DFM Probe Service Manual

A service guide for DFM Probes

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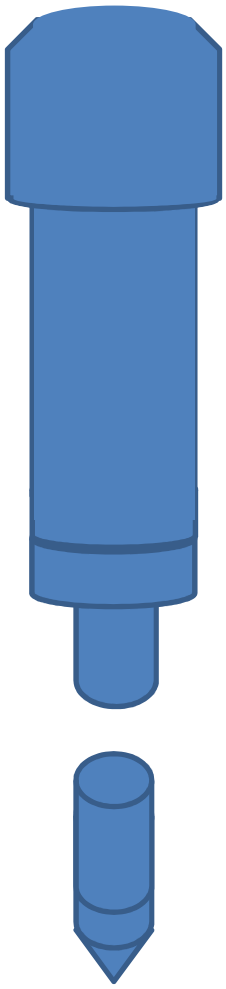
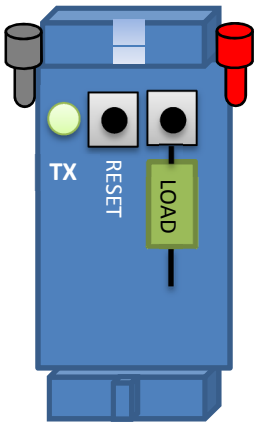
DFM Probe:

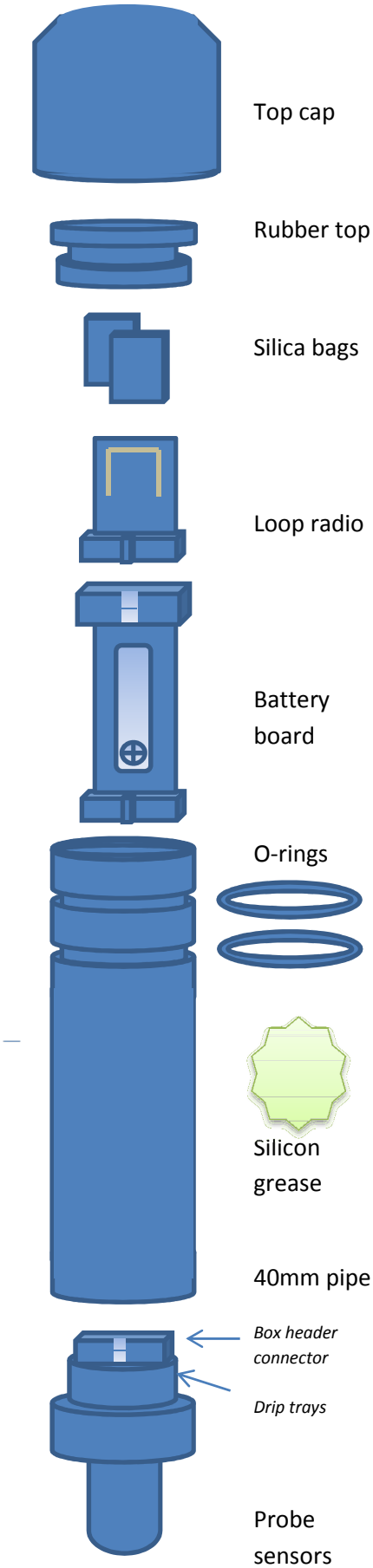
DFM Probe: Side view



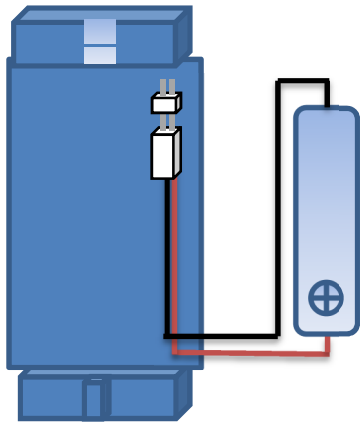
Reset Tool



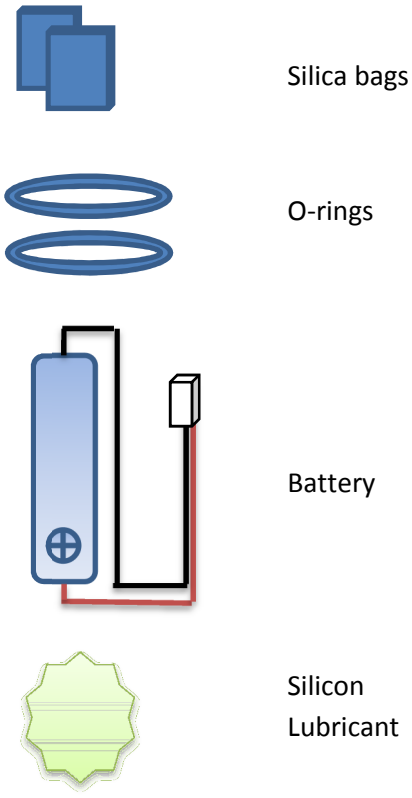
DFM Probe: **Component List**



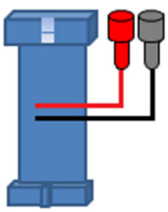
Probe Battery



Annual Replacement Kit

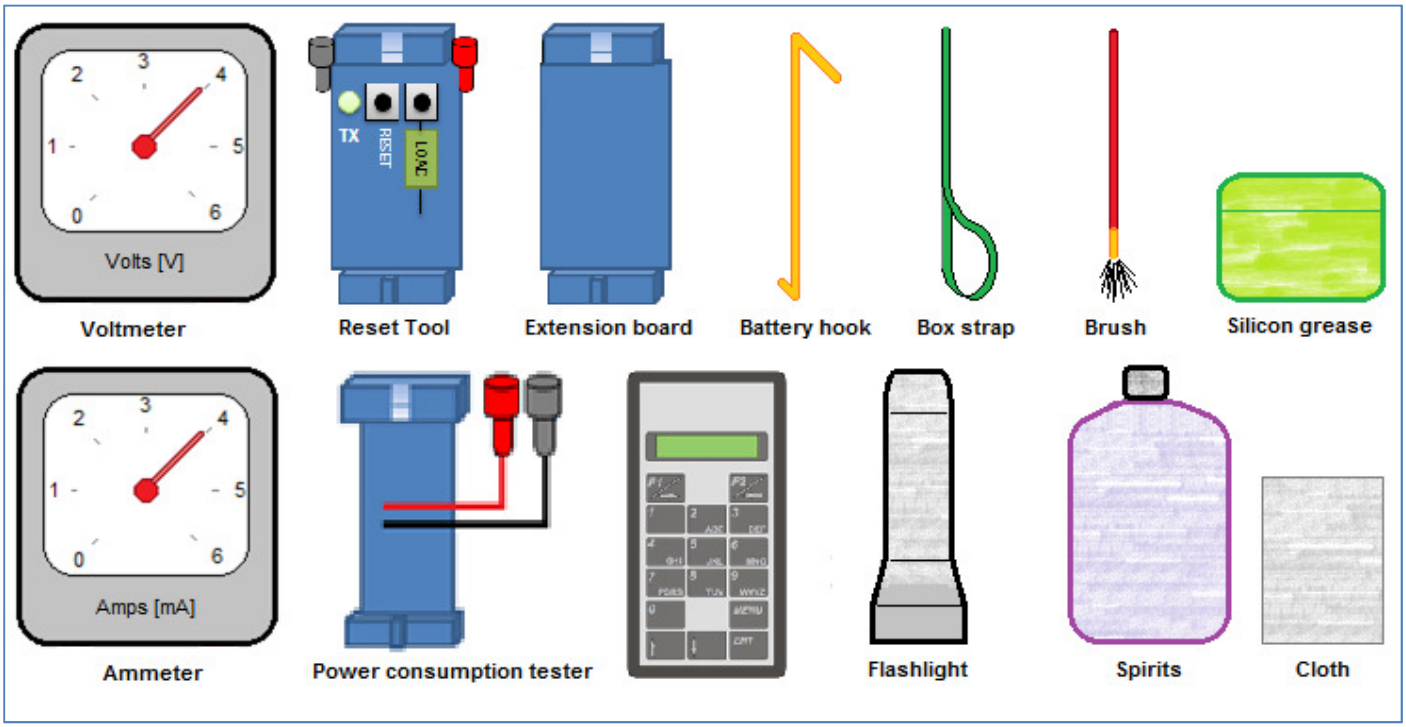


Power consumption tester

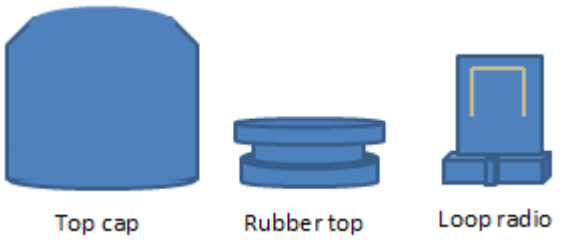


Probe Toolkit:

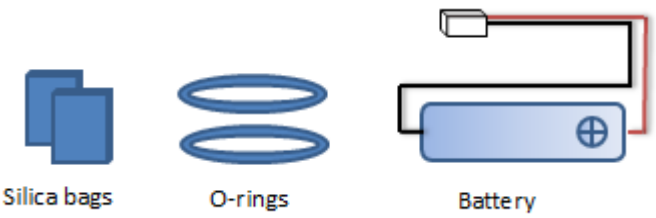
The following items will be required to service a DFM probe.



