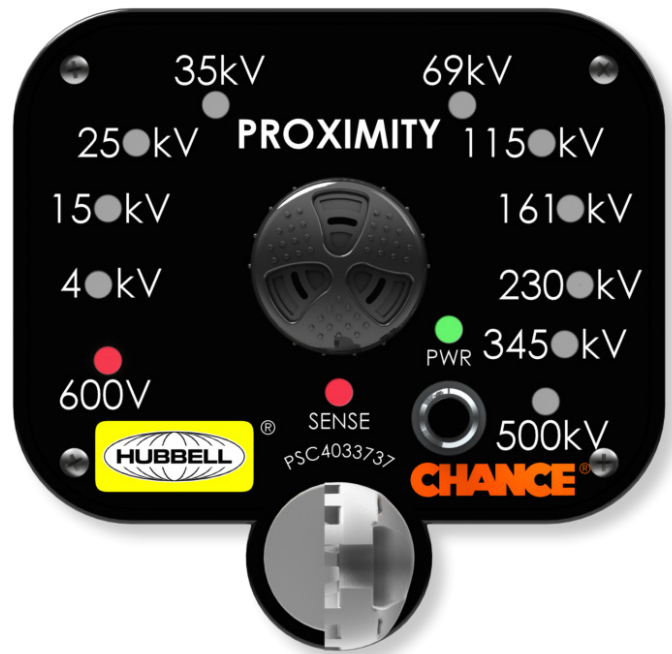


CHANCE® Proximity Voltage Indicator

Operating Instructions Model No. PSC4033737

For use with Capacitive Test Point through 500 kV AC



NOTICE: Before operating a Chance® Proximity Voltage Indicator (PVI), 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 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

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

Do not allow universal coupling 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.

⚠️ 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 always be adhered to. 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® Proximity Voltage Indicator (PVI), model #PSC4033737, is a portable tool used as a secondary means to confirm the condition of an AC (Alternating Current) HV (High Voltage) circuit after principal work procedures such as visible open gaps, dispatcher hold orders, and apparatus tag-outs have rendered the circuit de-energized. It presents field practicality over a voltmeter and obvious advantages over traditional methods without a meter.

The PVI is designed to determine equivalent Phase-to-Phase voltage classes up to 500 kV AC depending upon distance away from energized conductors. This unit is a non-contact (proximity) electric field intensity meter for voltages above 480 V AC and a near-field sensing device for voltages below 480 V AC. The PVI responds to the magnitude of an alternating current field gradient between its sensing element (located at the opposite end of the round universal coupling holder) and a counterpoise within the meter. The device indicates the combined field intensity from all other conductors, including ground wires and grounded equipment. If the universal coupling is close to a ground, another phase, or another voltage source the voltage indication will tend to be high. If the universal coupling is close to a jumper or equipment of the same phase, the indication will tend to be low.

In normal operation, the PVI is calibrated to respond to a sensed field in three ways. First, the SENSE LED (located left of the PWR button) will go from blinking to solid when an electric field is detected. Second, one or more LEDs (light-emitting diodes) will illuminate, representing the class of voltage that is present on the conductor. When two Range LEDs are illuminated at the same time, this is an indication that the electric field intensity is somewhere between the upper and lower range. The third response is an audible alarm. As the voltage field intensity increases, the Range LED will flash and the audible alarm will beep at a faster rate.

User-Defined Range display (ADVANCED FEATURE): In an advanced mode of operation, the PVI will temporarily disable Range indications and the audible alarm for voltages below the user selected range. As a safety feature, the SENSE LED will continue to function normally in both normal operation and advanced mode operation (blinking SENSE LED when no electric field is detected and a solid on SENSE LED when an electric field is detected).

NOTICE

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

DANGER

This device is not to be used to determine cable status on shielded cables or on cables where the concentric neutral surrounds the phase conductor.

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
- Bright display lights and adjustable audible alarm indicate voltage class without need to directly contact the conductor
- Used to determine if power lines are at rated voltage, have induced voltage, or are de-energized
- Designed to be held six (6) to eighteen (18) inches away from conductor being tested for presence of voltage
- As the voltage field intensity increases, the SENSE LED, Range LED, and adjustable audible alarm will flash and beep faster
- Advanced feature allows user to temporarily disable range indications for voltages below the user selected range
- Capacitive test point through 500 kV AC for overhead and underground systems
- Power-saving sleep mode
- Positive interface power button
- Phase-to-Phase equivalent range readings
- New lightweight design (17.6 oz without batteries)
- New battery drawer for easy and simple battery replacement
- Comes with storage bag designed to attach to line worker's belt or usage during storage
- QR code on instructions, Quick Reference guide, and on the unit itself

