. Feed the new Cable with Connector Pins through the Grommet into the Reel Hub. Without tangling the Cable, feed about 1 ft (0.3 m) of Cable through the grommet so as to provide enough slack to continue.
7. Tie a knot in the Cable, approximately 5" (125 mm) from the end, to secure it from going back through the Black Plastic Bridge (or the Grommet in a 102M Mini reel).
8. By hand, insert the Connector Pins into the new 2 Pin Cable Molex Connector. The negative Connector Pin is inserted into the terminal on the pointed side of the Cable Molex Connector, and the positive Pin into the other terminal (the negative Pin is solid and the positive Pin is hollow).

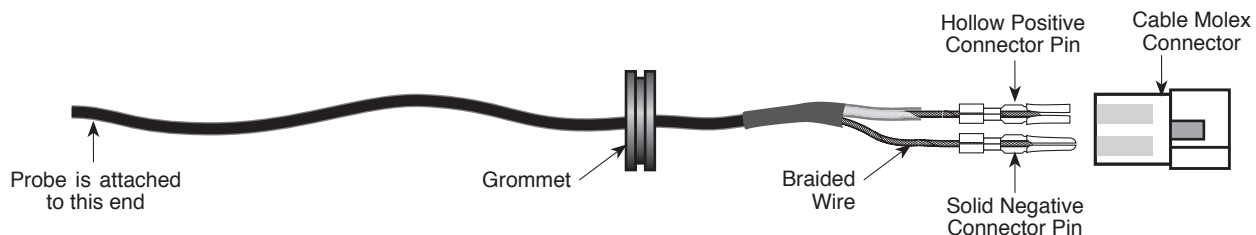


Inside View of 102 Reel Hub
Showing Connection Detail

9. Position the Cable inside the Reel Hub with Black Plastic Bridge over top (the notch allowing the cable to run through the Black Plastic Bridge facing downward) and refasten the two screws to secure the Cable to the Reel.

Note: There is no Black Plastic Bridge in a 102M Mini reel.

10. Connect the Cable Molex Connector to the Faceplate Molex Connector. Replace the battery.
11. With Probe in a glass of tap water, turn the Water Level Meter to the 'ON' position. If the connections are correct the buzzer and light on the Meter will be activated. Check connections if the buzzer does not sound.
12. Replace the Faceplate on the Reel and re-secure the three screws.
13. Wind the Cable onto the Reel, slowly, holding to ensure no slack.



