

# Hastings Hot Line Tools Digital Voltage Phase Meter

Catalog Number 6702



## Instruction Manual



## **TABLE OF CONTENTS**

|                              |    |
|------------------------------|----|
| SAFETY .....                 | 1  |
| FEATURES .....               | 2  |
| OPERATING INSTRUCTIONS ..... | 4  |
| BATTERY REPLACEMENT .....    | 9  |
| TROUBLESHOOTING.....         | 10 |
| SPECIFICATIONS.....          | 11 |
| WARRANTY .....               | 12 |



## **SAFETY**

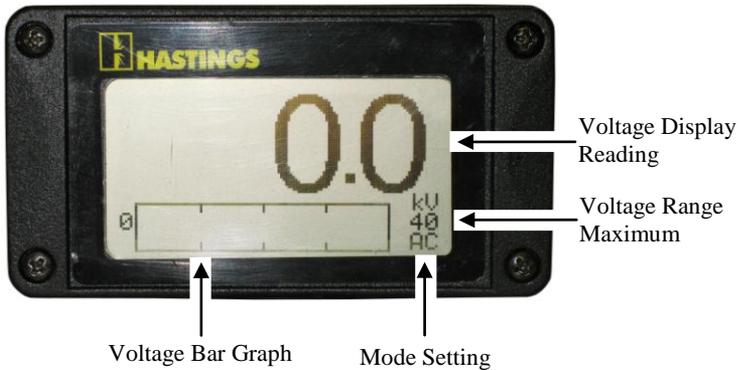
- The Meter must only be used by trained personnel familiar with the use of such devices. This device is designed for use with high voltage which is lethal. Improper use may result in serious injury or death.
- Always follow OSHA and your company work procedures when using the Meter.
- Always use the Meter with an appropriate hot stick length for the potential being tested.
- The Meter startup self test is automatic. If the device does not complete the startup self test, do not attempt to use it. (See Page 5 Step 2.0).
- The body of the Meter will be at an elevated potential. Use caution when operating the Meter in the vicinity of grounded or energized objects.
- The Meter is only intended for operation on 50 Hz and 60 Hz AC power systems and DC voltages up to 4 kV.
- Hi-Pot mode will only work with the Hi-Pot Adapter installed and with the Meter in Hi-Pot mode (see page 6).

## FEATURES

### Top view of Meter



### Front view of Meter



## **FEATURES**

- Auto self test and battery voltage level check during startup.
- Large digital display with backlight on/off function.
- Three modes of operation are available: AC, Hi-Pot (Hi-Pot Adapter must be installed to use in Hi-Pot mode, see page 6), and DC.
- Maximum value of voltage range is displayed.
- Long battery life from three “AA” batteries.
- High quality rugged extruded aluminum enclosure.

## OPERATING INSTRUCTIONS

### **1.0 Prepare to Use**

Remove the Meter from its storage case and inspect for damage.

The Meter consists of high voltage resistors encapsulated inside two fiberglass housings. These resistors are connected together with a coiled cord. A digital display is attached to one of the encapsulated resistor housings.

Attach each encapsulated resistor to a hot stick of appropriate length for the voltages to be tested.

If the Meter is to be used on voltages of over 40 kV, the proper number of Extension Resistors (Cat. No. 6703) must be attached to probe ends of the encapsulated resistors. To attach Extension Resistors, remove probes from encapsulated resistors, attach Extension Resistors to encapsulated resistors, and re-assemble probes to end of Extension Resistors. The Extension Resistors are used in pairs, attaching one to each end of the Meter sticks. To determine number of Extension Resistors required, see table below. Voltage range on the Meter will calibrate to correct voltage range during startup, if the ends of Extension Resistors remain in contact with each other during startup.

| Number of Extension Resistor Pairs Required | Voltage Range |
|---|---------------|
| 1   | 80 kV         |
| 2   | 120 kV        |
| 3   | 160 kV        |
| 4   | 200 kV        |
| 5   | 240 kV        |

Table 1: Extension Resistor Pairs for systems above 40 kV

## **2.0 Perform and observe “SELF TEST” result**

With the Meter turned off, press and release the ON/LIGHT/OFF button once to turn the Meter on and begin self test. Before powering on, position the Meter to keep the probe ends in contact with each other.

