

Live Wire

Owner's Manual

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●



Model MB0414L, MB0414H

www.origocorp.com

FOR INFORMATION

Greg Piesinger
President Origo Corporation
480-473-1995
gpiesinger@origocorp.com

Battery Replacement

The first indication of a low battery is a steady pulsing of the lights during a measurement. The Live Wire requires a certain level of voltage to turn on and once this has been done, load may draw a weak battery down to a level where the tool must shut off. After that occurs, the battery voltage will rise above the limit voltage again turning the tool on, thus repeating the process. The result of this cycle is a discernable steady pulse of the lights until the battery completely fails. Replace the battery immediately.



To access the battery compartment, use a screwdriver to remove the four (4) corner screws on the back of the body of the instrument. Replace with new alkaline 9VDC battery.

Introduction

- Battery Replacement** ●
- Introduction** ●
- Features** ●
- Precautions** ●
- Tool Description** ●
- Purpose** ●
- Using the Tool** ●
- Operating the Tool** ●
- How it Works** ●
- Quick Summary** ●
- Notes** ●

Thank you for purchasing the Live Wire by Origo. You now own the finest URD status indication tool on the market today. It is mandatory for users to read this manual carefully and to understand the capabilities and limitations of this tool, as it contains IMPORTANT safety information.

If you have any questions on how to use the tool or how to apply it in the field, call Origo Corporation at 480-585-1844.

For technical questions by maintenance shop personnel, call Returns, Warranty, and Technical Support at 480-473-1987.

Features

Live Wire – MB0414L

- Detects Energized Status in URD Un-Jacketed Cables
- Detects Energized Status in URD Jacketed Cables
- Attaches easily to hotstick
- 9VDC alkaline battery

Precautions

IMPORTANT !!

Because you entrust your personal safety with this instrument, always test the battery before every operation.

If you suspect for any reason that the instrument may be damaged or abused, thus affecting the operation of the tool, return the tool immediately to Origo for evaluation and/or repairs.

Follow all proper procedures deemed safe by your company or OSHA and wear PPE, Personal Protection Equipment at all times when verifying any cable's energized status. This tool shall only be used by qualified and trained personnel.

CAUTION:

Never contact the Spring Probe and the Barrel to the semi-conductive layer at the same time. This will result in obtaining a false dead **GREEN** light indication due to a valid resistive value being read by the tool but no voltage potential.

WARNING:

Never contact energized parts or conductors with any portion of the Live Wire tool. The tool is **NOT** to be applied to any energized source and will result in catastrophic failure of the instrument.

PRECAUTION:

Always take a multitude of samples and never depend on only one reading. Due to variations in semi-conductive values, the user must consider an average of samples.

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

ALERT:

The Heater Adapter retains a harmful amount of heat for a very long time. Always use the supplied heat pad for installation and removal.

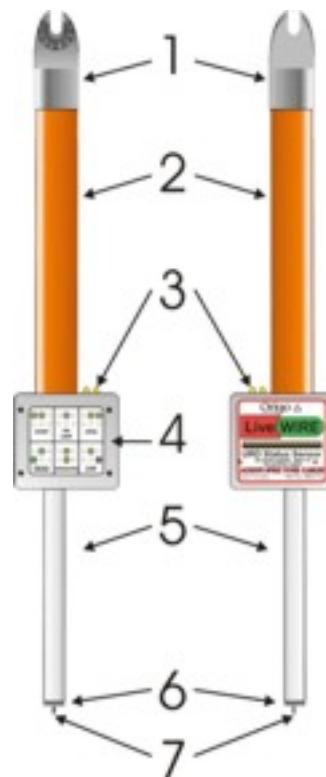
ADVICE:

Spiking must be performed while using all safety procedures adopted by your company and/or by OSHA. Remember to always wear your PPE when performing any status verification or working on or around URD cables.

and

Always Spike Your Cables

Tool Description



1. Universal Hotstick Adapter
2. Fiberglass Hotstick Extension
3. Status Light Panel
4. Nomenclature
5. Stainless Steel Barrel
6. Heater Adapter Threads
7. Spring Probe

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

Purpose

The Live Wire instrument is designed to determine the voltage status of URD cables. It is intended to be used in dig-in and cut-in situations to indicate if the URD cable in question is either energized or de-energized prior to working on or spiking the cable. If the Live Wire light panel indicates the cable is live, (**RED** light), then spiking of the energized cable is obviously not recommended and further steps must be taken to ensure a de-energized state of the cable. If the Live Wire indicates the cable is de-energized or dead (**GREEN** light), then spiking procedures can be continued if needed for the job. Other indications of the light panel and their meanings are addressed further in this booklet.



