

FIREFLY[®]

FUSE TOOL & VOLTAGE DETECTOR

and TESTER

Operating Instruction Manual



Making the Invisible Visible[™]

HDE[®] HD ELECTRIC COMPANY
A Textron Company

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IMPORTANT SAFETY INFORMATION

READ AND UNDERSTAND ALL ELEMENTS OF THIS MANUAL PRIOR TO USE.

WARNING: Use of the FireFly Fuse Tool Voltage Detector in certain corner locations may result in incorrect indications. Those conditions should be avoided or re-tested in a nearby location. Voltage cancellation effects inside right angles (conductors approximately 90° apart) may cause false indications if the Detector is used within 3 feet (1 meter) of the conductors joining. Other operating limitations may exist. These are found in the Instructions for Use section of this manual (page 6).

DANGER: Never insert the FireFly Detector into metal enclosures, switchgear, through access holes or use in any situations other than overhead conductors. Incorrect use of the FireFly Detector can lead to severe injury or death.

SAFETY

Rigorous hotstick work practices should be used at all times. All industry, OSHA and company work practices and safety procedures shall apply when working on or near high voltage systems. When used properly, the FireFly Detector reliably provides an alarm warning of energized conductors.

- Only trained, professional operating personnel should use this equipment. The voltages these instruments operate at are to be considered live and dangerous and are lethal. Severe injury or death can occur if improperly used.
- Make certain all other safety considerations have been identified, implemented and are in place prior to using this equipment. Maintain proper work clearances at all times.
- Make certain the FireFly Detector is properly rated for use on the system voltages you will test.
- Prior to using, make certain to inspect the instrument for any physical damage, cleanliness and check for proper working order using the test button. Remove from service and do not use if you suspect a problem with any of the above.
- Test the instrument before and after each use by testing on a known voltage source such as the PT-FTVD Proof Tester® Detector Tester for FireFly Voltage Detectors.
- Never allow another high voltage conductor, or grounded point, to come in contact with the tool during use. Keep housing of FireFly Detector free and clear of all structures at all times.
- Hotsticks must be used at all times per industry, OSHA and company work practices.
- Never touch the detector or control panel during contact with high voltage. The FireFly Detector should be considered to be at the same voltage as the conductor under test.

DESCRIPTION

The FireFly Detector combines a lighted fuse tool with voltage detection adding an extra margin of safety for those working on distribution lines. Operating frequency is 60Hz (optional 50Hz available).

The FireFly Detector includes is a single range voltage detector. One range of operating voltages is set within the unit. A typical range is 4kV-12kV. If the unit contacts a conductor energized from 4kV (line-to-line) to 12kV (line-to-line), red LEDs flash and an audible alarm is activated.

Other FireFly Detector voltage ranges are available up to and including 35kV. Do not use the detector at voltages higher or lower than it is rated. Consult the product label for the specific range or levels for the unit supplied.

When operating within the unit's voltage range (see product label), the FireFly Detector will provide both an audible and visual alarm upon making contact with an energized conductor. The FireFly Detector units will not give an alarm due to induced voltage on de-energized conductors, unless the induced voltage level exceeds the threshold voltage of the detector.

The FireFly Detector should be tested both prior to and after line testing to make certain the unit is working properly. The FireFly Voltage Detector has a built-in self-test feature to make certain the unit is working properly. Push the TEST button, which will test the battery, the electronic circuitry and the audible and visual alarm (see page 5 for more information). To test the FireFly Detector on a known voltage source before and after each use, the PT-FTVD Proof Tester FireFly Voltage Detector Tester can be used (see page 10 for more information).

If the FireFly Detector does not pass the self-test, the voltage detector batteries should be replaced and the unit re-tested. If the unit still does not pass the test, the unit should be sent in for repair. NEVER USE THE FIREFLY DETECTOR IF THE SELF-TEST IS NOT SUCCESSFULLY PASSED! See Self-Test Operation Section (page 5).

Four (4) 3V lithium batteries power the FireFly Voltage Detector and white lights. Even though the voltage detector is always "ON" and sensing voltage, the voltage sensor batteries should last for approximately one year under normal use. We do recommend however, replacing the batteries every six months. If the instrument is to be stored for a year or more, remove the battery during storage.

A universal spline adapter is built into the aluminum housing of the FireFly Detector units. Extension hotsticks are required for use at all times. Hotsticks are available from HD Electric Company and must be used when placing the FireFly Detector in contact with any conductor.

VOLTAGE DETECTOR SELF-TEST OPERATION

The self-test feature provides a full test of the battery, the voltage detection circuitry and the audible and visual alarm.

NOTE: The self-test should be used both prior to and after testing the conductor to confirm proper operation.

