

# CHANCE® Multi-Range Voltage Indicator Operating Instructions Model No. PSC4033710

For use with Capacitive Test Point through 80 kV AC



**NOTICE:** Before operating a Chance® Multi-Range Voltage Indicator (MRVI), thoroughly read, understand and follow these instructions. Keep these instructions with product for future reference.



Hubbell has a policy of continuous product improvement. Please visit [hubbellpowersystems.com](http://hubbellpowersystems.com) to confirm current design specifications.

# Guide to Warnings within Manual

The following is a list of warnings used within this manual and should be read in their entirety to ensure safe practices.

## **DANGER**

**A DANGER refers to operating procedures, techniques, etc., that, if not followed carefully could RESULT IN DEATH.**

## **WARNING**

**A WARNING refers to operating procedures, techniques, etc., that, if not followed carefully could RESULT IN INJURIES OR DEATH.**

## **CAUTION**

**A CAUTION refers to operating procedures, techniques, etc., that, if not followed carefully could RESULT IN DAMAGE TO EQUIPMENT or LOSS OF SERVICE to customers.**

## **NOTICE**

**A NOTICE refers to information that is considered important but not hazard related.**

# Product Safety

## ⚠️ WARNING

Do not allow the universal coupling or housing to become grounded in any way, or to contact another phase as this will cause erroneous voltage indication and could cause severe personal injury or damage to equipment.

## ⚠️ WARNING

Always use an appropriate length insulated Hot Stick even when wearing rubber gloves. Contact with the universal coupling or other parts, even with rubber gloves, will cause erroneous voltage indication. Always use with a universal pole to maintain its calibration.



CORRECT USE



INCORRECT USE

## ⚠️ WARNING

Before and after each use, always test the unit on a known energized voltage source or with the Voltage Indicator Tester to verify proper operation.

## ⚠️ DANGER

Minimum Approach Distances (MAD) should be adhered to at all times. For the latest information and charts refer to the official OSHA website: <https://www.osha.gov>

## ⚠️ CAUTION

The equipment covered in this manual must be used and serviced only by competently trained personnel familiar with and following approved work and safety practices. This equipment is for use by such personnel and this manual is not intended as a substitute for adequate training and experience in safe procedures for this type of equipment.

These instructions neither cover all details or situations in equipment use, nor do they provide for every possible contingency to be encountered in relation to installation, operation or maintenance. Should additional information and details be desired or if situations arise which are not covered adequately for the user's purpose, the specifics should be referred to Hubbell Power Systems.

# Function and Design Overview

The CHANCE® Multi-Range Voltage Indicator® (MRVI), model number PSC4033710, is a portable tool to confirm that an AC (Alternating Current) high voltage circuit is energized or de-energized prior to performing maintenance. It provides field practicality over the two points of contact measurement method. Readings from the MRVI represent the class of voltage that is present on the line. The MRVI is designed to determine approximate Phase-to-Phase and Phase-to-Ground nominal voltage up to 80 kV AC, 50/60 Hz. This unit is a direct contact electric field intensity indicator.

The MRVI is used as a secondary means to confirm the condition of a circuit after principal work procedures such as visible open gaps, dispatcher hold orders, and apparatus tag-outs have rendered the circuit de-energized.

## NOTICE

**This device is an AC (alternating current/alternating voltage) only indicator; do not use it to detect DC (direct current/non-alternating voltage).**

