

TAG[®]

VOLTAGE DETECTORS *and ACCESSORIES*

Operating Instruction Manual

TAG-200 and TAG-200MR
(Distribution Voltages) and
TAG-330 (Transmission Voltages)
Voltage Detectors are shown with
standard overhead contact probes.

TAG-330

TAG-200

TAG-200MR



HDE[®] HD ELECTRIC COMPANY
A Textron Company

1475 Lakeside Drive • Waukegan, Illinois 60085 U.S.A. • 847.473.4980
fax 847.473.4981 • website: www.HDElectricCompany.com

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

WARNING: Use of the TAG Detectors in corner locations may supply faulty indications. Those conditions should be avoided or re-tested in a nearby location. Voltage cancellation effects within right angles (conductors approximately 90° apart) may cause false reads 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 5).

DANGER: Never insert TAG Voltage Detectors into metal enclosures, switchgear, through access holes or use in any situations other than overhead conductor testing, unless special adapter probes designed for your application are available and are being used. Incorrect use of TAG Voltage Detectors or contact probes 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 TAG 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 TAG Detector is properly rated for use on the system voltages you will test.
- Assemble the TAG Voltage Detector with the proper contact probes for your application.
- Prior to using, make certain to inspect the instrument for any physical damage, cleanliness and check for proper working order using the All-Check® Self-Test button. Remove from service and do not use if you suspect a problem with any of the above.
- Test instrument before and after each use by testing on a known voltage source.
- Never allow another high voltage conductor, or grounded point, to come in contact with the instrument during use. Keep the TAG Detector housing 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 TAG Detector should be considered to be at the same voltage as the conductor under test.

GENERAL DESCRIPTION

The TAG-200 and TAG-200MR Voltage Detectors are designed to provide added safety to crew members that are required to work on distribution lines. The minimum voltage setting is 4kV (2.4kV line-to-ground). The TAG-200 and TAG-200MR Detectors maximum voltage setting is 69kV (40kV line-to-ground). Operating frequency is 60Hz (optional 50Hz available).

The TAG-200 Voltage Detector is a single range voltage detector. One range of operating voltages is set within the unit. A typical range is 4kV-15kV. If the unit contacts a conductor energized from 4kV (line-to-line) to 15kV (line-to-line), a red LED flashes and an audible alarm is activated.

The TAG-200MR Voltage Detector can be set for up to two operating voltage levels. There can be a low operating voltage level and a high operating voltage level. An example of voltage levels is 4kV - 15kV and 15kV - 35kV (phase-to-phase). If the instrument contacts an energized conductor at its low voltage level, 4kV, a single red LED flashes and an audible alarm is activated. If the instrument contacts an energized conductor at or above its high-level, 15kV, two red LEDs flash and an audible alarm is activated.

The TAG-330 Voltage Detector is designed to provide added safety to crew members that are required to work on transmission lines. The minimum voltage setting of the TAG-330 is 69kV (40kV line-to-ground), up to the maximum voltage setting of 765kV (442.2kV line-to-ground). Operating frequency is 60Hz (optional 50Hz available).

The operating voltage range or level of any TAG Voltage Detector can be customized to the user, but will always be less than the entire design rating of the product. Ranges of the TAG-200, TAG-200MR and TAG-330 Voltage Detectors can be roughly defined by the maximum voltage setting exceeding the minimum voltage setting by no more than three to four times, e.g. 4 to 15kV. Do not use the detector at voltages higher or lower than its rating. 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 TAG Detector will provide both an audible and visual alarm upon making contact with an energized conductor. The TAG Voltage 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 All-Check self-test feature is required both prior to and after line testing to make certain the unit is working properly. The All-Check self-test is operated by pushing the test button, which will test the battery, the electronic circuitry and the audible and visual alarm.

If the TAG Detector does not pass the All-Check self-test, the battery should be replaced and re-tested. If the unit still does not pass the test, the detector should be sent in for repair. **NEVER USE THE TAG VOLTAGE DETECTOR IF THE ALL-CHECK SELF-TEST IS NOT SUCCESSFULLY PASSED!** See All-Check Self-Test Operation Section (page 4).

A standard 9-volt lithium or alkaline battery powers the TAG Detectors. Even though the circuitry is constantly "ON" and sensing voltage, the battery should last for approximately one year under normal use. We do recommend however, replacing the battery 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 polycarbonate housing of the TAG Voltage 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 detector in contact with any conductor.

