



HIGH VOLTAGE PROXIMITY DETECTOR

An ISO 9001:2008 Company

Model 275 HP (Upto 275KV) / 500 HP (Upto 500KV)

The 275HP / 500HP is a HIGH VOLTAGE proximity detector. 275HP has eight voltage detection settings from 240Vac to 275KVac. & 500HP has 10 Voltage detection settings from 240V to 500KV. The 275HP / 500HP consists of an internal pickup sensor plate, a sensitivity selector, a visual and a sound annunciator. With the 275HP / 500HP physical contact with electrical conductors is not necessary when testing for live lines. This tester works by proximity.

Its sensor senses the radiated field which surrounds live conductors. Radiated field strength increases with voltage & decreases quickly with distance or earth shielding. The radiated field from a cable of closely bunched conductors supplied by three phase power tends to cancel (See "Limitations of use" paragraph). Detecting distance of a 250Vac single live wire is approximately 10cm. With a bunched neutral and earth cable, as in a flexible cable, the distance is reduced to 5cm.

Some of the typical users are : identify and check live cables; find fault in flexible cables; check earth equipment; service neon lighting; trace live wires; check high frequency radiation ; detect residual or induced voltages. For example, faults in damaged flexible cables are found by applying low voltage to each conductor. Earthing the remainder and moving the tester along the cable until the change in condition is obtained. (Flexible cables which are used in mining and building industries, are readily repairable when the break in the cable is located.)

When using for high voltage, the rotary switch (attenuator) is used to identify and differentiate various HV live cables. The tester must be used in conjunction with a long and insulating rod when measuring high voltage (KV). However, the 275 HP / 500HP is a non contact tester and it is advised that the tester should never come in to contact with cables (KV) as this tester is merely a non-contact AC proximity tester.

Checking or proofing the tester is easy. Switch the sensitivity to 240V AC and place the dome against a low voltage live conductor or rub the dome with a cloth or against an item of clothing as this generates a static DC which triggers the detection of circuit. The light and beeper should go "on" as if a live wire is being approached. Approaching the dome near a computer screen or a TV screen (not liquid crystal display type) should also trigger the tester while on 240V selection.



FEATURES :

- **8 Voltage Settings :** 240V , 2KV, 6KV, 11KV, 22KV, 33KV, 132KV and 275KV AC (Model 275HP).
- **10 Voltage Settings :** 240V, 3.3KV, 11KV, 22KV, 33KV, 66KV,110KV, 220KV, 330KV, 500KV (Model 500HP).
- Self test selection.
- High bright LEDs visual indication.
- Sound indication.
- Non-contact work by proximity.
- Detect low voltage on any systems.
- Compatible with most link sticks.
- Use 3 x 1.5V "C" batteries
- Easy access to batteries.
- High impact nylon casing.
- Sealed by "O" rings
- Suitable for indoor and outdoor use.
- Light weight, robust, & compact.
- Weight : Approx. 500g.

SAFETY:

- Meets EN61000-3-2; EN61000-3-3; EN61326-1; EN55011 EN61000-4-2; EN61000-4-3; EN61000-4-4; EN61000-4-5; EN61000-4-6; EN61000-4-11.

| Typical observation of test results made in the fields | | |
|--------------------------------------------------------|----------------------------|--------------------------|
| Range | MinDetection Voltage (MDV) | MDV as % of Line Voltage |
| 11KV | 1KV | 9.1% |
| 22KV | 2KV | 9.1% |
| 33KV | 3.1KV | 9.4% |
| 132KV | 12.5KV | 9.5% |
| 275KV | 22.5KV | 8.2% |

| Expected test results (laboratory testing): | |
|---------------------------------------------|-------------------------------------------------------|
| Range | Operated From |
| 240V | Variable from 80V or depending on the type of source. |
| 2KV | 250V |
| 6KV | 500V |
| 11KV | 1000V |
| 22KV | 1500V |
| 33KV | 4000V |
| 132KV | 8000V |

The distance for detection of the voltage depends upon the range selected & actual Voltage of the conductor. e.g. If the range selected is PC11KV, the minimum distance for detection of the PC11KV voltage is 22cm. But if the range selected is PC22KV, you need to be closer (14cm) to detect the PC11KV conductor.






LIMITATIONS OF USE :

It is recommended that the 275HP / 500HP is not used in HV yards of mixed voltages. In the presence of mixed voltages, the tester can become unreliable.

Problems can arise when the tertiary circuit of a 275/133/11KV transformer is tested. The electric field of the HV and MV bus bars can trigger the detector when it is above 3m above the ground. This is common with most of the electric field voltage detectors, and the users should be aware of it. The tester can pick up adjacent circuit to the one being tested and indicate the wrong information to the user.

