ENGLISH

HVNCVT2

INSTRUCTION MANUAL

Broad-Range High-Voltage Non-Contact Tester

- TEST
- 240V
- 4.2kV
- 15kV
- 25kV
- 35kV
- 69kV
- 115kV
- 230kV

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GENERAL SPECIFICATIONS

The Broad-Range High-Voltage Non-Contact Tester (HVNCVT2) is an instrument for verifying the live or de-energized status of conductors and other exposed electrical equipment. The tester warns against dangerous voltage in several different ranges without contacting the energized conductor. Only use with hot sticks and rubber gloves meeting industry standards. Verify the rotary switch setting before measuring voltage, to ensure it is on the correct setting for your application.

Always follow approved work safety practices and clearances per OSHA Sub-parts R & V and all company work rules. For Minimum Approach Distances (MAD), see OSHA Tables R-6 and R-7 (pages 8 & 9) in this manual.

- **Operating Temperature:** 14° to 122°F (-10° to 50°C) @ 85% relative humidity
- **Storage Temperature:** -4° to 140°F (-20° to 60°C) @ 85% relative humidity
- **Dimensions:** Tester: 10" x 4.25" x 4.25" (254 x 108 x 108 mm)
  Case: 13.5" x 8.75" x 4.75" (343 x 222 x 121 mm)
- **Weight:** 1.32 lbs. (600 g)
- **Power Source:** Three 1.5V "C" cell batteries

Specifications subject to change.

SYMBOLS

Warning or Caution

Risk of Electrical Shock

Double Insulated

⚠ WARNINGS

To ensure safe operation and service of the tester, follow these instructions. Failure to observe these warnings can result in severe injury or death.

- Use extreme caution when testing live electrical circuits due to risk of injury from electrical shock.
- Always use hot sticks and rubber gloves meeting industry standards.
- Follow approved work safety practices and clearances per OSHA Sub-parts R & V and your company work rules.
- Always test on a known live circuit to verify tester functionality prior to use.
- Do not exceed the limits marked on the instrument itself. Never test voltage more than 230kV AC RMS.
- Never ground yourself when taking measurements. Do not touch exposed circuit elements.
- Observe the proper safety precautions when working with voltage above 30V AC RMS to avoid electrical shock hazard.
- Do not assume equipment or conductors are, or will remain, de-energized. Always install proper grounding devices before starting procedure.
- Do not operate tester in an explosive atmosphere.
- Do not expose tester to rain or moisture. This increases the risk of fire or electric shock.
- Do not rely on this tester for shielded wire or cable with concentric neutrals.
- Do not let the unit make contact with live line voltage. Do not touch any exposed wiring, connections or other energized parts of an electrical circuit.
- 3-phase feeder cables with conductors close to each other may self-cancel the electric field and not be detected by the device. Verify that the phase conductors are separated by at least 15" (381 mm) before testing for AC voltage.
- Do not use in an area with mixed high voltages. In the presence of mixed voltages, the tester may become unreliable.
- Always ensure tester is directly under the conductor being tested. If other live voltage is nearby, tester may detect adjacent voltage.

FEATURE DETAILS

1. Voltage indicator LEDs
2. Buzzer
3. Battery compartment
4. Hot stick connection point
5. Sensitivity selector:
   - OFF
   - TEST
   - 240V
   - 4.2kV
   - 15kV
   - 25kV
   - 35kV
   - 69kV
   - 115kV
   - 230kV

OPERATING INSTRUCTIONS

FOR USE BY TRAINED PERSONNEL ONLY

Anyone using this instrument should be knowledgeable and trained about the risks involved with measuring medium and high voltage. They must also understand the importance of taking safety precautions as well as testing the instrument before and after using it to ensure that it is in good working condition.

EXAMPLES OF APPLICATIONS:

- Non-contact detection of live AC voltage
- Finding faults in cables
- Checking and detecting live high voltage cables
- Tracing live wires
- Checking grounding equipment