ALL-CHECK SELF-TEST OPERATION

The All-Check self-test feature provides a full test of the battery, the electronic circuitry and the audible and visual alarm.

NOTE: The All-Check self-test feature should be used both prior to and after testing the conductor to confirm proper operation. In the instructions below, the numbers appearing with the letter "A" refer to the TAG-200 Voltage Detector operating characteristics, the numbers with the letter "B" refer to the TAG-200MR Voltage Detector and the numbers with "C" refer to the TAG-330 Voltage Detector. The figures referenced are shown on page 5.

- 1A) Push and hold the test button on the inside of the polycarbonate housing to operate the All-Check self-test procedure. The red (alarm) LED light will flash and the buzzer will beep. After release of the button, the green LED light will illuminate for approximately one to two (1-2) minutes. The unit is ready for operation. (Figure 1)
- 1B) Push and hold the test button on the inside of the polycarbonate housing to operate the All-Check self-test procedure. The two red (alarm) LED lights will flash and the buzzer will beep. After release of the button, no lights will remain on. (Figure 2)
- 1C) Push and hold the test button on the inside of the polycarbonate housing to operate the All-Check self-test procedure. Three red (alarm) LED lights will flash and the buzzer will beep. After release of the button, the green LED light will illuminate for approximately two (2) minutes. The unit is ready for operation. (Figure 3)
- 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 7). 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 TAG 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 TAG Voltage Detector.

NOTE: When using the All-Check self-test feature, do not hold the housing of the TAG Voltage Detector in your hand. This causes the detector's sensing field to be modified and may distort the All-Check self-test ability to test. Hold the TAG Detector with a hotstick or hand hold at spline while pressing the red All-Check self-test button. Never use the All-Check self-test if the TAG Detector is in contact with any voltage source.

INSTRUCTIONS FOR USE

Situations To Avoid

Within certain situations and because of various system configurations, electrical field interference capable of affecting the operation of TAG Voltage Detectors 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.

- 90° CORNER CONFIGURATIONS:** Reposition the TAG Detector to to at least three feet (1 meter) on both sides of corner configurations and attempt to retest. Any 90° corner configuration may cause field cancellation, causing the TAG Detector not to operate correctly. Conductor configurations, busbar and other electrical apparatus all apply.
- SAME PHASE INTERFERENCE:** When two conductors of the same phase are in close proximity to one another, the field generated could shield the TAG Detector, causing it not to operate. Reposition the TAG Detector to areas which will remove it from these situations.
- OPPOSITE PHASE INTERFERENCE:** This condition may occur if you are testing a grounded and de-energized conductor which is in close proximity to a live, ungrounded conductor. When applying the TAG Detector, attempt to approach the conductor you want to test from outside this possible field. If you are within the field of the energized conductor, the TAG Detector may indicate that the de-energized line is energized.

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

DANGER: Never allow the TAG Detector probes or electrodes used for overhead (O/H) or underground (U/G) applications to bridge across, or come in contact with, another conductor or grounded point. The same applies to the TAG Detectors polycarbonate housing. Keep all parts free and clear at all times.

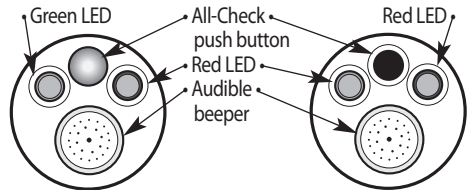


Figure 1
TAG -200
Control Panel

Figure 2
TAG -200MR
Control Panel

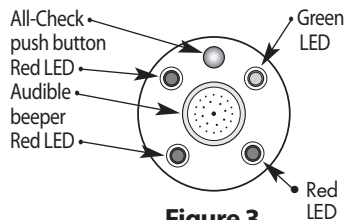


Figure 3
TAG -330
Control Panel

OPERATION

Once the All-Check self-test confirms proper operation, the TAG Detector is ready to test lines for voltage detection as follows:

