HUBBELL® CHANCE®

POWER SYSTEMS, INC.

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

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Centralia, Missouri 65240
Phone: 573-682-5521

Operating Instructions for CHANCE® Digital Phasing Tester

Catalog No.	Voltage
C403-3369	**1 - 16kV**
C403-3370	**1 - 40kV**
C403-3402 (Kit)	**1 - 16kV**
C403-3403 (Kit)	**1 - 40kV**

Extension Resistors

Catalog No.	Voltage
For use with only 40kV Digital Phasing Testers:	
C403-3371	**1 - 80kV**
For use with only 16kV Digital Phasing Testers:	
H1876-4	**1 - 48kV**
H1876-2	**1 - 80kV**

⚠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®.

NOTICE

Before operating a Chance Digital Phasing Tester, thoroughly read, understand and follow these instructions. Keep these instructions for future reference.

P403-3407
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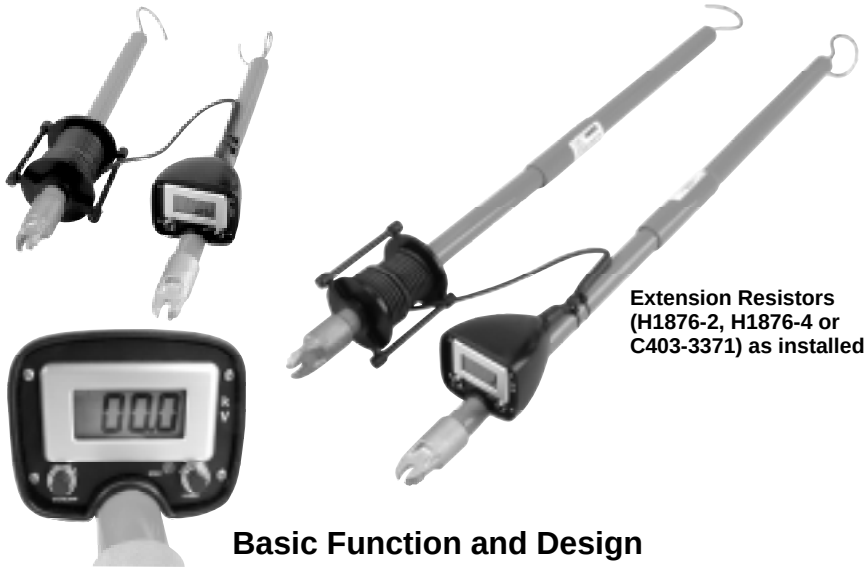


Extension Resistors (H1876-2, H1876-4 or C403-3371) as installed

Basic Function and Design

The CHANCE® Digital Phasing Testers are portable tools which permit the measuring of AC voltage on distribution and transmission circuits ranging from 1kV to 80kV for determining phase relationships and the voltage line-to-line or line-to-ground. Each unit consists of two sections of Epoxiglas® poles with internal resistors encapsulated to prevent moisture penetration and mechanical damage. A housing enclosing electronic circuitry and a digital meter display is mounted on one pole and a cable reel is mounted on the second pole. The resistors in the meter-stick and reel-stick are connected with a cable having insulation rated at 15kV. When used above 15kV extra caution is required to maintain working clearance for the higher voltage.

Catalog No. C403-3369 is designed for voltages up to 16kV, which read directly on the digital display. Each Epoxiglas® pole contains internal resistance. For voltages above 16kV and up to 48kV, one pair extension resistors, Catalog No. H1876-4, must be installed (one on meter-stick and one on reel-stick). Multiply the display reading by three (3) to obtain the actual voltage level. For voltages up to 80kV, one pair of H1876-2 extension resistors (or two pair of H1876-4's) must be added. Multiply the display reading by five (5) to obtain voltage level.

⚠CAUTION

Use only H1876-4 or H1876-2 extension resistors on the 16kV Digital Phasing Tester. Use of other extension resistors will result in a multiplying factor of some unknown fractional number and inaccurate voltage readings.

Catalog. No. C403-3370 is designed for voltages up to 40kV, which read directly on the digital display. Each Epoxiglas pole contains internal resistance. For use on lines above 40kV, a pair of extension resistors, Cat. No. C403-3371, must be installed which increases the voltage range to 80kV. Voltage levels with the extensions installed (one on meter-stick, one on reel-stick) will be the displayed voltage multiplied by two (2).

