

HI-POT/CONTINUITY TESTER

Model PLEP01

Instruction Manual

***MITCHELL
INSTRUMENT CO.***

Dear Customer:

Congratulations! Mitchell Instrument Co. is please to present you with your Hipot/Continuity Tester. This instrument allows quick and simple field testing of equipment to ensure proper grounding and insulation.

Before using the Hipot/Continuity Tester, we suggest that you take a few moments to review this manual.

Thank you for your trust and confidence.

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Section 1

An Introduction to Dielectric Withstand and Continuity Testing with the PLEP01

The continuity test/dielectric withstand test is a field test which is used to verify proper operation of electrical equipment used in the work place and on construction sites. The test ensures that the primary circuit power and ground conductors are properly wired and connected for safe operation. It also applies a high-voltage potential between power and ground conductors to make sure that no unintentional leakage or arcing paths exist between power and ground. The test consists of a ground continuity check and a high voltage check. It is non-destructive to the equipment under test, and can be accomplished in a short time.

A receptacle is provided for extension cords to allow them to be tested for hipot and ground continuity.

Safety Precautions

The dielectric withstand test generates voltages of up to 2500 volts ac at potentially lethal current levels. Currents of as little as 5 mA at 120 volts can cause death, and the PLEP01 is capable of generating a lethal output. The PLEP01 has been designed to minimize exposure to high voltages. However, the potential for serious injury or death exists and personnel should be aware when they conduct this test.

Test Personnel

Personnel require special training to conduct the dielectric withstand test. They should be aware that high voltage is hazardous. Do not wear any metal jewelry while using the PLEP01. The operator should keep the area free of unused leads and equipment. Others should be kept away while testing is being performed.

Testing Area

The area used for conducting the dielectric withstand test should be as remote as possible from normal work activities. Only personnel actually conducting the test should be allowed in the area, and it should be taped or roped off to preclude casual entry by other employees. In addition, the area should be marked "WARNING - HIGH VOLTAGE TESTING" or the equivalent to warn others of the nature of the testing taking place.

The bench being used should be non-conductive, and any exposed metal parts should be tied together and grounded. If a conductive surface must be used, it should be grounded.

Because of sparking during a dielectric test failure, it is not safe to conduct dielectric withstand tests in combustible atmospheres.

It is imperative that a good ground be provided to the PLEP01. Before connecting the PLEP01, ensure that a low-resistance ground is provided by the building wiring. If the PLEP01 is used on a high-resistance grounding circuit, dangerous high voltages may be present to the operator. In addition, the

power to the Testing Area should be provided with an easily reached shutoff switch which can be actuated by personnel outside the Area if needed.

Safety Techniques

The high voltage circuit of the PLEP01 is only energized while the **TEST** button is being pushed. High voltage can be shut off at any time by releasing the **TEST** button.

The PLEP01 is equipped with a Ground Continuity Check which makes sure that grounded systems have continuity between the ground pin of the power plug and exposed dead-metal parts. This is an important safety feature as well, and high voltage should not be applied to any equipment using a three-wire plug if the ground continuity light is not lit. If equipment using a two-wire plug is being tested, it is imperative that the operator make absolutely sure the ground probe is properly connected to the equipment being tested. If the lead is not properly connected, a dielectric withstand test failure may energize exposed dead metal of the equipment being tested. Additionally, without proper connection of the ground probe, the PLEP01 may not recognize the failure. The test will continue for its normal length of time, and the PLEP01 may show a "PASS".

The PLEP01 should be set up to the right and between the operator and the equipment under test. The operator must touch the ground probe to exposed metal of the equipment under test before the **TEST** button is pushed.

Using the PLEP01 Dielectric Withstand Tester

The dielectric withstand test involves high voltage and caution should be exercised when using the Tester. The Tester's return lead is connected to ground potential and when properly connected to the equipment being tested, it will guard against the operator contacting high voltage. Always make sure the return lead is firmly connected to exposed dead metal. In the sections below, the two tests are discussed.

Ground Check on Grounded Products

The Ground check ensures that the grounding pin of the power supply cord is properly connected to the exposed dead metal of the chassis. If this connection is absent, the exposed dead metal of your product could be at line potential indefinitely after an internal wiring fault, causing risk of shock to anyone touching it.

If the green **Ground Continuity** LED lights, the connection between the grounding pin and the exposed dead metal of the equipment being tested is good. Testing can continue.

