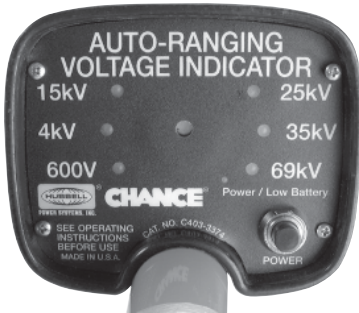
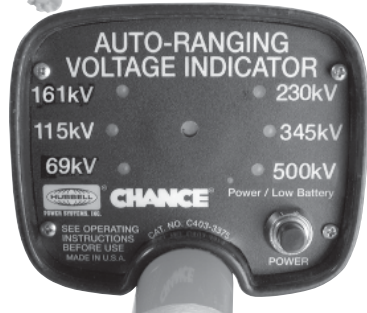


# Operating Instructions for **CHANCE**<sup>®</sup> Auto-Ranging Voltage Indicator

Catalog No.  
**C403-3374**  
Voltage  
**600V - 69kV**



Catalog No.  
**C403-3375**  
Voltage  
**69kV - 500kV**



## **⚠ CAUTION**

The equipment covered in this manual must be used and serviced only by competent, 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, Chance<sup>®</sup>.

## **NOTICE**

Before operating a CHANCE<sup>®</sup> Auto-Ranging Voltage Indicator, thoroughly read, understand, and follow these instructions. Keep these instructions in the device case for future reference.

## **⚠ WARNING**

Do not allow universal fitting to touch any part of URD cabinet, to become grounded in any other way, or to contact another phase as this will cause erroneous voltage indication and could cause severe personal injury or damage to equipment.

## Basic Function and Design

The CHANCE® Auto-Ranging Voltage Indicator (“ARVI”) is a portable tool to confirm that a high-voltage line is de-energized prior to performing maintenance. It presents field practicality over a voltmeter and obvious advantages over traditional methods without a meter. Readings from the ARVI represent the class of voltage that is present on the line.

The C403-3374 is designed to determine phase-to-phase voltage classes up to 69kV. The C403-3375 is designed to determine phase-to-phase voltage classes up to 500kV. Both units consist of one section of Epoxiglas® pole with high internal impedance that is encapsulated to prevent moisture penetration and mechanical damage.

The ARVI is actually an electric field intensity meter, which is calibrated to illuminate an LED (light-emitting diode) representing the class of voltage that is present on the conductor. It responds to the magnitude of the field gradient between its end probe and a floating electrode. The device indicates the combined field intensity from all other conductors, including ground wires and grounded equipment. If the universal fitting is close to a ground, another phase, or another voltage source the voltage indication will tend to be high. If the universal fitting is close to a jumper or equipment of the same phase, the indication will tend to be low. The tool must be used with a universal pole to maintain its calibration.

The ARVI can be 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.

### Operation — General

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To turn the unit on press and release the “Power” push button. Upon power-up each LED will illuminate individually from the lowest voltage to the highest followed by the audible alarm. These tests verify the function of the LED’s, alarm, batteries, and internal circuitry. Full unit function can only be verified using a known energized high voltage source or with the appropriate Voltage Indicator Tester (C403-3409 for C403-3374 ARVI and C403-3431 Voltage Indicator Tester for C403-3375 ARVI). Following the audible alarm the “Power/Low-Battery” LED will flash indicating that the unit is ready for use. After use turn the unit off by holding the power switch until the power LED turns off, or the unit will power itself down after approximately 15 minutes of inactivity.

The unit will begin to make an audible beep and an LED will blink when the unit senses an electric field, even when not making contact with an energized conductor. The higher the voltage, the faster the beeping occurs. If the unit senses constant voltage for approximately 15 seconds, it automatically goes into its hold-mode. At that point the LED representing the voltage class being indicated will light continuously and the beeping will become continuous for 1 to 2 seconds followed by 5 to 6 very rapid beeps and a brief period of silence. The unit then will return to the normal audible mode, but one LED will remain solid until reset. Remove the unit from the line and press and release the power switch to reset the unit.

#### CAUTION

Once in the Auto-Hold mode, the ARVI must be reset for the LED’s to indicate higher or lower voltages.

