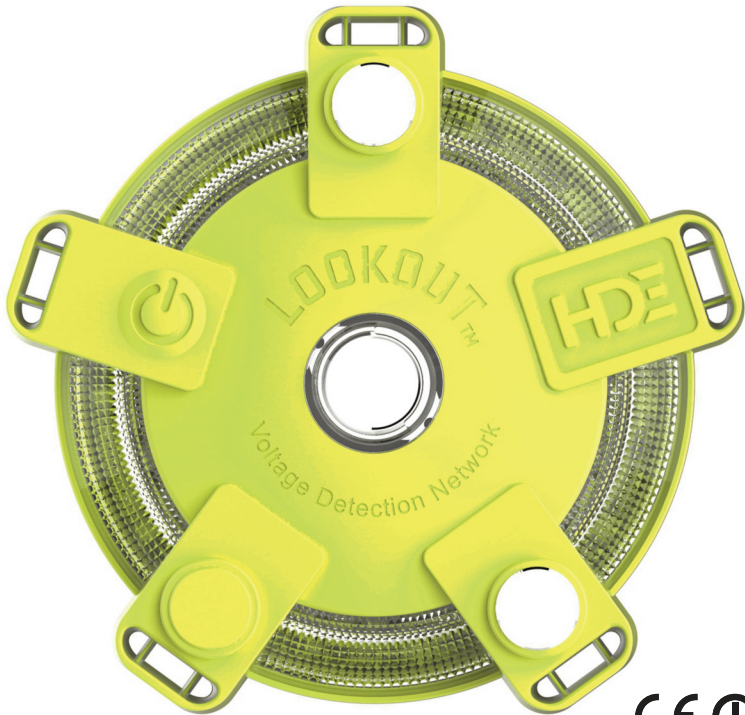


# LOOKOUT™

## VOLTAGE DETECTION NETWORK

Featuring WAVI® Work Area Voltage Indication Technology

### Operating & Instruction Manual



***Making the Invisible Visible®***

**HDE** HD ELECTRIC COMPANY  
A Textron Company

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# LOOKOUT™

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*Featuring WAVI® Work Area Voltage Indication Technology*

### Operating & Instruction Manual

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## GENERAL DESCRIPTION

The LOOKOUT Voltage Detection Network uses WAVi® Work Area Voltage Indication technology to detect strong electric fields surrounding high voltage conductors and power distribution equipment. It is typically placed near power lines or high voltage equipment. The LOOKOUT Detector provides an extra level of safety for trained personnel working on or near high voltage systems.



## POINTS TO UNDERSTAND BEFORE PROCEEDING

The LOOKOUT Voltage Detection Network detects electric field in ranges between 4kVAC and 500kVAC. Make sure you understand these points before proceeding:

- Risk of electrocution is inherent in or around high voltage. This product is not a substitution for common sense.
- Electric fields surround every energized AC conductor.
- The closer you are to a conductor, the stronger the field will be.
- Higher voltage means a stronger electric field and a greater warning distance. Lower voltage means a reduced warning distance.
- Do not use the LOOKOUT Detector while holding it in your hand. Wrapping your fingers around the Detector will block electric fields, preventing it from working properly.
- The detector will not find cables buried under the ground. The ground is a conductor and will block electric fields.
- Electric fields are NOT blocked by plastics, dry wood or clothing.
- Electric fields ARE blocked by ANY conductor such as a metal cabinet or door, wet wood, metal fences, green trees, a growing shrub or hedge and tall wet grass.
- Insulation on a wire does not block the electric field and does not affect warning distances.
- Underground primary cables are both insulated AND shielded. The shield is a conductor, is grounded, and will block the electric field.
- The Detector will not detect DC voltage or stored charge such as in charged capacitors or underground cable.
- Molded cable terminators such as elbows are, like the cables they are installed on, both insulated and shielded and will block electric fields.
- Your body will block electric fields. Placing yourself between a high voltage source and the LOOKOUT Detector may prevent it from detecting the high voltage.

## SAFETY



### **WARNING – Not for Use Below 2400 VOLTS AC.**

- Do not rely on the Detector as your sole source of high voltage detection. Risk of electrocution is inherent in or around high voltage.
- Always use proper high voltage safety procedures, including personal protective equipment, when working near or around high voltage equipment or conductors.
- Always use proper high voltage procedures for testing and grounding.
- Grounded equipment can appear to be live in close proximity to energized conductors.