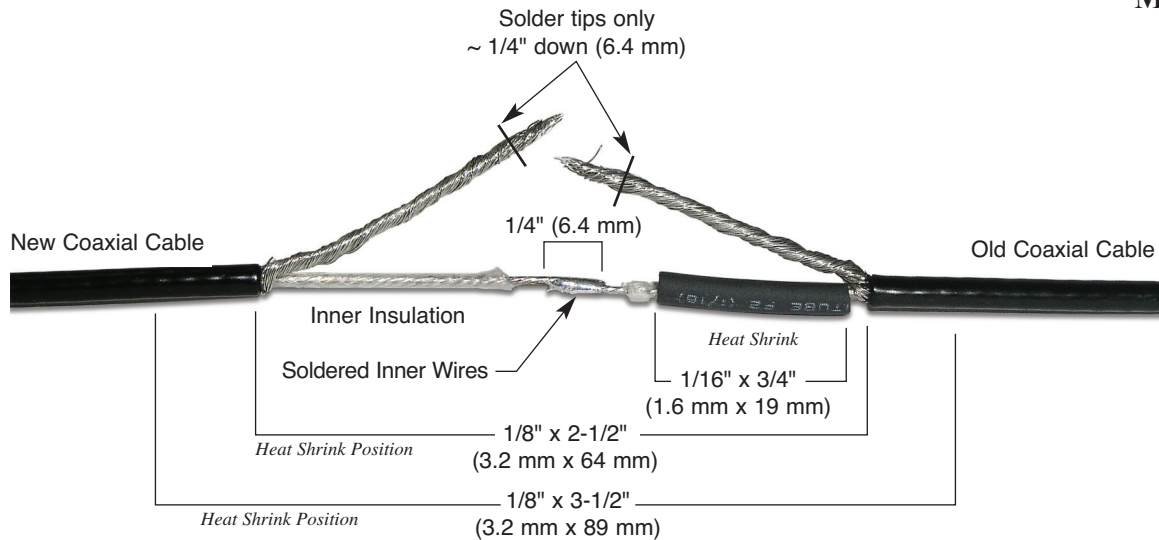
102/102M Replacement Cable

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Solinst®



Tools and Materials Needed

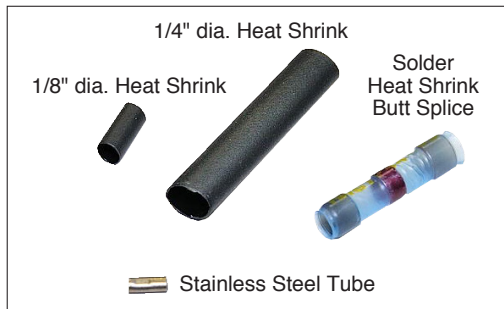
1. Cable Splice Kit (#101845)
 - 1/8" x 3-1/2" (3.2 mm x 89 mm) Heat Shrink
 - 1/8" x 2-1/2" (3.2 mm x 64 mm) Heat Shrink
 - 1/16" (1.6 mm) x 3/4" (19 mm) Heat Shrink
2. Wire Cutter
3. Wire Stripper
4. Solder Wire with Acid Flux
5. Soldering Iron
6. Alcohol
7. Heat Gun

Instructions

1. Cut the old coaxial cable at the exposed area and slide the 1/8" x 3-1/2" (3.2 mm x 89 mm) then the 1/8" x 2-1/2" (3.2 mm x 64 mm) pieces of heat shrink over the cable. Move the heat shrink up the cable.
2. Strip 1" (25 mm) off the new and 1" (25 mm) of the old cable's outer coating exposing the braided wire.
3. Undo the braided wire and divide the strands into two equal groups on each cable. Twist the wire strands of one of the groups together. Remove the other group by cutting the strands at the edge of the outer coating.
4. Place the 1/16" x 3/4" (1.6 mm x 19 mm) piece of heat shrink over the inner insulation of the old cable, which is now exposed. Push the heat shrink up to the edge of the outer coating.
5. Strip the inner insulation of each cable approximately 1/4" (6.4 mm) exposing the stainless steel wires. With the Kester Acid Flux, pre-tin the stainless steel wires by applying a small amount of solder to the wires with the soldering iron.
Clean wires with alcohol, and smoothly solder together.
6. Slide the 1/16" x 3/4" (1.6 mm x 19 mm) piece of heat shrink over the connection (see diagram).
7. Carefully apply heat from the centre working outward to prevent air pockets forming under the heat shrink.
8. Lay the twisted wires from each cable over the heat shrink so that they overlap. Carefully solder the wires together (see diagram). You do not have to use Acid Flux with these wires.
9. Slide the 1/8" x 2-1/2" (3.2 mm x 64 mm) piece of heat shrink over the connection centering the heat shrink (see diagram).
10. Being careful not to melt the outer coating of the cable, apply heat and press heat shrink onto the connection with your fingers.
11. Centre the 1/8" x 3-1/2" (3.2 mm x 89 mm) piece of heat shrink over the connection. Starting from the centre working outwards, apply heat to the heat shrink and press the connection with your fingers.

Tools and Materials Needed

1. Coaxial Cable Splice Kit (#111058)
2. Heat Gun
3. Wire Cutter (suitable for cutting stainless steel)
4. Wire Stripping Tool with 14-22 AWG (see photo)
5. Crimping Tool with 14-22 AWG (see photo)
6. Tweezers



Coaxial Cable Splice Kit (#111058)

Instructions

1. To begin, cut the original cable at a FT or M marking. Cut the replacement (splice) cable at 3/100 ft (3 markings), or 10 mm (10 markings) if using metric tape, more than the actual length you need to splice on.



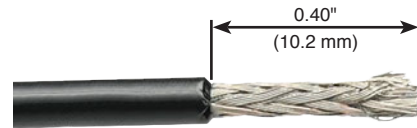
Note: You are starting with an extra 0.40" (10 mm) of splice cable to maintain the overall length of the Water Level Meter cable. During the splice you will be removing the extra 0.4" (10 mm).