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

- 1) Place the 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) Make certain that the correct probe is firmly screwed in place on the tip of the TAG Detector. For underground distribution (U/G) and metal-enclosed switch gear (MESG), the optional insulated extension probe (IEP-UD/C) is required. Use overhead probes for overhead applications only. Contact factory for further information.
- 3) Place the TAG Detector in direct contact with the conductor being tested for voltage. The TAG Voltage Detector should be positioned as close to a 90° orientation (perpendicular) to the conductor as possible. If the conductor is energized, the TAG Detector will give both an audible (beeping tone) and visual (red blinking LED(s) light) indication. If the conductor is not energized no signal is given, although on the TAG-200 and TAG-330 Voltage Detectors, the green LED light from the All-Check self-test may remain on for approximately two minutes (if still on from prior use). With the TAG-200MR Voltage Detector, if the conductor is energized within the specified low operating voltage range, the TAG Detector will give both a visual indication of one (1) blinking red LED and an audible alarm (beeping tone). If the conductor is energized within the specified high operating voltage range, the TAG Detector will give both a visual indication of two (2) blinking red LEDs and an audible alarm (beeping tone). If the conductor is not energized, no indications are given.
- 4) Test the TAG Detector for proper operation after performing the voltage test on the conductor by pushing the All-Check self-test button. See the All-Check Self-Test Operation section (page 4).



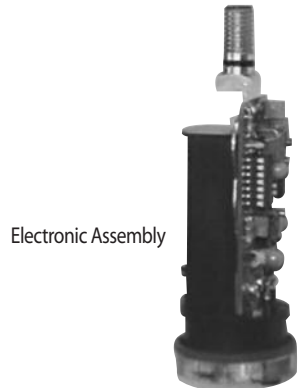
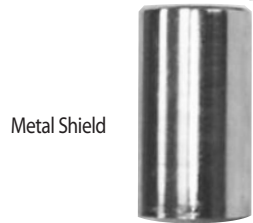
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BATTERY REPLACEMENT

Under normal conditions, the 9V alkaline battery will last approximately one year. When replacement is required (as determined by the All-Check self-test), replace the battery with a 9V alkaline battery, Duracell® #MN1604 or equivalent.

TAG-200, TAG-200MR and TAG-330 Voltage Detectors

1. Remove (unscrew) the Contact Probe from the detector.
2. Remove (unscrew) the insulated Retaining Nut.
3. Use the Contact Probe to push out the Electronic Assembly with Metal Shield from the polycarbonate housing.
4. Remove the Metal Shield from the Electronic Assembly.
5. Carefully remove the existing battery and replace it with a fresh 9V alkaline battery, Duracell® #MN1604 or equivalent.
Make certain that the polarity is correct.
6. Replace the Metal Shield on the Electronic Assembly.
7. Replace the Electronic Assembly with the Metal Shield installed in the polycarbonate housing, and insert until the contact screw is visible at the top of the unit. Replace the insulated Retaining Nut and the Contact Probe.



MAINTENANCE AND CARE

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

CLEANLINESS - The polycarbonate housing is very rugged, but it should be kept clean and free of dirt, grease and any other foreign materials. Use a silicone impregnated cloth prior to use in order to maintain the surface. If the housing surface integrity has been compromised in any way, return to factory for repair or replacement. Do not use.

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

BATTERY REPLACEMENT - While the battery is expected to last several months, battery life is determined by usage, storage and quality. Batteries should be changed on regular schedules not to exceed twelve months and is recommended every six months. See Battery Replacement section (page 7) for additional information.

CALIBRATION & TESTING - It is recommended that every twelve months the TAG Voltage Detector is sent for testing and possible recalibration, cleaning and inspection. We recommend this to be done at a factory trained repair facility, the HDE factory, or other qualified location.

Minimal maintenance is required for the TAG Detector. The polycarbonate housing should be cleaned with a silicone impregnated cloth prior to each use to assure proper operation. The case that is supplied with the unit is recommended for storage of the TAG Voltage Detector unit when the unit is not in use.

OPTIONAL ACCESSORIES

IEP-UD/C Underground Bushing Probe

The IEP-UD/C Underground Bushing Probe is designed for direct insertion into exposed 15, 25 or 35 kV loadbreak bushings (after connecting elbows have been removed and properly stored). It can be used with the TAG-200 and TAG-200MR Voltage Detectors, as well as the TAG-500 / TAG-5000 Wireless Phasers. The probe must be inserted directly into the bushing and remain free and clear of all surrounding surfaces. It is rated for use up to 35kV phase-to-phase.