## OPERATIONAL IMPAIRMENT

If the Detector is used in a manner not described in this instruction manual, the protection and effective operation of this equipment may be impaired.

The Detector will not detect DC voltage or stored charge such as in charged capacitors or underground cable. Always use proper high voltage procedures, including personal protective equipment, when working near or around high voltage equipment or conductors. Always use proper high voltage procedures for testing and grounding. Do not rely on the LOOKOUT Detector as your sole source of high voltage detection. Risk of electrocution is inherent in or around high voltage.

## HOW IT WORKS

The LOOKOUT Voltage Detection Network works by sensing the presence of the electric field surrounding anything that conducts high voltage electricity. The LOOKOUT Detectors measure only the strength of the electric field. They cannot directly measure distance to the source of the electric field such as an energized conductor.

Spinning red lights and an audible alert indicate an electric field and nearby energized conductor. Multiple LOOKOUT Detectors communicate with each other via a wireless mesh network. When one Detector senses a nearby conductor, it will cause every Detector in the network to begin alerting.

The LOOKOUT Detector has a power button on the top of the unit to verify battery power and proper functioning of the device. When powered on, some sections of the Detector will begin to glow according to the system voltage setting of the Detector. One glowing section indicates a low voltage setting, multiple glowing sections indicate progressively higher voltage settings. The Detector will then perform a self-test, shown by spinning green lights and a short beep.

The short, green, flashing light “heartbeat” indicates that the LOOKOUT Detector is powered on and monitoring for the presence of high voltage electric fields.

When high voltage is detected, the LOOKOUT Detectors within the same network will start flashing in a red-yellow-green sequence. The closest Detector to the energized conductor will flash red lights, the other Detectors within the network will flash yellow or green lights based on how much of the electric field is being detected.

For more information, refer to the A Word About Electric Fields section on page 7.

## HOW TO USE IT

The LOOKOUT Voltage Detection Network should be placed in the vicinity of high voltage conductors that are either energized or could possibly become energized for the purpose of alerting those in the vicinity to the presence of high voltage. Refer to the Warning Distance Information section starting on page 9 for determining the appropriate placement distances.

### **LOOKOUT Detectors can be placed as described in these examples:**

1. LOOKOUT Detectors may be placed on or around equipment that may be operated near energized conductors. Detectors may be placed on both sides and on top of the boom of a crane, in the operator's cab or around the outriggers using the accessory equipment mount.
2. The Detectors can be placed on top of typical traffic cones using the available accessory cone bracket. When a LOOKOUT Detector is placed on a safety/traffic cone, the Detector is positioned for best visibility.
3. LOOKOUT Detectors can be placed on the ground. The Detector will detect energized high voltage conductors on all sides and above it. Refer to the Warning Distance Information section starting on page 9 for determining the detection range and appropriate placement distances.
4. LOOKOUT Detectors can be applied to a fence or other similar structure using the accessory hanger bracket. When applied to a metal fence, the Detector will only detect conductors on the side of the fence it is hanging from.
5. The Detectors can be applied directly to a bare or insulated overhead conductor up to 35kV using the accessory hanger bracket. In this application, the Detector will provide a direct indication of the presence of voltage on either the conductor to which it is applied or on other nearby conductors.

## WHEN TO USE IT

The decision of when to use the Detector is made by the user and by your company's safety and work practices. When used properly, the Detector can provide an additional warning to users exposed or working around energized high voltage electricity and equipment. Awareness of the presence of a high voltage electric field allows the user to take additional precautions against accidental contact with energized equipment.