HOT STICK Model HSR - 120 / 120A / 120B / 120C / 121 / 122

"KUSAM-MECO" Hot Stick is suitable for use with Non Contact High Voltage Detector Model 275HP & 500HP. It's construction is Telescopic. It is constructed from highly insulating reinforced Fibre Glass rod. The reinforcement gives high mechanical strength. It has a rubber gripper for holding it firmly when making measurements of H.T. Lines. It is supplied with carry bag.

| Model | Length | |
|----------|-----------------------------------------------|--------------------------------------------------------------------------------------|
| HSR 120 | 1 x 1.2m Orange stick & 3 x 1.8m Black stick. | Combination of 3 Models Sticks HSR 120A, 120B & 120C |
| HSR 120A | 1 x 1.2m Orange stick |  |
| HSR 120B | 1 x 1.8m Black stick |  |
| HSR 120C | 1 x 1.8m Black stick with handle |  |
| HSR 121 | 1 x 3.0m Retractable stick. |  |
| HSR 122 | 1 x 5.0m Retractable stick. |  |

All Specifications are subject to change without prior notice



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HI - PROX 275HP - TEST REPORT NOTES -

1. The distance for 10cm at an angle of 90°.

| | | MEASURED | |
|---------------|-------|--------------------------------------------|----------|
| 275HP Setting | Angle | V _e for Sound and Light Trigger | Distance |
| 240Vac | 90° | 162Vac | 10cm |
| 2kV | 90° | 1350Vac | 10cm |
| 6kV | 90° | 4800Vac | 10cm |
| 11kV | 90° | 10kV | 10cm |
| 22kV | 90° | 14kV | 10cm |
| 33kV | 90° | 27kV | 10cm |

From a distance of 10cm from the conductor, the 275HP can detect 162Vac while on the 240Vac setting. From a distance of 10cm, it will however only start to detect 1350Vac on the 2kV position, 4800Vac on the 6kV position, 10kV on the 11kV position, 14kV on the 22kV position and 27kV on the 33kV position.

2. The distance for 5cm at an angle of 90°.

The results are as follows :

| | | MEASURED | |
|---------------|-------|--------------------------------------------|----------|
| 275HP Setting | Angle | V _e for Sound and Light Trigger | Distance |
| 240Vac | 90° | 90Vac | 5cm |
| 2kV | 90° | 1300Vac | 5cm |
| 6kV | 90° | 2800Vac | 5cm |
| 11kV | 90° | 5500Vac | 5cm |
| 22kV | 90° | 8200Vac | 5cm |
| 33kV | 90° | 15500Vac | 5cm |

From a distance of 5cm from the conductor, the 275HP can detect 90Vac while on the 240Vac setting. From a distance of 5cm, it will start to detect 1300Vac on the 2kV position, 2800Vac on the 6kV position, 5500V on the 11kV position, 8200V on the 22kV position and 15500V on the 33kV position.

3. The Voltage of the generator (V_e) set at a fixed voltage and the voltage setting on the 275HP is selected on the rotary setting switch.

The Voltage setting of 240Vac position selected.

| | | | MEASURED |
|---------------|-------|---------------------------------|------------------------|
| 275HP Setting | Angle | V _e on the generator | Distance For Detection |
| 240Vac | 90° | 500Vac | 32cm |
| 240Vac | 90° | 1000Vac | 48cm |
| 240Vac | 90° | 2000Vac | 75cm |
| 240Vac | 90° | 6000Vac | 124cm |
| 240Vac | 90° | 11000Vac | 146cm |
| 240Vac | 90° | 22000Vac | 226cm |

If you don't know the actual voltage to expect on a conductor, better try with 240Vac first. At 32cm, it will already detect 500Vac. While on the 240Vac position, from a distance of 2.26Meter, you would detect a conductor with 22kVac.

4. The rotary setting selector is now positioned on the 2kV position.

| | | | MEASURED |
|----------------------|--------------|---------------------------------------|-------------------------------|
| 275HP Setting | Angle | V_G on the generator | Distance For Detection |
| 2kVac | 90° | 1000Vac | 10cm |
| 2kVac | 90° | 2000Vac | 21cm |
| 2kVac | 90° | 6000Vac | 40cm |
| 2kVac | 90° | 11000Vac | 52cm |
| 2kVac | 90° | 22000Vac | 60cm |
| 2kVac | 90° | 33000Vac | 92cm |

The Higher the voltage, the smaller the distance of detection.