The following spares stock might be required.



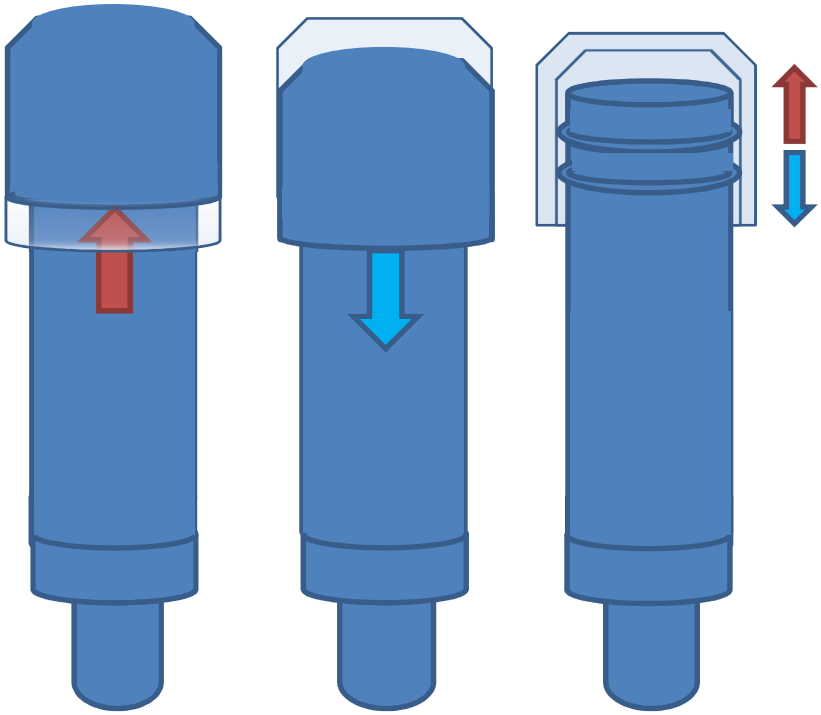
The following annual replacement stock will be required.



Probe assembly:

The probe is assembled in a way that no water or moisture can penetrate the battery chamber during the process of warming or cooling. The top-cap can move freely on the 40mm pipe to compensate for pressure differences inside the battery chamber. During the annual service of the probe, great care should be taken to follow the correct procedure when re-assembling the probe.

The probe is designed that during the process of warming the expanding air pushes the top-cap upwards. During the process of cooling the vacuum generated sucks the top-cap downwards again. No air is escaping or penetrating the battery chamber during the processes of warming or cooling and the pressure inside the battery chamber is always balanced with the atmospheric pressure. This prohibits water vapour and moisture to enter the battery chamber.



Warming ***Cooling*** ***O-ring seals***

O-ring Seals:

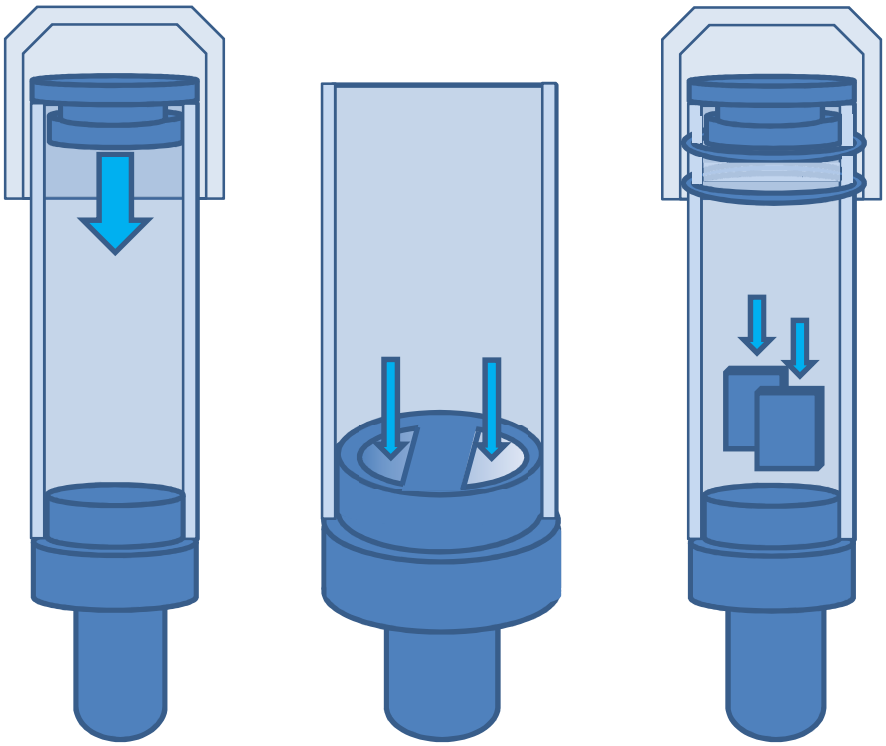
It is very important that the top-cap can move freely on the **O-ring seals** and mobility should not be restricted. A good quality **silicon base lubricant** should be used on the seals to prolong the lifespan of the seals. With oil base lubricants the rubber seals parish quickly and the seals start cracking. The O-rings should be **replaced annually**.

The function of the O-rings seals is very important, to prohibit water vapour and moisture to enter the battery chamber. Make sure that there is **no dirt** on the seals, or the inside of the top-cap. A single grain of sand stuck on the O-ring will allow air to pass by the seal and allows water vapour to condensate inside of the battery chamber.

Rubber Top:

Under rapid cooling conditions the above sealing method is not sufficient. During a heat wave period and the irrigation is switched on, the probe top will cool down rapidly when it is sprayed with water. The wet top is cooling down so quickly that water may pass by the seals into the battery chamber. That is why a secondary seal mechanism was implemented. A **rubber membrane** is pressed between the top-cap and the 40mm pipe. This membrane acts as lock valve for any air or water to enter the battery chamber.

Under rapid cooling conditions there will be a vacuum in the battery chamber, which is controlled by the rubber membrane. This vacuum will only be reduced once the probe top is warming up again.



Rubber Membrane ***Drip Trays*** ***Silica Bags***

Drip trays and Silica bags:

Every time the top-cap is removed, water vapour is introduced into the battery chamber. When the probe top is cooling down, the water vapour will start to condensate on the inside walls of the 40mm pipe. These water droplets will run down and collect in the **drip trays**, which are cut into the rubber resin of the probe. This condensation water will evaporate over time and the moisture starts collecting inside the moisture bags, **silica bags**, inside the battery chamber. These silica bags need to be replaced annually to ensure its functionality.

Water damaged probe:

It is important that the condensation water does not collect on the electronic connector box, or else the connectors will start oxidizing. Oxidised connector pins will rot away, and can lead to moisture creeping into the electronics of the probe and permanently damaging it. We call a probe **'water damaged'** if any corrosion is visible on the connector pins. To repair the damage requires us to cut open the top section of the probe and replace any corroded components. The probe will then be re-assembled into a new housing.

Every time the battery is replaced, a **visual inspection** of the connectors should be done. With the aid of a flash light look at the inside of the battery chamber that no water has collected at the bottom of the battery chamber and that there is no greenish or whitish corrosion on the connector pins. If there is any evident dampness, the battery chamber needs to be rinsed with spirits and the connectors brushed off with a brush. If there is any permanent damage on the connector pins, the probe will need to be sent in for repairs, because it will be only a matter of time before the pins will corrode and the probe will not be functional anymore.

Possible corrosion can also be visible on the removed battery board. If the connector at the bottom of the board has a whitish shine on it, this means that there is corrosion taking place on the male section of the plug.