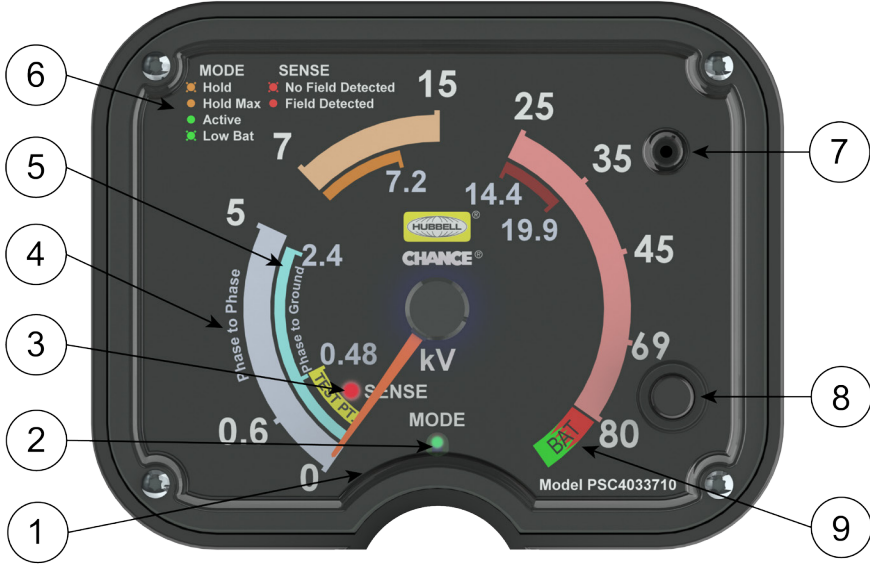
## ⚠ WARNING

**Before and after each use, always test the unit on a known energized voltage source or with the Voltage Indicator Tester to verify proper operation.**

## Features

- Meets intent of OSHA 1910.269 to test for absence of nominal voltage
- Used to determine if power lines are at rated voltage, have induced voltage, or are de-energized
- Capacitive test point through 80 kV AC for overhead and underground systems
- Stepper motor technology
- Illuminated fluorescent pointer
- Power-saving sleep mode (auto-off)
- Checks battery voltage on initial startup
- Positive interface power button
- Equivalent Phase-to-Phase and Phase-to-Ground reading ranges
- Manually activated Hold Mode
- Bluetooth technology
- New lightweight design (19.8 oz without batteries)
- Battery drawer for simple battery replacement
- Comes with a storage bag with a snaphook designed to attach to a lineman's belt
- QR code located in the instructions, Quick Reference guide, and on the unit itself

# Front Panel Information



- |                          |  |
|--------------------------|--|
| 1. Pointer Stop          | 6. LED Legend                            |
| 2. Mode LED              | 7. Audible Alarm                         |
| 3. Sense LED             | 8. Power Button                          |
| 4. Phase to Phase Scale  | 9. "BAT" Battery Voltage Level Indicator |
| 5. Phase to Ground Scale |  |

# Accuracy

This instrument is not a voltmeter; hence, the manufacturer claims no specific accuracy and therefore no specific accuracy is to be assumed by the user. Readings will vary with the field intensity, determined by a great variety of field conditions including proximity, size, and orientation of all system components in the vicinity, both energized and grounded. Erroneous readings may result from being placed near other energized conductor, sources, or grounds. To avoid such field distortions: keep the unit as far away as practical from all system components other than the specific conductor being tested.

# Operations for Overhead

## To Turn the Unit On:

1. Momentarily depress the "Power Button."
  - a. The "Mode LED" (Light Emitting Diode) will continuously illuminate green, indicating the unit is active. The pointer will rotate counter-clockwise against the "Stop" and will momentarily move clockwise to the zero mark. The audible alarm will sound once to indicate the power is on.
  - b. The pointer will pause at the zero mark for approximately 1 to 2 seconds before proceeding in the clockwise direction to a zone on the dial face marked, "BAT." The pointer will remain in this zone for approximately 4 to 5 seconds to indicate the current condition of the batteries. If the pointer is in the green "BAT" zone the batteries are good. If the pointer is in between the green and red "BAT" zones the batteries should be replaced soon. If the pointer is in the red "BAT" zone or the "Mode LED" is flashing green the batteries should be replaced immediately.
  - c. After the pointer has indicated the condition of the batteries, the pointer will recalibrate its position by rotating counter-clockwise below the zero mark (to the "Stop") and then move clockwise to the zero mark. The audible alarm will sound once and the "Sense LED" will illuminate, flashing red, if no electric field is currently being detected.
  - d. The MRVI is ready for use once it is installed on an appropriate length insulated Hot Stick.