Ground Check Failures

If the green **Ground Continuity** LED does not light when a grounded product is tested, the test should not be continued. The connection between the grounding pin of the attachment plug cap and the exposed dead metal of the chassis has a high resistance or no connection. This indicates a problem with the connection of the PLEP01 to the equipment being tested, or that the ground connection in the equipment being tested is defective. The connection to the tester should be checked, taking care to make a good

connection. The unit should then be retested. If a failing result is repeated, the connection between the power supply cord ground pin and the chassis of the equipment being tested should be checked and reworked until a passing result is obtained. Do not use equipment with a three-wire plug that has failed the Ground Continuity Test. It is unsafe.

High Voltage Dielectric Withstand Test

This test checks for insulation system breakdowns between the primary and ground circuits.

The dielectric withstand test is conducted by shorting the line and neutral conductors of the power supply cord and applying high voltage between them and the exposed dead metal of the equipment being tested. The test is continued while the **TEST** button is pressed.

High Voltage Dielectric Withstand Test Failures

If the red **Hipot Fail** LED lights, a problem has been found with the insulation system between primary and ground, or the leakage current between line and ground is more than the currently set leakage current limit, set at 5mA at the factory.. The equipment under test should be removed from service until the problem can be determined. Do not use equipment that has failed this test. It may be unsafe.

Section 2

Introduction and Specifications

Introduction

This manual contains complete operating, maintenance and calibration instructions for the Mitchell Instrument Co. Model PLEP01 Dielectric Withstand Tester.

The instrument is a bench-type Dielectric Withstand Tester with AC Output, designed for production line testing.

The PLEP01 features automatic one button operation, with numerous safety features designed to protect the operator:

- ? The Return Lead is directly connected to ground potential for operator safety.
- ? In case of trouble, the test can be immediately terminated at any time by releasing the **TEST** button.
- ? If a hipot or leakage failure is encountered, the high voltage is immediately cut to protect the operator. The **Hipot Fail LED** on the front panel lights to alert the operator.

Convenience and testing features include:

- ? Operator instructions are printed on the side panel for quick reference.
- ? Three wire extension cords, two wire (double insulated), and three-wire (grounded) products can be tested with one tester.

Your Tester is warranted for a period of one year upon shipment of the instrument to the original purchaser.

Specifications

Specifications for the PLEP01 are listed in Table 1.

ELECTRICAL	
Output	PRETEST: 500 Volts AC. METAL CASED: 1000 Volts AC. DOUBLE INSULATED: 2500 Volts AC.
Leakage Current	5 mA preset.
Pass/Fail Criteria:	
Ground Continuity:	3 ohm \pm 5% (Metal Cased only).
Leakage Current:	Internally adjustable 0.5 - 5 mA.
Dielectric Breakdown:	Separate high frequency detection circuit for breakdown spike detection.
Duty cycle	100 %.
ENVIRONMENTAL	
Operating Temperature	15-40°C.
Relative Humidity Range	0-90% non-condensing.
GENERAL	
Input power requirements	Model PLEP01: 114-127 volts, 50/60 Hz.
Weight	3 lbs.
Failure Indication	Visual, provided by red LED on front panel. Hipot Test automatically terminated on failure.
Operation Instructions	Provided on side panel.

Table 1. PLEP01 Specifications

Section 3

Operation

This section describes how to set up and make measurements with your Tester. We recommend that you read the entire section carefully so that you can use all of the features of your Tester.

Setting up your Tester

Your Tester is shipped with this manual. If reshipment of the instrument is necessary, be sure that adequate protection is provided to prevent damage during shipment. We recommend that the instrument be surrounded by at least one inch of shock-absorbing material on all sides of the container.