2. Prepare the cable ends that will be spliced together, the original cable and the splice cable, by doing the following:
 - a) Use the recommended stripping tool (see photo below) to pre-cut the jackets using the 14 AWG size slot at 0.4" distance.



- b) Use the heat gun (7.5 setting if applicable) to soften the outer cable jackets by pre-heating for 5 seconds.

- c) Use the recommended stripping tool at the 14 AWG slot to strip the outer cable jackets by 0.40" (10 mm) to expose the braided shielding wires.

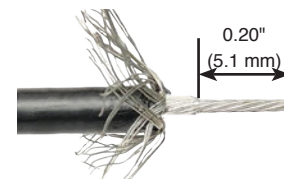


- d) Undo the braided shielding wires and push them back out of the way.

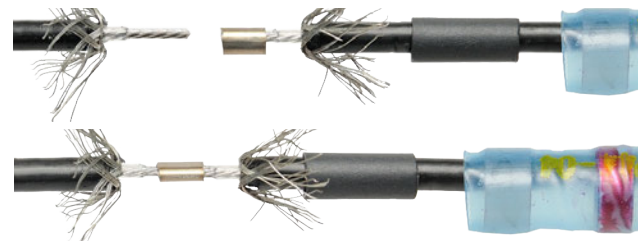
- e) Trim the centre leads to 0.30" (7.6 mm) from the shielding wires.



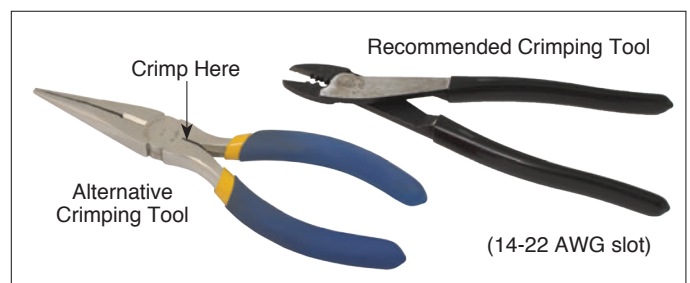
- f) Using the 18 AWG size slot, strip the inner insulation on the centre leads by 0.20" (5 mm).



3. Slide the larger 1/4" diameter piece of Heat Shrink onto one of the cables, and push out of the way. Slide the Solder Heat Shrink Butt Splice onto the cable, and push out of the way. Slide the smaller piece of 1/8" diameter Heat Shrink onto the cable and push out of the way.
4. Slide the stripped ends of both centre leads into the Stainless Steel Tube. The ends will be overlapping.

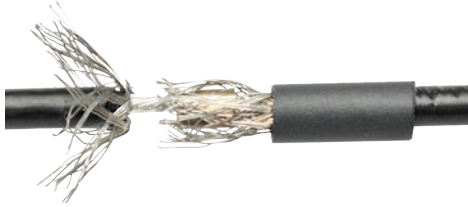


5. Using the crimping tool (see photo below), crimp the Stainless Steel Tube to the cable leads. Pull the cables to check the crimp connection.



Continued overleaf...

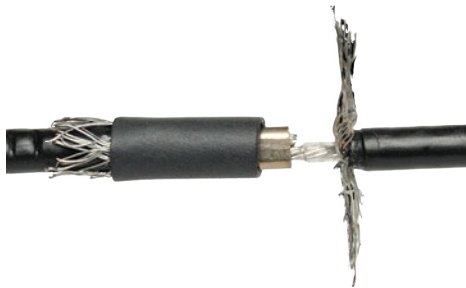
- Fold the shielding wires back over the Stainless Steel Tube, so the piece of 1/8" diameter Heat Shrink can slide over the wires.



- Use the tweezers to pull the wires from underneath the 1/8" Heat Shrink.



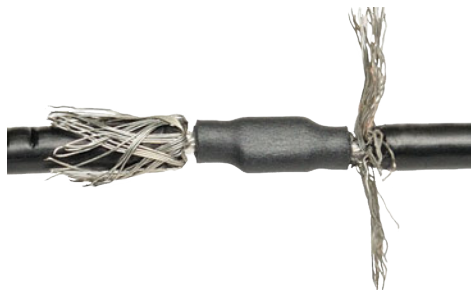
Note: Make sure there are no strands of wire left under the Heat Shrink. This could cause an electrical short in the splice.