## Taking a Reading:

2. Place the installed Shepherd Hook in contact with the power line conductor.
  - a. The "Sense LED" has been designed to change from flashing to continuously illuminated as the electric field increases in intensity and reaches a potential that is greater than or equal to 600 V AC Phase-to-Phase.<sup>1</sup>
  - b. The pointer will rotate and indicate a voltage level present on the power line conductor.

**Hold Mode:** Refer to page 8.

## Turning the Unit Off:

3. To turn the MRVI off:
  - a. Press and hold the "Power Button" for 3 seconds:
    - i. The "Mode LED" and "Sense LED" will turn off.
    - ii. The pointer will rotate counter-clockwise until it rests against the Stop.
    - iii. The audible alarm will generate three tones in decreasing pitch.
  - b. Or the MRVI will automatically power itself down (auto-off) after approximately 15 minutes of inactivity.

## WARNING

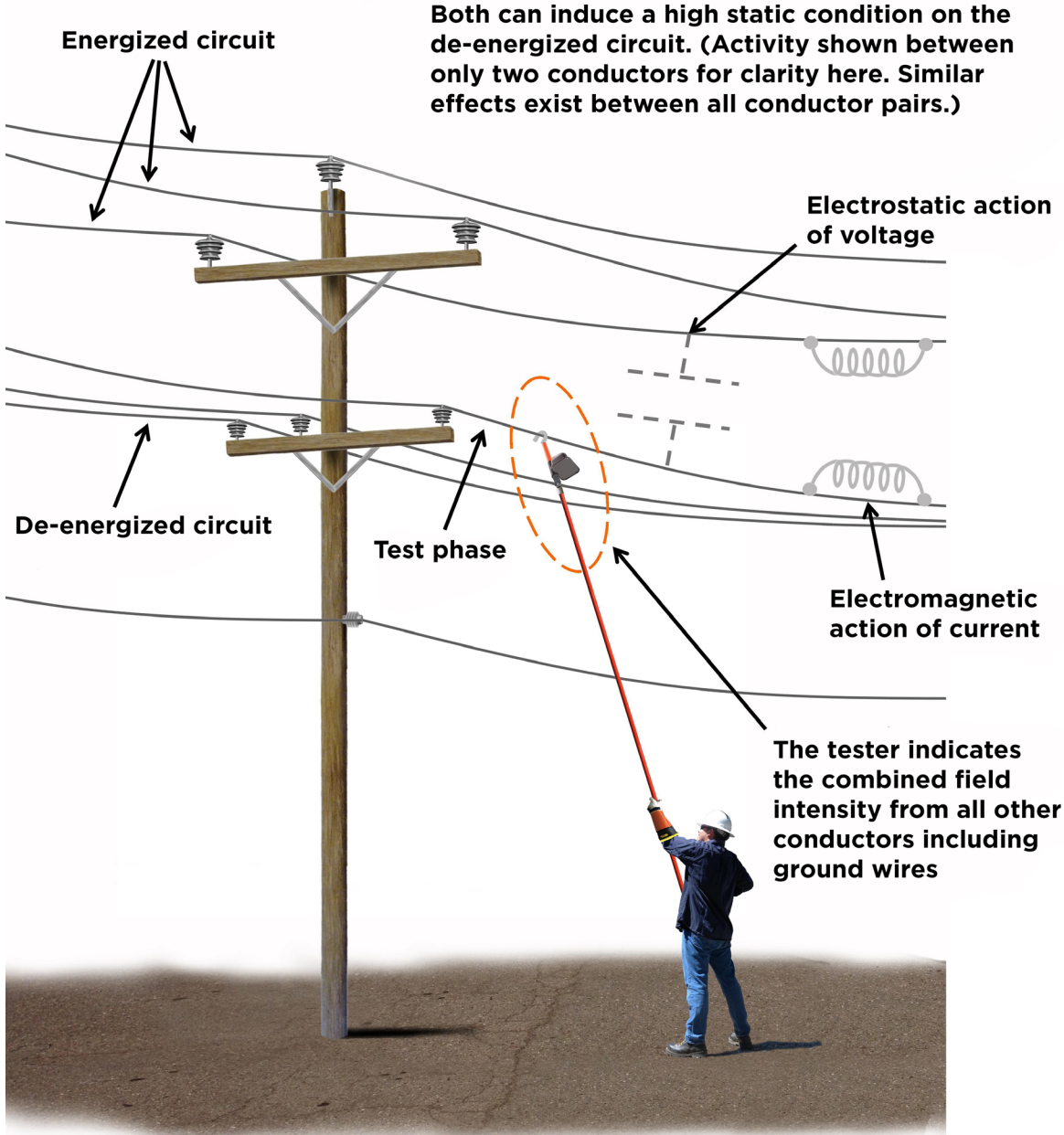
**Before and after each use, always test the unit on a known energized voltage source or with the Voltage Indicator Tester to verify proper operation.**