Ranges

The CHANCE® Proximity Voltage Indicator (PVI), model number #PSC4033737, is a portable tool to test for nominal Voltage up to 500 kV AC. The equivalent voltage ranges to provide indication of each of the Voltage Classes are as follows:

Voltage Class	Voltage Range
600 V	480 V to 900 V
4 kV	1 kV to 6 kV
15 kV	7 kV to 17 kV
25 kV	18 kV to 29 kV
35 kV	30 kV to 50 kV
69 kV	51 kV to 109 kV
115 kV	110 kV to 149 kV
161 kV	150 kV to 199 kV
230 kV	200 kV to 299 kV
345 kV	300 kV to 399 kV
500 kV	400 kV to 765 kV
above 765 kV	161 kV through 500 kV illuminate

NOTICE

Display of two LED's at same time indicates that the electric field intensity falls between the two ranges. For example, if the 4 kV and the 15 kV light come on at the same time, the electric field intensity is between 6 kV and 7 kV voltage range.



Accuracy

This instrument is not a voltmeter and is dependent on approximate distances for various voltage class indications; hence the manufacturer claims no specific accuracy and therefore no specific accuracy is to be assumed by the user.

The CHANCE® Proximity Voltage Indicator (PVI) is calibrated to operate at a distance from an energized conductor of six (6) to eighteen (18) inches for 480 V AC and above. The sensing distance on voltages less than 480 V AC is one (1) to six (6) inches. In general, the higher the voltage, the further away from the energized conductor sensing will begin. 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.

The PVI will show higher than expected ranges as you approach energized conductors. This can be used to verify that the conductor being tested by the PVI is the actual source of the electric field rather than another nearby conductor or source. If the range indication goes above the expected range (increasing as you get closer) this indicates that the source of the sensed electric field is being detected. If the field intensity is high enough that it exceeds the highest sensitivity setting of the device, then the 161 kV through 500 kV LEDs will light at the same time. Removing the PVI from this intense field should allow normal function, unless damage has occurred.

The device indicates the combined field intensity from all other conductors, including ground wires and grounded equipment. If the universal coupling is close to a ground, another phase, or another voltage source the voltage indication will tend to be high. If the universal coupling is close to a jumper or equipment of the same phase, the indication will tend to be low. Erroneous readings can result from being too far or too near the energized conductor/source and/or being too near another phase or ground. To avoid such field distortions, keep the unit as far away as practical from all system components other than the specific conductor being tested.

General Operations for Overhead and Underground

Volume: The audio tone volume can be adjusted by simply turning the rotating cover on the front panel alarm.

To turn the unit on: Press and hold the PWR (power) button for approximately 2 seconds until you hear an audible tone then immediately release the PWR button. The power-up test will illuminate each LED individually from the lowest voltage to the highest followed by a tone from the (adjustable) audible alarm. Following the audible alarm, the PWR LED will be on solid indicating that the unit is ready for use. (NOTE: a flashing PWR LED is an indicator of low battery voltage; see page 11 for details.) These tests verify the function of the LEDs, alarm, batteries, and internal circuitry. Full unit functionality can only be verified using a known energized high voltage source or with the Voltage Indicator Tester #PSC4033582 (see page 13 “Using the optional Voltage Indicator Tester #PSC4033582” for details).

To turn the unit off: Press and hold the PWR button for approximately 2 seconds until you hear two long beeps of the audible alarm and the PWR LED turns off. The unit will also power itself down (auto-off) after approximately 15 minutes of inactivity.

Normal operation: Always test the PVI before and after each use. For safety, the red SENSE LED will blink on and off until an electric field is detected. When an electric field is detected, the SENSE LED will stay on solid until the electric field is no longer detected. During detection of electric fields, an adjustable audible alarm will sound and one or more Range LEDs will light up to show the equivalent Phase-to-Phase voltage range(s) being detected. If two Range LEDs are illuminated, this is an indication that the voltage being detected falls somewhere between the upper and lower ranges. As the voltage field intensity increases, the Range LEDs will flash and the adjustable audible alarm will beep at a faster rate.

As a proximity tester, distance from the energized conductor (source of the electric field) will affect the performance of the detector. The PVI is calibrated to detect an energized conductor at a distance of six (6) to eighteen (18) inches on voltages 480 V AC or higher. The sensing distance on voltages less than 480 V AC is one (1) to six (6) inches. The higher the voltage the further away from the energized conductor sensing will begin.

The PVI is an AC (alternating current/alternating voltage) only detector; do not use it to detect DC (direct current/non-alternating voltage).

