HT-3KVdc

Dielectric Withstand Tester

0-3000 Volts DC Output

Instruction Manual

COMPLIANCE WEST USA

Dear Customer:

Congratulations! Compliance West USA is proud to present you with your Dielectric Withstand Tester. Your instrument features a groundbreaking logic-controlled circuit design and ergonomic front panel, and represents the latest in high voltage laboratory testing.

To fully appreciate all the features of your new meter, we suggest that you take a few moments to review this manual. Compliance West USA stands by your instrument with a full one-year warranty and a loaner instrument policy. If the need arises, please don't hesitate to call on us.

Thank you for your trust and confidence.

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Section 0

Quick Start

For a quick look at the abilities of the HT3KVDC, we are providing this quick start page, designed to get you up and running quickly. We recommend that you read the entire manual before using the HT3KVDC to conduct actual testing.

Initial Setup

1. Remove the HT3KVDC from its shipping carton and set it up on a bench. Plug it in to a correctly rated source of supply, using the supplied cordset. Turn it on using the switch on the rear panel.

2. Switch the Test Duration switch on the front panel to the DEFEAT position.

3. Push the RESET Button, then push and hold the TEST Button. The output voltage will stay on while the TEST Button is pressed.

4. Set the voltage level using the Voltage knob on the front panel.

5. Let the TEST Button go; output voltage will drop to zero.

6. Plug the red lead into the DC Out Jack. Plug the black lead into the Return Jack.

7. Connect the Test Leads across the part to be tested. Push and hold the TEST Button. Watch the front panel lights for test results.

Section 1

An Introduction to Dielectric Withstand Testing with the HT3KVDC

The dielectric withstand test is a test which is recognized by safety agencies worldwide as a valid criterion of safe assembly of end-use equipment. The HT3KVDC is designed as a research instrument to determine the dielectric properties of component assemblies of end-use equipment. It applies a high-voltage potential between DC Out and Return test leads and monitors Leakage Current and watches for Dielectric Breakdown during the test. To aid in testing, the HT3KVDC can be configured with or without a test duration timer, and can be set to deliver high voltage after an arc has been detected to allow safety engineers to pinpoint the problem.

The dielectric withstand test involves high voltage and caution should be exercised when using the HT3KVDC. The Return Jack on the front panel is connected to ground potential, and setups should be designed with this in mind, to guard against the operator contacting high voltage. Always make sure the return lead is firmly connected.

Leakage Test

The HT3KVDC leakage test uses a separate low-frequency circuit to detect excessive current as a result of low impedance between the Output and Return jacks on the front panel. There is not a specific leakage current level pass/fail requirement at this time for most equipment. However, higher than normal leakage current on a particular sample may indicate an assembly or component problem in the circuit.

The leakage current is also monitored by the HT3KVDC to ensure that excessive leakage does not keep the Tester from developing full voltage required for the high voltage test. The HT3KVDC will provide full voltage at any leakage current level up to 500 mA DC. The leakage current trip level is adjustable on the front panel.

If the green Full Voltage LED lights and the test continues, the leakage current was below the amount set by the rear panel adjustment.

If the red Excess Leakage LED lights, the buzzer sounds, and the test is terminated, the leakage current was over the amount set by the rear panel adjustment.

High Voltage Dielectric Withstand Test

This test checks for insulation system breakdowns by applying a high voltage between the Output and Return jacks on the front panel. The HT3KVDC uses a separate high-frequency circuit to detect arc breakdowns of greater than 100 nsec duration.

The duration of the test is controlled by the test time control on the front panel. The test time is counted from the time the Full Voltage LED is lit to the completion of the test. The timer may be defeated, allowing the test to continue for as long as the TEST Button is pressed. The minimum test time when the timer is defeated is one second.

If the green Hipot Pass LED lights, the test cycle has been successfully completed, meaning there was no dielectric breakdown,

If the red Hipot Fail LED lights, a breakdown arc has been detected.

High Voltage Discharge

The HT3KVDC has an internal rampdown circuit designed to discharge the high voltage after completion of the dielectric withstand test. The HT3KVDC should remain connected to the circuit until the green "Hipot Pass" light or the red "Hipot Fail" light on the front panel is lit, and the output voltage, as indicated on the front panel meter, drops to a safe level. This indicates that the HT3KVDC output voltage has discharged to a safe level and there is no energy stored in the circuit.