- 1) Push and hold the self-test button on the front panel to operate the self-test. The red (alarm) LED lights will flash and the buzzer will beep. The unit is ready for operation (Figure 1).
- 2) If pressing the test button does not cause the events listed in Step 1, the unit should not be placed in operation. The battery may need replacement, see Battery Replacement section (page 8). If changing the battery does not produce the results shown in Step 1, remove the unit from service and send in for repair.
- 3) After completing the voltage detection on the conductor (see next section), always confirm proper function of the FireFly Detector by completing Step 1 again. If the self-test does not function as above, DO NOT assume that the test results are correct. Re-test the conductor, preferably with a different FireFly Detector.
- 4) Verify the operation of the white lights by pressing the Lights ON/OFF button. Verify both the top and side white lights turn on. Replace the two Lights batteries if the lights do not come on (page 8).



Figure 1

NOTE: Never use the self-test if the FireFly Detector is in contact with any voltage source.

FIREFLY™

4/12kV

FTVD-15

Indicates presence of voltage with flashing red lights and beeper. Press and hold the TEST button to verify flashing lights and beeper are active. If not, replace the batteries. Two batteries are required for voltage detection and two for the white lights. All are lithium 2/3A or 123A batteries. Pressing the LIGHTS button toggles lights on and off. This is a direct contact device and must be used with an insulating hot stick. Do not use this

device as your only indication of high voltage. Use extreme caution as high voltage is nearby.

WARNING: Detects AC voltage only. Does not detect DC voltage such as charged capacitors or cable. Do not touch during measurement and keep free of other conductors and grounds. Read and understand all instructions. For use by trained professionals only. Misuse or abuse of this product can lead to severe injury or death.

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INSTRUCTIONS FOR USE

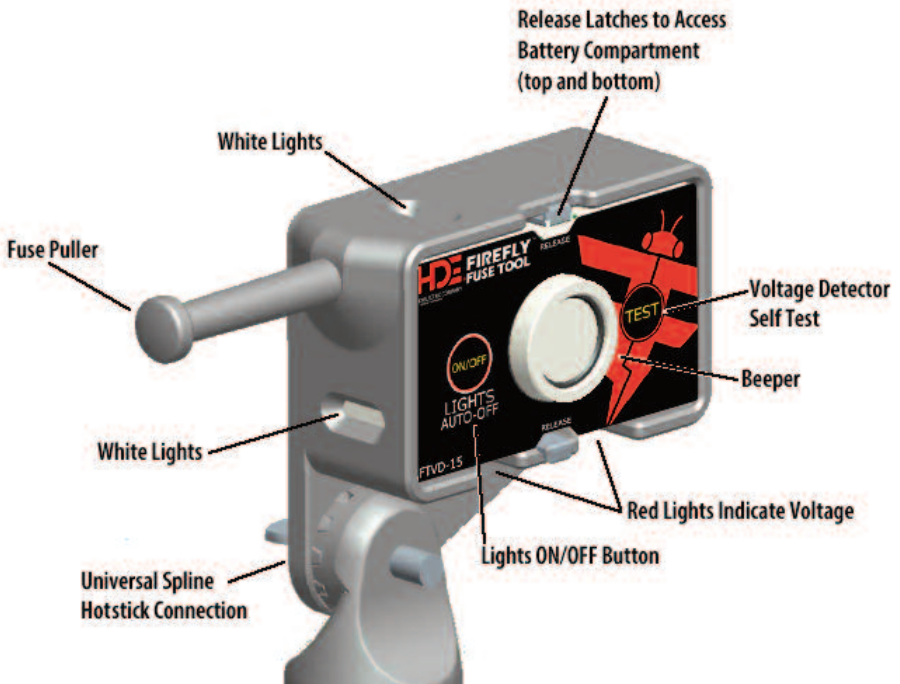
Situations To Avoid

Within certain situations and because of various system configurations, electrical field interference capable of affecting the operation of the FireFly Voltage Detector may occur. Within these areas it is imperative that you be aware of and identify all such conditions which may exist. Some examples of these situations are discussed here.

- 1) **90° CORNER CONFIGURATIONS:** Using the FireFly Detector on the inside of 90° corners may cause reduced voltage sensitivity or a failure to indicate voltage.
- 2) **SAME PHASE INTERFERENCE:** When two conductors of the same phase are in close proximity to one another, the field generated could shield the FireFly Detector, causing it not to operate.
- 3) **OPPOSITE PHASE INTERFERENCE:** This condition may occur when testing a grounded and de-energized conductor which is in close proximity to a live, ungrounded conductor. In this situation the FireFly Detector may indicate live voltage when the conductor being contacted is at ground potential.

NOTE: Only use the FireFly Detector within the voltage range specified on the product label. Do not use the FireFly Detector above or below the product label rating.

DANGER: Never allow the body of the FireFly Detector to bridge across, or come in contact with, another conductor or grounded point.