Catalog No.	Description
C403-3369	16kV Digital Phasing Tester includes - 1 ea. Straight hook probe - 1 ea. Pig-tail hook probe - Instruction manual - Plastic case
C403-3370	40kV Digital Phasing Tester includes - 1 ea. Straight hook probe - 1 ea. Pig-tail hook probe - Instruction manual - Plastic case
C403-3402	16kV Digital Phasing Tester Kit includes - 1 ea. C403-3369 16kV Digital Phasing Tester - 1 ea. T403-0856 15-35kV Elbow Adapter - 1 ea. T403-0857 15-35kV Bushing Adapter - 1 ea. C403-1762 16kV DC Hi-Pot Adapter - 1 ea. C403-0838 Phasing Voltmeter Tester - 2 ea. H1760-1 6' Universal Poles - 1 ea. P643-6 Bag for universal poles
C403-3403	40kV Digital Phasing Tester Kit includes - 1 ea. C403-3370 40kV Digital Phasing Tester - 1 ea. T403-0856 15-35kV Elbow Adapter - 1 ea. T403-0857 15-35kV Bushing Adapter - 1 ea. C403-0838 Phasing Voltmeter Tester - 2 ea. H1760-1 6' Universal Poles - 1 ea. P643-6 Bag for universal poles
C403-3371	1 pair 1-80kV Extension Resistors Use with only 40kV Digital Phasing Tester C403-3370
H1876-4	1 pair 48kV Extension Resistors Use with only 16kV Digital Phasing Tester C403-3369
H1876-2	1 pair 80kV Extension Resistors Use with only 16kV Digital Phasing Tester C403-3369
C403-0838	Phasing Voltmeter Tester
T403-0856	15-35kV Elbow Adapter
T403-0857	15-35kV Bushing Adapter
C403-1762	16kV DC HiPot Adapter
H1760-6	6' Universal Pole
P643-6	Bag for two 6' universal poles
H1760	8' Universal Pole
P643-8	Bag for two 8' universal poles

C403-0838 At left, Phasing Voltmeter Tester for All Models

C403-1762 Above, 16kV DC Hi-Pot Adapter

Care

The Digital Phasing Tester is an electronic instrument and, if properly cared for, will provide many years of trouble-free service. Keep all parts and cable clean and dry. Abuse or misuse will damage the unit. Store in a dry location, do not drop, and protect from jostling and impacts when carrying or using. The insulated cable must not touch any grounded or energized object because accuracy of readings will be affected and cable insulation may be impaired or damaged.

Specifications

Meter sampling rate: 3 per second
Operating temp: -25°C 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)
mwbevinsco.com

⚠CAUTION

Use only C403-3371 extension resistors on the 40kV Digital Phasing Tester. Use of other extension resistors will result in a multiplying factor of some unknown fractional number and inaccurate voltage readings.

The resistors and extension resistors limit current values to less than 1½ mA of current at maximum voltage rating across the inputs. Capacitance current to ground through the cable insulation depends upon area of ground contact.

Operation — General

⚠WARNING

Keep instrument clean and dry.
Always maintain proper working clearance between operator and all parts of the Digital Phasing Tester by using proper length universal poles or appropriately rated rubber gloves.

Digital Phasing Testers are equipped with a cable reel on which the cable between the two housings is stored. **Only the length of cable necessary to permit the contacts to reach between the points of measurement should be used. Any remaining cable length should be kept wound on the reel.** The reasons for keeping excess cable retracted are:

1. Cable insulation is limited to 15kV for lightweight and ease of handling. This is adequate for momentary contact with ground or 15kV conductors but damaged insulation may result in an uncomfortable shock if personal contact is made at a damaged area. At higher voltages, insulation puncture may result.
2. Meter indications will be affected and error introduced by the capacitance to ground between the cable and grounded structure, moist concrete or the earth. Other conductors will also influence meter indications if the cable is allowed to touch or come in close proximity to these conductors.

⚠WARNING

Keep cables, Epoxiglas® resistor housings, meter, and universal fitting from contact with other conductors, structures, switch cabinets, grounds, and personnel. Always maintain proper working clearance between operator and all energized parts of the unit by using proper length universal poles. Failure to follow these warnings could result in severe personal injury or damage to equipment.

This tool is not intended for continuous contact applications. Contact should be limited to the time required to note meter indication.