Dead or De-energized (Green) Indication

Spiking must be performed while using all safety procedures adopted by your company and/or OSHA. Remember to always wear your PPE when performing any status verification or working on or around URD cables.

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

Using the Tool

Non-Jacketed / Direct Buried Concentric Cables

On non-jacketed URD cable, the condition of the semi-conductor layer varies considerably depending on the cable's age and exposure to the elements. It is not unusual to find either small spots or large areas of the semi-conductor layer that have degraded. When the semi-conductor layer degrades, its resistance may increase to the point where the Live Wire tool either will not turn **ON** or the **OPEN** light will illuminate on the light panel. However, in most cases, by simply probing other areas on the cable, a good area of semi-conductor can be found and a correct indication of status can be obtained. The user should always take multiple samples on any URD cable to make sure of a correct determination of energized status.

On excessively corroded URD cable, it may be necessary to hot-brush the URD cable, in the area to be probed, to remove concentric and semi-conductor corrosion thus allowing the Live Wire tool to either turn **ON** or to extinguish its **OPEN** light.

TIP:

The use of a 'hot clamp' placed around the cable with a hot stick can also assist in obtaining correct and accurate indications. See 'How It Works' section for more information on when to use the 'hot clamp'.

TIP:

Simply cleaning the cable, by pouring water on the area to be tested, greatly increases the ability of obtaining a status light. Dirt or other foreign material can cause a complete loss of status acquisition capability and will many times prevent the Live Wire from turning **ON**.

Jacketed Concentric Cables

All jacketed cables, including semi-conductive jackets, require the Heater Adapter; part number MB0414H, to be attached to the Live Wire. Heated intrusion into the jacket is necessary to make contact to the concentric neutral and the semi-conductive layer. High temperatures caused by sun exposure or overload can cause a large increase in the semi-conductor layer resistance on some cables which will give an **OPEN** light status. A cool down period is recommended.

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

Operating the Tool

1. Always check the battery before using the Live Wire tool. This can be done by shorting the Barrel to the Spring Probe and viewing a **SHORT** light indication. Pressing a knife blade or coin against the Spring Probe until the metal makes contact with the Barrel is recommended. If the **SHORT** light does not appear or if the **SHORT** light pulses on and off repeatedly, the battery needs replacing.
2. Always attach the Live Wire tool to the appropriate length of hotstick advised by your company's safety regulations and/or by OSHA.



Battery Check

3. Make every attempt to hold the tool's Barrel perpendicular and near the center of the cable's diameter.

Non-Jacketed URD Cable

4. Apply the Spring Probe protruding from the Barrel against the semi-conductive layer. Press firmly and with enough pressure to compress the Spring Probe until the Barrel makes contact with the concentric wire.
5. Be as steady as possible and allow the light panel to process the reading. Although this requires only seconds to complete, the tool is evaluating many measurements. Light panel flickering is common during this time. The user should ignore any quick flashing of lights or actions in the light panel and wait for a steady and determined light indication. This process of evaluation occurs each time the tool is reapplied or moved.

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

6. **DO NOT ROCK THE TOOL.** Rocking or adjusting the tool while being pressed can cause damage to the Spring Probe or the Barrel threads used to attach the Heater Adapter and does not give the user any advantage in sampling. Simply reapply the tool in another area of the cable.
7. If NO lights or a steady **OPEN** light is obtained, simply move the tool to a new location on the cable. If all samples indicate **OPEN**, the user can ascertain that either the URD cable is corroded or the semi-conducting layer of the cable has degraded to a point where the resistance is higher than the Live Wire tool permits.