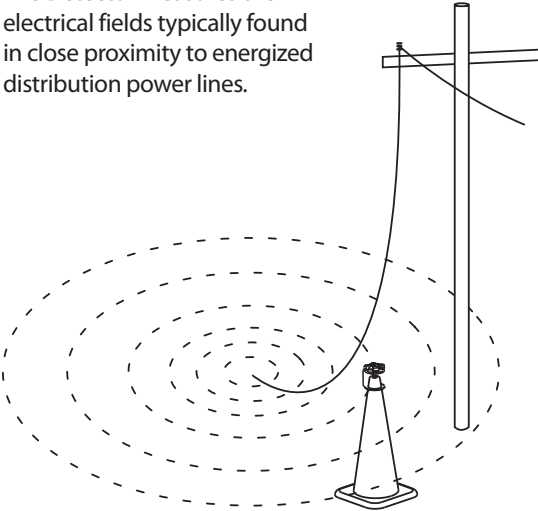
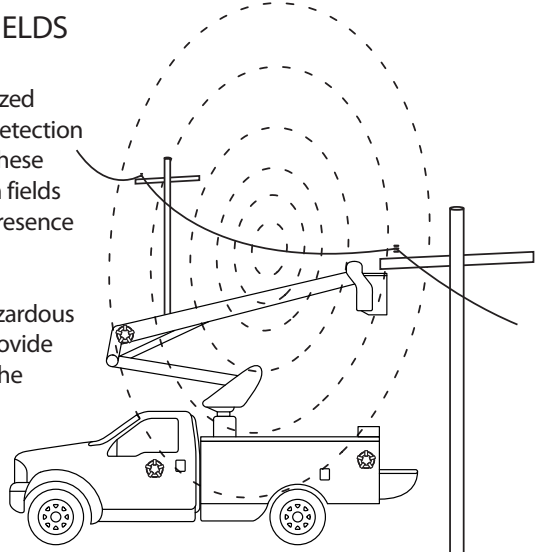
The LOOKOUT Voltage Detection Network provides an early warning of the proximity of potentially hazardous high voltage electricity and equipment. The Detector lights will spin and buzzer will sound when an electric field is detected and will continue to spin for as long as the electric field is present.

## A WORD ABOUT ELECTRIC FIELDS

Electric fields surround every energized conductor. The LOOKOUT Voltage Detection Network measures the strength of these electric fields to warn the user when fields are strong enough to indicate the presence of nearby high voltage conductors.

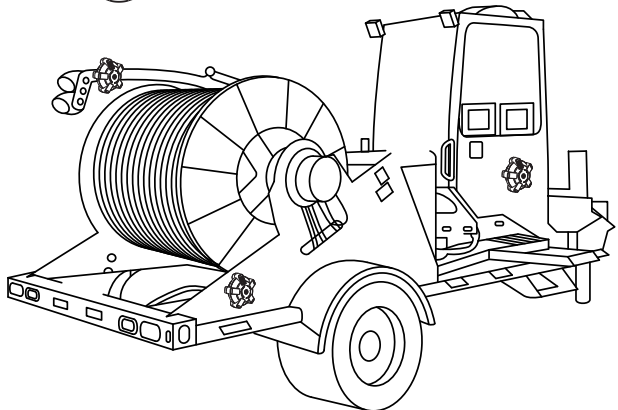
A downed power line is a typical hazardous situation where the Detector can provide a warning. The power line lying on the ground sets up a high voltage field surrounding the conductor that the Detector will sense and warn the user.

The Detector measures the electrical fields typically found in close proximity to energized distribution power lines.

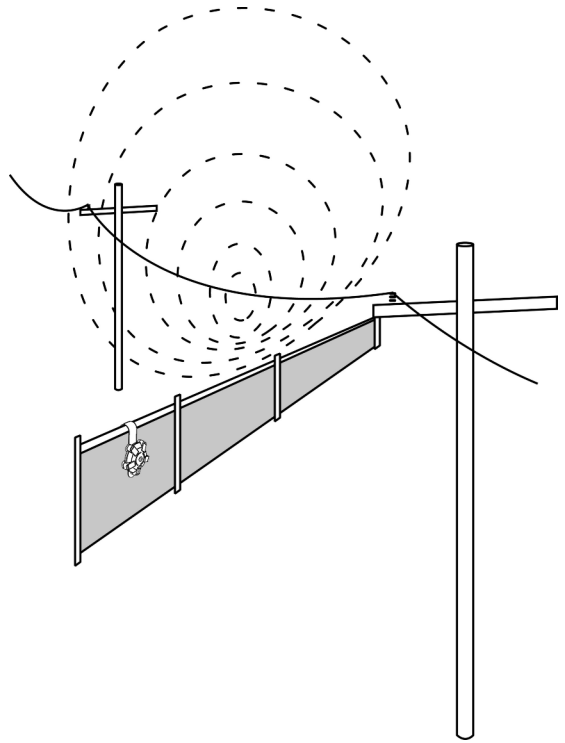


Positioning of the detector and its location relative to the voltage source can have a large effect on its sensitivity to electric fields.