OPERATION

NOTE: Direct, metal-to-metal contact with the conductor must be made for the FireFly Voltage Detector to operate correctly.

- 1) Place the FireFly Detector at the end of a hotstick adequate for protection for the voltage range being tested. Company, OSHA and industry safety procedures **MUST BE FOLLOWED AT ALL TIMES**. Connect the detector to the hotstick by way of the built-in universal spline, making certain it is securely attached.
- 2) If the FireFly Detector will be used at night or in the dark, test the Lights before use. The lights will shut off automatically 10 minutes after the most recent voltage detection or self-test, or they can be turned off manually.
- 3) Place the FireFly Detector in direct contact with the conductor being tested for voltage or inside the loop of the fuse cutout or switch. The FireFly Detector should be positioned as close to a 90° orientation (perpendicular) to the fuse or switch as possible. If the conductor is energized, the detector will give both an audible (beeping tone) and visual (red blinking lights) indication. If the conductor is not energized no signal is given.

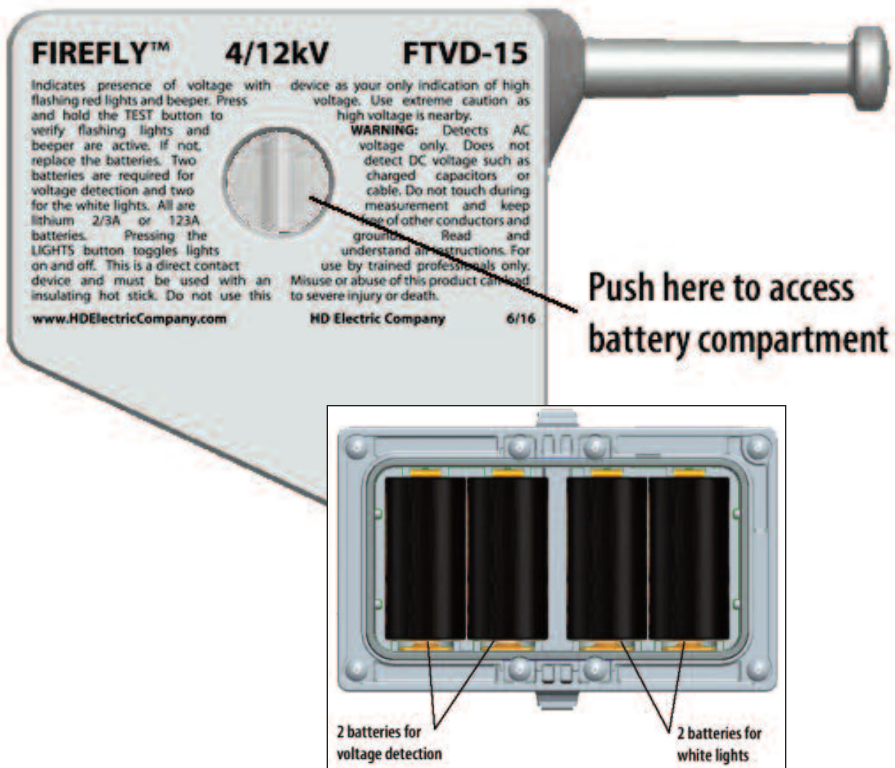
When operating within the unit's voltage range (see product label), the FireFly Detector will provide both an audible and visual alarm upon making contact with an energized conductor. The FireFly Detector unit will not give an alarm due to induced voltage on de-energized conductors, unless the induced voltage level exceeds the threshold voltage of the detector.

- 4) Test the FireFly Detector for proper voltage detection after each use by pushing the TEST button. See the Self-Test Operation section (page 5). The PT-FTVD Proof Tester FireFly Voltage Detector Tester can also be used to test the FireFly on a known voltage source before and after use (page 10).

BATTERY REPLACEMENT

Replace the four batteries as needed with IEC type CR17345 including Duracell® 123, Panasonic® CR123A and Energizer® 123. Note: Panasonic® type CR17335 or BR-2/3A are not acceptable replacements. Two of the four batteries power the voltage detector and the other two power the white lights. Always replace the two batteries for each function in pairs, but it is not necessary to replace all four batteries at the same time.

- 1) Remove the molded plastic inner housing from the aluminum outer housing by pressing and holding the two latches on the front of the unit and pushing through the hole in the back of the unit.
- 2) Pull the battery cover off of the back of the molded housing.
- 3) Replace batteries as needed for the voltage detector and/or the white lights. Verify correct battery polarity.
- 4) Replace the battery compartment cover and push the molded housing back into the aluminum holder right side up. Ensure both latches snap into place.



MAINTENANCE AND CARE

STORAGE - It is recommended for protection of the FireFly Detector that you always store it and its accessories in the carrying bag provided. If a prolonged period of storage is anticipated (six or more months), remove the batteries. Remember to replace the batteries prior to using the FireFly Detector again.

