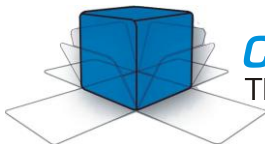


# ***HTT-1R***

FUNCTION CHECKER

## **Instruction Manual**



***COMPLIANCE WEST USA***

The blue box that tests. And tests.



**Dear Customer:**

*Congratulations! Compliance West USA is proud to present you with your HTT-1R. The operating instructions are included in the Manual, so please retain this information for future use.*

*Thank you for your trust and confidence.*



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# Section 1

## Operating Instructions

### Theory of Operation

The HTT-1R is designed to be a solution for fast and easy function testing of all dielectric withstand and continuity testers, including high current models delivering up to 30 amps. It allows function tests of all three failure modes to ensure that your tester is functioning properly.

The HTT-1R is designed to verify calibration points at a fixed value.

The HTT-1R, used daily, will prove function of the safety testers before shifts or before testing of a lot of products. It is provided with three switches which simulate passing and failing equipment for ground continuity, high leakage between primary circuits and ground, and dielectric withstand failure between primary and ground circuits. While all three switches can be simultaneously set for failing modes, we recommend that the HTT-1R be set with one failure at a time to ensure that your testers are functioning correctly.

A proper test plan would be constituted of the following tests:

1. Connect HTT-1R to the tester outputs.
2. Set all three switches on the HTT-1R to 'PASS'.
3. Verify passing result on the Tester.
4. Set the Ground switch on the HTT-1R to 'FAIL'; set both other switches to 'PASS'.
5. Verify Ground failure on the Tester.
6. Set the Leakage switch on the HTT-1R to 'FAIL'; set both other switches to 'PASS'.
7. Verify Leakage current failure on the Tester.
8. Set the Hipot switch on the HTT-1R to 'FAIL'; set both other switches to 'PASS'.
9. Confirm high voltage output by watching for spark in Arc Detect window of HTT-1R; verify dielectric breakdown failure on the Tester.

The above plan is presented in more detail in the Operation Section of this Manual; showing proper connection of the HTT-1R to any

dielectric tester and any high current ground continuity tester you may wish to test.

If any of the tests above return unanticipated results, you may have a problem with your tester. It is recommended that it be removed from service until the problem can be resolved. Section 4 of this manual also has troubleshooting information to help you determine if the HTT-1R is functioning correctly.



# Section 2

## Introduction and Specifications

### Introduction

This manual contains complete operating, maintenance and calibration instructions for the Compliance West USA Model HTT-1R Function Tester.

The instrument is a portable function tester used to verify proper operation of hipot and ground continuity testers. The HTT-1R is intended to be used as a calibration verification tool.

The HTT-1R is warranted for a period of one year upon shipment to the original purchaser.

### Specifications

Specifications for the HTT-1R are listed in the following table:

Maximum current capability of GROUND test circuit: 30 Amps	
Ground Test time should be 3 seconds Max and rest 10 s for currents above 10A	
Setting of PASS for Ground Circuit:	0.025 ohm resistor *
Setting of FAIL for Ground Circuit:	0.1 ohm resistor *
<b>Option Loma</b>	
Setting of PASS for Leakage Current:	4.232M $\Omega$ , 0.496mA at 2100V
Setting of FAIL for Leakage Current:	2.088M $\Omega$ , 1mA at 2100V
<b>Option MedmA</b>	
Setting of PASS for Leakage Current:	848k $\Omega$ , 2.48mA at 2100V
Setting of FAIL for Leakage Current:	424k $\Omega$ , 5mA at 2100V
<b>Option HimA</b>	
Setting of PASS for Leakage Current:	424k $\Omega$ , 4.95mA at 2100V
Setting of FAIL for Leakage Current:	200k $\Omega$ , 10.5mA at 2100V
<b>Option ExmA</b>	
Setting of PASS for Leakage Current:	220k $\Omega$ , 9.54mA at 2100V
Setting of FAIL for Leakage Current:	120k $\Omega$ , 17.5mA at 2100V
Maximum voltage capability of HIPOT test circuit: 3000 Vac / 4200Vdc	
Setting of PASS for Hipot test:	open circuit
Setting of FAIL for Hipot test:	arc-over at 750 V $\pm$ 400Vac / 1050 $\pm$ 560Vdc

**Table 1: Specifications of the HTT-1R**

\*Note: Switch contacts resistance and connectors can add up to 0.03 to the total resistance.

For customized values see product label.

## Section 3 Operation

This section describes how to set up and use the HTT-1R.