5. The rotary setting selector is now positioned on the 6kV position.

| | | | MEASURED |
|----------------------|--------------|---------------------------------------|-------------------------------|
| 275HP Setting | Angle | V_G on the generator | Distance For Detection |
| 6kVac | 90° | 1000Vac | 11cm |
| 6kVac | 90° | 2000Vac | 18cm |
| 6kVac | 90° | 6000Vac | 44cm |
| 6kVac | 90° | 11000Vac | 61cm |
| 6kVac | 90° | 22000Vac | 75cm |
| 6kVac | 90° | 33000Vac | 105cm |

On the 6kV position, the 275HP detect 22000Vac from a distance of 75cm. On the previous test, while on the 2kV position, the 275HP needed only 60cm to detect 22000V. So if you suspect the conductor to be of a certain voltage, refers to the tables of these tests to help you approximating the voltage.

6. The rotary setting selector is now positioned on the 11kV position.

| | | | MEASURED |
|----------------------|--------------|---------------------------------------|-------------------------------|
| 275HP Setting | Angle | V_G on the generator | Distance For Detection |
| 11kVac | 90° | 3500Vac | 1cm |
| 11kVac | 90° | 4000Vac | 6cm |
| 11kVac | 90° | 6000Vac | 11cm |
| 11kVac | 90° | 11000Vac | 22cm |
| 11kVac | 90° | 22000Vac | 35cm |
| 11kVac | 90° | 33000Vac | 42cm |

As you increase the selected voltage on the rotary switch, you need more voltage on the conductor to trigger the 275HP or you need to be closer (more volt per meter).

7. The rotary setting selector is now positioned on the 22kV position.

| | | | MEASURED |
|---------------|-------|---------------------------------|------------------------|
| 275HP Setting | Angle | V _g on the generator | Distance For Detection |
| 22kVac | 90° | 3000Vac | ---- |
| 22kVac | 90° | 4000Vac | 1cm |
| 22kVac | 90° | 6000Vac | 9cm |
| 22kVac | 90° | 11000Vac | 14cm |
| 22kVac | 90° | 22000Vac | 25cm |
| 22kVac | 90° | 33000Vac | 36cm |

We increased the selection voltage to 22kV and now, you need to be closer to detect the 11kV conductor. While on the previous test (11kV position), you could have been as far as 22cm before detecting 11kV, now while on the 22kV position (position on the 275HP), you need to be as close as 14cm from the conductor to detect 11kV.

8. The rotary setting selector is now positioned on the 33kV position.

| | | | MEASURED |
|---------------|-------|---------------------------------|------------------------|
| 275HP Setting | Angle | V _g on the generator | Distance For Detection |
| 33kVac | 90° | 1000Vac | ---- |
| 33kVac | 90° | 2000Vac | ---- |
| 33kVac | 90° | 7000Vac | 1cm |
| 33kVac | 90° | 11000Vac | 7cm |
| 33kVac | 90° | 22000Vac | 11cm |
| 33kVac | 90° | 33000Vac | 16cm |

9. The rotary setting selector is now positioned on the 132kV position.

| | | | MEASURED |
|---------------|-------|---------------------------------|------------------------|
| 275HP Setting | Angle | V _g on the generator | Distance For Detection |
| 132kVac | 90° | 18000Vac | 1cm |
| 132kVac | 90° | 22000Vac | 7cm |
| 132kVac | 90° | 33000Vac | 10cm |

KUSAM-MECO®

WARRANTY

Each "KUSAM-MECO" product is warranted to be free from defects in material and workmanship under normal use & service. The warranty period is one year (12 months) and begins from the date of despatch of goods. In case any defect occurs in functioning of the instrument, under proper use, within the guarantee period, the same will be rectified by us free of charges, provided the to and fro freight charges are borne by you. This warranty extends only to the original buyer or end-user customer of a "KUSAM-MECO" authorized dealer. This warranty does not apply for damaged IC's, fuses, disposable batteries, carrying case, test leads, or to any product which in "KUSAM-MECO's" opinion, has been misused, altered, neglected, contaminated or damaged by accident or abnormal conditions of operation or handling. "KUSAM-MECO" authorized dealer shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of "KUSAM-MECO". "KUSAM-MECO's" warranty obligation is limited, at option, free of charge repair, or replacement of a defective product which is returned to a "KUSAM-MECO" authorized service center within the warranty period. THIS WARRANTY IS BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. "KUSAM-MECO" SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, ARISING FROM ANY CAUSE WHATSOEVER. All transaction are subject to Mumbai Jurisdiction.

