
	STANDARD OPERATING GUIDELINE				
	EQUIPMENT				
	WB TAC STICK/DELSAR AC HOTSTICK				
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1.0 Objective



- 1.1 The purpose of this procedure is to establish operating guidelines for using the WB TAC Stick/Delsar AC Hot Stick.
- 1.2 The WB TAC Stick/Delsar AC Hotstick provides warning of exposed high voltage AC from a safe distance. The AC Hotstick will give early audible and visual warning of the presence of AC voltage without the need to contact the surface which carries the dangerous AC potential. The TAC Stick/AC Hotstick will beep and an LED will flash with an increasing rate as the unit is brought closer to the source.

2.0 Responsibility

- 2.1 It is the responsibility of all Department personnel to understand the procedures documented in this Standard Operating Guideline.

3.0 Basic Operation

- 3.1 Hold the TAC Stick/AC Hotstick by the grip at the lanyard end. The red striped area in the front indicates the sensing section.
- 3.2 Turn the unit on. Rotate the ring of the mode switch in the direction of the arrow to the *High Sensitivity* setting.
- 3.3 Allow the unit to self-test as follows:
 - 3.3.1 After turning the switch to the high sensitivity setting, wait for completion of the self-test cycle (at least three (3) seconds).
 - 3.3.2 Listen for the beeping and look for the flashing light.
 - 3.3.3 *Do Not Use* the unit if there is no beeping, no flashing light, or it puts out a steady tone or if the unit chirps and/or goes through the self-test cycle when tapped.
- 3.4 After the self-test has stopped, move the TAC Stick/AC Hotstick around slowly.
- 3.5 Continue to use the high sensitivity setting until the general location and direction of unshielded AC voltage is determined.
- 3.6 As the TAC Stick/AC Hotstick is brought closer to exposed AC, the unit will start to beep and the LED to flash.
- 3.7 Beeping and LED flashing will become more rapid as the sensing section is brought closer to the source.
 - 3.7.1 The unit may beep occasionally even when no AC is around. This is normal and frequently occurs while the stick is in motion and/or touching leaves. Hold the unit still while checking.
- 3.8 The higher you hold the unit (or the higher the wires are above the ground) the earlier a source can be detected.
- 3.9 Once AC has been clearly detected and the TAC Stick/AC Hotstick beeps rapidly, select as needed the *Low Sensitivity* or the *Front Focused Mode* to pinpoint the source of AC.
 - 3.9.1 *Warning* - In the Front Focused 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 distances 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.
- 3.10 *Do not* contact conductors with the unit.
- 3.11 *Do not* place the unit in any liquid.



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4.0 Typical Use

- 4.1 Always select the high sensitivity setting to start.
- 4.2 Site Assessment - Hold the 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 is coming. The signal will increase, meaning the Hotstick will beep more and more frequently as the Hotstick is brought closer to the AC voltage source. Reduce the sensitivity or switch to the Front Focused mode when needed to better pinpoint the source.
- 4.3 Vehicle Accidents - When a vehicle has struck a pole, transformer, building, traffic light, or other unknown structure, the TAC Stick/AC Hotstick should be used to verify that the vehicle, guy wires, fences, or other sections around it are not voltage-carrying. If there is any suspicion of AC voltage being present, make sure the power company has taken steps to assure power disconnect in the area. Be especially aware of the dangers of automatic retries. Use the TAC Stick/AC Hotstick to determine if wire fences and guy wires are truly without power and danger.
- 4.4 Swimming Pools - A frequent cause for electrocution are defective swimming pool lights or electric appliances which have fallen into water. 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 or water source.
 - 4.4.1 *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.
- 4.5 Night Searches - In searches conducted at night, especially when severe wind or ice storms may have damaged trees and subsequently power lines, the AC Hotstick can be used successfully. Use during search or rescue operations can verify that there are no dangerous AC signals in the path of the rescuers or on the site to be searched. Cases have been reported where highway wire fences carried dangerous AC voltages caused by downed wires from several miles away, creating an extreme hazard to responders.
- 4.6 Building Collapses - Collapsed buildings in the aftermath of explosions, fires, or storms may still be connected to power lines through underground or secondary circuits. The site should be checked out for the presence of AC voltage prior to any rescue operations, especially in a confined space.
- 4.7 Fires - In case of fires, disconnection of AC can be verified. Dangerous high tension wires can be identified with the TAC Stick/AC Hotstick.
- 4.8 Clean-up Operations - Significant danger from AC voltages exists for rescue workers or helpers doing clean-up operations from so-called back feeding of power lines from auxiliary generators used as emergency power supplies.
 - 4.8.1 *Note* - The 120V which may emanate from a user's location when emergency power generating equipment is used are transformed up to 7200V through the same transformers which are normally used to reduce these voltages. Again, it is absolutely mandatory to verify the absence of AC voltages, even when wires to the network are clearly disconnected.