- The Meter will perform self test and battery voltage check.
- If the battery voltage is low, this will be displayed during the first screen of startup, by “Battery Voltage: Low”. Batteries must be replaced if this message is observed.
- The Meter will default to AC when powered on. After passing the self test, if the probe ends of the Meter are not connected, the Meter display will prompt for the probe ends to be connected, and press the AC/HIPOT/DC button. This will determine the number of Extension Resistors connected to the Meter. The Meter defaults to 40 kV.

## **3.0 Turn backlight on/off, select Mode of Operation**

After the Meter is powered on, pressing and holding the ON/LIGHT/OFF button will turn on the backlight. Release ON/LIGHT/OFF once the backlight turns on. Pressing and holding ON/LIGHT/OFF again will turn the backlight off. Pressing and holding the AC/HIPOT/DC button will turn on the mode selection menu. With the mode selection menu on, pressing AC/HIPOT/DC will cycle through the available modes. Once the desired mode is selected, the Meter will return to the voltage reading mode.

Note: to use the Meter in Hi-Pot mode, a Hi-Pot Adapter must be installed (see page 6).

#### **4.0 Contact Meter with voltage source**

When a potential is contacted by both probes, the resulting voltage will display numerically on the display, and also graphically on the voltage bar graph.

If a voltage potential is contacted and the display flashes “++++”, the Meter has read a voltage higher than the allowable range. If a voltage potential is contacted and the display flashes “EEEE”, the Meter is in the wrong mode for the power system being tested.

#### **5.0 Accessories**

As previously stated in Section 1.0, Prepare to Use, Extension Resistors must be used in conjunction with the Meter on systems above 40 kV. See section 1.0 for instructions on this procedure.

Underground bushing adapters for 35 kV Elastimold, and all 15 and 25 kV bushings (Cat. No. 6702-1), and for 35 kV RTE bushings (Cat. No. 6702-3) can be attached to the Meter by removing the supplied probe and replacing it with the appropriate adapter.

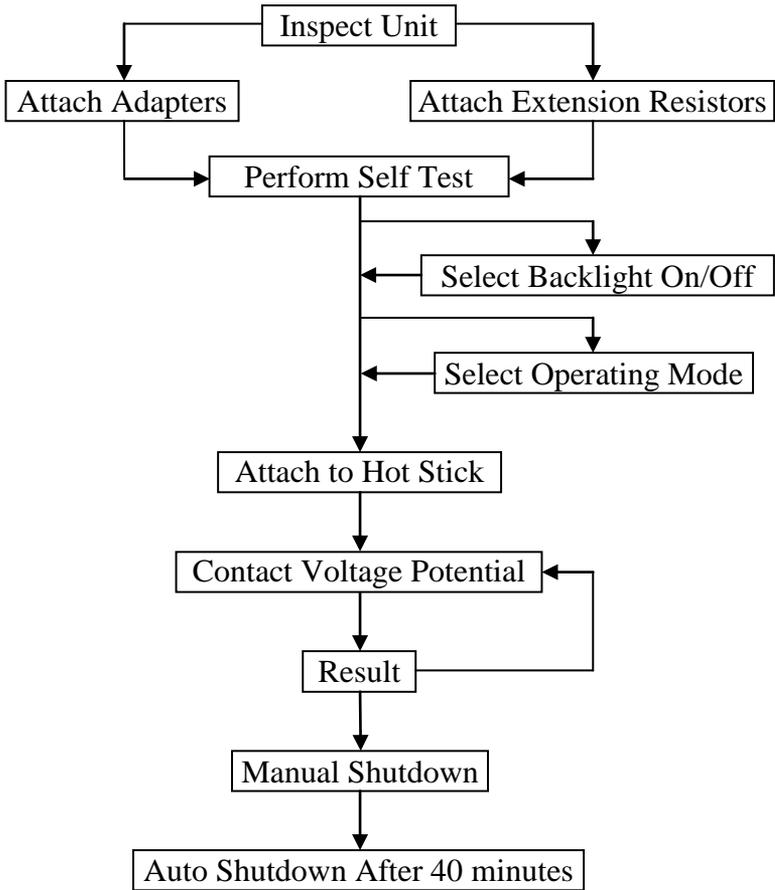
A DC Hi-Pot Adapter (Cat. No. 6702-2) is available which allows the testing of underground cable by rectifying the available system voltage and charging the cable to a DC voltage equal to the peak AC voltage supplied. While the DC voltage is high enough to test the cable, the current is limited by the Meter. In the event the cable is defective or grounds have been left on, fault currents will not result. Please see DC Hi-Pot instructions for operating the 6702 Meter with the DC Hi-Pot Adapter installed.