Annual Service:

Like with any implement that is exposed to the harsh environmental conditions, the probe needs to be serviced on a regular basis as well. There are two aspects to servicing a probe, environmental and functionality.

Environmental:

A visual inspection is required to validate the position of the probe.

- The plants the probe is measuring, do they still represent the average plant size and health of the block?
- Is the probe still inside the wetting zone of the irrigation system?
- Is the probe still measuring inside the main rooting zone of the plant?
- Is there any runoff visible where the probe is planted?
- Did a hollow develop around the probe where water might be accumulating?
- Is the ground cover and weeds representative of the rest of the block?
- Is the probe protection cage in place and effective?

If there are any environmental changes resulting in the probe readings not being representative of the entire block, then the probe should be re-installed at a better suited location.

Functionality:

There are certain items on the probe that need to be changed annually, to prolong the life expectancy and effectiveness of the probe. The following items should be replaced yearly.

- Probe battery
- Silica bags (moisture bags)
- O-ring seals
- Lubrication of rubber seals

A visual inspection of possible damages, like water damage on the connector pins inside the battery chamber, is recommended as well.

The probe top, rubber top and the inside of the top-cap needs to be cleaned with spirits. It is also recommended to wipe off the loop radio with a little bit of spirits, to remove any dust that can store any static electricity.

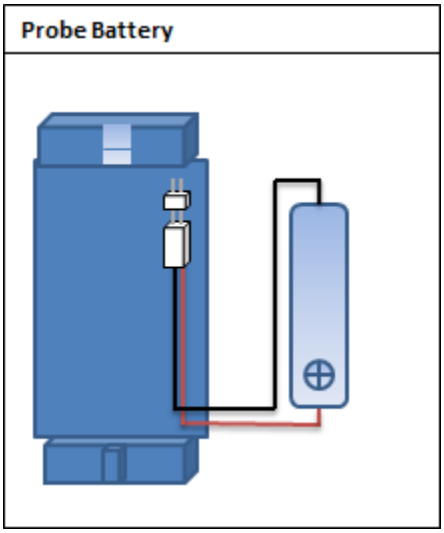
Failing to service the probe regularly will result in permanent damages to the probe. There might be some water damage that can occur if the seals do not function properly. The probe might lose its setup and calibration settings if the battery voltage runs too low. The probe might generate fictitious readings that will result in unreliable data be presented for scheduling purposes.

Service Interval:

Servicing the probe only when the battery is running low is not sufficient enough. The probe should be serviced on a **yearly** interval. It should be done before the irrigation season starts, to ensure reliability. A service record sheet should be implemented per probe, noting any work that was done on the probe. The environmental inspections should be done at least every three months. On seasonal crops the environmental inspection should be done weekly at the beginning after planting and then later increased to two-weekly when plant maturity has been achieved.

If the probe battery voltage reading is dropping to **below 3.4 volt**, it is recommended to replace the battery as quickly as possible. Because it is a matter of weeks before the battery voltage is too low for the probe to function properly.

Probe Battery:



The probe battery is an AA size Lithium Chloride battery specifically built for DFM. It is connected to the battery carrier board that fits into the probe box header connector. The loop radio slides into the top box header connector of the battery board. There is a slide guide on the box header connectors to ensure that it cannot be inserted the wrong way round.

Only the DFM supplied batteries should be used. DFM batteries are specifically configured for the probes and comply with the requirements. There is a vast amount of different types of batteries available, but some of them can damage the probe electronics, whereas others do not deliver enough current for the probe to function properly. Not all types of batteries can handle the extreme temperature fluctuations and are prone to explode under the harsh conditions the probe has to function.

The warranty on the DFM probe compels that a DFM battery is being used. DFM cannot guarantee the functioning of the probe if an alternative battery is being used.

The cell inside the DFM battery is developed for military applications and is used worldwide for high risk applications, where maximum reliability is required. Its gold coated electrodes and bobbin style electrode configuration ensures more effective slow energy release over longer periods of time and make it ideally suited for the probe application. This top of the range battery cell was chosen to ensure reliability and life expectancy.

The Lithium Chloride battery delivers a voltage of between 3.55 Volts to 3.65 Volts when there is no load attached to it. The exact voltage is mostly determined by its built-in protection circuit. The malfunction of the protection circuit will lead to the battery exploding under high load conditions, and thus should never be tampered with.

The probe battery has a shelf life of five years if stored in a cool and dry place. Thus, for every year the battery is in storage, it will lose 20% of its original capacity.

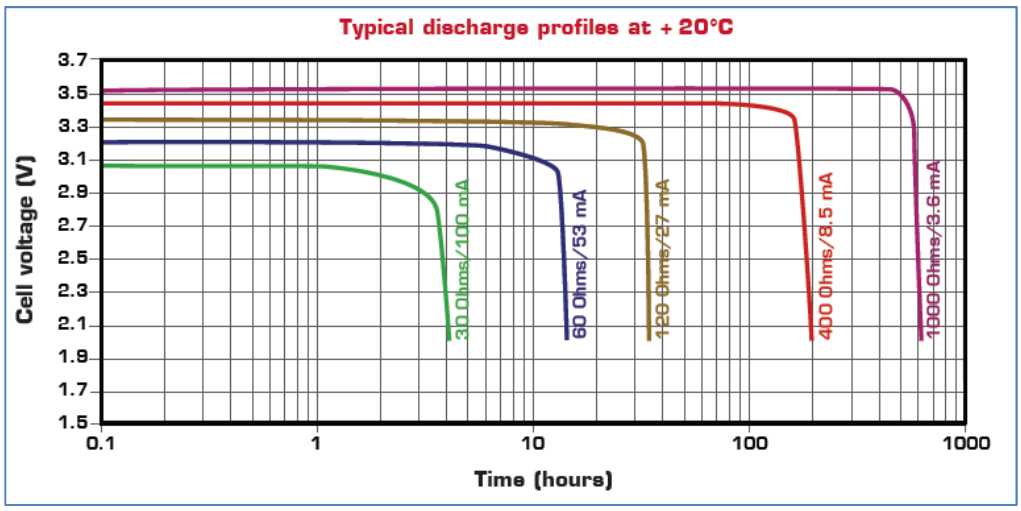
Battery life expectancy at 20°C for a read interval of 60 minutes and downloading once a week is estimated at 18 months. If the temperature is to increases to 40°C the life expectancy is reduced to 12 months. If the read interval is increased to 15 minute intervals the battery life expectancy is reduced to 9 months.

Lithium Chloride batteries are listed as hazardous material. Handle them with care.
Do not expose the batteries to direct sunlight, they may overheat and explode.
Do not expose the batteries to heat, it will degrade lifespan expectancy.
Store the batteries in a well-ventilated cool and dark environment.
Store the batteries separated from flammables and other hazardous material.
Do not store batteries for long periods of time; they will lose charge capacity due to internal leakage.
Never place a battery on a metal surface, or any other type of conductive material.
Always wrap batteries individually in insulating material during transport or storage.
Prevent batteries of coming in contact with other batteries or electronic components.
Prevent battery contact with water and other liquids.
Do not dispose of batteries; they have to be treated as hazardous waste.
Do not drop, puncture or damage the battery, they could explode.
Do not tamper with the internal battery load protection circuit.
Lithium Chloride batteries are not permitted to be transported by airfreight. You have to inform your courier service of the nature of product and the hazards involved.

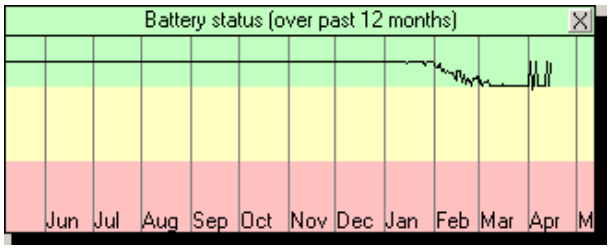
Lithium Chloride batteries can explode easily and are very dangerous! Handle them with care.