Section 2

Introduction and Specifications

Introduction

This manual contains complete operating, maintenance and calibration instructions for the Compliance West USA Model HT3KVDC Dielectric Withstand Tester.

The instrument is a bench-type Dielectric Withstand Tester with DC Output, designed for laboratory testing of components and insulation systems.

The HT3KVDC 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.
- The test can be immediately terminated at any time by pressing the RESET button.
- Before the test can commence, the unit must be armed by pressing the RESET Button. The test will not begin until the TEST Button is pushed.
- A non-defeatable rampdown circuit returns output voltage to safe levels before test termination. The Hipot Pass or Hipot Fail light will not light until voltage has been ramped down by the HT3KVDC.
- If a failure is encountered, the high voltage output is disabled, a buzzer sounds, and any voltage stored in the equipment being tested is bled off by an internal rampdown circuit in the HT3KVDC. Voltage discharge progress shown by front panel meter.
- The failure mode is shown by the front panel LEDs.

Testing features include:

- Test time and leakage limit are settable.
- Test duration timer is defeatable for specialized testing.
- Testing may terminated or continued when a dielectric breakdown is detected.

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

Specifications

Specifications for the HT3KVDC are listed in Table 2-1.

ELECTRICAL		
Output	0-3000 Volts DC Leakage Current 500mA, adjustable trip	
Pass/Fail Criteria:		
Leakage Current:	Pass/Fail point user adjustable.	
Dielectric Breakdown:	Separate high frequency detection circuit for breakdown spike detection	
Test Time:	User adjustable 1->60 sec., defeatable	
Voltage Ramp-down Time:	Factory set 8 sec. maximum	
Pass/Fail Repeatability	± 3%	
Duty cycle	100 %	
Test adjustments	Front Panel:	Test Time Leakage Limit Voltage Adjust Timer Duration ON/DEFEAT Failure Shutdown ON/DEFEAT
ENVIRONMENTAL		
Operating Temperature	15-40°C	
Relative Humidity Range	0-90% non-condensing	
GENERAL		
Input power requirements	Model HT3KVDC: 120/208VAC 3 phase, 50/60 Hz 5A/phase	
RESET and TEST Lamp Type	Replace with type 73 14V lamp.	
SAFETY AGENCY TOPICS		
Transformer Output	> 500VA	
Visual Indication of Voltage Output	Provided by front panel meter, directly connected to high voltage output	
Failure Indication	Audible, provided by internal buzzer Visual, provided by red LEDs on front panel Test can be automatically terminated on failure	
Leakage Test	Provided; 0 mA DC factory set pass/fail point, user adjustable.	

Table 2-1. HT3KVDC Specifications

Section 3

Operation

This section describes how to set up and make measurements with the HT3KVDC. We recommend that you read the entire section carefully so that you can use all of its features.

Setting up the HT3KVDC

The HT3KVDC is shipped in a special protective container that should prevent damage during shipping. The container should include the following:

- The HT3KVDC Dielectric Withstand Tester
- A black 18 AWG Test Return Lead (Alligator Clip/Banana Plug ends)
- A red 18 AWG High Voltage Test Lead (Alligator Clip/High Voltage Plug ends)
- A Power Cord.
- This Instruction Manual

Use the original shipping container for subsequent shipping. If the original shipping container is not available, be sure that adequate protection is provided to prevent damage during shipment.

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

AC Line Voltage Requirements

Connect the HT3KVDC only to a voltage source per the rating on the rear panel.

Fuse Replacement

There are four user-replaceable fuses (F1) located inside the tester, on the top shelf. The fuse ratings are located adjacent to the fuses..

Use the following procedure to replace the fuses.

1. Turn the power switch to the O or off position.
2. Unplug the HT3KVDC from the source of supply.
3. Remove the top panel of the HT3KVDC. Locate the fuses and the fuse label.
4. Replace the fuse with one of the correct type and rating.
6. Replace the top panel and connect the HT3KVDC to power.