<sup>1</sup> The "Sense LED" may change from flashing to continuously illuminated at voltages less than 600 V AC Phase-to-Phase due to the influences of other nearby energized conductors, static charges and other environmental conditions.

# Operations for Overhead (Cont.)

## NOTICE

Both the electromagnetic action of current and electrostatic action of voltage can induce a high static condition on the de-energized circuit. Activity effects can exist between all conductor pairs. The MRVI indicates the combined field intensity from all other conductors, including ground wires.



# Hold Mode for Overhead and Underground

## Hold Mode:

To place the MRVI in the Hold Mode:

- a. Make certain that the MRVI is powered on and active by momentarily depressing the "Power Button."
- b. While holding the installed Shepherd Hook (or Bushing Adapter for underground) away from the high voltage source, press the "Power Button" twice in rapid succession to place the MRVI into the Hold Mode.
- c. Once the MRVI is in its Hold Mode the "Mode LED" will flash orange and the audible alarm will chirp continuously to let you know the MRVI is in the Hold Mode.
- d. The pointer will rotate counter-clockwise until it encounters the "Stop" and then it will return to the zero mark on the dial.
- e. Place the installed Shepherd Hook (or Bushing Adapter for underground) in contact with the power line conductor:
  - i. The "Mode LED" will begin to flash orange.
  - ii. The audible alarm will begin to beep in higher and higher pitch.
  - iii. The pointer will rotate to indicate the voltage level present on the power line conductor.
- f. Once the MRVI has sensed a constant value of the voltage level present on the power line conductor:
  - i. The "Mode LED" will change from flashing to a continuously illuminated orange color.
  - ii. The audible alarm will sound a continuous tone and the pointer will hold on the peak value.
- g. Once the MRVI is removed from the power line conductor, the pointer will remain on hold until the "Power Button" is rapidly depressed a single time, placing the MRVI back into the active state.
- h. Once the "Power Button" is depressed:
  - i. The pointer will rotate counter-clockwise until it encounters the "Stop" and then it will return to the zero mark on the dial.
  - ii. The audible alarm will cease to generate a tone.
  - iii. The "Mode LED" will illuminate green to indicate the MRVI is in its active state and is ready to resume taking readings.

## CAUTION

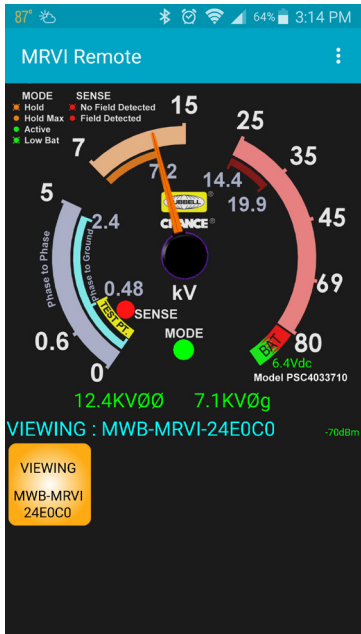
**In the Hold Mode the MRVI is waiting for a steady (consistent) voltage reading before holding a reading. Movement of the MRVI's Shepherd Hook (or the Bushing Adapter) in the electric field during the Hold Mode will cause a delay in capturing the reading. Keep the MRVI steady and in constant contact with the conductor until the "Mode LED" is continuously illuminated (orange color) and the audible alarm produces a continuous tone. To return to an active state, the indicator must be reset.**