Correct Application

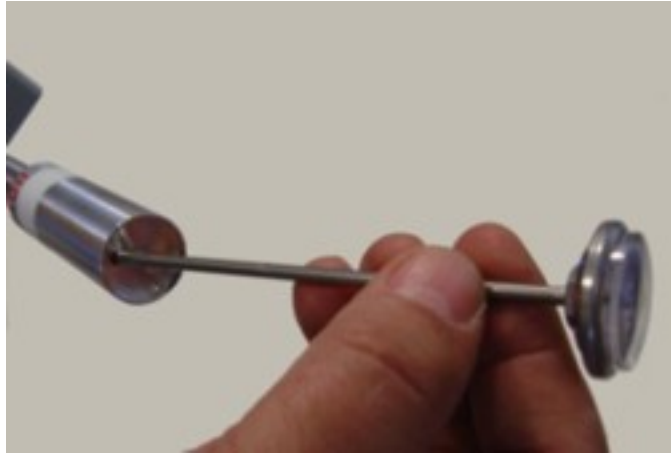
TIP:

Ground currents or EMF can induce current flow on the semi-conductor. Excessive amounts can cause the Live Wire to indicate a **RED** or an **UNKNOWN** light on a de-energized cable. To avoid this, the user may decide to apply an appropriate size 'hot tap', clamp around the cable near the test area. This provides a very stable connection between the concentric and semi-conductor and allows for a correct indication of dead or **GREEN** light.

Jacketed URD Cable

8. Follow steps 1 through 3.
9. Attach the Heater Adapter, part number MB0414H to the threaded end of the Live Wire tool.
10. Insert the supplied thermometer into the hole in the end of the Heater Adapter.

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●



Thermometer Insertion

11. Apply heat to the large metal end forward of the white insulator using a propane or heat gun until the temperature reaches **200°** degrees Centigrade.

DO NOT HEAT THE METAL STEM OR THE GLASS DIAL OF THE THERMOMETER. AVOID HEATING THE ADAPTER HIGHER THAN THE RECOMMENDED DEGREES AS THESE EXCESSIVE TEMPERATURES MAY RESULT IN DAMAGE



Heating the Adapter

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

12. Remove heat and temperature gauge.

13. Hold tool as perpendicular as possible to cable and place the hot end of Heater Adapter against jacket. Apply small amount of pressure, or just allow the weight of the tool and hot stick, to begin intrusion. The Heater Adapter will slowly melt into the jacket and make contact with the concentric neutral and the semi-conductive layer underneath.

Withdraw as soon as a light indication is given and repeat. It is common to obtain **SHORT** indications due to the center of the Heater Adapter being applied onto or near a concentric. Simply move a small distance from the original area and take another sample.

14. It may be necessary to re-heat the adapter, but under normal conditions, the Heater Adapter will retain enough heat to allow the user to take multiple samples of status.



Heater Removal

15. Sampled cable not spiked may be repaired using either semi-conductive tape or an appropriate 'Jacket Repair' kit.

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●



Heater Penetration

NOTE:

THE HEATER ADAPTER IS INTENDED FOR PRE-SPIKING USE ONLY. RANDOM SAMPLING OF JACKETED CABLES IS NOT RECOMMENDED.



Short Indication

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

16. When finished, wipe off melted jacket material from the heater. **BE VERY CAREFUL NOT TO GET JACKET MATERIAL IN THE THERMOMETER HOLE.** Q-tips work very well for removing melted jacket material.

17. Remove the heater using the supplied insulated storage bag.
CAUTION: THE METAL END OF THE HEATER ADAPTER CAN RETAIN HARMFUL HEAT FOR UP TO AN HOUR AFTER USE.

How it works

The key to the Live Wire is the capacitance coupling between the conductor and the semicon. (You could relate this coupling to that used on the voltage probe on elbows.) This capacitance coupling results in current flow between the semicon and the neutral wires.

