Defib-5 Addendum

Defibrillation Tester Options

Instruction Manual

COMPLIANCE WEST USA

Dear Customer:

Congratulations! Compliance West USA is proud to present you with your Defib-5. This manual describes options you have purchased with the Defib-5. The operating instructions for the options are included in the Manual, so please retain this information for future use.

Thank you for your trust and confidence.

Table of Contents

Section 1

Manual Overview

Contents of this Manual

This addendum manual describes the operation of the optional modules and accessories that are available with the Defib-5 Defibrillation Tester. In addition to providing the circuit described in EN 60601, Figure 50, the Defib-5 can be configured to provide the circuits described in EC-13, Figures 9A and 9B; EN 60601-2-49 Figure 101 (with EC-13 option), and EN 60601-2-27, Figures 101, 104 and 105. In this section, we show the various outputs on the front panel of the Defib-5, and in Sections 2 and 3, connection information for the various tests are discussed. For these discussions, please refer back to Figure 1 for the location of the various connections on the front panel of the Defib-5. Section 4 describes the Pass/Fail Reference and how to use it to determine proper operation of the Defib-5.

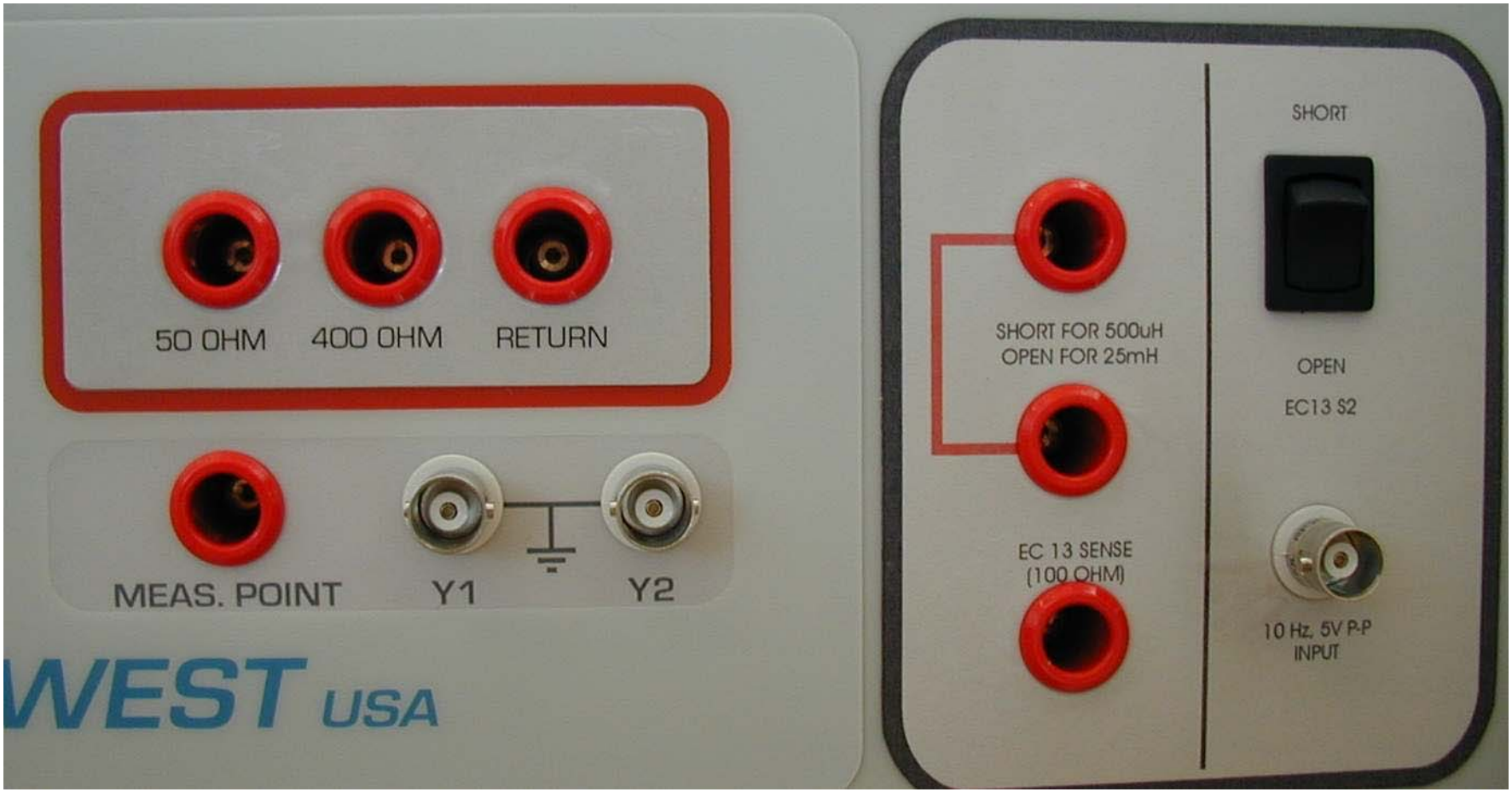


Figure 1 MegaPulse Front Panel Outputs

Section 2

EC-13/ EN 60601-2-49 Option

This option allows the Defib-5 to act as the circuit described in EC-13, Figures 9 and 9A or EN 60601-2-49, Figure 101. Please refer to Figure 2-1 for a schematic of the circuit in EC-13, Figures 9 and 9A, and Figure 1 for the appropriate front panel connections needed to conduct these tests with the Defib-5. Test connections are the same for EN 60601-2-49, Figure 101.
The connection information for the Defib-5 is shown in green text on Figure 2.

Notes on testing with the EC-13 option