User-Defined Range display (ADVANCED FEATURE): A feature of the Proximity Voltage Indicator allows the user to temporarily disable Range indications and audible alarm for voltages below a selected range. If the user presses and holds the PWR button and does not release it during the LED power-up test cycle, the unit will slowly progress through the ranges until the PWR button is released at the highest range to be disabled. (NOTE: for safety reasons the SENSE LED will continue to function normally: blinking LED when no electric field is detected and a solid red LED when an electric field is detected.) This User-Defined disabling of one or more ranges is for 345 kV AC or below; the 500 kV range cannot be disabled. To restore normal operation where all ranges are activated to illuminate with the alarm indication, simply power down and then power up the unit without holding the PWR button during the LED power-up test cycle.

NOTICE

Once in the *User-Defined Range display* mode, the PVI must be reset (turned off and turned back on) to return to normal operation.

⚠ 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.

Additional Operations for Overhead

To determine the approximate Phase-to-Phase voltage:

1. Check battery and circuitry for proper operation by pressing and releasing the PWR button. Verify full unit function by testing for proper reading with a known energized high voltage source or with the Voltage Indicator Tester, model #PSC4033582 (see page 13 “Using the optional Voltage Indicator Tester #PSC4033582” for details).
2. Attach the universal coupling to an insulated Hot Stick of proper length for the system voltage involved. Turn unit on by pressing and **holding the PWR button until the audible tone is heard then immediately release** the PWR button. Upon power-up each LED will illuminate individually from the lowest voltage to the highest followed by the audible alarm. This test cycle verifies the function of the LEDs, alarm, batteries, and internal circuitry. (NOTE: a flashing PWR LED indicates a low battery condition.)
3. Bring the PVI within six (6) to eighteen (18) inches of the line to be measured. Below 480 V AC you may need to be six (6) inches or less for detection to occur. Once an electric field is detected, relative Range indications will increase as you get closer to the energized part.
 - a. Keep the PVI perpendicular to the phase conductor.
 - b. Keep the PVI away from poles or structures at a distance at least twice the circuit's phase spacing; such as 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. When little or no consistency is apparent, consider the highest reading for safety precautions.

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 PVI indicates the combined field intensity from all other conductors, including ground wires.

⚠ WARNING

Always use 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.

Interpretation of PVI Indications on Overhead

Circuit Condition

Energized

Indication

SENSE LED is on solid (not blinking) and a Range LED indicating the field intensity is blinking, indicating the equivalent Phase-to-Phase voltage class based upon distance from the energized conductor. The alarm beep rate will increase with higher range indications.

De-Energized

SENSE LED is blinking, no voltage range LED is indicated, and the alarm will be silent **(be sure the User-Defined Range mode has not disabled the Range LEDs and alarm).**

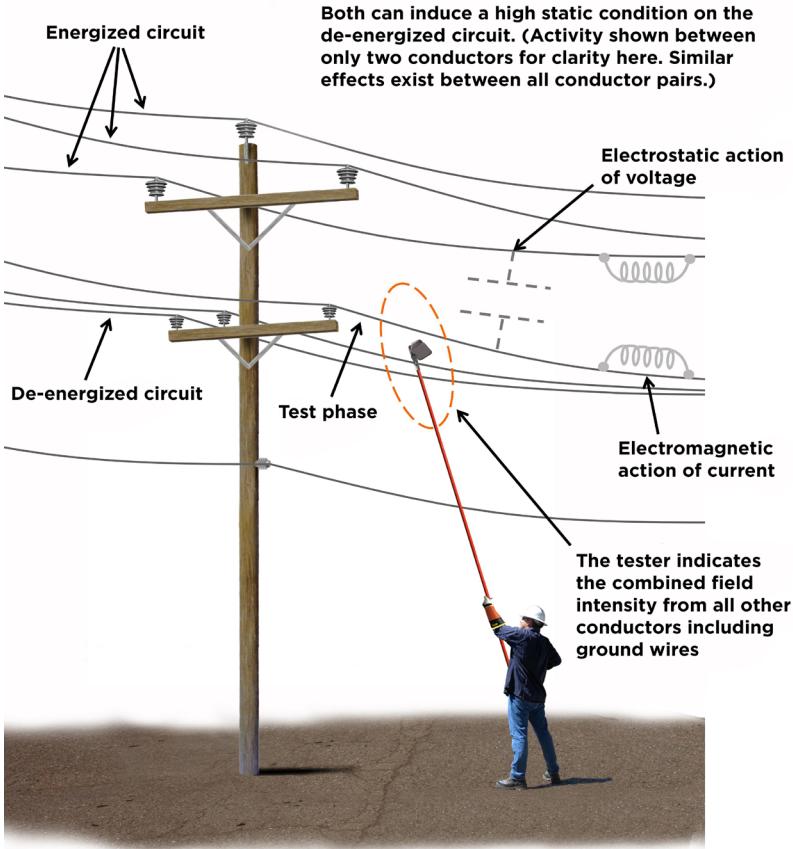
Voltage below Phase-to-Phase voltage class

Conductor may be de-energized and reading is due to static and/or induction; however, do not assume that circuit is de-energized. Instead, check and confirm circuit condition by another method. Be sure the distance between the conductor and PVI is not more than 18 inches.

