

Chroma Systems Solutions, Inc.

# Determining if a DUT is connected, using the Low Trip Limit

**19052, 19053 Hipot Testers**

Keywords: Current Limit Feature, Low Trip Limit, Leakage Current.

# Determining if a DUT is connected, using the Low Trip Limit

Title:

Product Family: **19052, 19053 Hipot Testers**

## Scope

Long title to answer a simple question: “Is it plugged in?”. Annoying, yet true. As necessary as it is to plug in the tester, it is more serious to tightly connect the device under test (DUT). Chroma 19053, 19054 Series Hipot Testers come equipped with a current limit feature that when enabled will not output the voltage to the DUT when the leakage current does not exceed the set low limit. Nice safety feature, especially if there were no device connected and an operator made contact with the output terminals.



**Fig. 1 Chroma AC/DC/IR HIPOT Tester 19053**

To determine if a device is connected to a hipot tester use the **low trip limit**. The low trip limit usually works well for AC hipot tests and as long as the steady state leakage current is within the measurement range for the hipot. For the low trip limit to work the steady state leakage current is measured both with and without the device connected. The low trip limit is then set in between these measured current levels. By setting the limit this way when a device is connected the measured current is above the low trip limit and without a device connected the measured current is below the trip limit. A low trip limit failure occurs when the steady state leakage current is below the low trip limit indicating no connection to the device.

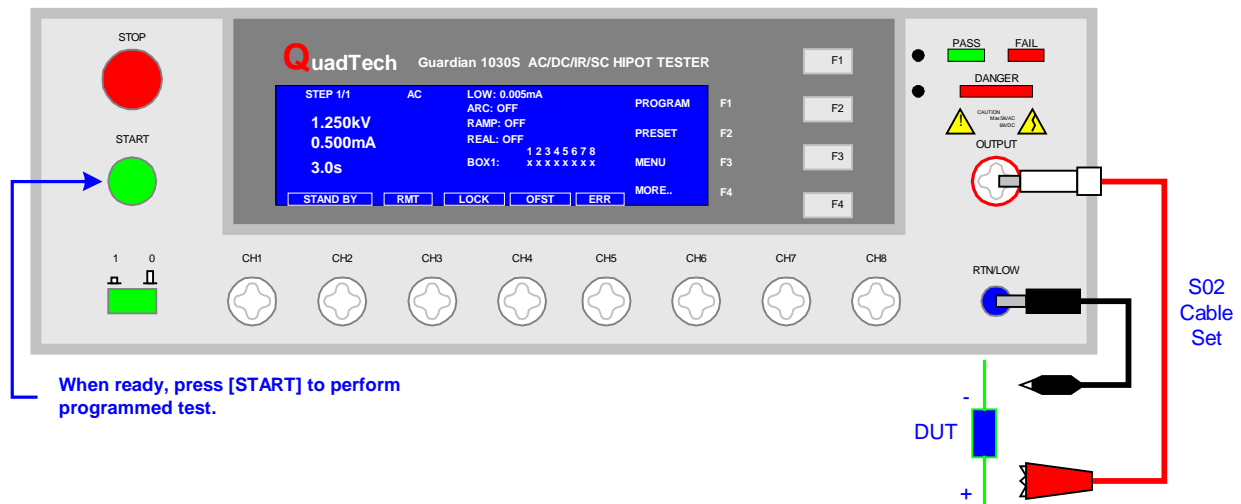


Figure 1 Measure Leakage Current with Device Connected & Disconnected

Picture Shows Quadtech Guardian 1030S model which is equivalent to Chroma model 19054.

### AC or DC

When performing a DC hipot frequently it is difficult to determine whether or not the DUT is connected to the hipot. Unlike an AC hipot where capacitance between the HV and ground lead causes a measurable amount of steady state current to flow, this is not always the case in DC hipot. If the measured current, with and without the device, connected are the same then the low trip limit cannot be used.

Set LOW Current Limit	STEP 1	AC	LOW : 0.005mA	UP	F1	To enter low current limit in 0.001mA increments  To move highlighted box to ARC.
	VOLT: 1.250 kV		ARC : OFF	DOWN	F2	
	HIGH: 15.0 mA		RAMP: OFF	ENTER	F3	
	TIME: 3.0 s		REAL: OFF		F4	
			BOX 1 : 1 2 3 4 5 6 7 8 X X X X X X X X	EXIT		
		0 - 30mA 0=OFF	RMT	LOCK	OFST	ERR

Figure 3.0: Set Low Current Limit on 19053/19054 Hipot Tester

To check that the device is connected when using DC hipot, perform an **AC hipot at a low voltage** as the first test in a sequence then follow this test by the DC hipot. A low trip limit can then be used during the AC hipot test to determine if the device is connected. This method works as long as the device has some capacitance associated with it. This method has the additional advantage of giving the manufacturer a quick check of the line leakage current for certain devices. The leakage test is not done

## Application Note

in accordance with standards such as UL544, which call for a special circuit and the device to be under power. If the AC test voltage is set to 120VAC then it will give the manufacturer an idea as to how much leakage current might be available to an operator.

For complete product specifications on the Chroma 19053, 19054 Hipot Testers or any of Chroma's products, visit us at [www.Chromausa.com](http://www.Chromausa.com). Do you have an application specific testing need? Call us at 978-461-2100 for east coast, 949-600-6400 for west coast or email your questions to [sales@chromausa.com](mailto:sales@chromausa.com). Put Chroma to the test because we are committed to solving your test instrumentation requirements.