The LOOKOUT Detector detects voltages above it and on all sides. The cone mounting bracket conveniently places the Detector for best visibility.

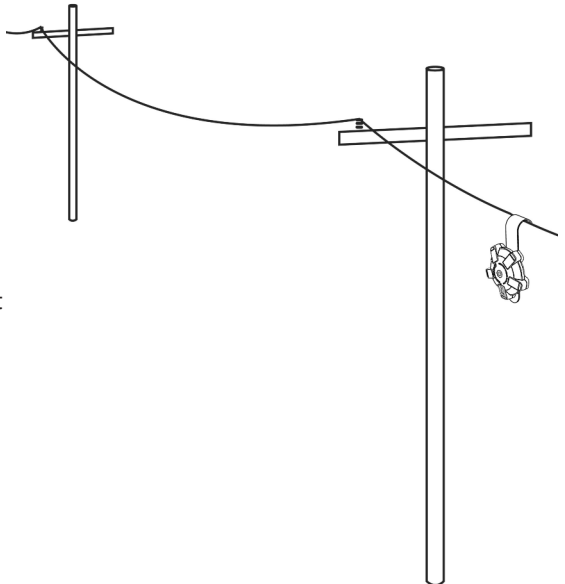


The LOOKOUT Voltage Detection Network measures only the strength of the electric field. It cannot directly measure distance to the source of the electric field such as an energized conductor. The higher the voltage, the stronger the field and the greater the alarm distance. The reverse is also true; the Detector may alarm due to the very close proximity of low voltage. Adjusting the system voltage setting of the LOOKOUT Detector via the mobile application can help normalize the detection distance across voltage levels.



Electrically conductive objects located underneath power lines can appear to be live. A metal fence or a growing hedge can cause a distortion of the electric field under these lines and result in high electric field strength near the ground.

The LOOKOUT Voltage Detection Network will provide an early warning of high electric fields, but not all fields are directly caused by nearby energized objects. To prevent the Detector from issuing too many false alarms, it should not be used in typical office or factory environments where all equipment is low voltage and there is no danger of contacting energized high voltage conductors.



Conductors of different phases in close proximity may also reduce warning distances due to field cancellation effects.



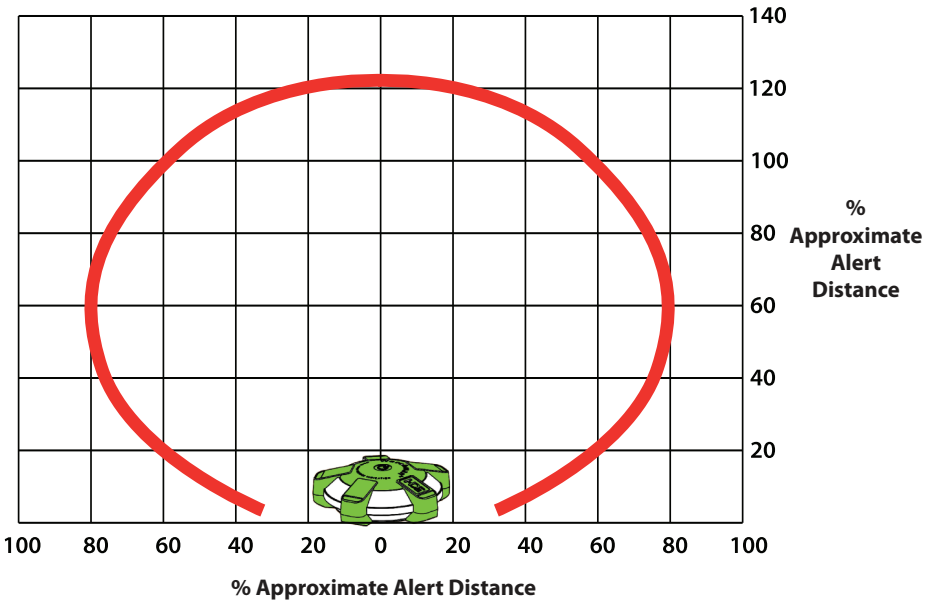
# WARNING DISTANCE INFORMATION

The sensitivity of the LOOKOUT Voltage Detection Network may be adjusted in the field via the use of the LOOKOUT mobile application. The typical detection distance of the Detector is adjusted to reflect the OSHA minimum approach distances for qualified electrical workers. When powered on, the LOOKOUT Detector will default to its lowest voltage setting of 4kV. Refer to A Word About Electric Fields beginning on page 7 for more information about how electric fields change over distance.