To assemble the IEP-UD/C probe on the TAG Voltage Detector:

1. Inspect the IEP-UD/C probe for any mechanical defects and make certain it is clean and dry.
2. Remove the metal overhead probe on the TAG Detector by unscrewing it from the threaded terminal in the nose of the TAG Detector.
3. Screw the IEP-UD/C onto the nose of the TAG Detector. Make certain it is snug by hand tightening, but **DO NOT OVERTIGHTEN**.
4. After assembly, test the TAG Voltage Detector by using the All-Check self-test function. Do not hold onto the probe during the self-test. Hold the body of the TAG Detector and depress the self-test button, allowing the TAG Detector to test its internal functions.
5. After approving completion of the self-test, test the fully assembled TAG Voltage Detector on a known voltage source, such as the PT-DET Proof Tester® Voltage Detector Tester, prior to using.



IEP-EA/C Elbow Adapter Probe

The IEP-EA/C Elbow Adapter Probe is designed for 21.1kV maximum line-to-ground voltage, using the TAG-200 and TAG-200MR Voltage Detectors and TAG-5000 Wireless Phasers only.

The IEP-EA/C probe is used in place of the metal probe on the TAG Detector for overhead applications. The elbow adapter probe must be tightly assembled to the TAG Detector (See the IEP-UD/C Underground Bushing Probe for assembly instructions). The TAG Voltage Detector with the IEP-EA/C probe is a direct contact voltage detector for use with loadbreak elbows. All 15kV and 25kV elbows and only Elastimold type 35kV elbows may be tested with this probe. The TAG Detector cannot be used on deadbreak elbows. Use of the TAG Voltage Detector with this probe for testing loadbreak elbows is a two-person operation. One person must firmly hold the elbow with a suitable live line tool attached to its pulling eye. The second person can insert the assembled TAG Detector with the IEP-EA/C probe over the elbow probe. The TAG Detector with this elbow adapter probe **MUST BE TESTED ON A KNOWN VOLTAGE SOURCE**, such as the PT-DET Tester, before and after each use. The TAG Detector self-test does not test this elbow adapter probe. Keep the TAG Detector and this elbow adapter probe free and clear of all grounded surfaces during testing.



PT-DET TESTER FOR TAG VOLTAGE DETECTORS

The PT-DET Proof Tester Voltage Detector Tester is for use on TAG-200, TAG-200MR, TAG-330 Voltage Detectors up to and including 69 kV. This tester generates high voltage AC for testing TAG Voltage Detectors.



To use, hold the Tester in one hand and the TAG Detector in the other hand. Apply the TAG Detector probe to the metal end plate on the Tester. Press and hold the TEST button on the Tester. A properly operating TAG Detector will signal the presence of voltage with both its beeper and flashing lights. If the TAG Detector does not operate, replace the battery in the Detector with a 9V alkaline type battery, per the instructions (page 7). If the Tester LED does not light, replace the Tester battery with a 9V lithium or alkaline type battery.

CAUTION: This device generates high voltage AC for testing TAG high voltage AC voltage 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.

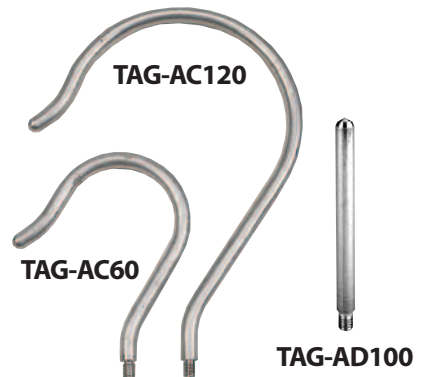
WARNING: Do not use this tester except as directed. Do not use to test equipment other than specified TAG Voltage Detectors. Do not apply to energized circuits or equipment. Do not operate this Tester without the battery cover and do not open the housing. Refer all servicing to the factory. Failure to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

OTHER ACCESSORIES

The TAG-200 and TAG-200MR Voltage Detectors come standard with two overhead contact probes, the TAG-41811/B overhead bullet-tip probe and the TAG-42029 overhead "Y" probe. The case supplied with the TAG-200 and TAG-200MR Voltage Detectors is the C-200 plastic storage case. This case also holds the IEP-UD/C and the PT-DET Tester. A steel storage case is also available, part number CM-200, as well as a carrying bag, part number B-2.



The TAG-330 Voltage Detector comes standard with three overhead contact probes, the TAG-AD100 overhead straight probe, the TAG-AC60 small overhead hook probe and the TAG-AC120 large overhead hook probe. The case supplied is the CM-300 steel storage case. This case also holds the PT-DET Tester.



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



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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.

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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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