# Operations for Underground



Taking a reading with the MRVI with Bushing Adapter on dead-front equipment



Screenshot of MRVI app

**Always use appropriate length insulated Hot Stick even when wearing rubber gloves. Contact with universal coupling or other parts, even with rubber gloves, will cause erroneous voltage indication. Also, due to the close proximity of conductive metals, the readings taken in URD cabinets will typically be higher than on an overhead line.**

As with overhead, the same basic rules and procedures apply when using the CHANCE® Multi-Range Voltage Indicator (MRVI) on underground systems. Follow these three very important additional instructions when using the tool on underground equipment:

## ⚠ DANGER

1. **When testing dead-front URD equipment, use an appropriate Bushing Adapter rather than the short probe or the Shepherd Hook.**
2. **Use *extreme caution* when testing live-front URD equipment. Use applicable safe work practices and procedures. Do not use any probes on the MRVI when testing live-front URD equipment. In place of a probe, use a small hex head machine screw (1/4-20 X 3/8" long).**
3. **When testing live-front URD equipment, the MRVI may detect fields from adjacent conductors, energized parts or grounds, including grounded cabinet components. Indication of an energized field may not be sufficient to isolate one specific conductor. Should the user wish to confirm a specific conductor is energized (or de-energized) further testing with a non-wireless Phasing Set designed for this application will be required.**

## ⚠ WARNING

**Before and after each use, always test the unit on a known energized voltage source or with the Voltage Indicator Tester to verify proper operation.**

# Operations for Underground (Cont.)

## To Turn the Unit On:

1. Momentarily depress the "Power Button."
  - a. The "Mode LED" (Light Emitting Diode) will continuously illuminate green, indicating the unit is active. The pointer will rotate counter-clockwise against the "Stop" and will momentarily move clockwise to the zero mark. The audible alarm will sound once to indicate the power is on.
  - b. The pointer will pause at the zero mark for approximately 1 to 2 seconds before proceeding in the clockwise direction to a zone on the dial face marked, "BAT." The pointer will remain in this zone for approximately 4 to 5 seconds to indicate the current condition of the batteries. If the pointer is in the green "BAT" zone the batteries are good. If the pointer is in between the green and red "BAT" zones the batteries should be replaced soon. If the pointer is in the red "BAT" zone or the "Mode LED" is flashing green the batteries should be replaced immediately.
  - c. After the pointer has indicated the condition of the batteries, the pointer will recalibrate its position by rotating counter-clockwise below the zero mark (to the "Stop") and then move clockwise to the zero mark. The audible alarm will sound once and the "Sense LED" will illuminate, flashing red, if no electric field is currently being detected.
  - d. The MRVI is ready for use once it is installed on an appropriate length insulated Hot Stick.

## Taking a Reading:

2. Install the proper Bushing Adapter (see page 16 "Optional Accessories").
  - a. The "Sense LED" has been designed to change from flashing to continuously illuminated as the electric field increases in intensity and reaches a potential that is greater than or equal to 600 V AC Phase-to-Phase.<sup>1</sup>
  - b. The pointer will rotate and indicate a voltage level present on the power line conductor.  
**NOTE:** Readings taken in URD cabinets will typically be higher than on an overhead line.

**Hold Mode:** Refer to page 8.

## Turning the Unit Off:

3. To turn the MRVI off:
  - a. Press and hold the "Power Button" for 3 seconds:
    - i. The "Mode LED" and "Sense LED" will turn off.
    - ii. The pointer will rotate counter-clockwise until it rests against the "Stop."
    - iii. The audible alarm will generate three tones in decreasing pitch.
  - b. Or the MRVI will automatically power it down (auto-off) after approximately 15 minutes of inactivity.