System Voltage (kV)	OSHA Minimum Approach Distance*	Approximate Alert Distance
4	2'-1"	3'
15	2'-2"	3'
25	2'-7"	4'
35	2'-10"	4'
69	3'-4"	5'
115	3'-5"	5'
138	3'-10"	5'
230	5'-8"	8'
500	10'	12'

\*Based on OSHA Standard 1910.269 for minimum approach distances for qualified electrical workers

## LOOKOUT Detector on the ground



## WARNING DISTANCE INFORMATION *continued*



**WARNING: Treat all conductors as live unless or until there is a visible break from a live source and a ground is in place.**



Be aware of unique conditions that may be present around three phase delta systems. Unlike grounded Y systems, a single phase of a delta system can become grounded without causing an outage and the delta system can continue to operate with this grounded phase. If this phase is grounded as the result of a downed conductor or other storm damage, it may be grounded only temporarily and could become reenergized if moved or disturbed. **The LOOKOUT Voltage Detection Network will not detect any grounded conductor, whether it is a grounded delta phase conductor, a guy wire or a pole ground.**



### **NOT FOR USE BELOW 2400 VOLTS AC.**

Before using, read the instruction manual and review product labeling. Press the Power / Self Test button on the top of the Detector to turn it on and verify spinning lights before and after each use. The test circuitry generates an internal voltage which the Detector then detects by turning on the lights. **DO NOT USE** the LOOKOUT Detector if the On/Test button results in red lights being displayed. First try recharging the LOOKOUT Detector. If red lights continue to appear, remove from service and contact the factory to arrange for repair.



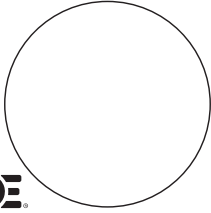
**CAUTION – Press the On/Test button before and after each use to ensure proper operation.**

The detector will show spinning lights and an audible alarm when it detects high voltage. For more details, refer to the Warning Distance Information starting on page 9.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interferences, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**LOOKOUT™**  
**Voltage Detection Network**

Read instructions before use. Press power button to turn on. Green chasing lights indicate successful self-test. If no lights appear, recharge battery. While on, an intermittent "heartbeat" flash will be visible. If heartbeat stops, battery should be recharged. Do not hold device while in use. Use caution during use, high voltage may be nearby.



**HDE**

**CAUTION:** Strong Magnets.  
**WARNING:** Do not rely on this device as your only indication of high voltage.  
**DANGER:** Chasing lights indicate proximity to high voltage and risk of arcing and electrocution.

Contains SM200 FCC ID: U90-SM200 IC: 7084A-SM200  
HDElectricCompany.com  
HDELookout.com

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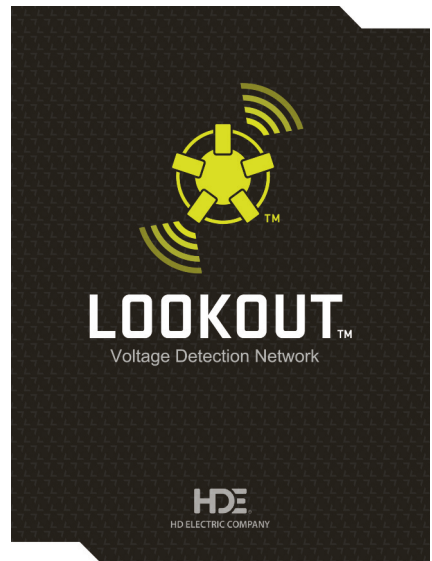
## MOBILE APPLICATION

The LOOKOUT mobile application provides a method for adjusting the settings and monitoring the state of all the LOOKOUT Detectors in the network. It provides the option to turn the detectors on and off remotely, change the system voltage settings, perform self-tests, monitor alert state and check battery levels. The application is available on both the Apple® and Android® app stores.

