

Application note

New behavior in HF Leakage mode on the QA-ES III in firmware v1.04

This application note describes how the new firmware v1.04 improves the QA-ES III's ability to measure modulated or pulsed inputs from ESUs during a High Frequency Leakage test.

Background

It has been observed in the field that some Electrosurgery units (ESUs) from manufacturers such as Olympus and ERBE will modulate or pulse their output under certain test conditions.

HF Leakage mode on the QA-ES III creates such a condition with the 200 Ohm load set. In previous QA-ES III firmware (v1.03 and older), modulated inputs from these ESUs would not be measured properly, and no leakage current value would be returned on the QA-ES III front display.

Fig 1 and 2 below show captures of the modulated/pulsed outputs from an ERBE VIO 300D ESU on a Fluke 190M Handheld Oscilloscope.

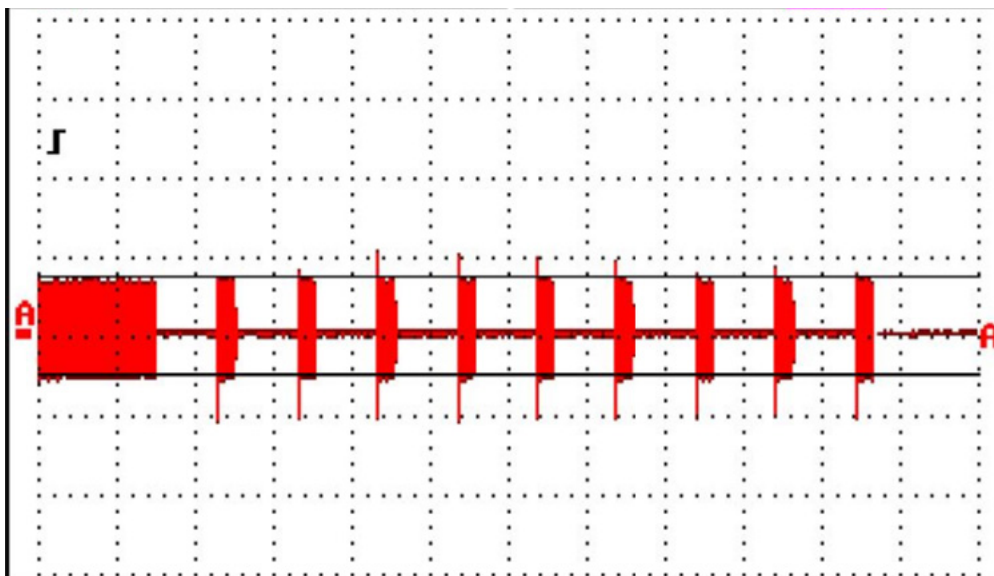


Figure 1. ERBE Auto Cut Effect 4 Modulated Output

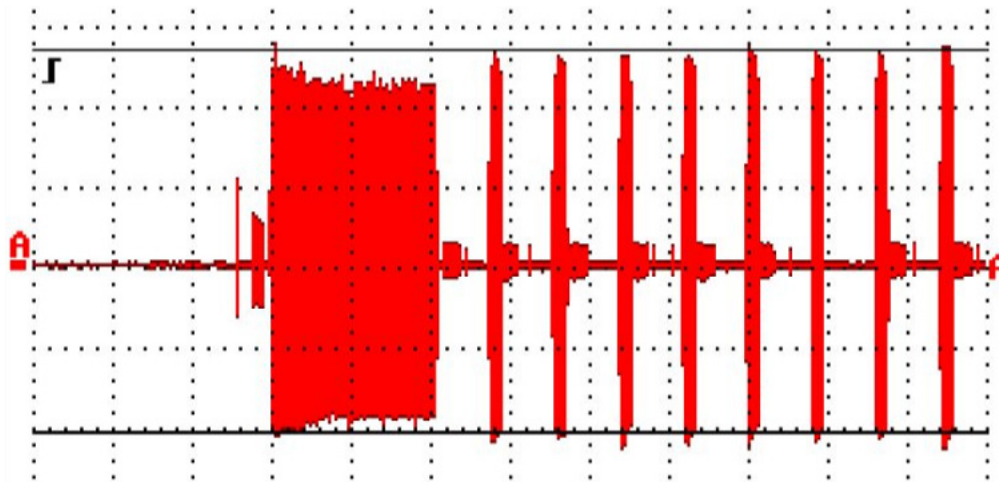


Figure 2. ERBE VIO 300D Swift Coag Effect 4 Modulated Output

New behavior can now be expected from the QA-ES III HF Leakage measurement mode. Below are the scenarios that can exist.

1. If a measurement is performed with enough delay and no modulated input, the leakage current measurement will be returned as normal with no additional messaging.
 2. If there is not enough delay set to return a measurement, or properly detect a modulated input, a message will appear on the screen stating, “Increase delay or use continuous mode”. These instructions should be followed, either increase the delay to allow enough time to perform a measurement or use continuous mode (which handles both normal and modulated inputs).
 3. If there is enough delay set, but a modulated input is detected, the QA-ES III front panel will display the message “Modulated Input Detected, use continuous mode”. If this occurs, continuous mode must be used as it contains special detection methods to lock into a range, and display both the “Peak” and “Current” or RMS measurement of the leakage current detected. Single measurement mode does not provide enough time to properly range in this scenario.
- Once the proper range is found, two measurement fields will be displayed:
 - Peak: XX mA
 - Current: XX mA
 - The “Peak” reading indicates the maximum or peak current detected in mA (only increases if a new peak is detected).
 - The “Current” reading indicates the live reading of leakage current detected; this value will fluctuate in real time as the pulsed input has varying amplitude at a high rate.
 - Since measuring leakage current is typically used to detect the “worst case” current present under the given conditions, the “Peak” field will be the best measurement to record after several seconds of capture.

In case you have any questions regarding this application note please contact our [Technical Support team](#).

Additional notes

If a the ESU output is modulated, and continuous mode is used on the QA-ES III for the HF Leakage test, the following behavior can be expected:

- The QA-ES III will range for several seconds to properly detect the current, a message on the screen will read “Modulated Input... Locating Range”

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