## **6.0 Shutdown**

To turn the Meter off, press & hold the ON/LIGHT/OFF pushbutton until the display shuts off, indicating meter shutdown. The backlight will turn on during shutdown of the Meter.

The Meter will automatically shut down after 40 minutes if no voltage potential is detected.

## Operating Instructions Flow Chart



## BATTERY REPLACEMENT

The Meter uses three “AA” cells. These may be either Alkaline or NiMH.

The batteries are accessed by removing the back panel of the Meter.



## TROUBLESHOOTING

|  |  |
|--|--|
| Meter will not turn on.  | Check batteries.   |
| Incorrect voltage range is displayed for connected pairs of Extension Resistors. | Manually turn Meter off. Turn Meter back on, making sure free ends of Extension Resistors remain in contact with each other during self test.  |
| During operation, the display flashes “++++”.                                    | The Meter has read a voltage higher than the allowable range.  |
| During operation, the display flashes “EEEE”.                                    | The Meter is in the wrong mode for the power system being tested.<br>Examples: <ul style="list-style-type: none"><li>• The Meter is in AC mode and applied to a DC voltage.</li><li>• The Meter is in DC mode and applied to an AC voltage.</li><li>• The Meter is in AC mode, a Hi-Pot Adapter is installed, and applied to an AC voltage or positive DC voltage.</li></ul> |
| Polarity incorrect on a DC measurement.  | The Meter is in HiPot mode while applying Meter to a DC power system.  |

**WARNING:** When using the Meter on a DC power system, do not use the Meter with a DC Hi-Pot Adapter installed. The Hi-Pot Adapter can block the DC voltage being supplied, and the Meter will not be able to display the system voltage.

## SPECIFICATIONS

|                       |  |
|-----------------------|--|
| Line Voltage Mode     | 0 – 40 kV AC<br>0 – 4 kV DC  |
| Operating frequency   | 50 – 60 Hz AC, DC  |
| Batteries             | 3 x 1.5V Alkaline or NiMH “AA”   |
| Battery Life          | 24 hrs (backlight on continuously)<br>14 days (backlight off continuously) |
| Operating Temperature | -40°F to 122°F   |
| Storage Temperature   | -40°F to 158°F   |
| Weight                | 3.8lbs (without probes)<br>4.0 lbs (with probes)                           |
| Accuracy              | 1% *   |

\* Accuracy is affected in the field by the proximity of other conductive objects in the vicinity of this Meter. Keeping the cord away from other objects will improve accuracy.

## **WARRANTY**

HASTINGS warrants the catalog number 6702 Digital Voltage Phase Meter to be free from manufacturing defects, for a period of one year from the date of purchase to the original owner. At the discretion of the company, units returned under this warranty shall be either repaired or replaced at no cost to the customer. This warranty will not apply to normal wear and tear or inappropriate use, alteration or abuse of the device.

### **For warranty or repair send units to:**

HASTINGS Hot Line Tools  
770 South Cook Road  
Hastings, MI 49058

Attn: Warranty Repair Department

### **For Enquiries or technical assistance call:**

269-945-9541 or FAX 269-945-4623

P31428-R2