<sup>1</sup> The "Sense LED" may change from flashing to continuously illuminated at voltages less than 600 V AC Phase-to-Phase due to the influences of other nearby energized conductors, static charges and other environmental conditions.

# Capacitive Test Point

## ⚠ DANGER

**Capacitive Test Points must be free of corrosion and contamination for valid testing. If ever in doubt about interpreting CHANCE® Multi-Range Voltage Indicator reading under any circumstance, always assume circuit is energized and take appropriate safety precautions.**

## ⚠ WARNING

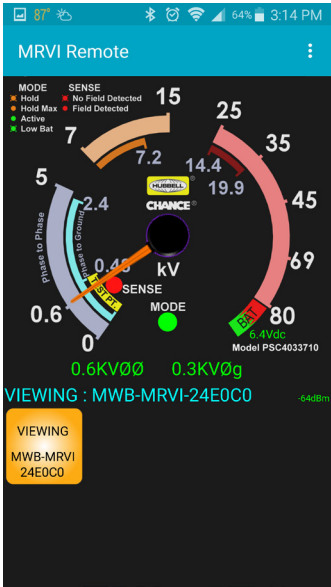
**Failure to use proper safety equipment, procedures, and work rules could result in personal injury or damage to equipment.**

1. To test Capacitive Test Points on dead-front URD equipment, safely remove the protective cap/cover from the elbow by using appropriate work practices and procedures. Follow the Elbow manufacturer’s recommendations on proper cleaning and use of all Capacitive Test Points. Capacitive Test Points must be free of corrosion and contamination for valid testing.
2. While observing all required safe work practices, and with an appropriate length insulated Hot Stick attached to the MRVI’s universal coupling, bring the sensing element area of the MRVI to the Elbow Test Point and observe the "Sense LED" and the dial indication. Due to the design of the Elbow’s Test Point (capacitive coupled rather than direct contact with the Phase conductor in the Cable), the small amount of energy available may not be enough to produce a detectable electric field. If the MRVI indicates the Capacitive Test Point is energized, consider the Cable energized. If the MRVI does not have any indication of an energized Capacitive Test Point, then further testing should be performed by another method to insure the Cable is not energized or holding a charge.

The Capacitive Test Point must be free of corrosion and contamination for testing continuity; a dirty or contaminated Capacitive Test Point may prevent proper indication of Cable condition. If ever in doubt about interpreting MRVI readings under any circumstance, always assume the circuit is energized and take the appropriate safety precautions.

