GLASTONBURY FIRE DEPARTMENT

STANDARD OPERATING GUIDELINES

SOG NUMBER: HZT-202	ISSUED DATE: 03-07-11	EFFECTIVE DATE: 03-08-11
REVISION #: 2	REVISED DATE: 01-11-16	EFFECTIVE DATE: 01-11-16

CATEGORY: HAZ-MAT

SUB-CATERGORY: HAZ-MAT DETECTION EQUIPMENT

SUBJECT: METERING FOR ELECTRICAL HAZARDS USING AC HOTSTICK

*** USE EXTREME CAUTION WHEN APPROACHING AREAS WHERE LIVE VOLTAGE MAY BE PRESENT***

Section I – Introduction

A. Objective:

To familiarize the firefighter with the operation of the AC HotStick and to ensure that the device is safely used when determining any electrical hazards

B. Applicability

To be used as a supplemental device to ensure that a potential threat of an electrical hazard has been eliminated. Department members are to use extreme caution and when in doubt is to isolate the electrical hazard until confirmation that the threat no longer exist.

C. References

AC HotStick manual

Section II - Basic Operation

1. Hold the AC HotStick by the grip at the lanyard end.
2. The red striped area in front indicates the sensing section.
3. Turn unit on by rotating the ring of the mode switch in the direction of the arrow to the **High Sensitivity** setting.
4. Allow the unit to self-test as follows:
   a. After turning switch to **High Sensitivity** wait for completion of the self test cycle (at least three seconds).
   b. Listen for beeping and look for flashing light.
   c. DO NOT USE unit if there is no beeping; no flashing light; puts out a steady tone; the unit chirps and /or goes through self-test when tapped.
5. After the self-test has stopped, move the AC HotStick around slowly.
6. Continue to use the **High Sensitivity** setting until the general location and direction of unshielded AC voltage is determined.
7. As the AC HotStick is brought closer to the exposed AC, the unit will start to beep and the LED to flash.

8. Beeping and LED flashing will become more rapidly as the sensing section is brought closer to the source.
   a. The unit may beep occasionally even when no AC is around.
   b. This is normal and frequently occurs while the stick is in motion and/or touching leaves.
   c. It can be caused by electrostatic charges or other fields.
   d. Hold unit still while checking.
9. The higher you hold the unit (or the higher the wires are above ground) the earlier a source can be detected.

10. Once AC has been clearly detected and the AC HotStick beeps rapidly select as needed the **Low Sensitivity** or the **Front Focused Mode** to pinpoint the sources.

WARNING: In the **Front Focus Mode** the unit will pick up signals mainly from the front tip end. Do not use this mode when starting a search. The sensitivity is greatly reduced and the set will no longer pick up signals from certain distance and directions. Extreme caution must be exercised to prevent inadvertent contact with live wires, which may not be detectable in these modes, especially if multiple live wires are present.

Do not contact conductors with unit. Do not place unit in liquid.

Section III – Sensitivity Range

The detection range/sensitivity will be different depending on a number of factors:

1. AC Voltage signal amplitude which is present will affect the distance at which the first warning will occur. The higher the voltage the earlier the warning alarm will activate.
2. The physical size of the conductor, length height of voltage carrying material will affect the distance at which the first warning will occurs.
3. The height of the HotStick above ground as well as the height of the signal source will affect the distance between AC source and point of first warning indicated on the HotStick. The higher the HotStick is held above, the further it will "see", the wider its horizon will be. The range of the HotStick lying on the ground is very limited.
4. Shielding: If AC conductors are fully enclosed in grounded metal shielding, they are safe and will generate no indication on the HotStick, unless they radiate strong magnetic AC field e.g. transformers, or ballasts for fluorescent lights. Metal doors or plates may prevent AC field from emanating. However if the metal parts are in electrical contact or very close to an AC power sources the HotStick will indicate the presence of AC potential.