Front Panel Features

The front panel features of the HT3KVDC are shown in Figure 3-1 and described in Table 3-1.

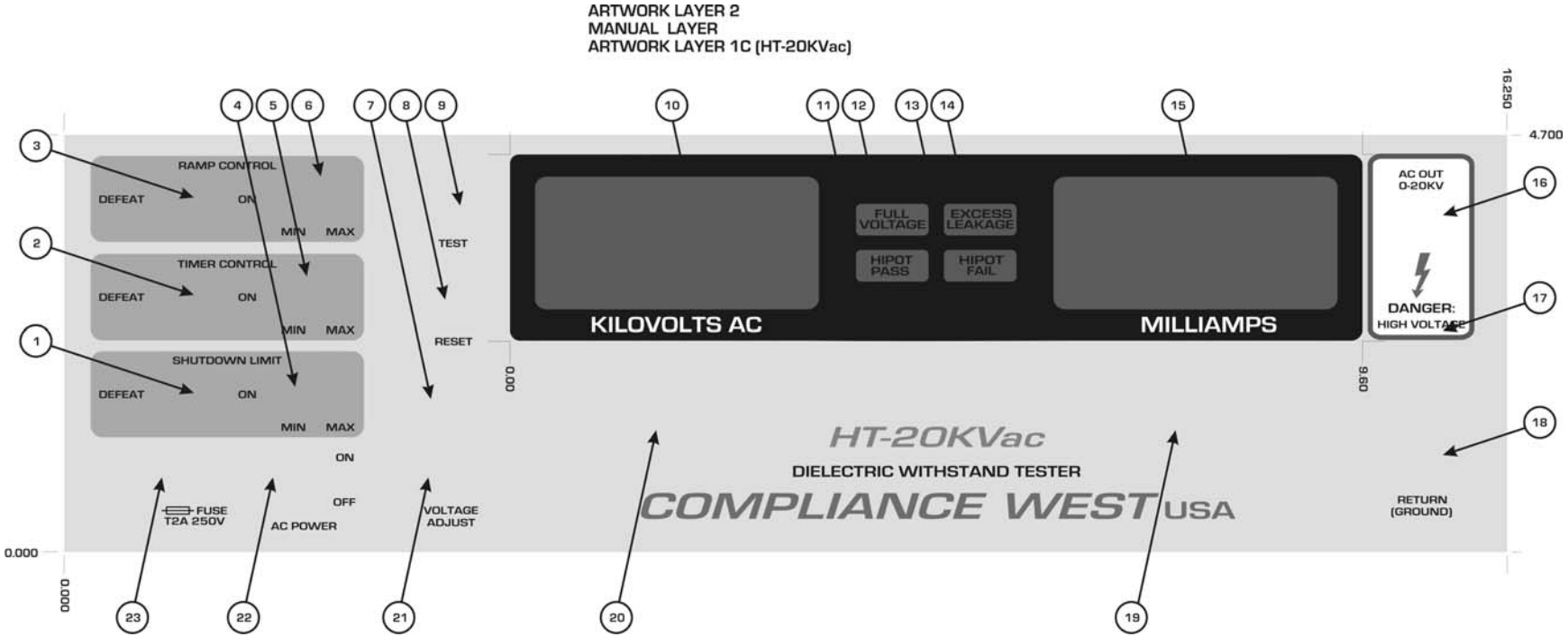

Figure 3-1. Controls, Indicators, Connectors - Model HT3KVDC Front Panel

ITEM NO.	NAME	FUNCTION
1	Failure Shutdown Switch	When in ON position, a leakage or dielectric failure will terminate the test. When in DEFEAT position, test will continue. The test will terminate when the 10mA absolute leakage current limit of the HT3kVdc is exceeded.
2	Test Timer Switch	When in ON position, test duration is as set by Test Time Adjustment, Item 15. When in DEFEAT position, test continues as long as TEST Button on front panel is pressed. Minimum test time is approximately one second.
3	Voltage Ramp Switch	Not provided..
4	Leakage Limit Adjustment	Adjusts the alarm level for the excessive leakage current test. See "Adjustment of the Leakage Current Level" section.
5	Test Time Adjustment	Adjusts the test duration. See "Adjustment of the High Voltage Test Duration" section.
6	Ramp Time Adjustment	Not provided..
8	RESET Button / Red Indicator Lamp	When lit, indicates that the HT3KVDC is unarmed. This button must be pushed before the TEST Button is functional. When the RESET Button is pressed, the red lamp goes out and the yellow TEST lamp is lit. PRESSING THE RESET BUTTON AT ANY TIME STOPS TEST. Replace lamp with type 73 T1¾ 14V lamp.
9	TEST Button / Yellow Indicator Lamp	When lit, indicates that the HT3KVDC is ready to test. The yellow lamp goes out when the TEST Button is pressed. Replace lamp with type 73 T1¾ 14V lamp.
10	Voltage Meter	Visual indication of the actual output voltage.
11	Hipot Pass LED	At the preset test duration time, if no insulation breakdowns are encountered, the green Hipot Pass LED will light and the test will terminate. If the Test Timer Switch is defeated, testing continues only while the Test Button is pressed (minimum test time one second).
12	Full Voltage LED	The full voltage LED will light and if not defeated, the high voltage duration time starts when the voltage output reaches the preset level.
13	Hipot Fail LED	Indicates failure of high voltage test. If arcing or a flashover of the insulation system is detected, the red Hipot Fail LED will light, the internal buzzer will sound. The test may be terminated depending on the setting of the Failure Shutdown Switch.
14	Excess Leakage LED	Indicates failure of leakage current test. If leakage current is too high, the Excess Leakage LED will light and the internal buzzer will sound. The test may be terminated, depending on the setting of the Failure Shutdown Switch.