## Ranges

The approximate voltage ranges to provide indication of each of the voltage classes are as follows:

### C403-3374 ARVI ONLY

Voltage Class	Voltage Range
600V	480V to 900V
4kV	1kV to 6.5kV
15kV	6.6kV to 17kV
25kV	18kV to 29kV
35kV	30kV to 50kV
69kV	51kV to 80kV
Above 80kV	Over range (all LED's illuminate)

### C403-3375 ARVI ONLY

Voltage Class	Voltage Range
69kV	50kV to 109kV
115kV	110kV to 149kV
161kV	150kV to 199kV
230kV	200kV to 299kV
345kV	300kV to 399kV
500kV	400kV to 765kV
above 765kV	Over range (all LED's illuminate)

## 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 the proximity, size, and orientation of all system components in the vicinity, both energized and grounded. Erroneous readings can result from both electrodes being at the same electrical potential or the universal fitting being too near another phase or ground. To avoid such field distortions, keep the ARVI as far away as practical from all system components other than the specific conductor being tested.

## Auto-Hold

The ARVI has a hold feature built into the circuitry, which automatically holds a reading when the unit is left on an energized conductor or senses constant voltage for a period of approximately 15 seconds. In the hold-mode, the LED representing the voltage range being indicated will become solid. The audible beeping will become continuous for 1 to 2 seconds followed by 5 to 6 very rapid beeps, then 1 to 2 seconds of silence. The unit then will return to the normal audible mode, but one LED will remain solid until reset. To reset the unit after a held reading is displayed, remove the unit from the line and simply press and release the power switch.

### CAUTION

Once in the Auto-Hold mode, the ARVI must be reset for the LED's to indicate higher or lower voltages.

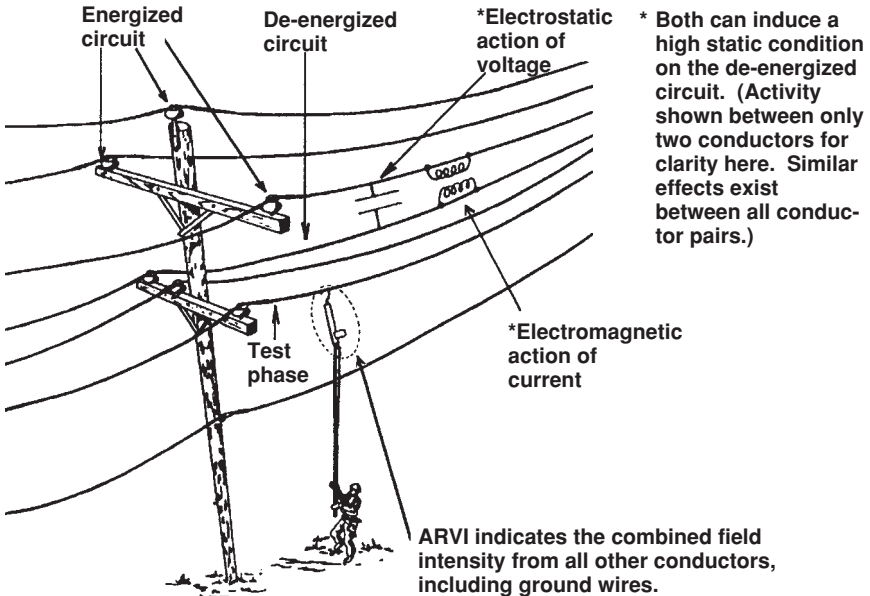
# Operation — Overhead

## **⚠ WARNING**

Keep instrument clean and dry.

Do not allow universal fitting to become grounded or contact another phase as this will cause erroneous voltage indication and could cause severe personal injury or damage to equipment.

Always maintain proper working clearance between operator and all energized parts of the ARVI by using proper length universal pole. Failure to follow these warnings could result in personal injury or damage to equipment.



## **⚠ CAUTION**

Always use appropriate length stick even if wearing rubber gloves.

Contact with universal ferrule or other part even with rubber gloves will cause erroneous voltage indication.

Always use with a universal pole to maintain its calibration.

This tool is not intended for continuous contact applications. Contact with energized conductor should be limited to the amount of time required to note indication.