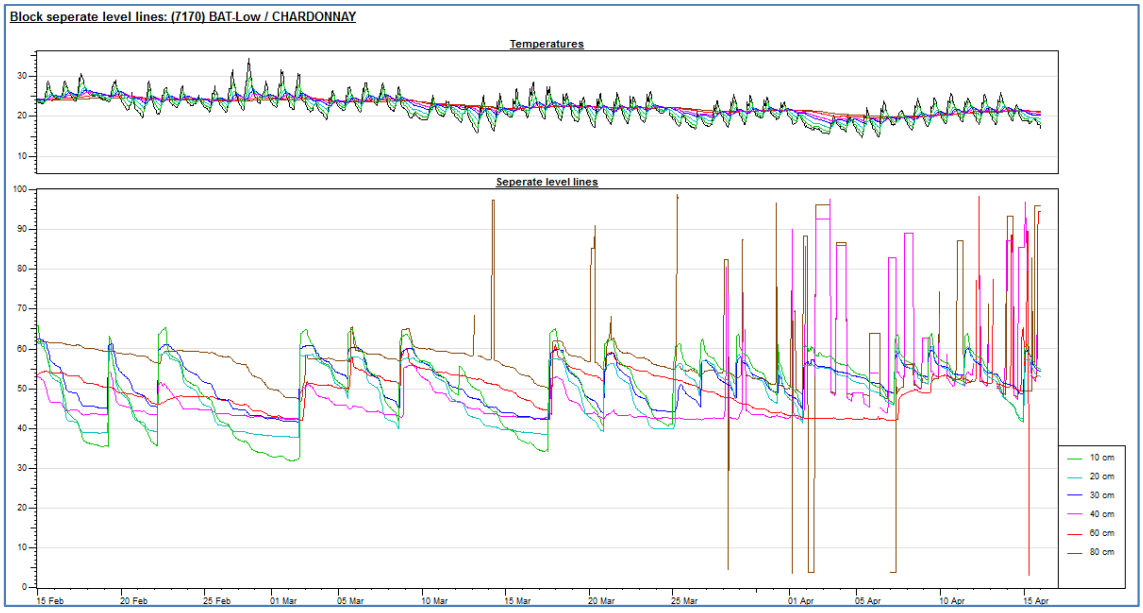
Battery lifespan:

The battery voltage will drop when a resistive load is connected to it. The amount of voltage drop under load conditions will determine the quality of the battery. This voltage drop though, cannot be used to determine the life expectancy of the battery, due to the current flow being limited by the protection circuit. If there is not enough chemical substance left in the battery anymore, the voltage drop will increase under load conditions.



Once an increase in voltage drop is evident, a rapid decline in battery voltage capacity can be experienced. For the probes it is less than a month before critically low levels will be reached. The lack of battery capacity will also become evident on the sensor readings as sporadic and erratic spikes will show on the probe readings graph.





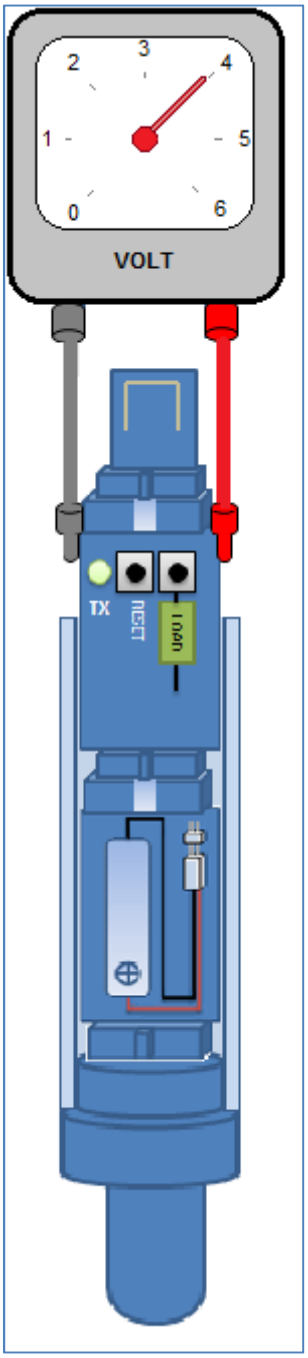
The lifespan of the battery cannot be predicted accurately, because there are many factors affecting the lifespan of the battery. The lifespan of the battery is effected by:

- Temperature
- Probe read interval
- Data download interval
- Chemical substance
- Leakages due to moisture and dust

Probe Battery Test:

The battery voltage in the probe reading record represents the supply voltage after all the sensors have been read, and thus represents the recovery voltage of the battery. It is not a true representation of the minimum voltage while sensors are switched on. The battery voltage on the probe reading is also not very accurate and is measured in coarse steps of 3.6V, 3.5V, 3.3V, 3.1V, 2.9V and 2.7V.

Use the reset tool to measure the exact voltage of the probe battery as follows:



- Remove the top cap and rubber top from the probe.
- Remove the radio card.
- Insert the reset tool into the top of the battery board.
- Set your voltmeter to the correct DC VOLT scale, 5 Volt or higher.
- Connect the voltmeter to the reset tool terminals.
- Measure the battery voltage under 'Low Load' conditions.

The next step is to measure the battery voltage under load, which is the minimum voltage while the probe is taking a reading.

- Insert the radio card into the top of the reset tool.
- Use the data logger to force the probe to take a reading.
- For the next 15 seconds monitor the battery voltage and record the lowest voltage.
- Repeat these steps a couple of times to make sure that you are getting a good minimum reading, which represents the voltage under 'High Load' conditions.
- Re-assemble probe after test is completed.
- Set probe date and time.
- Take a sample reading and validate results.

When re-assembling the probe, make sure to follow the correct procedure. You will also need to set the probe date and time with the logger, because the probe might have reset its clock due to lack of supply current. Also take a probe sample reading to validate that the probe installation has not been disturbed.

The battery voltages have to comply with the following specifications:

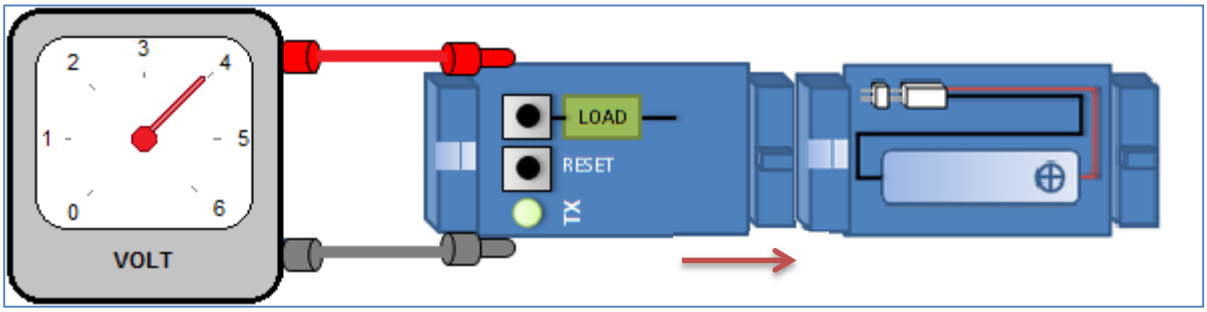
Specification:	Minimum	Normal	Maximum
Battery Voltage Low Load	3.55V	3.60V	3.65V
Battery Voltage High Load	3.45V	3.50V	-
Voltage Drop (Lo Load – Hi Load)	-	0.10V	0.15V

If this voltage drops too far, there might be not enough chemical substance left in the battery anymore, and the battery is starting to run flat. If you were to repeat the test with a different (new) battery and you are still experiencing big voltage drops, would be a sign that there might be a problem with the sensors. At that point you are required to perform a probe power consumption test to verify if the probe is faulty.

If the voltage drop is too big you should confirm your findings with a 'Battery Load Test'.

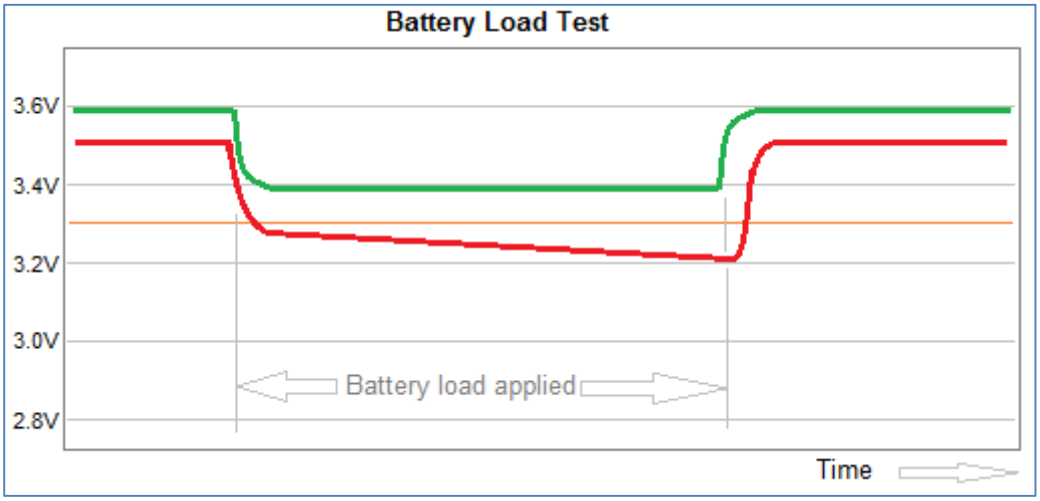
NOTE: Lithium Chloride batteries are listed as hazardous material. Handle them with care.
NOTE: Do not press the 'Battery Reset Button' whilst the 'Reset Tool' is connected to a probe.
NOTE: Do not short-circuit any pins whilst the 'Reset Tool' is connected to a probe.
NOTE: Make sure that the voltmeter is set to DC - VOLTS before connecting it to the 'Reset Tool'.
NOTE: Do not remove the probe battery while the probe is taking a reading, it can corrupt the flash.