15	Current Meter	Visual indication of the output current
16	High Voltage Output Receptacle	High Voltage Receptacle. For connection of high voltage test lead.
18	Return Lead Receptacle	Grounded banana plug receptacle. For Return Lead connection.
21	Voltage Adjust Knob	Voltage is continuously adjustable during test.
22	Power Switch	Turn the Tester ON/OFF
23	Fuseholder/ Fuse replacement	Replace line fuse. Specifies replacement fuse and supply voltage used.

Table 3-1. Controls, Indicators, Connectors - Model HT3KVDC Front Panel

Initial Checkout Procedure

Use this procedure to verify that the HT3KVDC is working correctly. This procedure should be conducted daily. Refer to Figure 3-1 for location of items.

CAUTION
High voltage. Risk of shock. Use care.

1. Turn the Tester on using the front panel switch; item 22.
2. Set the Test Timer and Failure Shutdown switches to ON; Items 1-3. Set the Breakdown Detect knob to minimum, to keep excessive leakage current from flowing.
3. Disconnect leads from the Output and Return receptacles; items 16 and 18.
4. Push the red RESET button; item 8. The yellow TEST button will light; item 9.
5. Push the yellow TEST button.
6. The Tester will conduct a test sequence. The voltage meter will show a value and return to zero. During the test, the voltage can be adjusted using the Voltage knob; item 21. At the end of the test, the Full Voltage, Hipot pass, and red RESET lamps should be lit.
7. Connect the red lead to the Output jack; item 16, and the black lead to the Return jack, item 18.
8. Connect the two leads together. Push the RESET button and then push the TEST button.
9. At test termination, the Excess Leakage and/or Hipot Fail lamps; items 13 and 14, and red RESET lamps should be lit.
10. Disconnect the black lead from the red lead, and remove both leads from the HT3KVDC.
11. Enable the voltage output by pressing the RESET button, then the TEST button. After the full voltage LED lights, adjust the Voltage knob; item 21, so the output is approx. 1500 volts. Press the RESET button to stop the test.
12. Plug the red lead into the DC Out receptacle.
13. (This test simulates a dielectric breakdown. There is high voltage on the Red lead. Exercise caution to avoid shock.) Push the red RESET button, then the yellow TEST button. After the full voltage LED lights, VERY CAREFULLY pick up the lead by its insulation and touch it to the Return jack. The test will immediately terminate with a buzzer. The Full Voltage, Hipot Fail and/or Excess Leakage, and red RESET lamps should be lit.

If any of these tests give unexpected results, service may be required. Please contact our Service hotline for assistance.