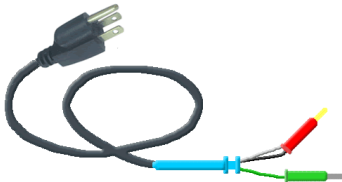
### Setting up the HTT-1R

As shipped from the factory, the HTT-1R container contains the following items:

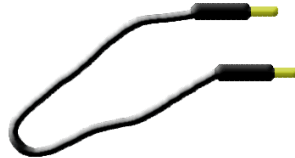
- The HTT-1R Function Tester
- This manual
- Return cable (P/N: 00-HTTRGGL)
- Output and chassis cable (P/N: 00-HTTRHV)

Remove the HTT-1R from the container and place it on a non-conductive test bench. Plug the cables; follow instructions on Set up procedure. To begin testing, follow the directions in Section 1 above.

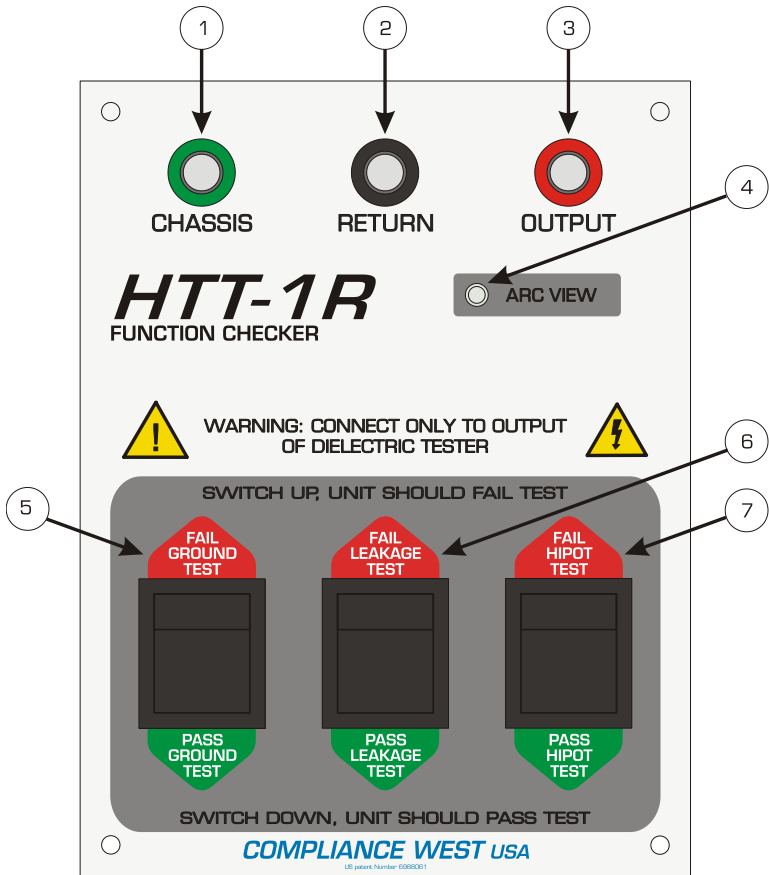
*Note: This setup will work for any hipot / ground bond tester having a standard wall receptacle and return banana jack connectors.*



**Cable P/N 00-HTTRHV**



**Cable P/N 00-HTTRGGL**



**Figure 1: HTT-1R Front Panel Features**

Item	Name	Function
1	Chassis Banana Receptacle	If a Ground Continuity Hipot is being checked, connect to the chassis ground output of the Hipot. If a ground bond tester is being used, connect it to the high current output.
2	Return Banana Receptacle	Connected to the Return Lead on the Hipot or Ground Continuity Tester, which is normally connected to dead metal parts of the equipment undergoing dielectric test.
3	Output Banana Receptacle	Connected to the high voltage output of the Hipot Tester being checked.
4	Arc View	When Dielectric Breakdown function is being checked, a spark will be visually demonstrated the breakdown occurred.
5	Ground Test Switch	When set to FAIL, an open ground is simulated and the tester should stop testing and indicate a failure. When set to PASS, a normal passing result is simulated.
6	Leakage Test Switch	When set to FAIL, an excess leakage condition is simulated and the tester should stop testing and indicate a failure. When set to PASS, a normal passing result is simulated. Used for Dielectric Testers only.
7	Hipot Test Switch	When set to FAIL, a dielectric breakdown will be simulated and a spark can be seen in the Arc View window. When set to PASS, a normal passing result is simulated. Used for Dielectric Testers only.

**Table 2: HTT-1R front panel Controls, Indicators, and Connectors**

## **Setup Procedure: Hipot Tester**

This procedure will describe the connection of the HTT-1R to a hipot tester or a combination hipot/ground bond tester. Because of the varying types of tester outputs, cables provided with the HTT-1R may not fit the hipot / ground bond tester. For custom cables, please contact Compliance West USA.