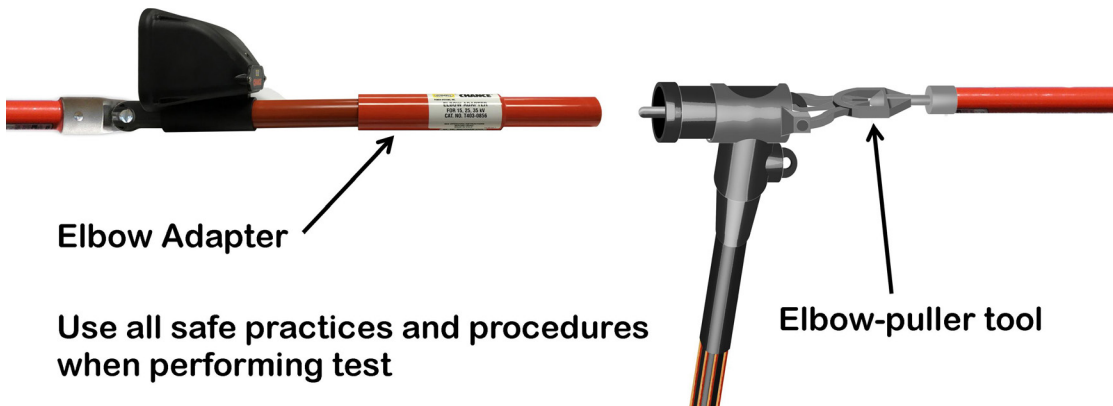


Testing a Capacitive Test Point on dead-front elbow



Screenshot of MRVI app

## Optional Procedure for Elbow/Cable Test



**It is recommended that two linemen perform this procedure.**

1. Operator #1: pull elbow with elbow-puller tool, then orient elbow so it is accessible with MRVI.
2. Operator #2: install elbow adapter on the MRVI, then insert elbow adapter into elbow to check elbow/cable for voltage.

### **⚠ WARNING**

**Failure to use proper safety equipment, procedures, and work rules could result in personal injury or damage to equipment.**

# Battery Replacement



A low battery condition is indicated when the “Mode LED” is flashing green, or during start-up the pointer is in the red “BAT” zone. Batteries can be replaced by carefully removing the two screws on the battery drawer and sliding the drawer away from the housing to expose the battery holder. Replace the four “AA” batteries, noting proper polarity. Either Alkaline or Lithium batteries may be used.

## NOTICE

**This device contains no user serviceable components. Do not remove the front lens assembly.**

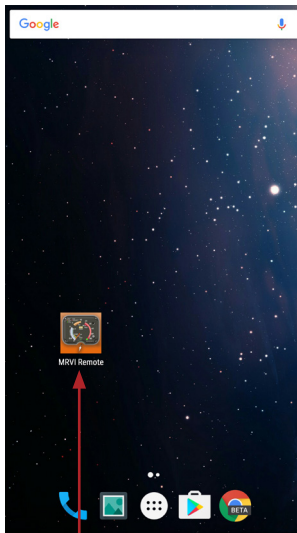
## CAUTION

**Ensure that the wires connected to the battery holder remain connected and are not damaged. After the battery drawer and screws are replaced in the housing, test the function of the unit on a known energized voltage source or with the Voltage Indicator Tester PSC4033582 for proper operation.**

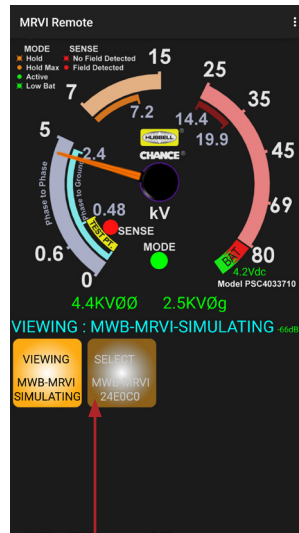
# MRVI Remote Application (Apps)

Apps are available for the iPhone®, iPad®, and Android® operating systems to enable the operator to remotely view the status of the MRVI.

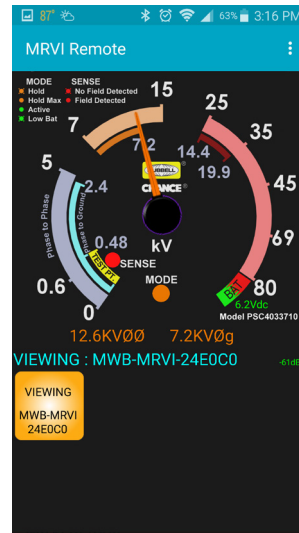
1. Download the MRVI app from the Apple iTunes® or Google Play® stores.
2. Turn on the MRVI by momentarily depressing the “Power Button.”
3. Make sure that Bluetooth is enabled in the settings on your phone.
4. Activate the MRVI Remote app.
5. Once the app has linked to the MRVI, the smart phone display will show the readings of the MRVI.
6. To capture the data: take a screenshot according to your phone’s instructions.