Setting up the HT3KVDC for Laboratory Testing

This section describes procedures for setting the

a. leakage current level
b. high voltage level
c. high voltage test time
d. test timer switch
e. failure shutdown switch.

This will allow you to change settings from the factory settings below. Refer to Figure 3-1for location of items.

Factory Settings

The HT3KVDC is configured as shown when shipped from Compliance West USA:

Leakage Current Level:	0 mA
High Voltage Level:	0 volts
High Voltage Test Time:	minimum
Test Timer Switch:	ON
Failure Shutdown Switch:	ON

Adjustment of the High Voltage Level

This procedure controls the high voltage level used in the dielectric withstand test. The HT3KVDC is factory set for 0 volts DC. Use the procedure below to set it.

1. Turn the Test Timer switch; item 2, to the DEFEAT position. (The HT3KVDC will supply voltage while the TEST button; item 9, is held in.)
2. Make sure there are no test leads connected to the HT3KVDC.
3. Press the RESET button; item 9. The yellow TEST light; item 9, should light, indicating that the HT3KVDC is ready to test.

4. Push and hold the TEST button; item 9.
5. While the TEST button is pressed, the voltage will be enabled. Adjust the high voltage control; item 21, until the desired voltage is reached.

Adjustment of the High Voltage Test Duration

This procedure sets the amount of time the Tester will conduct the high voltage test. The test duration of the HT3KVDC is factory set for 0 seconds. If a different test duration is required, use this procedure to set it.

1 Make sure there are no test leads connected to the Tester. Set all three front panel switches "ON".
2 Push the RESET button; item 8. The yellow TEST light; item 9, should light, indicating that the Tester is ready to test.
3 Push the TEST button; item 9.
4 The Full Voltage LED; item 12, will light. The test time is from when the Full Voltage LED lights to the end of the test.
5 After the test is complete, adjust the Test Time control; item 5.
6 Push the RESET Button; item 8, then the TEST Button; item 9, and time the new test duration. Adjust the Test Time control until correct.

Setting the Test Timer Switch

The Test Timer Switch; item 2, allows test time to be controlled by the HT3KVDC's internal timer or to continue until terminated by the operator.
When this switch is in the DEFEAT position, the test will continue only while the TEST button; item 9, is pushed. The minimum test time is approx. 1 second.
When this switch is in the ON position, the test time will be controlled by the HT3KVDC's internal timer. For information on how to set this time, see instructions above.

Setting the Failure Shutdown Switch

The Failure Shutdown Switch; item 1, allows the operator to continue testing after a failure is encountered. This allows the operator to find a breakdown point, but **all safety shutdown circuitry in the HT3KVDC is disabled when the Failure Shutdown switch is in the DEFEAT position**. Tests may be terminated at any time by pressing the RESET button.
When the Failure Shutdown switch is in the DEFEAT position, the test continues while the TEST button; item 9, is held down (minimum duration 1 second). This allows the operator to find insulation breakdowns easily. The HT3KVDC will shut down, no matter which switch position is selected, if the leakage current exceeds 10 mA.
When the Failure Shutdown switch is in the ON position, the HT3KVDC will stop the test when excessive leakage or a high voltage arc is detected. Leave the Failure Shutdown switch in the ON position for normal testing.
WARNING: Testing with the Failure Shutdown switch in the DEFEAT position is extremely hazardous. The HT3KVDC can generate lethal levels of voltage and current. Therefore, care should be taken in examining the equipment being tested to locate areas of failure while the HT3KVDC is operating. Do not operate the HT3KVDC for extended periods under conditions of dielectric failure, as damage to the equipment being tested may result.

Operating Techniques

The following paragraphs describe how to operate the HT3KVDC Dielectric Withstand Tester.

CAUTION
High voltage is generated by the HT3KVDC. Although the chassis of the equipment under test is grounded by the HT3KVDC, a risk of shock exists. Exercise care when using the HT3KVDC.

Daily Operation Test

The operation of the HT3KVDC should be checked daily by conducting the tests described in the **Initial Checkout Procedure** section of this Manual.

Testing Products

This section describes how to conduct a test. Testing can be terminated at any time by pressing the red RESET button; item 8.