Probe Battery Load Test:



To test the quality of the battery, a battery load test needs to be performed as follows:

- Remove the probe battery from the probe.
- Insert the 'Reset Tool' into the top box header connector of the battery board.
- Configure the voltmeter to measure the correct DC (direct current) voltage range, 5 Volts or higher.
- Connect the voltmeter to the reset tool terminal connectors.
- Record the meter voltage, which is the 'Battery Voltage without Load'.
- Place a resistive load on the battery by pressing the 'Load Button'.
- Keep the 'Load Button' pressed until the new battery voltage stabilizes.
- The new voltage represents the 'Battery Voltage under Load'.
- Release the 'Load Button'.



The battery voltages have to comply with the following specifications:

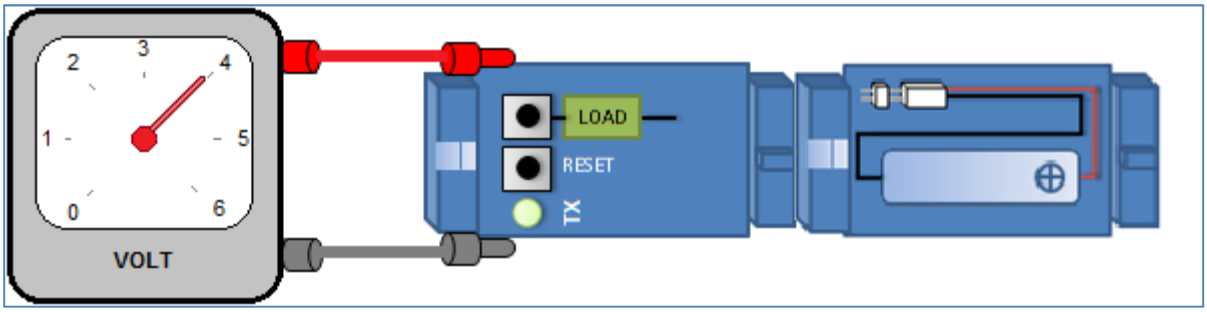
Specification:	Minimum	Normal	Maximum
Battery Voltage without Load	3.55V	3.60V	3.65V
Battery Voltage under Load	3.33V	3.40V	3.56V
Voltage Drop (No Load – Load)	-	0.15V	0.25V

If the probe battery voltages do not comply with the specifications, the battery should be replaced. If it is a new battery or it has been in storage for a while, the battery chemical substance needs to be re-activated and the load test repeated.

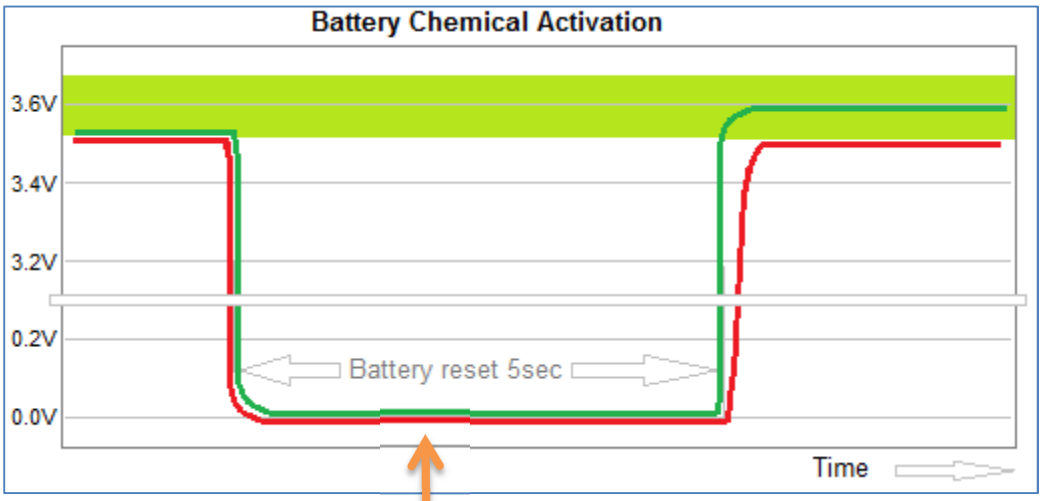
Lithium Chloride batteries are listed as hazardous material. Handle them with care.
Do not press the 'Battery Reset Button' whilst the 'Reset Tool' is connected to a probe.
Do not short-circuit any pins whilst the 'Reset Tool' is connected to a probe.
Make sure that the voltmeter is set to DC - VOLTS before connecting it to the 'Reset Tool'.

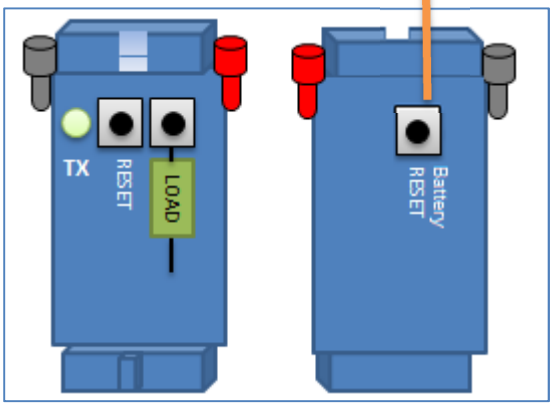
Chemical Activation:

The chemical substance in the probe battery needs to be activated before use. This is normally done before shipping, but in cases where the battery is being kept in storage for long periods of time, the activation process has to be repeated before use. The chemical activation process is done as follows:



- Insert the 'Reset Tool' into the top box header connector of the battery board.
- Configure the voltmeter to measure the correct DC (direct current) voltage range, 5 Volts or higher.
- Connect the voltmeter to the reset tool terminal connectors.
- Press the 'Battery Reset Button' on the back of the 'Reset Tool' for 5 seconds.
- Wait for the battery voltage to stabilize and confirm that it is above the specified 3.55 Volts.
- Continue with a 'Probe Battery Load Test' to ensure that the battery is within specification.

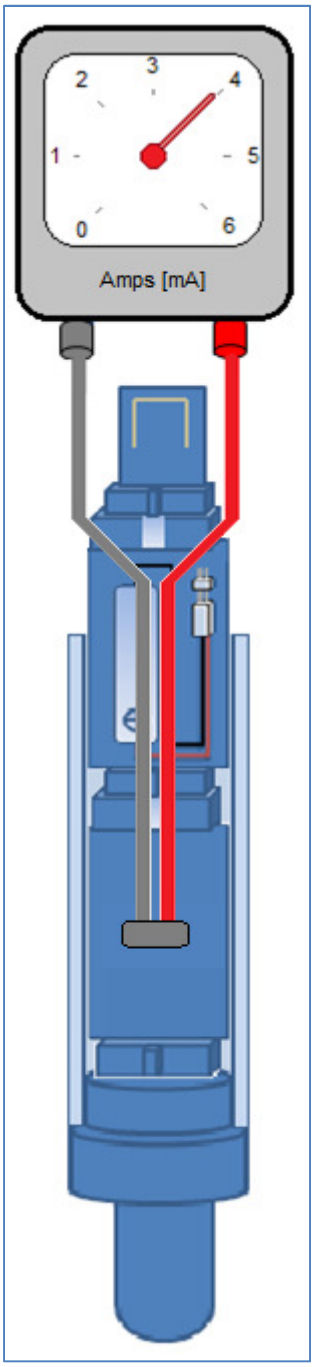




Reset tool: Front and Back view

Do not press the 'Battery Reset Button' whilst the 'Reset Tool' is connected to a probe.
Do not short-circuit any pins whilst the 'Reset Tool' is connected to a probe.
Do not use this method of chemical activation when using alternative battery suppliers.