- Centre the 1/8" Heat Shrink over the Stainless Steel Tube.



- Use the heat gun to apply the 1/8" Heat Shrink.



- Fold the shielding wires from both cables over the Heat Shrink. Start with the wires from the original cable, then overlap with the wires from the splice cable.



- Before proceeding, check for proper electrical continuity by ensuring no shielding wires remain under the Heat Shrink. Do this by turning the Water Level Meter to the 'ON' position. If the buzzer or light turn on without pushing the test button, check for wires under the Heat Shrink.
- After confirming there are no shielding wires under the heat shrink, slide the Solder Heat Shrink Butt Splice over the shielding wires.



- Apply heat to the middle of the Solder Heat Shrink Butt Splice, until most of the red band changes to silver (some of the red band may still be visible).
- Continue to apply heat to the ends of the Butt Splice, until they form a round shape around the jacket.

Note: Do not overheat the Solder Heat Shrink Butt Splice at its ends, as this may melt the outer jacket of the cable.



- Centre the 1/4" diameter piece of Heat Shrink over the Butt Splice, and use the heat gun to apply the 1/4" Heat Shrink.

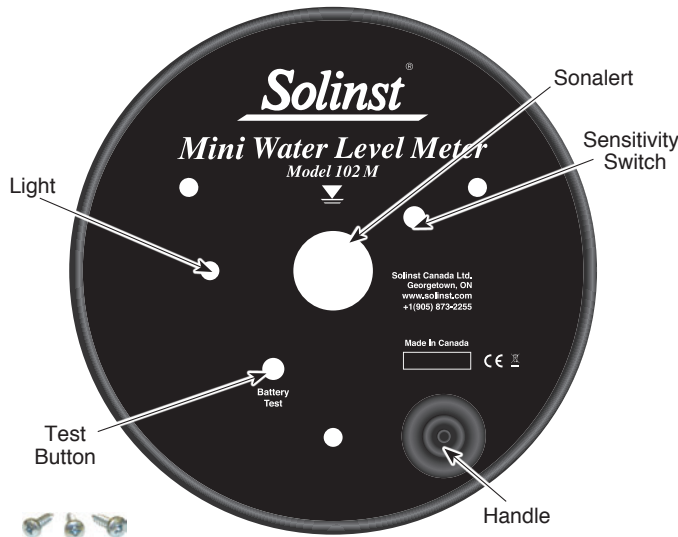


- With Probe in a glass of tap water, turn the Water Level Meter to the 'ON' position. If the connections are correct the buzzer and light on the Meter will be activated, and they will stop as soon as the probe is removed. Check the splice if the buzzer does not sound.

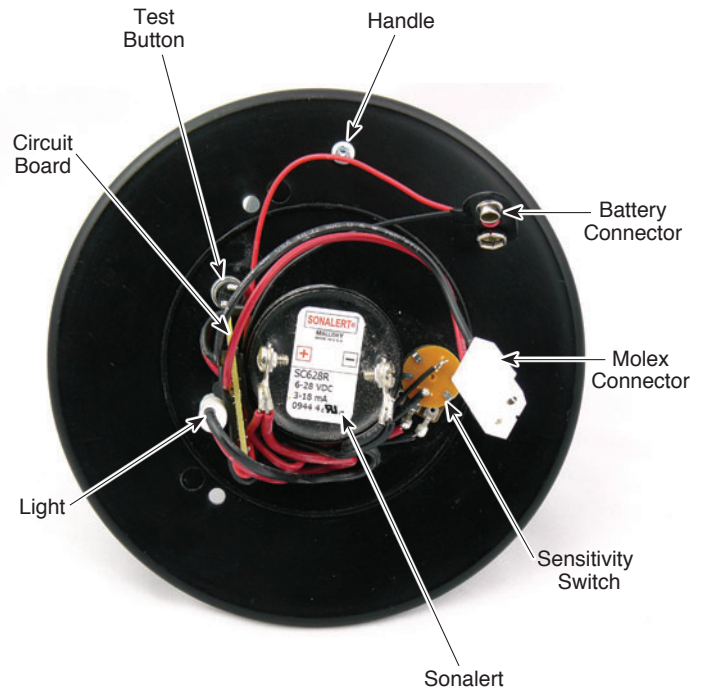
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Tools and Materials Needed