1. Connect your Tester to a correctly rated source of supply and turn it on.
2. Plug the black lead into the Return receptacle; item 18. Plug the red lead into the DC Out receptacle; item 16.
3. Connect the alligator clips of the leads across the circuit or part being tested. Keep in mind that the black lead is connected to earth ground.
4. Press the RESET button; item 8. The yellow TEST light; item 2, should light, indicating that the HT3KVDC is ready to test.
5. Push the TEST button, item 9. The HT3KVDC will:
   - Immediately energize the high voltage output.
6. - If the Failure Shutdown Switch; item 1, is ON, and if the leakage current of the circuit under test is too high, the Excess Leakage LED; item 14, will light, and the test will terminate.
   - If the Failure Shutdown Switch is set to DEFEAT the HT3KVDC will continue to test until the 500 mA leakage current limit is exceeded.
7. - If the Test Timer Switch; item 2, is ON, the HT3KVDC will conduct the high voltage test for the amount of time set in the Test Duration procedure.
   - If the Test Timer Switch is set to DEFEAT, the high voltage test will continue only while the TEST button; item 9, is pressed.
8. If an insulation system breakdown is detected, and
   - The Failure Shutdown Switch; item 1, is ON, the voltage will ramp down to a safe level, the Hipot Fail LED; item 13, will light, the buzzer will sound, and the test will terminate.
   - The Failure Shutdown Switch is set to DEFEAT, and the requirements of Table 3-3 are met, the Hipot Fail LED will light and the test will continue.
9. If no breakdown is detected, the high voltage will ramp down, the Hipot Pass LED; item 11, will light, and the red RESET switch; item 8, will light.
10. Do not disconnect the leads from the equipment being tested until the Hipot Pass or Hipot Fail light has lit, and the meter indicates less than 30 volts.

Test results

Hipot Pass

If the Hipot Pass light is lit, the equipment being tested passed all test parameters.

Red LED/Buzzer

Any red LED/buzzer test result means the equipment being tested failed a test phase.

If unanticipated test failures continue, and you suspect that the equipment under test is built correctly, check the following items:

1. Leakage Current Setting: May be set too low. This would cause normal input capacitor charging to draw more than the preset leakage current limit, triggering a Leakage Current Fail light and terminating the test. Consider raising the acceptable leakage current level; see **Adjustment of the Leakage Current Level**.

   If the Leakage Current level is at its highest setting and failures continue, check the circuit being tested with an ohmmeter; it may be shorted.

Test Timer	ON	ON	DEFEAT	DEFEAT	DEFEAT	ON	DEFEAT	DEFEAT
Failure Shutdown	ON	ON	ON	ON	DEFEAT	DEFEAT	DEFEAT	DEFEAT
See Below	A	B	C	D	E	F	G	H

Table 3-3: Front Panel Switch Truth Table

A and B	Full voltage is produced at the output immediately. Test will stop automatically on all leakage or breakdown failures. For safety, we recommend that you begin testing with the front panel voltage knob set at minimum.
C	Test Timer is defeated. Same as (A) above except that after full voltage is reached, the test will continue only as long as the Test button is held in, minimum one second. Test will stop automatically on all leakage or breakdown failures.
D	Test Timer is defeated. Full voltage is produced at the output immediately when the Test button is pressed. The test will continue only as long as the Test button is held in, minimum one second. Test will stop automatically on all leakage or breakdown failures. For safety, we recommend that you begin testing with the front panel voltage knob set at minimum.
E	Timer is ON, Failure Shutdown is defeated. The HT3kVdc will not shut down when a breakdown is detected, allowing evaluation of arcing within the EUT. The Hipot Fail light may flash when an arc is detected. The HT3kVdc test time will be controlled by the knobs on the front panel. At the end of the test, the Hipot Pass light will not illuminate. For safety reasons, excessive leakage current, as set by the Shutdown Limit knob, will cause the HT3kVdc to shut down.
F	Test Timer is ON, Failure Shutdown is defeated. The HT3kVdc will not shut down when a breakdown is detected, allowing evaluation of arcing within the EUT. The Hipot Fail light may flash when an arc is detected. The HT3kVdc test time will be controlled by the knob on the front panel, but voltage will be immediately applied to the EUT when the TEST button is pushed. At the end of the test, the Hipot Pass light will not illuminate. For safety reasons, excessive leakage current, as set by the Shutdown Limit knob, will cause the HT3kVdc to shut down.
G	Test Timer and Failure Shutdown are defeated. The HT3kVdc will not shut down when a breakdown is detected, allowing evaluation of arcing within the EUT. The Hipot Fail light may flash when an arc is detected. The HT3kVdc ramp time will be controlled by the knob on the front panel, but the test will last for only one second when the full voltage is reached. No operator intervention will make the test continue longer; i.e. pushing the TEST button will have no effect. At the end of the test, the Hipot Pass light will not illuminate. For safety reasons, excessive leakage current, as set by the Shutdown Limit knob, will cause the HT3kVdc to shut down.
H	Hipot Test Defeat. Full voltage is produced at the output immediately. Test will continue only as long as the TEST button is held in, mimimum one second. The HT3KVDC will not shut down on a dielectric failure, but the front panel Hipot Fail light will flash to indicate a dielectric breakdown. The Hipot Pass light will not light at the completion of a successful test. For safety, we recommend that you begin testing with the front panel voltage knob set at minimum. For safety reasons, excessive leakage current, as set by the Shutdown Limit knob, will cause the HT3kVdc to shut down.