Power-Up/Power-Down/Backlight/Hold/Reset

- **Power-up:** To turn the unit on, press and release the push button labeled "Power". Upon power-up the Hold light will light momentarily and all segments of the display will be displayed briefly and then display 00.0 or 0.01 when in the operational mode.
- **Power-down:** Unit powers down automatically after approximately 15 minutes, or can be turned off manually by pressing and holding the power switch for approximately 2 seconds.

- **Backlight:** The display can be lighted for reading in dim or dark conditions. To turn on the display backlight, press and release the button labeled "Backlight". The backlight will stay on for approximately 5 minutes and then turn off. To turn off the backlight manually, press and release the backlight switch.
- **Hold:** The unit has a hold feature that permits a reading to be held on the display until reset. To turn on the hold feature, press and release the "Power" button. The "Hold" light will begin blinking, indicating it is in hold mode. The light will continue to flash for approximately 15 seconds at which time the light will become solid and the reading will be held until reset.

⚠WARNING

Do not attempt to reset the display until both the meter-stick and reel-stick are removed from all voltage sources. Failure to follow this warning could result in serious injury of death.

- **Reset:** After voltage measurement has been made and the reading is noted, remove both the meter-stick and reel-stick from all voltage sources, then press and release the "Power" button to reset.

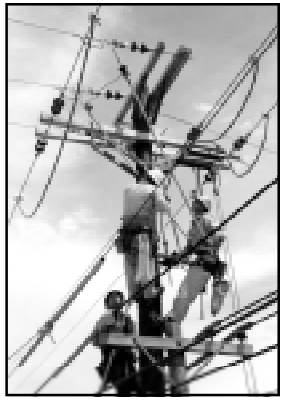
⚠CAUTION

Once in the Hold mode, the Digital Phasing Tester must be reset for the meter to measure higher or lower voltages.

Operation — Overhead

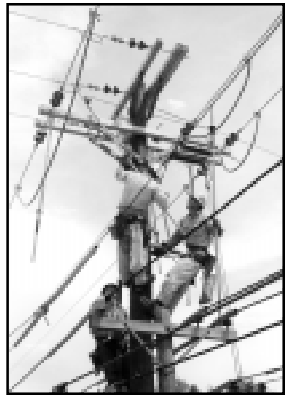
To measure line-to-ground voltage, the handle on which the meter is mounted should preferably be used at the ground potential contact to minimize stray capacitance influence on the meter. On line-to-line measurements contact is made to each phase conductor. Keep the connecting cable as far as possible from the subject conductors, other conductors, and grounded or metal structures and platforms. As before noted, this is to avoid influence which may distort meter indications.

In tying two energized 3-phase feeders together where it is necessary to match phases, voltage measurements must be made between a conductor of one circuit and each of the conductors of the second circuit. This procedure is followed for each phase to avoid connecting phases in reversed rotation. Re-check the third phase just before making the final connection to assure proper phase relationship. With matched phases one may expect the voltage indication to be near zero. More often a voltage will be indicated due to phase shift and/or unequal voltage drop at the junction point of remotely energized circuits. Proper connections can readily be determined by the meter indications. Preliminary phase-to-phase measurements of each circuit are necessary to determine proper voltages are being joined.



Left, checking tester and reading line voltage.

Right, phasing test to determine B to B phase.



Operation — Underground (URD)

When using the phasing tester 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, keeping cable from contacting energized or grounded surfaces, etc. However, the following are two additional instructions when using the tool on underground equipment:

⚠WARNING

Do not use any probes on the Digital Phasing Tester when testing live-front URD equipment.

1. Due to the close proximity of energized parts and grounded surfaces, no probes must not be used when using the phasing tester 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 adapters when testing dead-front URD equipment. Failure to use proper adapters could result in personal injury or damage to equipment

2. Before the tool is used to test elbows or bushings on dead-front URD equipment, the overhead probes must be removed and the proper bushing adapter or elbow adapter substituted.

T403-0856

Up to 35kV Elbow Adapter

T403-0857

Up to 35kV Bushing Adapter

Battery Replacement

When the battery symbol is displayed in the upper left side of the display the batteries must be replaced. To replace batteries, remove the four screws holding the front panel on, then carefully remove panel. If it is necessary, disconnect the connector being careful not to damage the wires. Replace the four "AAA" batteries noting proper polarity. Replace the connector making sure that it locks into place. Reinsert the panel into the housing ensuring that the wires are not pinched; replace the four mounting screws. Test the function of the unit on a known energized voltage source or with a Phasing Voltmeter Tester, C403-0838.