1. 102M SC100 Replacement Faceplate Assembly (#109740)
2. Phillips or Robertson (Square Head) Screwdriver
3. Small (3 mm) Flat Screwdriver
4. 10 mm Wrench or Pliers
5. Solder Iron and Wire



102M Replacement Faceplate Assembly indicating the location of the components (comes with handle attached and 3 Phillips screws)



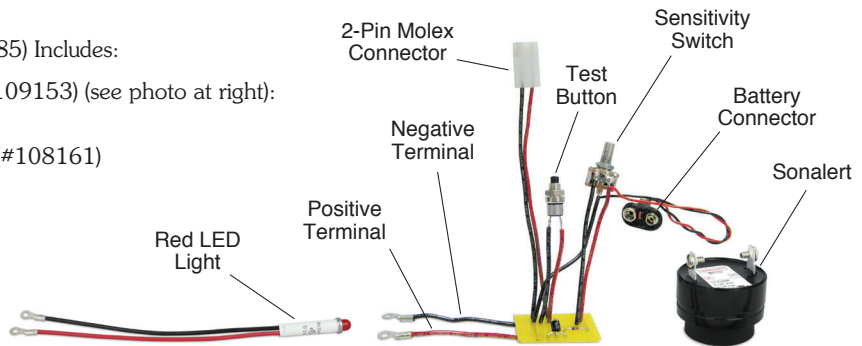
Back of 102M Faceplate showing wiring connections and the location of the components

Instructions

1. Remove the Faceplate by unfastening the three screws on the front. Unplug the 2-Pin Molex Connector from the Cable Molex Connector. Disconnect the battery.
2. There should be a rubber band holding the internal wiring snug against the Sonalert, remove the band to access the wiring.
3. From the front of the Faceplate, use a small flat screwdriver to undo the screw holding the Sensitivity Switch Knob. Remove the Knob.
4. Use the wrench or pliers to undo the nut holding the Sensitivity Switch to the Faceplate. Note the location and push the Switch through the Faceplate.
5. Use the wrench or pliers to undo the nut holding the Test Button to the Faceplate. Note the location and push the Button through the Faceplate.
6. Undo the two screws from the wire connections on the Sonalert. On the Circuit Board, unsolder the black and red wires that attach to the connections on the Sonalert. **Note the position of the wires on the Circuit Board.**
7. Push the Light out through the front of the Faceplate and feed the wires through.
8. Undo the Sonalert retaining ring from the front of the Faceplate, and remove the Sonalert.
9. Insert the Sonalert through the opening in the new Faceplate and secure with the retaining ring.
10. Feed the wires connected to the light through the hole in the front of the faceplate, and snap the light into place.
11. Resolder the red and black wires to the Circuit Board. Use the screws to reconnect the wire connections to the Sonalert (red wires to the positive terminal and black wires to the negative).
12. Place the Test Button through the Faceplate and secure using the nut.
13. Place the Sensitivity Switch through the Faceplate and secure with the nut. **Orient the Switch as shown in the photo above.** Replace the Knob on the Sensitivity Switch and secure with the screw.
14. Position the wiring around the Sonalert so the Circuit Board is between the light and the Sonalert with **components facing away from the Sonalert.** Wrap the Battery Connector leads around the wires to provide extra strain relief. See photo above.
15. Replace the rubber band around the electronics to hold the wiring in place.
16. Connect the 2-Pin Molex Connector to the Cable Molex Connector. Reconnect the battery.
17. Position the new Faceplate on the Reel and secure with the three screws.
18. With the Probe in a glass of tap water, turn the Mini Water Level Meter to the 'ON' position. If the connections are correct the buzzer and light on the Meter will activate. Check the connections if the buzzer does not sound.

Tools and Materials Needed

- 102M Complete Electronics Package (#107485) Includes:
 - 102M Faceplate Electronics Repair Kit (#109153) (see photo at right):
 - Sonalert (#101164)
 - Red LED Light with Wires and Terminals (#108161)
 - 9V Alkaline Battery (#100108)
- Phillips or Robertson #2 Screwdriver
- Small (3 mm) Flat Screwdriver
- 10 mm Wrench or Pliers
- Wire Cutters

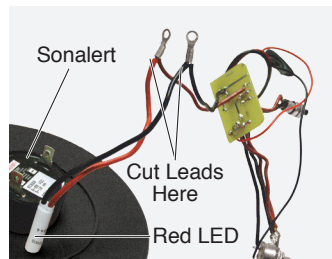


Instructions

Note: A red reel is shown in the images, as it is easier to see the wiring detail. 102M Mini Water Level Meters do have black reels.