Section 4

Technical Assistance

For Technical Assistance
Phone: (800) 748-6224

Technical Assistance is available from Compliance West USA between the hours of 8:30 AM and 5:00 PM Pacific Time.

Compliance West USA
7915 Silverton Ave. Suite 315
San Diego, CA 92126

Phone: (858) 860-0277
FAX: (858) 860-0279

Section 5

Maintenance and Calibration

WARNING

THESE SERVICE INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

This section of the manual contains maintenance information for the Model HT3KVDC Dielectric Withstand Tester. This maintenance information is divided into service information, general maintenance, a performance test, and a calibration procedure. The performance test is recommended as an acceptance test when the instrument is first received, and later as a preventative maintenance tool to verify proper instrument operation. A 1-year calibration cycle is recommended to maintain the specifications given in Section 1.

No test equipment is required to conduct the performance test.

The test equipment required for the calibration procedure is a DMM able to read true rms 0-3000 Vdc ± 1%.

Service Information

The HT3KVDC is warranted to the original purchaser for a period of 1 year. This warranty does not cover problems due to misuse or neglect.

Malfunctions which occur within the limits of the warranty will be corrected at no charge. Mail the instrument post paid to the manufacturer. Dated proof of purchase is required for all in-warranty repairs.

The manufacturer is also available for calibration and / or repair of instruments that are beyond their warranty period. Contact the manufacturer for a cost quotation. Ship the instrument and your remittance according to the instructions given by the manufacturer.

General Maintenance

Calibration Access

Use the following procedures to gain access to the calibration adjustments of your instrument.

1. Set Line Power switch to OFF.
2. Disconnect the power cord from the rear of the instrument.
3. Remove the four screws on the top of the Tester.
4. Slide the top of the enclosure off the rear of the Tester.
5. All calibration adjustments are now accessible.

WARNING

Dangerous voltages exist when energized. Exercise extreme care when working on an energized circuit.

6. To reassemble, reverse steps 1-5 above.

Cleaning

Clean the front panel and case with a mild solution of detergent and a damp sponge. Clean dust from the PWB with clean, dry, low pressure (<20 psi).

Performance Test

The performance test evaluates the performance of your instrument to ensure that the logic, lights and high voltage sections are working properly. This test is recommended for incoming inspection, as a preventative maintenance check, and to verify proper operation during the calibration procedure. It is not necessary to disassemble the instrument to conduct these tests. If the instrument fails any part of the performance test, calibration and / or repair is indicated.

Allow the instrument to stabilize and perform the test at an ambient temperature of 23°C ±5°C (73 °F ±9°F).

Operation/Lamp Function Test

Use this procedure to verify that the HT3KVDC is working correctly. This procedure should be conducted daily. Refer to Figure 3-1 for location of items.

CAUTION

High voltage. Risk of shock. Use care.