The application will connect a phone or tablet to the to the LOOKOUT charger via Bluetooth®. The charger will then serve as a wireless bridge, communicating commands from the phone or tablet to each LOOKOUT Detector in the network. It is necessary that the charger remains powered on while using the mobile application. The application will NOT connect directly to an individual LOOKOUT Detector without the use of the charger.

After the desired voltage settings have been programmed, you may close the application and unplug the charger. The LOOKOUT Detectors will retain their settings until they are powered off.

The LOOKOUT Mobile App can be downloaded from the applicable app store or using the link on [HDELookout.com](http://HDELookout.com).



## BATTERY CARE

The LOOKOUT Detector will indicate if it has low batteries. When the batteries are low the Detector heartbeat lights become amber instead of green. The Detector will continue to detect voltage until the remaining battery life is exhausted, at which time the heartbeat will cease.

To recharge a Detector, stack the unit on top of the LOOKOUT Charger. A total of 6 LOOKOUT Detectors can be stacked and charged at one time. Make sure the magnets on the bottom of the Detectors are aligned with the steel plates on the Charger or on the LOOKOUT Detector below if being stacked. A full charge will take about 3 hours and will provide 500 hours in Monitor mode and 8 hours in Alert mode under typical conditions. A quick fifteen minute charge to a low battery will provide 8 hours in Monitor mode under typical conditions. The Detector will not connect to the mobile application, detect voltage or receive new voltage settings while charging.

If the LOOKOUT Detector will not turn on, try charging it for fifteen minutes. The battery may be drained down too far to be able to power on. If it still will not turn on then the battery may need to be replaced. For battery replacement contact HD Electric Company at 847-473-4980 or by email at [sales@hde.textron.com](mailto:sales@hde.textron.com) to order a replacement battery.

For battery replacement, access the battery through the door on the bottom. A screwdriver is required to open the battery compartment door. Remove and properly dispose of the old battery, replacing with a new HD Electric Company lithium-ion battery pack. Be sure to firmly press the battery connectors into place and replace the cover. Press the On button to confirm proper operation. If, after changing the batteries, the On button fails to confirm proper operation, DO NOT USE the LOOKOUT Detector. Remove it from service and contact the factory to arrange for repair.

## LITHIUM BATTERY USE AND DISPOSAL

- Charge the battery only with the HD Electric Company supplied charger.
- Do not disassemble, open, crush, bend, deform, puncture or shred the internal battery.
- Contact your local recycling center or HD Electric Company for proper battery disposal.
- Improper battery use may result in a fire, explosion or other hazard and cancellation of manufacturer warranty.

## CLEANING

To clean, wipe with a damp cloth with water. Do not use harsh chemicals or solvents.

## TECHNICAL SPECIFICATIONS – LOOKOUT Detector

**MODEL NUMBER:** LO-01

**TYPICAL WARNING DISTANCE:** 3 feet (0.9m) from a 4kVAC conductor. For more details, refer to the Warning Distance Information starting on page 9.

**OPERATING FREQUENCY:** The LOOKOUT Detector will only detect 50Hz/60Hz AC voltage - do not use below 2400 volts.

**BATTERIES:** Internal rechargeable Li-ion - around 500 hours in Monitor mode, 8 hours of continuous voltage indication (Alert mode) under typical conditions

**WEIGHT WITH BATTERY:** 1.0 lb. (453g)

**DIMENSIONS:** 6.75" Dia x 1.55" H (17.14cm x 3.94cm)

**VOLTAGE RANGE:** 4kVAC to 500kVAC system voltage

**ENCLOSURE MATERIAL:** ABS UL 94-HB

**PRINTED CIRCUIT BOARDS:** FR-4 UL94V-0

**INGRESS PROTECTION:** IP67

### ENVIRONMENTAL CONDITIONS

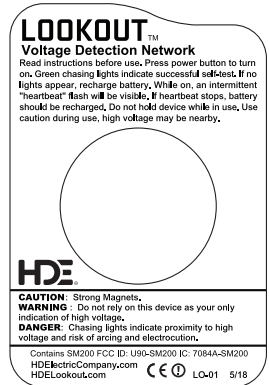
**ALTITUDE:** Up to 6,566 ft. (2000m)

