



## PRODUCT INSTRUCTIONS

# CE-IT Insulator Tester

**IMPORTANT NOTE: Do not use this instrument in an explosive environment.**

### 1. INFORMATION BULLETIN

The Model CE-IT Insulator Tester is fully automatic and highly sensitive electronic instrument designed to test the effectiveness of buried pipeline insulators. The CE-IT can also be used to determine isolation condition of pipelines in road crossing casings.

The Model CE-IT circuit automatically adjusts to the voltage polarity present on the underground piping system under test. A read out of the test results are displayed in English on the LCD meter:

**GOOD:** This is displayed when the Model CE-IT determines that the electrical load placed on the pipe on either side of the isolator is not leaking from one side to the other, so it is able to build a capacitive load, and therefore determines that the isolator is effective.

**BAD INPUT SHORT:** This is displayed when the Model CE-IT determines that the electrical load placed on the pipe on either side of the isolator is leaking from one side to the other, so it is not able to build a capacitive load, and therefore determines that the isolator is not effective.

**BAD INPUT OPEN:** This is displayed if the Model CE-IT is not able to electrically load one or both sides of the isolator. This result indicated a broken lead wire to one or both sides of the isolator on the pipe system under test.

The entire testing procedure is complete in less than 30 second and audible signal alerts the operator when test cycle is completed. Although the Model CE-IT is equipped with power start switch, the instrument will automatically shut off in 10 minutes if not in use, to conserve batteries.

The Model CE-IT is factory calibrated, ready to use and requires no field adjustments.

#### Functional Features:

- Senses external polarity
- Matches external polarity
- Sense external voltage
- Matches internal voltage reference with external voltage
- Sends charging voltage
- Senses flowing current throughout the testing cycle
- Gives result of test considering the above tested parameters
- Expected battery life exceeds 50 hours

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### 2. THEORY OF OPERATION

#### Overview:

The Model CE-IT Insulator Tester is a fully automatic, highly sensitive device used to test buried pipeline insulators and the isolation of pipelines in road crossing casings to determine their effectiveness. The CE-IT has a LCD readout that displays in English the condition of the insulator under test. An audible signal is heard when the CE-IT is operating, with an increase in the speed of the pulsating tone when the test cycle is completed.

#### Principle of Operation:

The actual resistance of a buried insulator depends on many factors, such as the environment in which the joint is located. In a very low resistivity environment, the normal resistance measurement for an insulating joint may be as low as 0.5 ohm. Checking the insulating joint of a buried pipeline for current leakage is often a more reliable test than an internal resistance test. For this reason, the CE-IT looks at the electrical characteristics of the joint itself rather than the internal resistance. In general, the following conditions are evidenced when an effective insulator is measured:

1. Substantially different ground voltage readings are evidenced on opposite sides of the insulator. The delta  $V_g$  is usually smaller or even in the opposite polarity (interference coupling) on the side of the insulator which is opposite from the protected segment of the pipe.
2. The percentage of current leakage that the joint will allow to flow through is low (25 percent or less).
3. The voltage drop across the insulator is significant. (The voltage drop across an ineffective or shorted insulator would be negligible in the range of 10 millivolts or less).

The Model CE-IT Insulator Tester uses the above three criteria to determine if the insulator and testing path (i.e. connections from the test station to both ends of the insulator) is either: open, shorted or good. To operate: The CE-IT is connected to both sides of the buried insulator through a test station (see below, figure 1).

When the power to the CE-IT is turned on and the "Start" button is pressed, the following sequence of events occurs:

1. First the CE-IT senses the polarity of the voltage at the test leads and then matches that polarity with the internal voltage in the instrument.
2. The CE-IT then senses the external voltage applied to the pipe and matches the internal voltage reference with the external voltage. (The maximum external voltage should not exceed 50 volts DC or 10 volts AC.)
3. After matching the external polarity and voltage, the CE-IT then measures the charging current applied to the protected side of the pipeline and senses the current flowing through the insulator throughout the testing cycle (about 20 seconds).

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- The CE-IT then displays the result of the completed test. A "Short" is indicated if the voltage drop across the insulator is between 12 and 10 millivolts or less, and/or the current leakage through the insulator is above 25 percent of the current applied to the protected pipe. An "Open" is indicated in the case of an open wire connection from the test station to the pipeline or the CE-IT test leads. A "Good" is indicated when the ground voltage readings ( $\Delta V_g$ ) are smaller or of opposite polarity on the unprotected side of the pipeline, the current leakage through the insulator is less than 25 percent and the voltage drop across the insulator is greater than 10 to 12 millivolts.

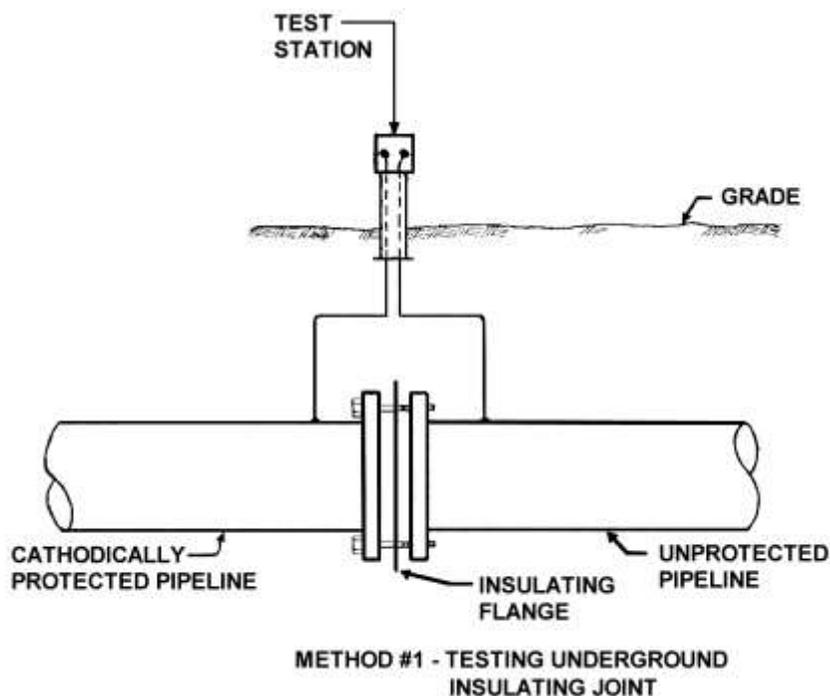


Figure 1.

### 3. SHIPPING INSTRUCTIONS

All instruments being returned for repair should be sent PREPAID to either address below:

Tinker & Rasor  
791 S. Waterman Ave  
P.O. Box 1667  
San Bernardino, CA 92402

Include with shipment information the nature of the problem, purchase order, serial number and return delivery address. Immediate service is guaranteed!

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