Removing Old Faceplate Electronics

- Remove the Faceplate by unfastening the three screws on the front. Unplug the 2-Pin Molex Connector from the Tape Molex Connector. Disconnect the battery.
- There should be a rubber band holding the internal wiring snug against the Sonalert, remove the band to access the wiring.
- From the front of the Faceplate, use a small flat screwdriver to undo the screw holding the Sensitivity Switch Knob. Remove the Knob.
- Use the wrench or pliers to undo the nut holding the Sensitivity Switch to the Faceplate. Note the location and push the Switch through the Faceplate.
- Use the wrench or pliers to undo the nut holding the Test Button to the Faceplate. Note the location and push the Button through the Faceplate.
- Unscrew the two terminals from the Sonalert.
- Use the wire cutters to cut the leads of the Circuit Board from the positive and negative terminals on the LED leads. Cut the leads as close to the terminals as possible. See photo at right.



Sonalert Replacement:

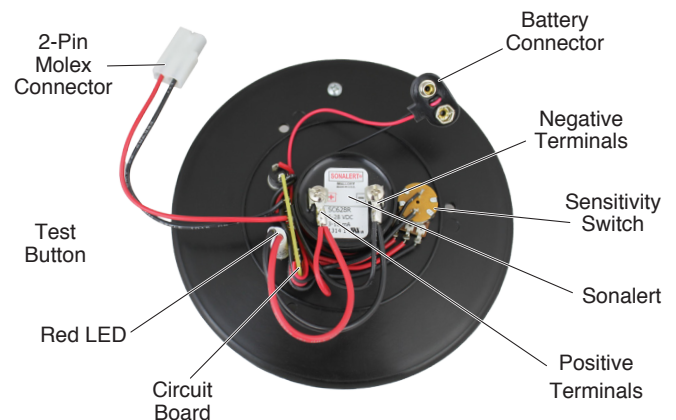
To Replace the Sonalert, undo the Sonalert Retainer Ring on the front of the Faceplate and remove the old Sonalert. Place the new Sonalert in the opening and replace the Retainer Ring.

LED Replacement:

To test the LED light, touch the negative and positive terminals to the corresponding terminals on the battery. If it does not light up, it needs to be replaced. To replace the LED simply push the old LED out of the Faceplate and snap the new one in its place.

Installing New Faceplate Electronics

- Take the negative and positive terminals of the Kit, together with the positive and negative terminals of the LED leads, and connect to the terminals on the Sonalert using the two screws. Ensure the black leads are connected to the negative terminal and red leads to the positive.
- Place the new Test Button through the Faceplate and secure using the nut.
- Push the new Sensitivity Switch through the Faceplate and secure with the nut. **Orient the Switch as shown in the photo below.** Replace the Knob on the Sensitivity Switch and secure with the screw.
- Position the wiring around the Sonalert so the Circuit Board is between the LED light and the Sonalert with **components facing away from the Sonalert**. Wrap the Battery Connector leads around the wires to provide extra strain relief. See photo below.