Probe Power Consumption Test:



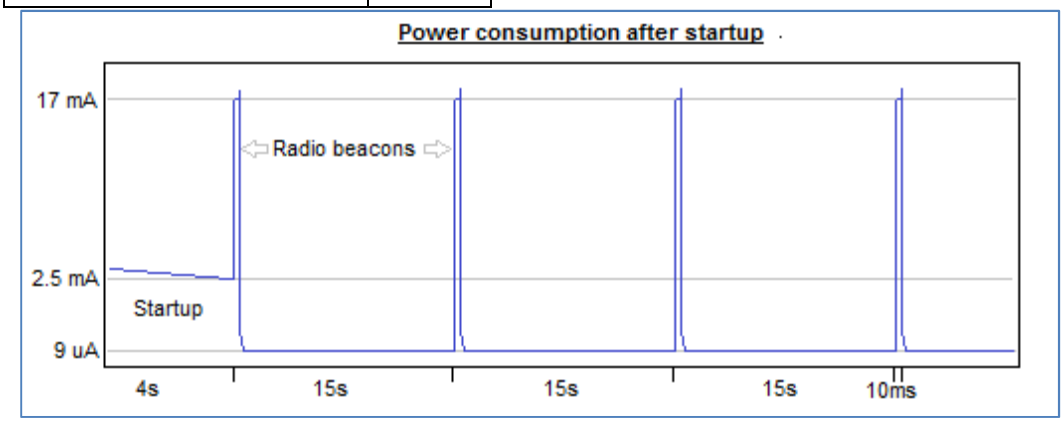
Perform this test to measure the power consumption of the probe. This test is essential for fault finding on the probe:

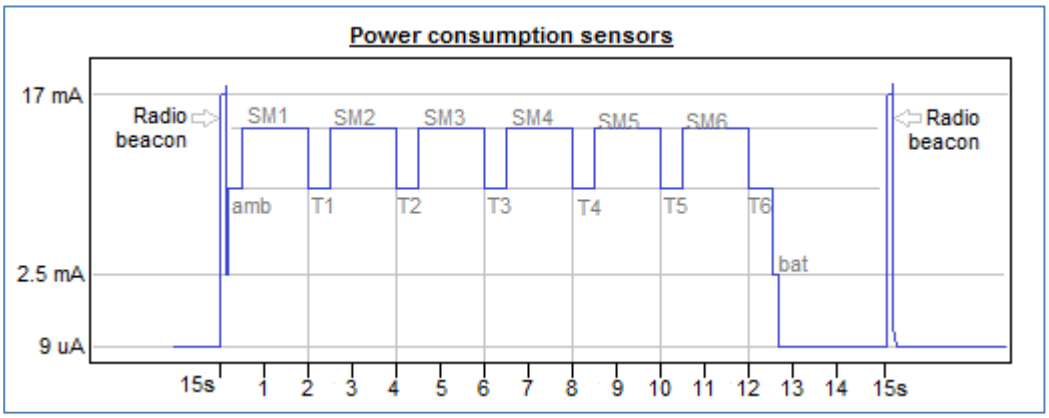
- Remove the top cap and rubber top from the probe.
- Remove the radio card and battery board.
- Insert the **power consumption test board** into the probe header connector.
- Insert the battery board into the top of the power consumption test board.
- Set your ammeter to the correct DC AMPs scale, 20mA or higher.
- Connect the ammeter to the power consumption test board terminals.
- Take power consumption readings and compare them to table below.
- Re-assemble probe after test is completed.
- Set probe date and time.
- Take a sample reading and validate results.

When re-assembling the probe, make sure to follow the correct procedure. You will also need to set the probe date and time with the logger, because the probe might have reset its clock due to lack of supply current. Also take a probe sample reading to validate that the probe installation has not been disturbed.

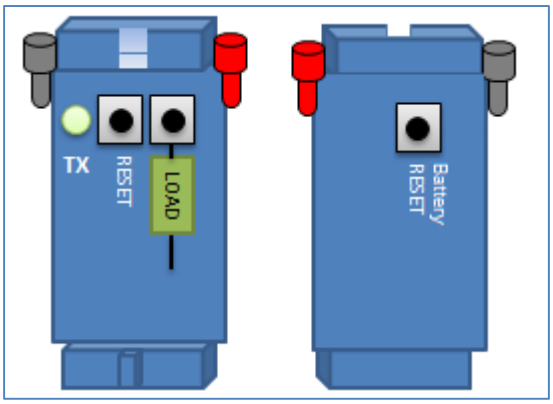
The probe power consumption has to comply with the following specifications (±10 %):

Probe sleep mode	9 uA
Probe awake	2.5 mA
Temperature sensor	9 mA
Moisture sensor	16 mA
Radio TX mode	17 mA
Radio RX mode	20 mA
Radio ON mode	12 mA
No radio connected	7 uA



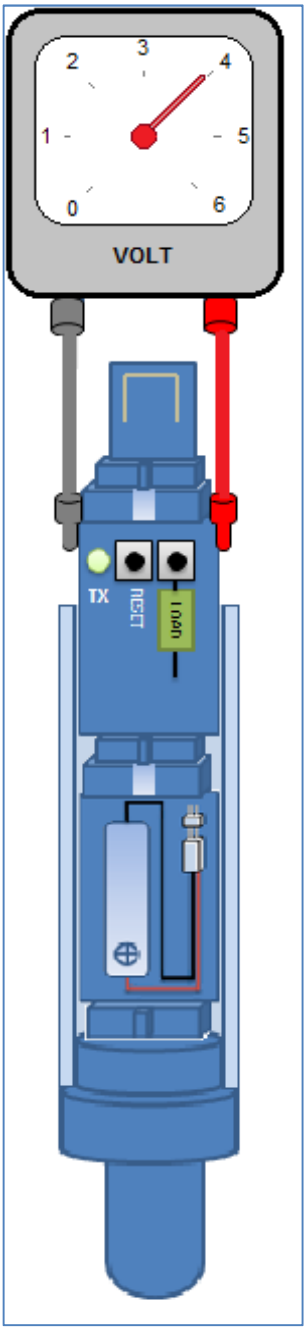


Probe Reset Tool:



The probe reset tool is essential for fault diagnostics for probe and battery malfunction:

- TX LED shows reset condition and radio comms.
- Reset button to hardware reset probe.
- Load button to generate additional load on battery.
- Battery reset button to activate battery chemistry.
- Terminals to measure battery voltage.



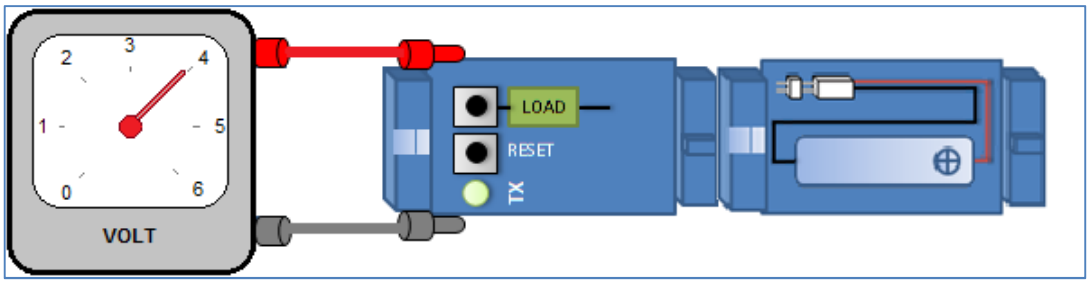
Use the reset tool for probe malfunction diagnostics as follows:

- Remove the top cap and rubber top from the probe.
- Remove the radio card.
- Insert the reset tool into the battery top header connector.
- Insert the radio into the top of the reset tool board.
- Set the voltmeter to the correct DC VOLT setting, 5 Volts or higher.
- Connect the voltmeter to the terminals to do a battery test.
- Press the reset button to initialize the start-up procedure.
- Monitor the LED signals (see table below).
- Monitor battery voltage (see probe battery test above).
- Re-assemble probe after diagnostics is successfully completed.
- Set probe date and time.
- Take a sample reading and validate results.

When re-assembling the probe, make sure to follow the correct procedure. You will also need to set the probe date and time with the logger, because the probe might have reset its clock due to lack of supply current. Also take a probe sample reading to validate that the probe installation has not been disturbed.