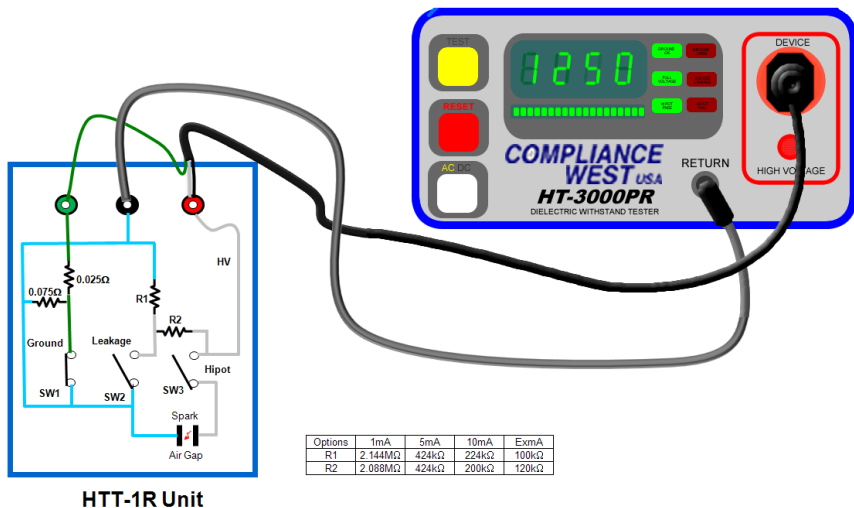
- 1) Connect the hipot tester to the HTT-1R.
  - i) On your hipot tester, identify the high voltage output receptacle. Connect the Output and chassis cable to the high voltage receptacle. The other two ends of the cable, connect them to the HTT-1R, the green banana plug goes to the chassis green banana receptacle, and the red banana plug to the output red banana receptacle.
  - ii) On your hipot tester, identify the return lead of the high voltage output. This is connected to the black banana Return jack receptacle of the HTT-1R.
  
- 2) Conduct a simulated PASSING test by setting all three switches of the HTT-1R to the PASS (green) setting and initiating a hipot test by starting your hipot tester.
  - i) Your hipot tester should indicate 'PASS'.
  
- 3) If your tester checks for ground continuity, conduct a simulated GROUND OPEN test by setting the GROUND switch on the HTT-1R to 'FAIL'. (All other switches on the HTT-1R should be set to 'PASS'.) Begin testing by starting your hipot tester.
  - i) Your hipot tester should indicate 'FAIL', stop testing, and sound a buzzer or otherwise warn the operator of a problem.
  
- 4) Conduct a simulated EXCESS LEAKAGE test by setting the LEAKAGE switch on the HTT-1R to 'FAIL'. (All other switches on the HTT-1R should be set to 'PASS'). Begin testing by starting your hipot tester.

i) Your hipot tester should indicate ‘FAIL’, stop testing, and sound a buzzer or otherwise warn the operator of a problem.

5) Conduct a simulated HIPOT FAILURE test by setting the HIPOT switch on the HTT-1R to ‘FAIL’. (All other switches on the HTT-1R should be set to ‘PASS’.) Begin testing by starting your hipot tester.

i) The dielectric breakdown will be visible as an arc in the ARC VIEW window of the HTT-1R.

ii) Your hipot tester should indicate ‘FAIL’, stop testing and sound a buzzer or otherwise warn the operator of a problem. (If the current of the spark is above the leakage limit, the Excess Leakage failure may occur as well)



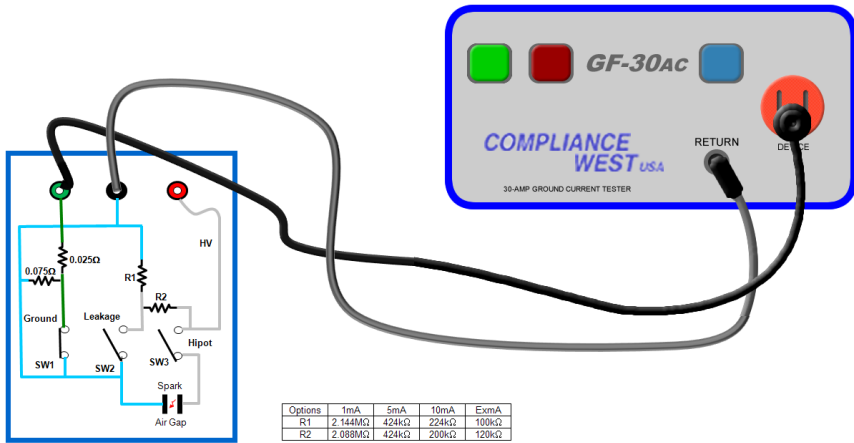
**Figure 2: Connection to a hipot tester**

## **Setup Procedure: Ground Bond Tester**

This procedure will describe connection of the HTT-1R to a ground bond tester. Because of the varying types of tester outputs, only return banana to banana cable is provided with the HTT-1R that can be used on a Ground bond tester. For custom cables, please contact Compliance West USA.