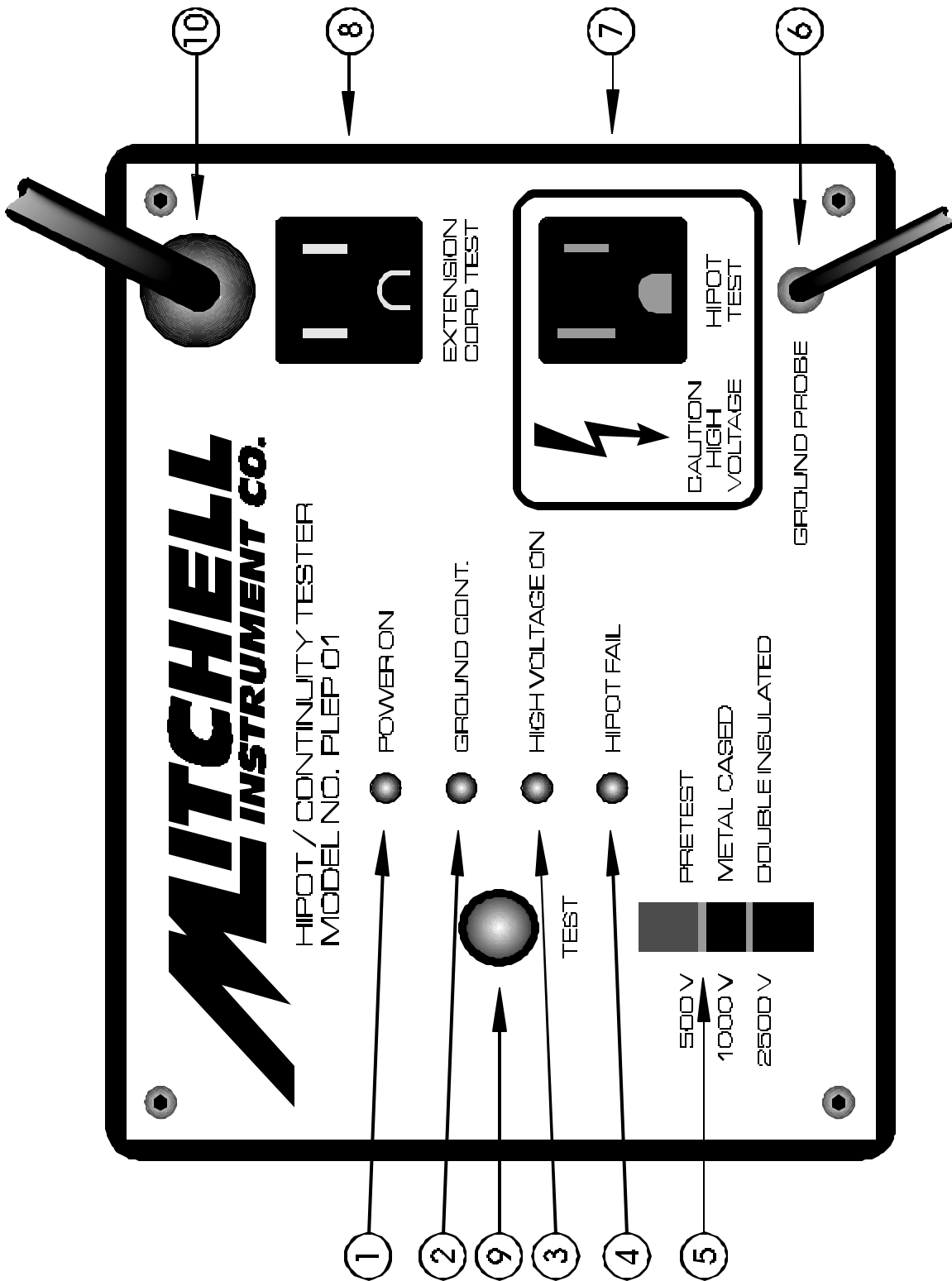
Remove the Tester from its container and place it on a test bench.

AC Line Voltage Requirements

The PLEP01 can only be used on voltages noted in the Specifications. Operation at other voltages will cause improper operation and may permanently damage the PLEP01.

Front Panel Features

Before using your Tester, take a few minutes to become familiar with the use of its controls, indicators and connectors. The front panel features of the PLEP01 are shown in Figure 2 and described in Table 2.



ITEM	NAME	FUNCTION
1	Power LED	When lit, indicates that the PLEP01 is ready to test.
2	Continuity LED	When lit, indicates that the PLEP01 is properly connected to a Metal Cased product, and the product has passed the Continuity Test.
3	High Voltage LED	Lit when TEST Button is pressed. Indicates that the hipot test is being conducted with no failures.
4	Hipot Fail LED	Indicates failure of the hipot test. High voltage output is terminated.
5	Voltage Select Switch	Selects which Hipot Test voltage of 500, 1000 or 2500 volts will be applied to the Hipot Receptacle when the TEST button is pressed.
6	Ground Probe	Used during Continuity and Hipot Testing to touch all exposed metal parts of the equipment being tested.
7	Hipot Receptacle	Equipment or extension cord under test to be plugged into this receptacle.
8	Extension Cord Receptacle	Extension cord under test to be plugged into this receptacle.
9	TEST Button	While pressed, allows selected Hipot Voltage to be present on the Hipot Receptacle. Releasing button stops test.
10	Power Cord	Plug into correctly rated source of supply. See Specifications.

Table 2. Controls, Indicators, Connectors - Model PLEP01 Front Panel

Initial Checkout Procedure

The following procedure will verify that the Tester is working correctly. We recommend that this procedure be conducted periodically to ensure proper operation of the Tester.