Fig. 1: Ideal detection angle

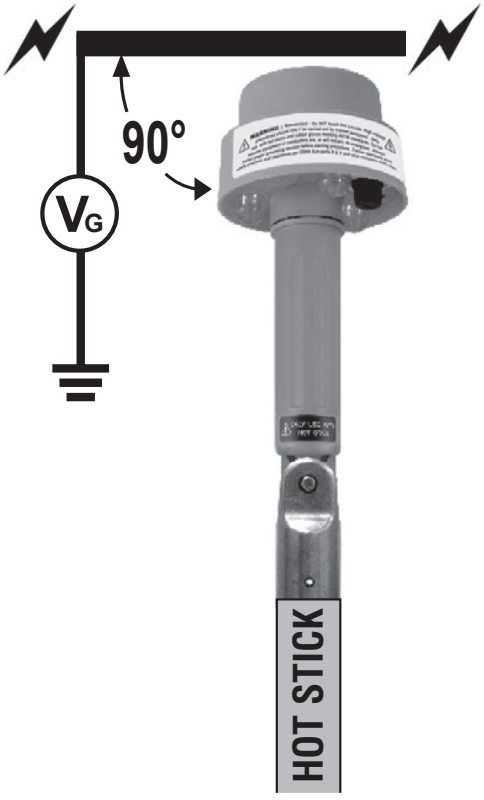

Fig. 2: Finding a cable fault

Fig. 3: Voltage detection for overhead lines

OPERATING INSTRUCTIONS

Prior to use, always inspect the tester for visible signs of damage. If there is any sign of damage, or if the tester does not operate correctly, discontinue use.

Always test on a known live circuit to verify tester functionality. The tester should be used as an indication only.

Tester should be kept clean and dry. If it is not, wipe with a clean, dry lint-free cloth.

TEST FUNCTION

Turn the sensitivity selector knob (5) to TEST in order to perform a self-test on the unit. Look for a steady red light from all 3 LEDs (1) and listen for a steady high-pitched sound. This self-test function confirms battery sufficiency, system integrity, and operation/active mode. Always test on known live circuit to verify tester functionality prior to use. ***If the 3 red LEDs do not glow and the beep sound is not present, replace batteries.***

240V AC (Secondary Test)

Perform a second test function prior to use by turning the sensitivity selector knob (5) to 240V and placing the dome near a low voltage live conductor. If a low voltage live conductor is not available, rub the dome against an item of clothing to generate static. Look for a blinking red light from all 3 LEDs (1) and listen for a beeping sound. See Fig. 1 on page 5 for ideal detection angle. Always test on known live circuit to verify tester functionality prior to use. ***If the 3 red LEDs do not glow and the beep sound is not present, replace batteries.***

OPERATION

Before using the unit, a hot stick must be attached. Only use with hot sticks and rubber gloves meeting industry standards. Always follow approved work safety practices and clearances per OSHA Sub-parts R & V and all company work rules.

Turn the sensitivity selector knob (5) to the appropriate setting. It is recommended to start with a lower test setting than the actual working voltage, then gradually increase the setting until the voltage is detected.

Gradually move the tester towards the live conductor until the warning signal is triggered. See Fig. 1 on page 5 for ideal detection angle. Always maintain the minimum approach distances listed in OSHA Tables R-6 and R-7 on pages 8 & 9 in this manual.

OPERATING INSTRUCTIONS

FINDING FAULTS IN CABLE

The tester may be used for finding faults in some flexible cables. Turn the sensitivity selector knob (5) to the appropriate setting for the energized cable being detected. Move the detector along (but not touching) the cable, listening for rapid beeping or steady sound and looking for the rapidly blinking or steady red light from all 3 LEDs (1). When the fault is reached, the unit will no longer beep or blink. See Fig. 2 on page 5. Always maintain the minimum approach distances listed in OSHA Tables R-6 and R-7 on pages 8 & 9 in this manual.

OPERATING INSTRUCTIONS

Always follow approved work safety practices and clearances per OSHA Sub-parts R & V and all company work rules. For Minimum Approach Distances (MAD), see OSHA Tables R-6 and R-7 below.

TABLE R-6 – ALTERNATIVE MINIMUM APPROACH DISTANCES FOR VOLTAGES OF 72.5 kV AND LESS[1]

Nominal voltage (kV) phase-to-phase	Distance			
	Phase-to-ground exposure		Phase-to-phase exposure	
	ft.	m	ft.	m
0.050 to 0.300[2]	Avoid Contact	Avoid Contact	Avoid Contact	Avoid Contact
0.301 to 0.750[2]	1.09	0.33	1.09	0.33
0.751 to 5.0	2.07	0.63	2.07	0.63
5.1 to 15.0	2.14	0.65	2.24	0.68
15.1 to 36.0	2.53	0.77	2.92	0.89
36.1 to 46.0	2.76	0.84	3.22	0.98
46.1 to 72.5	3.29	1.00	3.94	1.20

[1] Employers may use the minimum approach distances in this table provided the worksite is at an elevation of 3,000 feet (900 meters) or less. If employees will be working at elevations greater than 3,000 feet (900 meters) above mean sea level, the employer shall determine minimum approach distances by multiplying the distances in this table by the correction factor in OSHA's Table R-5 Altitude Correction Factor, corresponding to the altitude of the work.

[2] For single-phase systems, use voltage-to-ground.