**OPERATING TEMPERATURE:** -20°F to +140°F (-29°C to +60°C)

**HUMIDITY:** 95% to 60°C (non-condensing)

**OVERVOLTAGE CATEGORY:** II Non-contact

**POLLUTION DEGREE:** PD4



## TECHNICAL SPECIFICATIONS – LOOKOUT Charger

**MODEL NUMBER:** LOC-01

**WEIGHT:** 0.6 lb. (272g)

**DIMENSIONS:** 6.5 in. (16.5cm) diameter

**VOLTAGE INPUT:** 9VDC to 14VDC

**VOLTAGE OUTPUT:** 9VDC to 14VDC

**ENCLOSURE MATERIAL:** ABS UL 94-HB

**PRINTED CIRCUIT BOARDS:** FR-4 UL94V-0

**INGRESS PROTECTION:** IP67

### ENVIRONMENTAL CONDITIONS

**ALTITUDE:** Up to 6,566 ft. (2000m)

**OPERATING TEMPERATURE:** -20°F to +140°F (-29°C to +60°C)

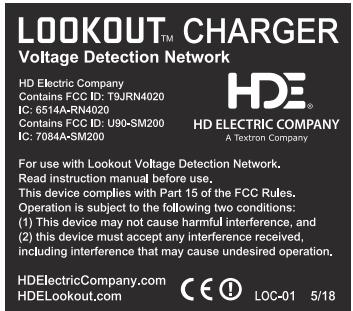
**HUMIDITY:** 95% to 60°C (non-condensing)

**OVERVOLTAGE CATEGORY:** II Non-contact

**POLLUTION DEGREE:** PD4

### MANUFACTURING LOCATION

HD Electric Company • Waukegan, IL. 60085, USA



## ACCESSORIES



### **LO-EM Equipment Mount**

*(shown on the left)*

The LOOKOUT Equipment Mount accessory may be attached with sheet metal screws or high bond adhesive tape anywhere that a secure mounting location is desired. Using the Equipment Mount, Detectors may be placed on or around equipment that will be operated near energized conductors such as on both sides and on top of the boom of a crane, in the operator's cab or around the outriggers.

### **LO-CL Claw Tool for Detector Installation**

*(shown above mounted on hotstick)*

The LOOKOUT Claw Tool accessory may be used to easily affix or retrieve LOOKOUT Detectors from the Equipment Mount anywhere that is reachable by a standard hotstick.



### **LO-OP Operator Unit**

*(shown with optional Equipment Mount)*

Relays network voltage detection alerts to the operator. Does NOT detect voltage.



### **LO-CB Safety Cone Mounting Bracket**

The LO-CB Safety Cone Mounting Bracket accessory allows the LOOKOUT Detector to be placed on a cone for better visibility and sensitivity to overhead conductors. Use the Detector mounted on the top of this bracket for best sensitivity above and to the sides.



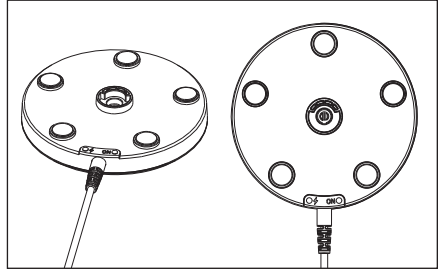
### **LO-HB Fence Hanger Bracket**

Used on fences or any railing to provide a warning of a nearby energized field. When applied to a metal fence, the Detector will only detect conductors on the side of the fence it is hanging from.

May also be attached to overhead conductors up to 35kV. The Detector will provide a direct indication of the presence of voltage on either the conductor to which it is applied or on other nearby conductors.

### **LOC-01 Charger**

LOOKOUT Charger and Wireless Bridge with 12VDC automotive jack. A total of 6 LOOKOUT Detectors can be stacked and charged at one time. Make sure the magnets on the bottom of the Detectors are aligned with the steel plates on the Charger or on the LOOKOUT Detector below if being stacked.



The Charger is also a Wireless Bridge used to communicate to the Detectors through the LOOKOUT mobile app. See page 11 for more details. It is necessary that the charger remains powered while using the mobile application. The application will NOT connect directly to an individual LOOKOUT Detector without the use of the charger.

### **LO-BGS Carrying Bag**

Carrying bag with handles; holds 6 LOOKOUT Detectors, charger and accessory brackets.



### **LO-XF1 Charger Adapter, 120V**

120VAC charge adapter to plug LOC-01 Charger with 12VDC adapter into 120VAC outlet.