5.0 Dangers



- 5.1 The user should exercise extreme caution at all times when approaching areas where live voltage may be present, while trying to detect live voltage (with or without the use of the TAC Stick/AC Hotstick), and in taking action after detection of the live voltage. Failure to exercise extreme caution or to use the TAC Stick/AC Hotstick in strict accordance with the directions of this tool can result in severe injury or death.

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- 5.2 One of the greatest dangers to rescuers comes from the sudden reapplication of AC voltage after the high tension wires were disconnected through safety/fusing circuits. These automatic retries are computer programmed and will try to reconnect AC voltage after a short. There are no firm rules at what interval and frequency these automatic retries will occur. They usually cease after 3 to 4 retries in the first minutes after a short.
- 5.3 The rescuers must make sure that, in case wires have been found, the power company has actually disconnected that section of the circuit. Downed wires should always be treated as if they were voltage-carrying. Only the power companies have qualified personnel to ground out circuits and to assure their safe handling. The TAC Stick/AC Hotstick does not warn of hazards from DC current (car batteries).
- 5.4 The TAC Stick/AC Hotstick also does not warn of shielded AC voltages. Extreme caution should be exercised to avoid inadvertent contact with live voltage which may be shielded from detection by the TAC Stick/AC Hotstick but which may nevertheless be subject to contact because the shielding can be moved or reached around. Extreme caution also should be exercised when using the TAC Stick/AC Hotstick in areas where multiple live voltages may be present. In such situations, care must be taken especially when using the Low Sensitivity or Front Focused Mode to avoid inadvertent contact with one source while pinpointing another source.
- 5.5 High Voltages - The electronic circuits of the TAC Stick/AC Hotstick are protected against electrical overload. All conducting parts are encased in insulating material in order to protect the user in case of accidental contact with a live wire. However, avoid contacting wires which may carry high voltages. The surface of the TAC Stick/AC Hotstick may be wet or contaminated. For safety reasons, keep the unit clean and dry. Keep a safe distance of at least 9 feet from all unguarded live parts suspected of voltages in excess of 601 volts.

6.0 Sensitivity / Range

- 6.1 Aside from the mode switch, a number of factors will influence the distance between the first signal indication generated by the TAC Stick/AC Hotstick and a dangerous AC voltage source. The detection range/sensitivity will be different due to a number of factors. They are:
 - 6.1.1 The 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.
 - 6.1.2 The physical size of the conductor, length, and height of the voltage carrying material will affect the distance at which the first warning will occur. A car contacting AC will be detected much earlier than a short piece of wire.
 - 6.1.3 The height of the Hotstick above the ground as well as the height of the signal source will affect the distance between the AC source and the point of first warning indicated on the Hotstick. The higher the Hotstick is held above the ground, the further it will "see" and the wider its horizon will be. The range of a Hotstick lying on the ground is very limited.
 - 6.1.4 The same holds true for wires strung in the air compared to wires lying on the ground. Wires high above the ground will be noticed from a much greater distance than wires on the ground.
 - 6.1.5 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 fields e.g., transformers or ballast's for fluorescent lights. Metal doors or plates may prevent AC fields from emanating. However if the metal parts are in electrical contact or very close to an AC power source the Hotstick will indicate the presence of AC potential.
 - 6.1.6 Some shielding is also provided through wet leaves, brush, and trees. They will reduce the range. However, if a tree or a water puddle is on AC potential, the Hotstick will give the proper warning from a safe distance.

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7.0 Battery Change

- 7.1 Select a clean, dry area. It is a good practice to change the batteries only in a non-explosive, safe atmosphere.
- 7.2 Place the TAC Stick/AC Hotstick on a flat surface.
- 7.3 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.
- 7.4 Note the polarity and location of the batteries.
- 7.5 Lift up the front of the TAC Stick/AC Hotstick and let the batteries slide out.
- 7.6 Always wipe clean the terminal of new or used batteries.
- 7.7 Hold the TAC Stick/AC Hotstick horizontally and slide in four (4) fresh AA batteries. Do not drop the batteries, their positive terminals are soft.
- 7.8 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.
- 7.9 Hold the stick vertically and push the end cap fully in. Tighten the lanyard screw.
- 7.10 Check the operation. If the self-test does not work or a continuous tone is heard, recheck the direction of the batteries installed. Tap the unit slightly while in the *Front Focused Mode* to check for a good battery contact. The unit should not chirp or go through a self-test when tapped.
- 7.11 The TAC Stick/AC Hotstick is equipped with a low battery watchdog circuit. If the battery voltage drops below approximately 4.8V, the AC Hotstick will emit a constant tone until the batteries are fully exhausted. This prevents the use of the AC Hotstick when the batteries are old or installed incorrectly.

8.0 Reference

- 8.1 Highland Park Fire Department

Approve  Fire Chief