TABLE R-7-ALTERNATIVE MINIMUM APPROACH DISTANCES FOR VOLTAGES OF MORE THAN 72.5 kV [1 2 3]				
Nominal voltage (kV) phase-to-phase	Distance			
	Phase-to-ground exposure		Phase-to-phase exposure	
	ft.	m	ft.	m
72.6 to 121.0	3.71	1.13	4.66	1.42
121.1 to 145.0	4.27	1.30	5.38	1.64
145.1 to 169.0	4.79	1.46	6.36	1.94
169.1 to 242.0	6.59	2.01	10.10	3.08
242.1 to 362.0	11.19	3.41	18.11	5.52
362.1 to 420.0	13.94	4.25	22.34	6.81
420.1 to 550.0	16.63	5.07	27.03	8.24
550.1 to 800.0	22.57	6.88	37.34	11.38

[1] Employers may use the minimum approach distances in this table provided the worksite is at an elevation of 3,000 feet (900 meters) or less. If employees will be working at elevations greater than 3,000 feet (900 meters) above mean sea level, the employer shall determine minimum approach distances by multiplying the distances in this table by the correction factor in OSHA's Table R-5 Altitude Correction Factor, corresponding to the altitude of the work.

[2] Employers may use the phase-to-phase minimum approach distances in this table provided that no insulated tool spans the gap and no large conductive object is in the gap.

[3] The clear live-line tool distance shall equal or exceed the values for the indicated voltage ranges.

OPERATING INSTRUCTIONS

PROTECTIVE CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

TABLE 130.7 (C) (16) FROM NFPA 70E 2015

Note below that this new PPE category table no longer references a category 0.

PPE Category*	Clothing	Min. APTV Rating Cal/cm²	Required Garments	Required Protective Equipment
1	Arc-rated clothing[1] and PPE	4	Long-sleeve shirt and pants or coverall. Flash suit hood or face shield[2]. Jacket, parka, rainwear or hard hat liner (AN).	Hard hat. Safety glasses or safety goggles (SR). Hearing protection (ear canal inserts). Heavy duty leather gloves[3]. Leather footwear (AN).
2	Arc-rated clothing[1] and PPE	8	Long-sleeve shirt and pants or coverall. Flash suit hood or face shield[2] and balaclava. Jacket, parka, rainwear or hard hat liner (AN).	Hard hat. Safety glasses or safety goggles (SR). Hearing protection (ear canal inserts). Heavy duty leather gloves[3]. Leather footwear (AN).
3	Arc-rated clothing system[1] and PPE	25	Long sleeve shirt (AR). Pants (AR). Coverall (AR). Flash suit jacket (AR). Flash suit pants (AR). Flash suit hood. Gloves[1] . Jacket, parka, rainwear or hard hat liner (AN).	Hard hat. Safety glasses or safety goggles (SR). Hearing protection (ear canal inserts). Leather footwear (AN).
4	Arc-rated clothing system[3] and PPE	40	Long sleeve shirt (AR). Pants (AR). Coverall (AR). Flash suit jacket (AR). Flash suit pants (AR). Flash suit hood. Gloves[1] . Jacket, parka, rainwear or hard hat liner (AN).	Hard hat. Safety glasses or safety goggles (SR). Hearing protection (ear canal inserts). Leather footwear (AN).

AN = as needed (optional) AR = as required SR = selection required

* One of the 3 basic methods is used to determine an HRC for a job task.

[1] Arc rating is defined in article 100 NFPA 70E 2015 Edition.

[2] Face shields are to have wrap-around guarding to protect not only the face but also the forehead, ears and neck, or alternatively, an arc-rated flash suit hood is required to be worn.

[3] If rubber insulating gloves with leather protectors are used, additional leather or arc-rated gloves are not required. The combination of rubber insulating gloves with leather protectors satisfies the arc flash protection requirement.

MAINTENANCE

BATTERY REPLACEMENT

1. Unscrew the tester handle (battery compartment) from the tester head.
2. Remove the 3 batteries.
3. Replace with 3 new batteries (1.5V “C” type). Batteries should be placed in the handle with the negative (-) end down into the handle first, and the positive (+) end upwards towards the head.
4. Screw the handle and head back together, ensuring that the black rubber O-ring is still in place, taking care not to damage the O-ring.

CLEANING

Be sure tester is turned off and wipe with a clean, dry lint-free cloth. ***Do not use abrasive cleaners or solvents.***

STORAGE

If the tester is not to be used for periods of longer than 60 days, remove the batteries and store separately from the tester.

DISPOSAL / RECYCLE

Do not place equipment and its accessories in the trash. Items must be properly disposed of in accordance with local regulations.

Please see www.epa.gov or www.erecycle.org for additional information.