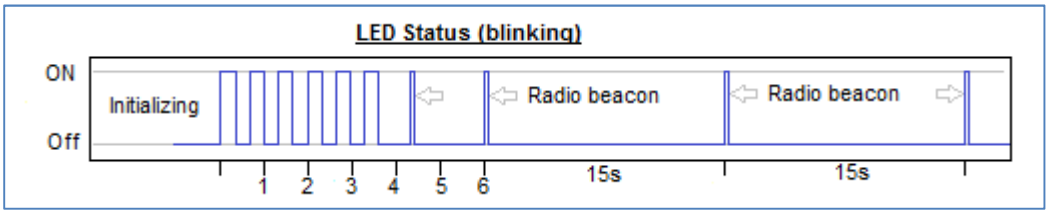
Use the reset tool for probe battery malfunction diagnostics as follows:

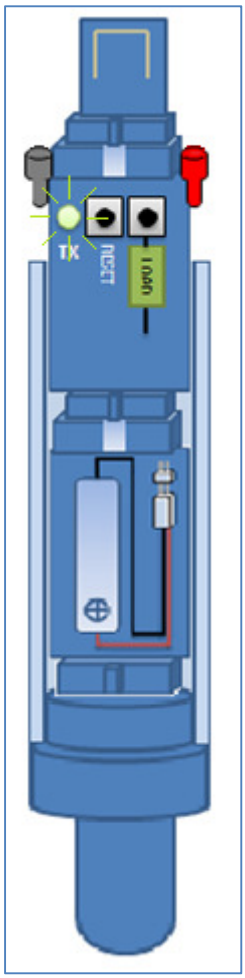
- Remove the radio and the battery from the probe.
- Insert the reset tool into the top header connector of the battery board.
- Set the voltmeter to the correct DC VOLT setting, 5 Volts or higher.
- Connect the voltmeter to the terminals to do a battery test.
- Press the load button to perform a battery load test (see probe battery load test above).
- Press the battery reset button for 5 seconds to activate the battery chemistry (see Chemical Activation above).



Reset Tool LED indication:

Use the LED indicator to diagnose probe malfunction. Below is the normal LED behaviour after RESET.

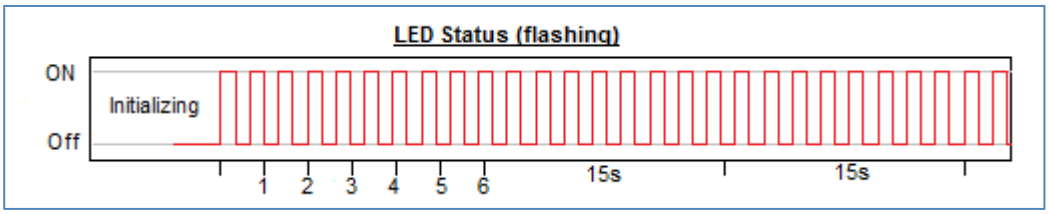




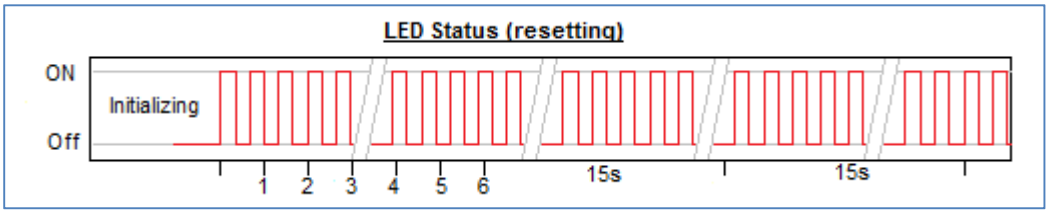
After reset the probe will give 6 flashes (2 per second), which is followed by a short flash, indicating the first beacon sent. The second beacon is delayed by 3 seconds after the 6th reset flash. From there on the probe will flash every 15 seconds to indicate that another beacon has been sent.

The first beacon indicator is the important one to look for. This is the sign that the probe has started up correctly and that the processor hardware is functioning correctly. The delay between the 6th flash and the beacon should be less than a second. If this delay is longer than a second is an indication that there might be something wrong with the radio or the on-board flash. The first 6 flashes should also time correctly as two per second. If the original 6 flashes are faster or slower than two per second is an indication of malfunction of the processor.

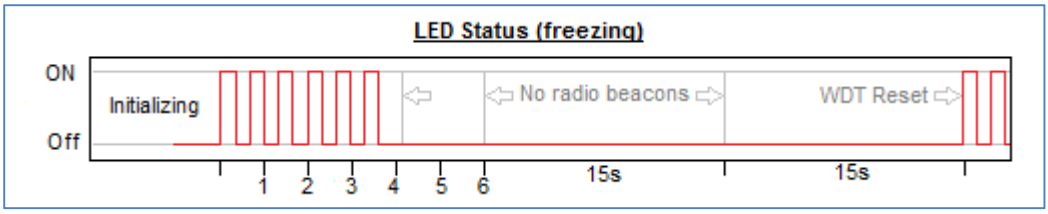
Below are a few examples of malfunctioning probes with internal faults.



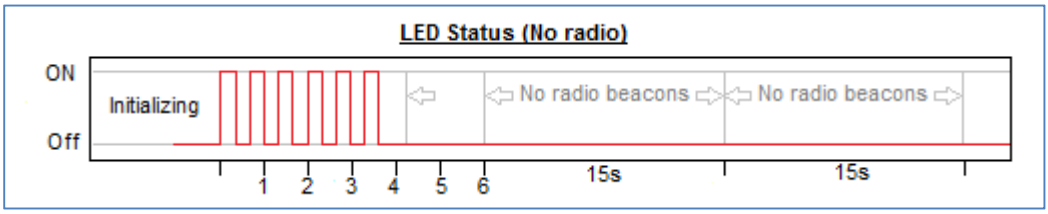
A probe, where the LED keeps flashing twice per second, is referred to as a flashing probe. This normally occurs when the internal crystal timer is damaged. This might be as a result of the probe being dropped or exposed to high voltage static discharge.



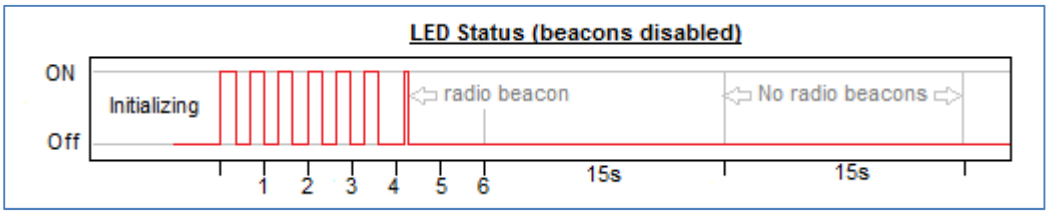
The probe keeps resetting on regular intervals (below 30 seconds) without sending a beacon. At times this condition is mistakenly identified as a flashing probe. This could be due to a voltage drop below 2.7 Volt and is called a brownout. Replace the battery and test again. If this problem persists then perform a probe power consumption test. High power consumption after 3 seconds is an indication that the flash memory or the radio is faulty. Low power consumption is an indication that there is a problem with the power supply as a result of an internal fault. It would be the internal protection circuit that is damaged as a result of reverse polarity of static discharge.



The probe keeps resetting on regular intervals (more than 30 seconds) without sending a beacon. At times this condition is mistakenly identified as a flashing probe. This freezing condition occurs when the flash memory is not available and the probe watchdog timer resets the probe after 32 seconds. This is normally due to a faulty flash or a faulty flash power control transistor and occurs after static discharge or low battery power during data safe action.



The LED does not show the 15 second interval beacon signals, because it cannot talk with the radio card. The probe (watchdog timer) will not reset, but the logger cannot find the probe. First take out the radio card and clean it with spirits and the test it again. If the problem prevails then replace the radio card. On the older version probes the radio power supply transistor might be damaged. Also check the battery board for any visible damage.

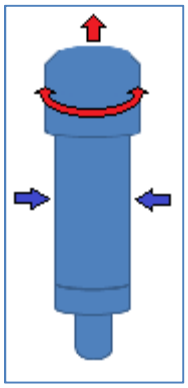


If the ‘Send Beacons’ option on the probe is disabled; only one beacon will be sent after RESET. This option needs to be enabled for the loggers to be able to talk to the probe. To access the probe with the logger, select the applicable menu option on the logger and reset the probe. The logger will pick up the one beacon to talk to the probe. Repeat these steps every time you need to talk to the probe. Enable the probe ‘Send Beacons’ option on the probe setup screen of the logger.