MRVI Remote App



SELECT BUTTON  
The app can link up to four MRVIs simultaneously



MRVI Remote App displaying a MRVI in Hold Mode

**SELECT BUTTON:** The app can link up to 4 MRVIs simultaneously.

1. If the app is linked to more than one MRVI, you may select which MRVI to monitor by tapping on one of the active select buttons.
2. Turning off one of the MRVIs will disconnect that particular unit from the MRVI Remote app and will remove the select button associated with that MRVI. All other MRVIs previously linked to the app will remain linked and available for data display. For safety reasons, the app only displays the information from the MRVI and does not control the operation of the MRVI.

## Maintenance

The CHANCE® Multi-Range Voltage Indicator (MRVI) is an electronic instrument and, if properly cared for, will provide many years of trouble-free service. Keep all parts clean and dry. **Clean only with cloth dampened with water. Do not use chemical solvents.** Do not use CHANCE® Moisture Eater II wipes on any part of the MRVI as it will cause damage.

Abuse or misuse will damage the unit. Store in a dry location, do not drop, and protect from jostling or impacts during storage, carrying, or use. See page 18 "Specifications" for operating and storage temperatures and humidity ranges.

### CAUTION

**Do not drop tool as accuracy may be impaired.**

## Repairs

For Hubbell Power Systems authorized repair or factory calibration, please contact:

**BEVINS**  
*Protecting crews since 1957*

**M.W. Bevins Co.  
9903 E. 54th St.  
Tulsa, OK 74146  
(918) 627-1273  
(918) 627-1294 (FAX)  
www.bevinsco.com**

# Optional Accessories



**Indicator Tester - PSC4033582**



**15 kV Bushing Adapter - T4030428**



**15 kV, 25 kV, 35 kV Bushing Adapter - T4030857**



**Elbow Adapter - T4030856**



# Optional Kit PSC4033810

For overhead and underground (URD) Loadbreak Elbow applications. The kit includes:

PSC4033710	Multi-Range Voltage Indicator (MRVI)
T4030857	Bushing Adapter for up to 35 kV
T4030856	Elbow Adapter for up to 35 kV
H18766S	Shepherd Hook
H18766	Straight Probe
329	Small Hex Head Machine Screw (1/4-20 X 3/8" long)
CC-MRVI	Carrying Case

# Specifications

**Weight (w/o batteries):** 561 g (19.8 oz)

**Dimensions:** 12.55" L X 5.15" W X 5.06" H

**Battery requirements:** Four (4) Alkaline or Lithium "AA" batteries

**Operating voltage range(s):** Test Point to 80 kV AC (Phase-to-Phase equivalent), 50/60 Hz

**Operating temperature range:** -20° to +80°C

**Operating humidity range:** 5% to 95% Rh

**Storage temperature:** -20° to +60°C (Recommended storage at 21°C +/- 2°C)

**Storage humidity range:** 5% to 95% Rh (Recommended storage at 45% Rh +/- 8% Rh)

**Shock Testing:** per IEC 60068-2-27, "Test Ea and guidance: Shock"

Level 1 - 500 m/s<sup>2</sup> (50g), 11ms Half-sine pulse, 3 pulses Positive & Negative, each axis.

Level 2 - 1000 m/s<sup>2</sup> (100 g ± 4 g), 1.5 to 2.5ms Half-sine pulse, 3 pulses Positive & Negative, each axis

**Vibration Testing:** per IEC 60068-2-6, "Test Fc: Vibration (sinusoidal)"

1.5 mm p-p from 10 Hz to 40 Hz, 5g rms from 40 Hz to 2000 Hz for 3.3 hrs each axis

**Limitations:** Always use appropriate length insulated Hot Stick even if wearing rubber gloves. Always test the unit before and after each use on a known energized voltage source or with the Voltage Indicator Tester to verify proper operation.

## FCC

Contains FCC ID: T9JRN4020

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



Hubbell Power Systems, Inc.  
210 N. Allen St  
Centralia, MO 65240  
[www.hubbellpowersystems.com](http://www.hubbellpowersystems.com)

Hubbell has a policy of continuous product improvement. Please visit [hubbellpowersystems.com](http://hubbellpowersystems.com) to confirm current design specifications.

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