CLEANLINESS - The aluminum outer housing is very rugged, but it should be kept clean and free of dirt, grease and any other foreign materials. The inner plastic housing should also be kept clean and dry. If either housing surface integrity has been compromised in any way, return the FireFly Detector to the factory for repair or replacement. Do not use.

DAMAGE - If you suspect any mechanical or electrical damage, do not use the FireFly Detector and arrange for repair by returning to the factory.

BATTERY REPLACEMENT - See Battery Replacement section (page 8) for additional information.

CALIBRATION & TESTING - It is recommended that every twelve months the FireFly Detector is sent in for testing, cleaning and inspection. We recommend this to be done at a factory trained repair facility, the HD Electric Company factory, or other qualified location.

Minimal maintenance is required for the FireFly Detector. The carrying bag that is supplied with the unit is recommended for storage of the FireFly Detector when it is not in use.

TECHNICAL SPECIFICATIONS

ENVIRONMENTAL CONDITIONS

CONDITIONS - Indoor and outdoor use

ALTITUDE - Up to 6,566 ft. (2000M)

OPERATING TEMPERATURE -40°F to +120°F (-40°C to +49°C)

HUMIDITY - 95% to 49°C (non-condensing)

MEASUREMENT CATEGORY IV

OVERVOLTAGE CATEGORY IV

ENCLOSURE MATERIAL - Aluminum, polycarbonate

DIMENSIONS:

LENGTH - 6 in. (15cm), Width 1.2 in. (3cm), Height 6 in. (15cm)

WEIGHT - 1 lb. (454g)

BATTERY LIFE - Voltage detection - up to 40 hours continuous alert
White lights - up to 8 hours continuous

BATTERY - 3V lithium, ANSI-5018LC, IEC-CR17345

VOLTAGE DETECTION RANGE - Voltage ranges available from
4kV to 35kV system voltage, 50/60Hz.

OPTIONAL ACCESSORIES

PT-FTVD TESTER FOR FIREFLY DETECTORS

The PT-FTVD Proof Tester® FireFly Detector Tester is for use on all FireFly Detector models. This tester generates high voltage AC for testing the FireFly Voltage Detector.

To use, apply the metal plate on the bottom of the FireFly Tester to the right side of the Firefly Detector housing as shown. Press and hold the TEST button on the Proof Tester. A properly operating FireFly Detector will signal the presence of voltage with both the beeper and red lights. If the FireFly Voltage Detector does not operate, replace the Voltage Detector batteries, per the instructions (page 8). If the Proof Tester LED does not light, replace the Proof Tester battery with a 9V lithium or alkaline type battery.

CAUTION: This device generates high voltage AC for testing the voltage detection function in FireFly Detectors. There is no danger of electric shock when this Tester is used as directed. Discontinue use and return to HD Electric Company for service if the housing is cracked or broken, or if the battery cover is lost.

WARNING: Do not use this Tester except as directed. Do not use to test equipment other than specified FireFly Voltage Detectors. Do not apply to energized circuits or equipment. Do not operate this Tester without the battery cover and do not open the housing. Refer all servicing to the factory. Failure to follow these instructions may lead to electric shock, severe injury or death.

HOTSTICKS

A range of hotsticks are available in lengths starting at 4'. Contact HD Electric for more details.



FireFly™ Detector Proof Tester® for HD Electric FireFly Fuse Tools

This tester tests the voltage detector in FireFly fuse tools. To use, apply the right flat side of the FireFly fuse tool to the metal end plate on the Tester. Press and hold the test button on the Tester. A properly operating FireFly will indicate the presence of voltage with its flashing red lights and beeper. If the FireFly does not indicate, replace the batteries. See instructions. If the Tester LED does not light, replace the Tester battery with a 9V alkaline or lithium type.

CAUTION: This device generates 200VAC for testing the voltage detector in FireFly fuse tools. There is no danger of electric shock when this tester is used as directed. Discontinue use and return to HD Electric Company for service if the housing is cracked or broken or if the battery cover is lost.

WARNING: Do not use this tester except as directed. Do not use to test equipment other than FireFly fuse tools. Do not apply to energized circuits or equipment. Do not operate this Tester without the battery cover and do not open the housing. Refer all servicing to the factory. Failure to follow these instructions may lead to electric shock, severe injury or death.

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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 BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM THE USE OR HANDLING OF THESE PRODUCTS. THIS SHALL INCLUDE BUT, NOT LIMITED TO, LOST PROFITS OR REVENUE, LOSS OF USE OF THE PRODUCTS, COST OF SUBSTITUTE PRODUCTS, FACILITIES OR SERVICES, OR DOWNTIME.

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.

HD Electric Company is committed to ongoing review and improvement of its product lines, and thus reserves the right to modify product design and specifications without notice.

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