KUSAM-MECO®

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KUSAM-MECO®

An ISO 9001:2008 Company

HIGH VOLTAGE A.C. PROXIMITY DETECTOR HI-PROX



Model : 275HP

INSTRUCTION MANUAL

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**Caution, risk of electric shock.****Caution, refer to the user manual.****Specifications****Electrical*****Detecting Ranges***

| <u>Selection</u> | <u>Detects voltage from</u> |
|------------------|-----------------------------------------------------|
| 240V | Variable from 80V or depending on type of source |
| 2kV | 250V |
| 6kV | 500V |
| 11kV | 1000V |
| 22kV | 1500V |
| 33kV | 4000V |
| 132kV | 8000V |
| 275kV | 22kV |

Mechanical

| | |
|------------------|--------------------------------|
| Bump Test : | IEC68-2-29 |
| Vibration Test : | IEC1010, clause 8.3 |
| Drop Test : | IEC1010, clause 8.4 |
| Impact Test : | IEC1010, clause 8.2 |
| Case Height : | 229 mm |
| Case Width : | 96 mm |
| Weight : | 0.59 kg (Batteries included) |

Environmental

| | |
|-------------------------|-----------------|
| Operating Temperature : | -15°C to + 55°C |
| Storage Temperature : | -20°C to + 65°C |
| Humidity : | 93% RH @ 40°C |
| Cold Temperature : | IEC68-2-1 |
| Dry Heat : | IEC68-2-2 |
| Damp Heat : | IEC68-2-3 |

Laboratory And Field Test Results

Expected test results (laboratory testing)

| <u>Range</u> | <u>Operated from</u> |
|--------------|-----------------------------------------------------|
| 240V | Variable from 80V or depending on type of source |
| 2kV | 250V |
| 6kV | 500V |
| 11kV | 1000V |
| 22kV | 1500V |
| 33kV | 4000V |
| 132kV | 8000V |
| 275kV | 22kV |

Typical observation of test results made in the field

| <u>Range</u> | <u>Min. Detection Voltage(MDV)</u> | <u>MDV as % of Line Voltage</u> |
|--------------|------------------------------------|---------------------------------|
| 11kV | 1kV | 9.1% |
| 22kV | 2kV | 9.1% |
| 33kV | 3.1kV | 9.4% |
| 132kV | 12.5kV | 9.5% |
| 275kV | 22.5kV | 8.2% |

Changing Batteries

The 275HP Hi-Prox uses 3x1.5V “C” cells batteries. Open the battery cover (turn counter-clockwise) to remove the batteries. Ensure polarity is respected.

Safety Rules

The 275HP Hi-Prox has been designed with safety in mind. However, no design can completely protect against incorrect use.

Electrical circuits are dangerous and lethal through lack of caution or poor safety practice. The following rules should reduce the danger:

- Read the user manual carefully and completely before using the tester. Fully understand the instructions before using this product. Follow the instructions for every test. Take all the necessary precautions. Do not exceed the limits of this instrument.
- The 275HP Hi-Prox must never be in physical contact with any conductor higher than 1kV. This is a proximity detector, not a detector which works by contact.
- Always use a fiber glass rod or any authorized stick.
- A high voltage test is carried out with the tester attached to an operating stick, sometimes called “links stick”.
- Verify the rotary switch setting before measuring. Make sure it is on the correct setting for your application.
- Always check that the 275HP Hi-Prox is working before and after the test.
- Do not touch any exposed wiring, connections, or other “live” parts of an electrical circuit.

This instrument should only be used by a competent, suitably trained person who understands this test procedure fully. Personnel working with high voltage should be trained regularly.

General Description

The **275HP Hi-Prox** consists of an internal pickup sensor plate, a rotary switch as sensitivity selector, a sound annunciator (high pitch, high power buzzer), a visual indicator (high bright LEDs), and three “C” size batteries.

The 275HP Hi-Prox detects AC voltages using the sensor plate. The sensor plate collects part of the radiated electric field (V/M). The electric field is seen by the internal circuitry and triggers the input of a CMOS integrated circuit. The integrated circuit charges a capacitor via a diode. Once that capacitor reaches a certain level, the buzzer and LEDs annunciator are turned “ON”.

The trigger level is fixed (CMOS logical level change). The “self-test” inserts a voltage on the sensor plate, just like if the sensor would pick up a voltage. The 275HP Hi-Prox allows identification of AC voltages from 220Vac to 275kVac. The enclosure is made out of industrial grade polyurethane. The enclosure can be attached to a link stick. The small cylinder part of the 275HP Hi-Prox fits into most link stick adaptors.