To determine the approximate phase-to-phase voltage:

1. Check battery and circuitry for proper operation by pressing and releasing the power switch. Verify full unit function by contacting with a known energized high voltage source or with the appropriate Voltage Indicator Tester (C403-3409 for C403-3374 ARVI and C403-3431 Voltage Indicator Tester for C403-3375 ARVI).
2. Thread the hook probe into the end fitting of the ARVI and attach universal fitting to an insulated hot stick of proper length for system voltage involved.

Turn unit on by pushing and releasing the power switch.

3. Make contact with the line to be measured with the shepherd hook per the following instructions:
  - a. Keep ARVI perpendicular to the phase conductor.
  - b. Keep ARVI away from poles or structures a distance at least twice the circuit's phase spacing, i.e. test out on span rather than near structure, jumpers, risers, cutouts, insulators, ground wires and any system components other than the conductor being tested.
  - c. Test three or four locations to check consistency. Where little or no consistency is apparent, consider the highest reading as correct.
4. If the ARVI is left on the conductor for approximately 15 seconds, it will go into the Auto-Hold mode and hold the voltage indication until reset (see Auto-Hold section of these instructions).

#### Interpretation of ARVI readings on Overhead

Reading	Circuit Condition
Appropriate line-to-line voltage class	Energized
No Indication	De-Energized
Voltage below line-to-line voltage class	Probably de-energized and reading is due to static; however, do not assume that circuit is de-energized. Instead, check and confirm circuit condition by another method.

*All interpretations should take into account the circuit configuration, length, proximity to other lines; and should be consistent with previous experience on same circuit with this instrument. If ever in doubt about interpreting ARVI reading under any circumstance, always assume circuit is energized and take appropriate safety precautions.*

## Operation — Underground (URD) C403-3374 ONLY

### **WARNING**

Do not allow universal fitting to touch any part of URD cabinet, to become grounded in any other way, or to contact another phase as this will cause erroneous voltage indication and could cause severe personal injury or damage to equipment.

### **CAUTION**

Always use appropriate length stick even if wearing rubber gloves.

Contact with universal ferrule or other part even with rubber gloves will cause erroneous voltage indication.

Always use with a universal pole of proper length to maintain its calibration.

When using the ARVI on underground systems, the same basic rules and procedures apply as with overhead; for example, maintaining proper working clearances to all parts of the tool, keeping tool clean and dry. However, the following are two additional instructions when using the tool on underground equipment. The readings taken in URD cabinets will typically be higher than on an overhead line.

### **WARNING**

Do not use any probes on the ARVI when testing live-front URD equipment.

Failure to follow this warning could result in personal injury or damage to equipment.

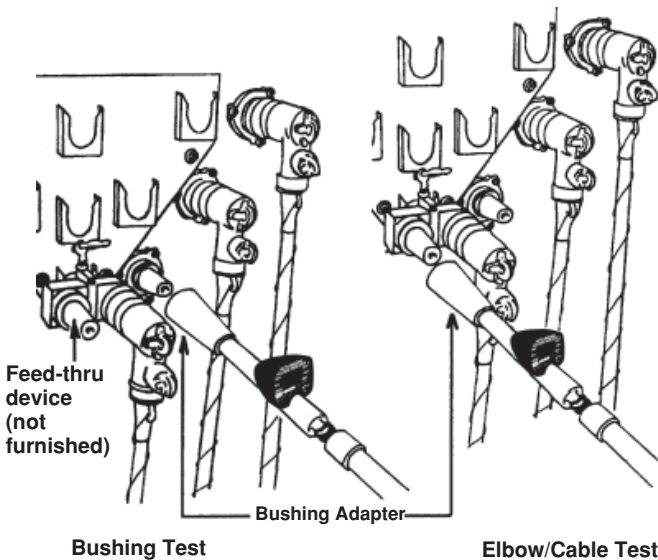
1. Due to the close proximity of energized parts and grounded surfaces, probes must not be used when using the ARVI on live-front URD equipment because probes could either bridge from phase-to-phase or phase-to-ground or sufficiently reduce clearance to cause flashover. Therefore the probes must be removed from the tool. NOTE: A small hex-head machine screw (1/4-20UNC x 3/8 long) could be inserted to protect the female thread.