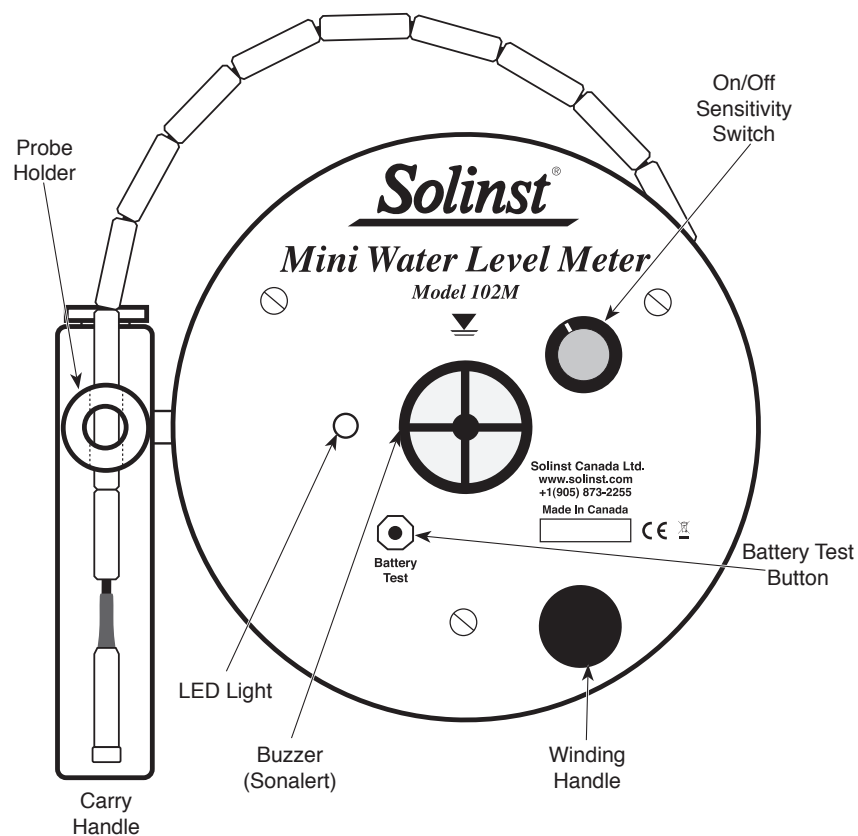
- Replace the rubber band around the electronics to hold the wiring in place.
- Connect the 2-Pin Molex Connector to the Tape Molex Connector. Connect the Battery Connector to the battery.
- Replace the faceplate and secure with the three screws.
- With the Probe in a glass of tap water, turn the Mini Water Level Meter to the 'ON' position. If the connections are correct the buzzer and light on the Meter will activate. Check the connections if the buzzer does not sound.

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Solinst® *Mini Water Level Meter: Op Instructions*

Model 102M

Model 102M Mini Water Level Meter



Available Probes: P1 & P2

Water Level Measurements

1. The zero measurement point on both P1 and P2 Probes is the tip.
2. Feed the cable into the well.

3. The light and buzzer activate when the probe tip enters water. To ensure accuracy, lower and raise the probe a few times and then record the depth measurement from the cable at the top of the well.

Equipment Check

1. Turn sensitivity switch **fully clockwise**.

Notes: 1. Clockwise rotation of sensitivity switch turns meter on and increases sensitivity.
2. Always set switch to highest sensitivity position, then decrease if necessary.

2. Depress the Battery Test button to test the battery and circuitry (excluding the probe when not in use).
3. Submerge the probe in tap water to test the probe. This completes the circuit and activates the buzzer and light.

Routine Care

1. After the depth to water has been recorded, the cable should be carefully rewound onto the reel, the probe wiped dry and placed into the probe holder.
2. The probe, weights, cable and reel can be cleaned with phosphate free (non-abrasive) detergent and water.

Battery Replacement

- Battery type - alkaline, 9 volt.
1. The battery is housed within the faceplate of the reel.
 2. Using a flat headed screwdriver, remove the three screws on the faceplate.

3. Carefully remove the faceplate so as to not unwind the cable. Note that there is an elastic band keeping everything together in the faceplate.
4. While leaving the elastic band in place, replace the battery.
5. Carefully place the faceplate back onto the hub and line up the holes.

Note: Before screwing the faceplate back onto the hub, make sure no wires are outside the hub.

6. Once the screws have been tightened and the faceplate is secure, test the water level meter.

Replacement Parts

The following parts can be provided should components become lost or damaged.

1. Splice kits
2. Lights, switches, etc.
3. Reels
4. Replacement cable with probe (complete)
5. Assembled probes on 10 ft or 3 m lengths of cable
6. Probes and weights

Troubleshooting

SYMPTOM	CAUSE	REMEDY
No sound when probe immersed in water.	Dead battery.	Replace with 9V Alkaline.
	Water Conductivity is very low.	Increase sensitivity switch setting (turn clockwise) or call Solinst for assistance.
	Disconnected wires on circuit board.	Check all connections inside hub of reel for loose/disconnected wires - solder or reconnect.
	Broken wire in cable.	Locate break in cable - splice and seal. (Contact Solinst)
Instrument continuously sounds after being immersed in water.	Disconnected wire inside probe.	Contact Solinst to obtain parts/repair instructions.
	Water in probe. Probe may be dirty which could interfere with the circuit connection.	Contact Solinst for instructions to remove, clean and reseal the probe.