The Live Wire first must measure resistance to ensure that it has the proper connection to the neutral wires and the semicon. Corrosion or degraded semicon can prevent a proper connection to the neutral and semicon. Exposure to contaminants and age can degrade semicon to the point that its resistance becomes too high to obtain a valid status indication.

If the resistance is correct, the Live Wire can then detect the voltage between the semicon and neutral and use it to indicate the cable status.

To be safe, this voltage must either be below a low threshold to indicate that the cable is dead or **GREEN** and above a higher threshold to indicate that the cable is live or **RED**. If it is between the two thresholds, the Live Wire will indicate the status as **UNKNOWN**. The user need only reapply the tool to another spot to obtain a valid status indication.

Corroded or detached neutral wire can cause the voltage measurement to be taken over a length much longer than the normal 1/8" gap between the neutral and semicon. Ground currents, which are always present, can give rise to small voltage differences over this longer measurement length which can be falsely interpreted as coming from the center conductor of a live cable. By using the cable clamp or hot tap, the user forces the probe voltage measurement to be taken over the desired 1/8" gap which eliminates this source of error.

On jacketed cables, the jacket material both prevents neutral corrosion and holds the neutral tight against the semicon thus eliminating this source of error.

Finally, the user will at times encounter situations in which the tool will not be able to indicate cable status due to the poor condition of the cable. The Live Wire tells the user this via the **OPEN** and **SHORT** lights. If the semicon has degraded to a point of becoming an insulator, a tic tracer or other no contact voltage sensor may be used for attempting status. If the tic tracer says the cable is live, it probably is live. However, if it says it is dead, one can't be sure because the semicon may still be enough of a semiconductor to prevent the tic tracer from detecting the center conductor voltage.

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

Remember, the most important factor in determining voltage status in URD cables is to always follow your company's and OSHA safety rules.

TIP:

Never Rock, twist or move the Live Wire tool in an attempt to get a better sample. This only causes the tool to try to re-establish and will cause the lights to flash randomly. The flashing of the lights is similar to the movement of the needle on an analog voltmeter or the rise in numbers on a digital voltmeter.

Always Wear Your PPE

Quick Summary

- **NO LIGHTS** = Either battery is dead, URD cable is corroded, or semi-conductor resistance is too high to turn on the Live Wire tool.
- **ON / SHORT** = Spring Probe and Barrel are shorted against concentric or semi-conductor resistance is too low to obtain a valid status indication.
- **ON / UNKNOWN** = Live Wire tool has turned on and URD cable resistance is in range but voltage is too high to indicate GREEN and too low to indicate RED.
- **ON / OPEN** = Either URD cable is corroded or semi-conductor resistance is too high to obtain a valid status indication.
- **ON / GREEN** = URD cable is Dead or de-energized.
- **ON / RED** = URD cable is Live or energized.

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

CAUTION

The Live Wire has been thoroughly tested and has worked correctly on all URD cables encountered thus far. However, since the age of URD cables in the field span a period of more than 30 years, it was impossible to test the Live Wire on every type of cable or in every possible environment. Therefore, the possibility exists that a unique situation might be encountered in which the Live Wire will fail to give the correct status indication.

Because of the nearly infinite variation in cable characteristics and testing situations, it may be impossible to totally eliminate all hot spiking. However, the design goal of the Live wire was to reduce the incidence of live spiking by a very large factor. Since the possibility of live spiking still exists, it is important to follow all safety procedures and

Always Spike Your Cables

TIP:

A primary feature of the Live Wire is that the **OPEN**, and **SHORT** lights inform the user when the cable condition is such that a reliable status measurement cannot be obtained. If, after cleaning the cable and multiple attempts, the unit fails to turn ON or extinguish these lights, it indicates that status information cannot be obtained on this cable.



Severely Corroded Semi-Conductor and Concentric

- Battery Replacement ●
- Introduction ●
- Features ●
- Precautions ●
- Tool Description ●
- Purpose ●
- Using the Tool ●
- Operating the Tool ●
- How it Works ●
- Quick Summary ●
- Notes ●

**Do a Safety Favor,
think Safety Every Day**

Notes

- ✓ Always spike my cables
- ✓ Always wear my PPE