**⚠ WARNING**

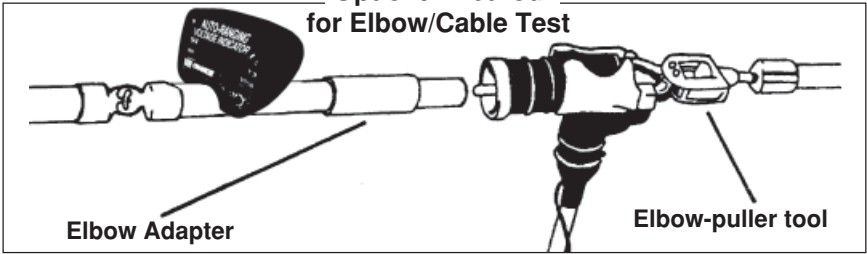
**Use proper elbow and/or bushing adapter when testing dead-front URD equipment.**

**Failure to use proper adapters could result in personal injury or damage to equipment.**

2. To test elbows or bushings on dead-front URD equipment, remove the hook probe and install the proper elbow adapter or bushing adapter on ARVI. Testing of elbows can be accomplished by two methods:
  - a. Recommended procedure (one person required): Secure an insulated feed-thru device in a parking stand on the dead-front transformer or switch. Pull elbow with appropriate hot line tool and install elbow on feed-thru device. Install bushing adapter on ARVI. Insert bushing adapter into feed-thru bushing to check elbow/cable for voltage. Insert bushing adapter into the apparatus bushing to check bushing for voltage.
  - b. Optional procedure (two people required): Operator #1 pull elbow with elbow-puller tool, then orient elbow so it is accessible with ARVI. Operator #2 install elbow adapter on ARVI, then insert elbow adapter into elbow to check elbow/cable for voltage.



**Optional Method  
for Elbow/Cable Test**



**T403-0856**  
Up to 35kV Elbow Adapter



**T403-0857**  
Up to 35kV Bushing Adapter

**T403-0428 15kV Bushing Adapter**



**Interpretation of ARVI readings on Underground (URD)**

Reading	Circuit Condition
Appropriate line-to-line voltage class	Energized
No Indication	De-Energized

*If ever in doubt about interpreting ARVI reading under any circumstance, always assume circuit is energized and take appropriate safety precautions.*

## Battery Replacement

A low battery condition is indicated when the alarm chirps with no LED indication of voltage and the “Power / Low Battery” LED flashes at an increased rate. Batteries can be replaced by removing the four screws in the front panel, removing the panel and replacing the four “AAA” batteries on the back of the panel, noting proper polarity. **CAUTION: Ensure that the wires connected to the orange connector in the panel assembly remains connected and are not damaged and the battery strap is secure.** After the panel 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.

**⚠ CAUTION**

**After replacing batteries, ensure that the wires connected to the orange connector in the panel assembly remain connected and are not damaged. After the panel and screws are replaced in the housing, test the unit on a known energized voltage source or with the Voltage Indicator Tester to verify proper operation.**

# Care

The ARVI is an electronic instrument and, if properly cared for, will provide many years of trouble-free service. Keep all parts clean and dry. 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.

# Specifications

Operating temp: -20° to +80°C  
Unit power: Four (4) “AAA” batteries

# Repair

If repair/calibration or parts are required, please contact:

**M.W. Bevins Co.**  
9903 E. 54th St.  
Tulsa, OK 74146  
(918) 627-1273  
(918) 627-1294 (FAX)  
[www.mwbevinsco.com](http://www.mwbevinsco.com)

**C403-3409**  
Voltage Indicator Tester



Catalog No.	Description
C403-3374	Auto-Ranging Voltage Indicator, 600V – 69kV includes - Instruction manual - Plastic Case
C403-3375	Auto-Ranging Voltage Indicator, 69kV – 500kV includes - Instruction manual - Plastic Case
C403-3409	Voltage Indicator Tester for C403-3374 ARVI
C403-3431	Voltage Indicator Tester for C403-3375 ARVI
T403-0856	15-35kV Elbow Adapter
T403-0857	15-35kV Bushing Adapter
H1760-1	6' Universal Pole
P643-6	Bag for two 6' universal poles
H1760	8' Universal Pole
P643-8	Bag for two 8' universal poles
T403-3418	Auto Ranging Voltage Indicator 600V - 69kv C403-3409, T403-0857, T403-0856

NOTE:  
Because Hubbell has a policy of continuous product improvement, we reserve the right to change design and specifications without notice.



# CHANCE

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**P403-3408**  
rev A