Section IV – Typical Use

1. **Site Assessment:** Hold the AC HotStick on the lanyard end and move it sideways and up and down; moving slowly forward. Observe the LED and listen to any beep. If a signal is noted, hold still. If it persists, try to find the direction from where the signal comes. The signal will increase, meaning the AC HotStick will beep more and more frequently as the AC Hotstick is brought closer to the AC voltage source. Reduce the sensitivity or switch to **Front Focused** mode when needed to better pinpoint in on the source.

2. **Vehicle Accidents:** When a vehicle has struck a pole, transformer, building, traffic light or other unknown structure, the AC HotStick can be used to verify that the vehicle, guide wires, fences or other sections around it are not voltage-carrying. If there is any suspicion of AC voltage being present, make sure that Eversource has taken steps to assure power is disconnected in the area. Be especially aware of the dangers of automatic retries. Use the AC HotStick to determine if wire fences, guide wires are truly without power and danger.

3. **Swimming Pools:** A frequent cause for electrocution is either defective swimming pool lights or electric appliances which have fallen into a swimming pool. Even if there is no visible indication that this may have happened, use the AC HotStick to verify that no dangerous AC potential exists prior to removing a victim from a pool.

WARNING: Do not contact water in and around the pool with your body or with the unit when checking to determine that no AC potential exists.

4. **Night Searches:** Searches conducted during the night especially when severe wind or ice storms may have damaged trees and subsequently power lines, the AC HotStick can be used to ensure that no dangerous AC signals exist in the path of rescuers or on the site to be searched.

5. **Building Collapses:** Collapsed buildings, especially in the aftermath of explosions, may still be connected to power lines through underground or secondary circuits. The site should be checked for the presence of AC voltage prior to any rescue operations especially in confined space areas.

6. **Fires:** AC HotStick can be used to verify that AC voltage has been disconnected. Dangerous high tension wires can be identified as well.

7. **Clean Up Operations:** Significant danger from AC voltage exists doing clean-up operations from so-called back feeding of power lines from auxiliary generators used as an emergency power supply.

NOTE: The 120V which may emanate from a user's location when emergency power generating equipment is used, are transformed up to 7200 volts through the same transformers which are normally used to reduce these voltages.

Section V –Maintenance

1. **Batteries:**
To change the units batteries the following steps are to be taken:

   a. Select a clean dry area. It is good practice to change batteries only in a non explosive, safe atmosphere.
   b. Place the AC HotStick flat on a table.
   c. Unscrew the knurled lanyard screw. The gray end cap, which contains the beeper, is spring loaded and may push out as the screw is removed.
   d. Note the polarity and location of the batteries.
   e. Lift up the front of the AC Hotstick and let the batteries slide out.
   f. Always wipe clean the terminal of new or used batteries.
   g. Hold the AC HotStick horizontally and slide in the fresh batteries. Do not drop the batteries as the positive terminals are soft.
   h. Replace the end-cap carefully. Note the position of the insert for the lanyard screw. It needs to line up with the hole in the housing.
   i. Hold the stick vertically and push the end-cap fully in. Tighten the lanyard screw. It needs to line up with the hole in the housing.
   j. Check operation. If self-test does not work or continuous tone is heard, recheck the direction of the batteries installed. Tap the unit slightly while in the **Front Focused** mode to check for good battery contact. Unit should not "chirp" or go through self-test when tapped.

2. **Low Battery Indication:**

   a. The AC HotStick is equipped with a low battery watchdog circuit.
   b. If the battery voltage drops below approximately 4.8 volts, the AC HotStick will emit a constant tone until the batteries are fully exhausted.
   c. This prevents the use of the AC HotStick when the batteries are old or installed incorrectly.

3. **Cleaning of AC HotStick:**

   a. The AC Hotstick should be kept clean.
   b. Use 409 or soap and water.

c. Avoid getting water inside the unit as the area near the end cap may not be fully watertight.
d. Do not use antistatic sprays on the AC HotStick or the pouch.

Section VI- Approval

Fire Chief Richard P Thiery Date of Approval: 1/11/16