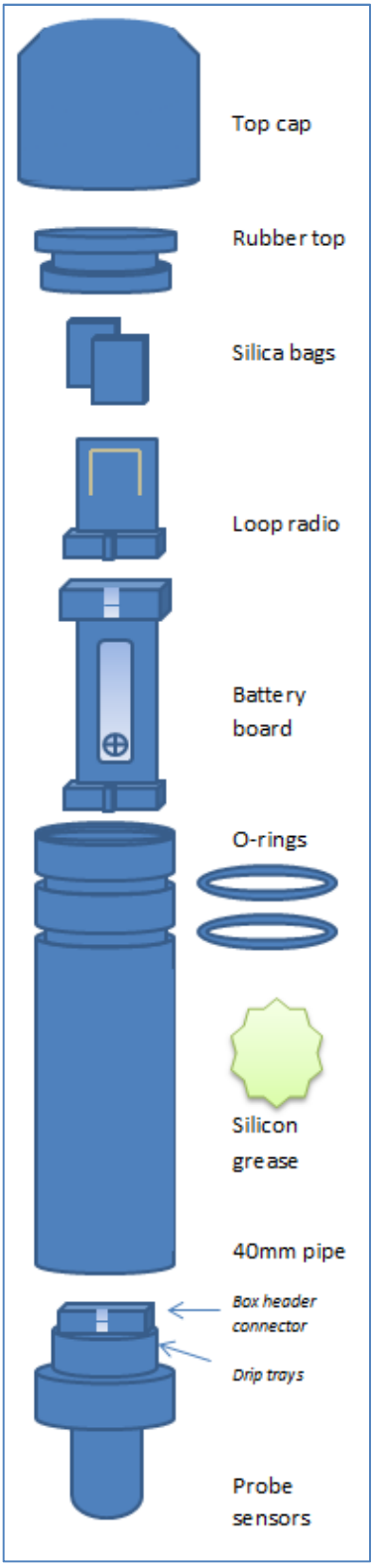
Do not press the ‘Battery Reset Button’ whilst the ‘Reset Tool’ is connected to a probe.
Do not short-circuit any pins whilst the ‘Reset Tool’ is connected to a probe.

Procedures replacing a probe battery:

The first step is to remove to old battery.



- Remove the probe top-cap. Use your left hand to stabilize the probe in position and with the right hand twist the top-cap until it is lose enough to be pulled upwards. Slowly pull off the top-cap while twisting it. When removing the top-cap, the rubber top might still be lodged inside the top-cap and can fall out. Make sure that the rubber top does not fall on the ground. Place the removed top-cap on a clean and dry surface.
- Remove the rubber top and place it on a clean and dry surface. If the rubber top is not on the top of the probe, it might still be lodged inside the top-cap, remove it carefully.
- Pull out the radio card and clean it with spirits and a dry cloth and give it time to dry off.
- Pull out the battery board. You can use the battery hook if the battery board does not come out easily.
- Remove the O-rings and destroy them by cutting them in half.
- Remove the silicon bags and disperse of them.



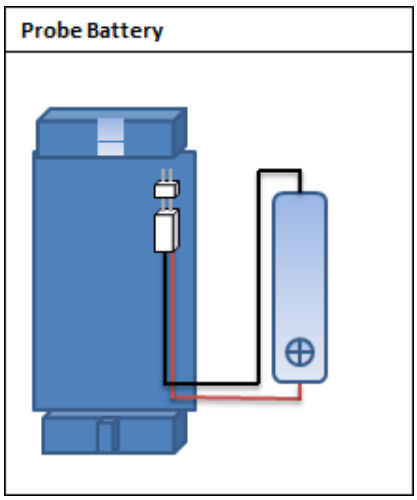
The next step is to perform a probe inspection.

- Inspect all the removed parts for dampness, dirt and corrosion. If there is any evidence of condensation on any of the components will require the probe top (battery chamber) be rinsed with spirits.
- With a flashlight inspect the inside of the battery chamber for any evidence of corrosion or condensation. If so then rinse the inside of the battery chamber with spirits, and using a brush, clean the box header connectors of any corrosion. If the gold copper pins show any corrosion (discolouring) the probe needs to be taken out for water damage repairs.
- Inspect all the components for any visible damage. Replace if need to.

The next step is cleaning all the components.

- Clean all the components with a brush and spirits and inspect for any visible damage.
- Take special care when cleaning the O-ring grooves to make sure there is no dirt or old grease in there.
- Wipe off the rubber top and top-cap and ensure that there is no dirt left on the inside of the caps.

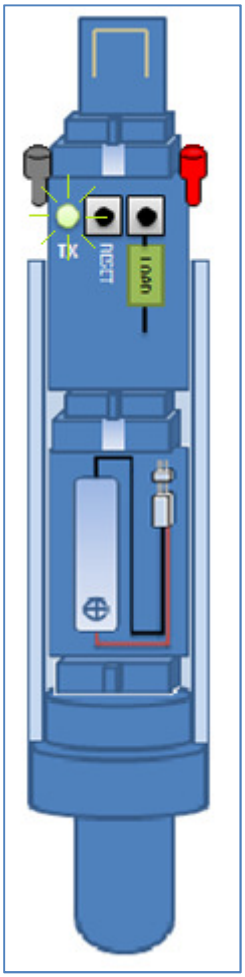
Prepare the battery board when replacing the loose battery.



- Cut off the white plastic cover from the battery board.
- Remove the battery from the board and disperse the battery.
- Inspect the battery board for any damage or corrosion.
- Clean off the battery board and inspect.
- Insert the new battery into the connector.
- Fasten the battery to the board with some adhesive tape or heat-shrink.

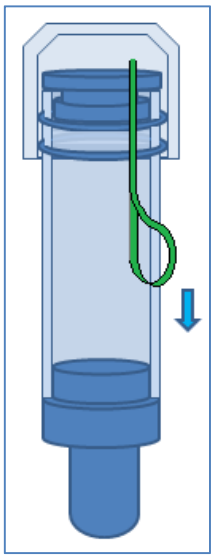
Activate and prepare the battery for assembly.

- Perform a probe battery load test to ensure that the new battery is still fine.
- If the battery has been stored for a while, chemical activation is required.
- Perform a probe power consumption test if the previous battery did not last long enough.
- Insert the probe battery board into the probe box header connector.
- If you have difficulties inserting the battery board, use a spare battery board inserted into the top of the new battery board to elongate it. It will be easier to guide the new battery into its slot. Then remove the spare board.
- Perform a reset tool test and a probe battery test to ensure the working of the probe.
- Insert the radio card into the top of the battery board.

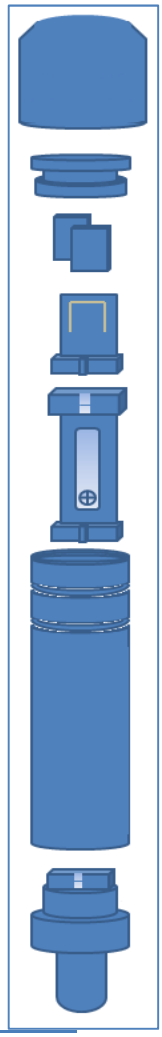


Assemble the serviced probe.

- After the battery board and radio are inserted into the probe, prepare for assembly of the probe.
- Put two new silicon bags into the battery chamber, one each side of the battery board.
- After cleaning smear the O-ring grooves with a little bit of silicon lubricant.
- Pull the new O-rings over the top of the probe and slide them into the O-ring grooves, pressing them nicely into position.
- Smear the O-rings with silicon lubricant to ensure easy movement and sealing of the top-cap.
- After cleaning smear the contact points of the rubber top with silicon lubricant.
- Push the rubber top into position into the top of the probe 40 mm pipe sections.
- Smear the access lubricant around the side of the rubber top for additional sealing.
- After cleaning the top-cap smear it with silicon lubricant on the inside walls.



- Take a box strap and fold it over, for the ends meat up on top each other.
- Place the folded box strap over the O-rings and the side of the rubber top.
- Hold the box strap in position with your left hand.
- Push the top-cap over the rubber top, box strap and O-rings.
- Pull out the box strap so that all the excess air can escape.
- Give the top-cap a good twist with your right hand, while holding the probe section steady with your left hand. This is to ensure that the lubricant is sealing the top-cap properly and all excess air can escape.
- Make sure that the top-cap is not rising up again.



Test the probe after assembly.

- Set the probe date and time with the logger.
- Take a probe reading and validate that the probe installation was not disturbed.
- Configure the probe settings and make sure all the settings are still correct.