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 PVI reading under any circumstance, always assume circuit is energized and take appropriate safety precautions.

⚠ WARNING

Do not allow the universal coupling 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.



Additional Operations for Underground

Always use appropriate length insulated Hot Stick even if wearing rubber gloves.

Contact with universal coupling or other parts even with rubber gloves will cause erroneous voltage indication.

When using the CHANCE® Proximity Voltage Indicator (PVI) 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.

1. The readings taken in URD cabinets will typically be higher than on an overhead line.
2. When testing live-front URD equipment, the PVI 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 contact type instrument designed for this application will be required.

⚠ DANGER

This device is not to be used to determine cable status on shielded cables or on cables where the concentric neutral surrounds the phase conductor.

Capacitive Test Point

⚠ DANGER

Capacitive Test Points must be free of corrosion and contamination for valid testing. If ever in doubt about interpreting CHANCE® Proximity 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 PVI's universal coupling, bring the sensing element area of the PVI to the Elbow Test Point and observe the SENSE LED and the Range LEDs. 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 PVI indicates the Capacitive Test Point is energized by the Cable, consider the Cable energized. If the PVI 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.

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 PVI readings under any circumstance, always assume circuit is energized and take appropriate safety precautions.

Interpretation of PVI Indications on Underground (URD)

Circuit Condition

Energized

Indication

SENSE LED is on solid (not blinking) and a Range LED indicating the field intensity is blinking, indicating the equivalent Phase-to-Phase Voltage Class based upon distance from the energized conductor. The alarm beep rate will increase with higher range indications.

De-Energized

SENSE LED is blinking, no voltage range LED is indicated, and the alarm will be silent (**be sure the User-Defined Range mode has not disabled the Range LEDs and alarm**).

- * **Capacitive Test Point must be free of corrosion and contamination for testing continuity.**
- * **If ever in doubt about interpreting Proximity indicator reading under any circumstance, always assume circuit is energized and take appropriate safety precautions.**

⚠ WARNING

High Voltage Cables are capable of holding a voltage charge even though the AC source has been removed. Always assume the circuit is energized and take proper safety precautions.

Battery Replacement



A low battery condition is indicated when the alarm chirps with no LED indication of voltage and the PWR LED flashes at an increased rate. Batteries can be replaced by removing the two screws securing the battery drawer, carefully pulling the drawer out just far enough to replace the two “AA” batteries, noting proper polarity.

⚠ 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.

Maintenance

The CHANCE® Proximity Voltage Indicator (PVI) 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 PVI 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.

Repairs

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



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

Accessories



Indicator Tester - #PSC4033582

Using the (optional) Voltage Indicator Tester (#PSC4033582)

Further details can be found in the PSC4033582 Operating Instructions.

The (optional) Voltage Indicator Tester (#PSC4033582) was originally designed for use with the Full Range Auto-Ranging Voltage Indicator (#PSC4032915). It can also be used to test the CHANCE® Proximity Voltage Indicator (PVI) in the following manner:

1. Insert the plug of the Voltage Indicator Tester into the jack located on the back of the meter housing (see photograph).
2. Safely place the insulated boot of the alligator clip next to the sensing element, which is located at the opposite end of the round universal coupling holder. Make sure that nothing but the insulated boot is touching the metal alligator clip during the test.
3. One or more of the LEDs in the four (4) to twenty-five (25) kV range should begin blinking and the audible signal should emit a beeping sound.
4. If the PVI operates as described, it is operating properly. If not, replace the battery in the Voltage Indicator Tester and repeat the above procedure. If the PVI still does not operate as described, either the PVI or Voltage Indicator Tester may not be operating properly. Both should be returned to the manufacturer for repair.



Specifications

Weight (w/o batteries): 498.95 g (17.6 oz)

Dimensions: 6.22" L X 5.15" W X 5.06" H

Battery requirements: Two (2) Alkaline or Lithium "AA" batteries

Operating voltage range(s): Test Point to 500 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 (Store in a dry location)

Storage humidity range: 5% to 95% Rh (Store in a dry location)

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

Level 1 - 500 m/s² (50g), 11ms Half-sine pulse, 3 pulses Positive & Negative, each axis.

Level 2 - 1000 m/s² (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

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not used in accordance with the instruction manual, may cause harmful interference to radio communications.

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Hubbell has a policy of continuous product improvement. Please visit hubbellpowersystems.com to confirm current design specifications.

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