High Voltage Testing

The rotary switch (attenuator) is used to identify and differentiate various HV live cables. **The tester must be used in conjunction with a long and insulating rod when measuring high voltage (kV).**

Non-Contact

It is advised that the tester should never come into contact with cables (kV) as this tester is merely a *non-contact* AC proximity tester.

Limitations On The 275HP Hi-Prox

It is recommended that this tester is not used in HV yards of mixed voltages. In the presence of mixed voltages, the tester can become unreliable.

Problems can arise when the tertiary circuit of a 275/133/11kV transformer is tested. The electric field of the HV and MV bus bars can trigger the detector when it is about 3m above the ground. This is common with most of the electric field voltage detectors. Users should be aware of it. The tester can pick up adjacent circuit to the one being tested and indicates the wrong information to the user.

Typical Uses

- Identify and check live cables
- Check and detect live high voltage cables (using extension hot stick)
- Find fault in flexible cables
- Check earth equipment
- Service neon lighting
- Trace live wires
- Check high frequency radiation
- Detect residual or induced voltages

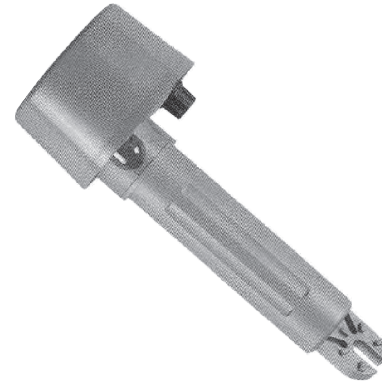
Broken Wires In Cables

Faults in damaged flexible cables are found by applying low voltage to each conductor. Earthing the remainder (the wires that do not need to be traced. Do not earth the live wire, so that they can be detected by the 275HP Hi-Prox.) and moving the tester along the cable until the change in condition is obtained. (Flexible cables, as used in mining and building industries, are readily repairable when the break in the cable is located).

Low Voltage Testing

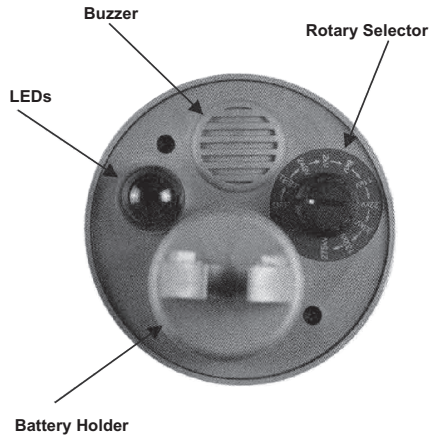
The 275HP Hi-Prox works by proximity. Physical contact with electrical conductors is not necessary when testing for live lines. Its sensor senses the radiated field which surrounds live conductors. It is recommended not to touch high voltage wires with the 275HP Hi-Prox.

Radiated field strength increases with voltage and decreases quickly with distance or earth shielding. The radiated field from a cable of closely bunched conductors supplied by three phase power, tends to cancel (See “**Limitations of the 275HP Hi-Prox**” on page 9). Detecting distance of a 250Vac single live wire is about 10 cm and with a bunched neutral and earth cable, as seen in a flexible cable, the distance is reduced to 5 cm.



Front Panel Layout

- OFF - Turn the pick-up sensor off
- Self-Test - Check if the entire circuitry is working
- 240Vac - 240Vac selection
- 2kV - 2kVac selection
- 6kV - 6kVac selection
- 11kV - 11kVac selection
- 22kV - 22kVac selection
- 33kV - 33kVac selection
- 132kV - 132kVac selection
- 275kV - 275kVac selection
- Buzzer - High noise level buzzer
- LEDs - High bright low current LEDs
- Battery Holder



Preparation for Use

When unpacked, the tester should be inspected for any visible signs of damage, and the preliminary checks described in the user manual should be performed to ensure that it is operating correctly. If there is any sign of damage, or if the instrument does not operate correctly, return it to your nearest supplier.

This instrument is powered by three “C” type batteries.

Checking And Proofing The Tester

Switch the sensitivity to “SELF-TEST”. The buzzer of the 275HP Hi-Prox should beep and the LEDs should light. This indicates that the 275HP Hi-Prox is operational.

Verify the working of this unit by selecting 240Vac and place the dome against a low voltage live conductor or rub the dome with a cloth or against an item of clothing as this generates a static DC which triggers the detection of circuit. The light and beeper should go “on” as if a live wire is being approached.

Approaching the dome near a computer screen or a TV screen (not liquid crystal display type) should also trigger the tester while on the 240V selection.