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Solinst®

Tools and Materials Needed

1. SC Series Replacement Hub Assembly (#103561)
 - Molded Hub (#102157)
 - Retaining Ring (#102159)
 - 2 x Stainless Steel Washers (#102560)
 - Nylon Washer (#103507)
 - Clamp (#102164)
 - 2 Robertson Screws (#103494)
 - 6 x Phillips/Robertson Screws (#103485)
 - Grommet (#102864)
 - Black Delrin Spacer (not used for SC2000 reels) (#102163)
2. Phillips Screwdriver
3. Robertson (Square head) Screwdriver
4. Retaining Ring Pliers (Solinst pt#103546 or similar)
5. Molex Pin Extraction Tool (available at most tool outlets)

Hub Side View

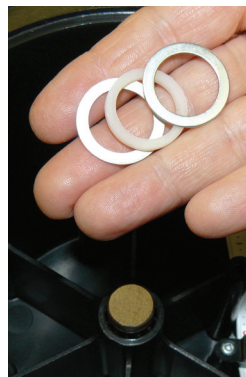
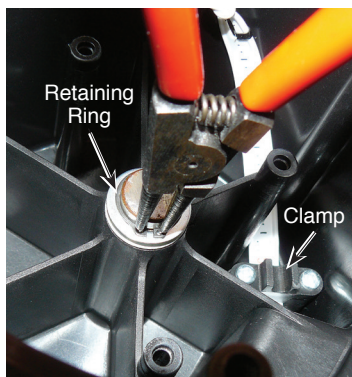
Hub Inside View



101/102 Replacement Hub Assembly

Removing the Old Hub

1. Unwind the tape/cable from the hub and pull it through the grommet until you come to the end.
2. Use the Phillips or Robertson screwdriver to undo the three screws holding the faceplate to the hub.
3. Remove the faceplate and disconnect the Molex connector that attaches the faceplate electronics to the tape/cable.
4. Remove the two Robertson screws holding the clamp over the tape/cable inside the hub and remove the clamp.
5. Use the Molex pin extraction tool to remove the pins from the tape/cable Molex connector, noting the polarity. The negative pin is removed from the terminal on the pointed side of the Molex connector.
6. Pull the tape/cable through the grommet and remove it from the reel.
7. Use the retaining ring pliers to remove the retaining ring holding the hub to the centre rod of the frame. Remove the three washers.



8. Pull the hub and attached backplate from the frame.
9. Remove the three screws holding the hub to the backplate.

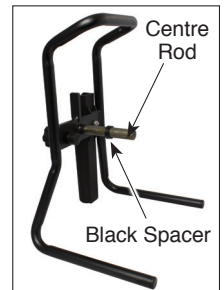
Attaching the New Hub

10. Fasten the three screws to secure the backplate to the new hub (see photo at right).
11. Ensure the black delrin spacer is installed on the centre rod of the frame and the brake pad is flush with the back of the frame. Slide the hub and backplate back onto the frame (See photo at right).



Note: SC2000 reels do not need the spacer, as there is a shoulder on the centre rod.

12. Replace the three washers over the centre rod (nylon washer between the two stainless steel washers) and reinstall the retaining ring on the centre rod.
13. Feed the tape/cable through the grommet in the new hub (grommet may need to be installed in hub opening).
14. By hand, insert the pins back into the Molex connector. The negative pin is inserted into the terminal on the pointed side of the Molex connector, and the positive pin into the other/middle terminal.



Note: Model 101: the negative pin is on the top of the tape, numbers facing up. Model 102: the negative pin is the male pin.

15. Position the tape/cable inside the hub, with the clamp over top and numbers facing up. Refasten the two screws to secure the tape/cable to the new hub.
16. Connect the Molex connector from the faceplate to the tape/cable.
17. With the Probe in a glass of tap water, turn the Water Level Meter to the 'ON' position. If the connections are correct, the buzzer and light on the Meter will be activated. Check connections if the buzzer does not sound.
18. Align the faceplate on the hub and re-secure the three screws.
19. Slowly wind the tape/cable onto the reel, holding to ensure no slack.

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