CAUTION

High voltage (up to 1000 Volts AC) generated by the PLEP01 is exposed during this test. A risk of shock exists. Exercise care when using the PLEP01.

1. Connect the Tester to a proper source of supply using the included 18 AWG power supply cord. The green Power LED should light.
2. Touch the tip of the **Ground Probe** to the U-shaped grounding pin of the **Hipot Receptacle**. The green **Ground Continuity** LED should light.
3. Remove the **Ground Probe** from the **Hipot Receptacle**. The green **Ground Continuity** LED should go out.
4. Carefully hold the insulated portion of the **Ground Probe**. High voltage will be exposed during this test.
5. Select the 1000V/Metal Cased setting of the **Voltage Switch**. Hold down the test button. The orange **High Voltage** LED should light.
6. Carefully insert the **Ground Probe** into one of the parallel openings in the **Hipot Receptacle**. The orange **High Voltage** LED should go out, and the Red **Hipot Fail** LED should light.

Passage of these tests indicates that the PLEP01 is functioning properly and that it is safe to use.

If the results of the performance test are not in accordance with the above, service is required. Remove the PLEP01 from service and contact the manufacturer for servicing information.

Operating Techniques

The following paragraphs describe how to operate your PLEP01 Dielectric Withstand Tester. Before proceeding with testing, the PLEP01 Tester operation should be verified.

CAUTION:

High voltage is generated by the PLEP01. Although the chassis of the equipment under test is grounded by the PLEP01, a risk of shock exists. Exercise care when using the PLEP01.

Operation Test

We recommend that the operation of the PLEP01 be audited periodically by conducting the performance test described above in the "Initial Checkout Procedure" section.

Testing Completed Products

This section describes how the PLEP01 is used to conduct a hipot/continuity test. Before continuing, we recommend that you read Section 1, "An Introduction to Dielectric Withstand Testing with the PLEP01". It contains valuable safety, operation and test result evaluation information which can help you conduct the test safely and correctly.

The test can be stopped immediately at any time by releasing the **TEST** button.

1. Connect the PLEP01 to a correctly rated source of supply. The green **Power On** LED should light, indicating that the PLEP01 is ready to test.
2. Make sure the power switch of the unit being tested is ON.
3. Plug the equipment under test into the **Hipot Receptacle** of the PLEP01.
4. Using the **Voltage** switch, select the proper test voltage. Avoid using test voltage higher than recommended below, or permanent damage to the equipment under test may result:
 - a. 500 V: Operational testing of new equipment before energizing.
 - b. 1000 V: For testing a product with a three-wire power supply cord and/or a metal enclosure.
 - c. 2500 V: For testing double insulated products.
5. Touch the **Ground Probe** to exposed metal on the piece of equipment being tested.
6. Press the **TEST** button, and hold for test duration.
7. If the orange **High Voltage** lamp stays lit, the equipment under test passes the tests.

8. If the red **Hipot Fail** LED lights, a hipot or leakage current failure has occurred. Put the equipment under test aside and do not use it until the problem has been fixed.
9. Release the **TEST** button. The PLEP01 has completed the test.

Testing Extension Cords

This section describes how the PLEP01 is used to conduct a hipot/continuity test to test three-wire extension cords with grounding pins.. Before continuing, we recommend that you read Section 1, "An Introduction to Dielectric Withstand Testing with the PLEP01". It contains valuable safety, operation and test result evaluation information which can help you conduct the test safely and correctly.

The test can be stopped immediately at any time by releasing the **TEST** button.

1. Connect the PLEP01 to a correctly rated source of supply. The green **Power On** LED should light, indicating that the PLEP01 is ready to test.
2. Plug the extension cord into the **Hipot Receptacle** and the **Extension Cord Receptacle** of the PLEP01.
3. Using the **Voltage** switch, select the 1000 volt range. Avoid using test voltage higher than recommended. The **Ground Probe** is not used in this test.
4. Press the **TEST** button, and hold for test duration.
5. If both the green **Ground Continuity** LED and the orange **High Voltage** LED stay lit, the extension cord passes the tests.
6. If the red **Hipot Fail** LED lights or the green **Ground Continuity** LED is not lit, a hipot or ground continuity failure has occurred. Do not use the cord until the problem has been found and corrected.
7. Release the **TEST** button. The PLEP01 has completed the test.

Section 4

Technical Assistance, Calibration and Repair Service

For Technical Assistance

Phone: (800) 748-6224

Technical Assistance is available between the hours of 8:30 AM and 4:30 PM Pacific Time. We are also available to repair and calibrate the tester as needed.