1. Turn the Tester on using the front panel switch; item 19.
2. Set the Test Timer, and Failure Shutdown switches to ON; Items 1-3.
3. Disconnect leads from the Output and Return receptacles; items 16 and 18.
4. Push the red RESET button; item 8. The yellow TEST button will light; item 9.
5. Push the yellow TEST button.
6. The Tester will conduct a test sequence. The meter will show a value and return to zero. During the test, the voltage can be adjusted using the Voltage knob; item 21. At the end of the test, the Full Voltage, Hipot pass, and red RESET lamps should be lit.
7. Connect the red lead to the Output receptacle; item 16, and the black lead to the Return receptacle, item 18.
8. Connect the two leads together. Push the RESET button and then push the TEST button.
9. At test termination, the Excess Leakage and/or Hipot Fail lamps; items 13 and 14, and red RESET lamps should be lit.
10. Disconnect the black lead from the red lead, and remove both leads from the HT3KVDC.
11. Enable the voltage output by pressing the RESET button, then the TEST button. After the full voltage LED lights, adjust the Voltage knob; item 21, so the output is approx. 1500 volts. Press the RESET button to stop the test.
12. Plug the red lead into the Output jack, and the black lead into the Return jack.
13. (This test simulates a dielectric breakdown. There is high voltage on the Red lead. Exercise caution to avoid shock.) Push the red RESET button, then the yellow TEST button. After the full voltage LED lights, VERY CAREFULLY pick up the Black lead by its insulation and touch it to the alligator clip on the end of the red lead. The test will immediately terminate with a buzzer. The Full Voltage, Hipot Fail and/or Excess Leakage, and red RESET lamps should be lit.

With the exception of lamp replacement of the TEST and RESET buttons with type 73 14 volt lamps, if the results of the performance test are not in accordance with the above, service is required. Remove the Tester from service and contact the manufacturer for servicing information.

Calibration Procedure

The Calibration Procedure should be used any time your instrument has been repaired or fails to pass the performance test. The calibration procedure consists of the following:

- The Voltage Calibration adjustment calibrates the voltage output to agree with the meter reading.

Before starting the Calibration procedure, perform the Calibration access procedure given earlier in this Section.

NOTE

Allow the instrument to stabilize for approximately five minutes. Perform all calibration adjustments at an ambient temperature of 23°C ±5°C (73° F ±9°F).

WARNING

CALIBRATION ADJUSTMENTS ARE PERFORMED ON ENERGIZED CIRCUITS. EXERCISE CAUTION AT ALL TIMES, AND USE A NON-CONDUCTIVE TOOL FOR ALL ADJUSTMENTS.

Voltage Meter Calibration Adjustment

Use the following procedure to calibrate the output voltage. Pot R326 is located on the lower PWB, in the center, and is used to adjust the meter reading.

1. Ensure that all test leads are removed.
2. Connect the DMM between the red high voltage jack and the black return jack. Both jacks are located on the front panel.
3. Push the RESET, then the TEST Button on the front panel. Wait for the full voltage LED on the front panel to light. Read the voltage on the DMM and compare it to the front panel meter. Using a non-conductive screwdriver, adjust R326 to bring both meters into agreement. If necessary, the Test Time control on the front panel may need to be increased to allow the test to continue for a sufficient time.

Calibration of the Leakage Current Knob

- This procedure will ensure the Shutdown Limit knob on the front of the Tester will have a range of 0-10 mA.

Before starting the Calibration procedure, perform the Calibration access procedure given earlier in this Section.

1. Make sure the Tester is turned off.
2. Attach the Test Leads to the Tester.
3. Connect the Test Leads to each other, which will simulate a short.
4. In the front center of the top PWB, adjust Pot R210 all the way counter-clockwise.
5. Make sure the voltage is set to the minimum and turn the Tester on.
6. Turn the Timer Control Switch on the front of the Tester to Max. (This will allow for more time to set the Leakage limit.)
7. Turn the Shutdown Limit knob on the front of the Tester to Max.
8. **Making sure the voltage is set to minimum**, **SLOWLY** turn the voltage adjust knob until the milliamp reading is at 10.0 mA.
9. **SLOWLY** turn Pot R210 clockwise until the Excess Leakage and/or the HiPot fail lights come on.