# LIMITED WARRANTY AND LIMITATION OF LIABILITY

This warranty applies to all products sold by HD Electric Company (the "Products"); provided, however, that the term Products does not include any third party products purchased through HD Electric Company, for which no warranties are made (the "Third Party Products"). Third Party Products may be subject to a separate manufacturer's warranty; [should you have any question regarding whether a separate warranty applies, please contact HD Electric Company].

NOTICE: READ THIS LIMITATION OF WARRANTY AND LIABILITY BEFORE BUYING OR USING THE PRODUCTS CONTAINED HEREIN.

It is impossible to eliminate all risks associated with the use of the Products. Risks of serious injury or death, including risks associated with electrocution, arcing and thermal burns, are inherent in work in and around energized electrical systems. Such risks arise from the wide variety of electrical systems and equipment to which Products may be applied, the manner of use or application, weather and environmental conditions or other unknown factors, all of which are beyond the control of HD Electric Company.

HD Electric Company does not agree to be an insurer of these risks, and shall have no liability for any claims arising from such risks.

WHEN YOU BUY OR USE THESE PRODUCTS, YOU AGREE TO ACCEPT THESE RISKS.

HD Electric Company warrants to the original purchaser that the Products (excluding any third party products purchased through HD Electric Company, for which no warranties are made) will be free from defects in material and workmanship, under normal use and regular service, and preventative maintenance for a period of one (1) year (ten (10) years for HDE Capacitor Controls) from the date of shipment (the "Warranty Period"). Should any failure to conform with this warranty be found during the Warranty Period, you must notify HD Electric Company of your claim within thirty (30) days of discovery, and within the Warranty Period. Your failure to give notice of claims of breach of warranty within the Warranty Period shall be deemed an absolute and unconditional waiver of claims for such defects. HD Electric Company will have no responsibility to honor claims received after the date the applicable Warranty Period expires.

Upon notice of your claim, HD Electric Company will provide a return authorization number, and further instructions on how to return the product for service. You must follow HD Electric Company's instruction. You are responsible for all Product removal, handling, re-installation, and shipping (both to and from HD Electric Company). Products returned for repair, as well as repaired or replacement Products shall be sent postage / freight prepaid. After receipt of a product which HD Electric Company determines is defective, HD Electric will, at its option, either (1) repair (or authorize the repair of) the Product or (2) replace the Product, subject to the following: The Products are made using parts sourced from a variety of manufacturers. Due to the rapidly changing technology environment, parts may become obsolete / unavailable over time (end of life). In the event that a Product cannot be repaired or replaced due to unavailability of parts, HD Electric Company will use commercially reasonable efforts to obtain substitute parts or conduct work around design, but cannot guarantee its ability to do so.

Items not found defective will be returned at your expense, or failing receipt of instruction from you on return of such items within five (5) business days of our notice to you that the product is not defective, HD Electric may dispose of the product at its discretion and with no liability to you. HD Electric Company's determination of defects is final. Products repaired or replaced during the Warranty Period shall be covered by the foregoing warranties for the remainder of the original Warranty Period or ninety (90) days from the date of delivery of the repaired or replaced Products, whichever is longer.

## LIMITATIONS:

This warranty is void in the event of misuse, alteration, faulty installation, or misapplication of the product.

This warranty does not cover failure of product or components due to any ACT OF NATURE; lightning, floods, hurricanes, tornadoes or any other such catastrophic events.

HD Electric Company does not warrant any third party products or associated hardware or their performance or suitability for use and application. Such items are provided "as-is".

All repairs must be authorized by HD Electric Company. Unauthorized repairs will not be reimbursed under any circumstances.

HD Electric Company is not required to make replacement or loaner equipment available while Products are being repaired or replaced, or to compensate you for any in/out labor charges or expenses associated with removal, handling or re-installation of the Products.

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IN NO EVENT SHALL HD ELECTRIC COMPANY HAVE ANY LIABILITY FOR ANY THIRD PARTY PRODUCTS OR ASSOCIATED HARDWARE, OR CUSTOMER-OWNED SYSTEMS, EQUIPMENT OR SOFTWARE.

HD Electric Company must have prompt notice of any claim so that an immediate product inspection and investigation can be made. Buyer and all users shall promptly notify HD Electric Company of any claims, whether based on contract, negligence, strict liability, or other tort or otherwise be barred from any remedy.

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