**If the ground bond tester has an output current above 15A, make sure the test time is not higher than 3 seconds, to repeat another test wait for 10 seconds. Resistors inside may overheat, this can cause permanent damage and miss readings.**

- 1) Connect the ground bond tester to the HTT-1R.
  - a) On your ground bond tester, plug the return lead of the high current output to the black return banana receptacle of the HTT-1R.
  - b) On your ground bond tester, plug the high current output into the HTT-1R chassis green banana receptacle.
  
- 2) Conduct a simulated PASSING test by setting all three switches of the HTT-1R to the PASS (green) setting and initiating a ground bond test by starting your ground bond tester.
  - a) Your ground bond tester should indicate 'PASS'.
  
- 3) Conduct a simulated GROUND OPEN test by setting the GROUND switch on the HTT-1R to 'FAIL'. (All other switches on the HTT-1R should be set to 'PASS'.) Begin testing by starting your ground bond tester.
  - a) Your ground bond tester should indicate 'FAIL', stop testing, and sound a buzzer or otherwise warn the operator of a problem.



HTT-1R Unit

**Figure 3: Connection to a Ground bond tester**

\*Note: It is highly recommended to use the cables that are currently used when testing products with the ground bond tester and not the cables supplied with the HTT-1R.

### Unanticipated Results

The HTT-1R test may cause your tester to give results not consistent with those anticipated by the switch setting of the HTT-1R. Until the problem is resolved, your tester should be removed from service.

If there is an unexpected leakage or ground result, first check the hipot or ground bond trip limit setting are correct.

If it is not detecting hipot failures, make sure testing voltage is above 1150Vac.

If there is a question regarding the proper operation of the HTT-1R, troubleshooting information in Section 4 can be used to verify proper operation of the HTT-1R.



# Section 4

## Troubleshooting the HTT-1R

The HTT-1R requires an annual calibration. If the HTT-1R does not operate as described in the Theory of Operation section, and the equipment connected to the HTT-1R has been verified to be in good working condition, then the HTT-1R should be returned to Compliance West USA for inspection and/or repair.

Table 3 shows expected results for a known good hipot tester for all recommended operating modes. Table 4 and 5 shows the expected values to be measured with a resistance meter. Values of less than 1 ohm should be measured with a high precision resistance meter.

Switch designation / Switch position			Operating mode
GROUND	LEAKAGE	HIPOT	
PASS	PASS	PASS	No failure: the tester connected to the HTT-1R should indicate test completion with a passing result.
FAIL	PASS	PASS	Ground Fail: the tester connected to the HTT-1R should indicate a “ground open” or “ground fail” condition.
PASS	FAIL	PASS	Leakage Fail: the tester connected to the HTT-1R should indicate an “excess leakage” or “excess current” failure.
PASS	PASS	FAIL	Hipot Fail: The tester connected to the HTT-1R should indicate a “hipot fail” or “dielectric failure”. The high-voltage arc that occurs to create the simulated test failure is visible through the ARC VIEW window.

**Table 3: HTT-1R Normal operating modes and expected results.**

Ground switch position	Resistance between Chassis and Return with $-0\Omega$ / $+0.03\Omega$ tolerances
Pass	$0.025\Omega - 0.055\Omega$
Fail	$0.1\Omega - 0.13\Omega$

**Table 4: HTT-1R Resistance for ground circuit**

	Resistance between Output and Return with +/- 5% tolerances			
Leakage switch position	LomA option	MedmA option	HimA option	ExmA option
Pass	$4.232M\Omega$	$8.48k\Omega$	$424k\Omega$	$220k\Omega$
Fail	$2.088M\Omega$	$424k\Omega$	$200k\Omega$	$120k\Omega$

**Table 5: HTT-1R Resistance for Leakage circuit**

## Section 5

### Technical Assistance

Technical Assistance from Compliance West USA is available:

**Phone:** (800) 748-6224

**Hours:** 8:00 AM - 4:00 PM Pacific Time.

Also available on our web site at: **[www.compwest.com](http://www.compwest.com)**

Contact:

Compliance West USA  
650 Gateway Center Way, Suite D  
San Diego, CA., 92102  
United States of America.

**Phone:** (619) 878-9696

**FAX:** (619) 794-0404