Testing with the EC-13 option requires substantial changes to the circuitry in the Defib-5, and these changes are accomplished using jumpers on the front panel, and by using different output jacks from the EN 60601 outputs. Some models may have jacks on the rear panel instead of the front panel. The front-panel jack representation is shown in Fig. 1 for clarity.

The changes to the circuit are as follows, along with the appropriate actions to perform on the front panel:

1. EC 13 SENSE Jack: This jack is necessary to verify the value of the 100 ohm resistor. (Refer to Figure 1-1 for the jack location on the front panel, and to Figure 2-1 for the schematic location.) The 100 ohm resistor value is measured between the EC 13 SENSE jack and the RETURN jack on the front panel.

2. Inductance Jumper: For testing to EC-13, a 25uH inductance is required. To provide this inductance, the provided front panel jumper must be REMOVED.

3. EC-13 S2: This switch is provided to protect the Signal Generator from the output pulse of the Defib-5 when CLOSED, and to allow the required 5V p-p signal to be injected when OPEN.

4. 10 HZ, 5V P-P INPUT: BNC provided on front panel is for connection to the signal generator required for the Defibrillator Overload Test as shown in EC-13, Fig. 9A.

5. 400 OHM Jack: This is the output jack from the Defib-5 used with EC-13 Testing. It provides the correct pulse to the EUT, in accordance with EC-13 Figures 9A and 9B. Do not use the 50 OHM output jack, which is provided for testing to EN 60601.

6. RETURN Jack: This jack is used for the return of the test voltage, named P2 in EC-13.

7. MEAS. POINT: This is the point which is connected to the voltage divider network to determine PASS/FAIL results of the test. See Fig. 2 for more details.

8. Y1 – Y2: These differential outputs are to be connected to two different channels of an oscilloscope, then the outputs are subtracted. This resulting waveform is used to judge acceptability of the EUT.

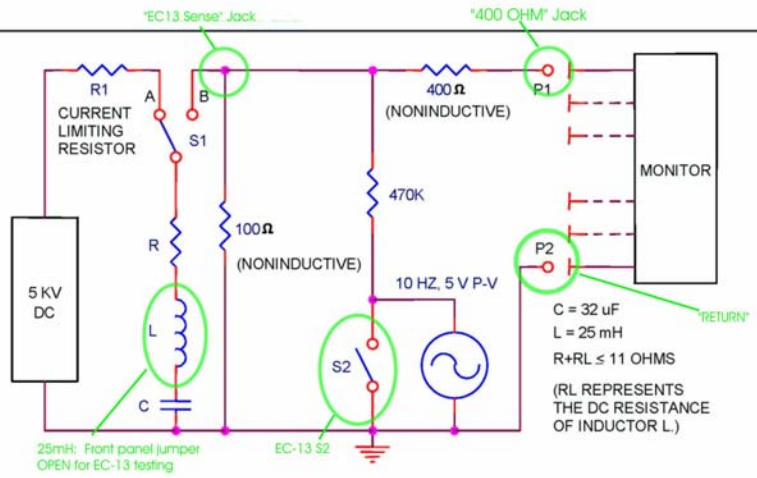


Figure 9A—Test circuit for defibrillator overload tests (5.2.2.2.1 and 5.2.2.2.2)

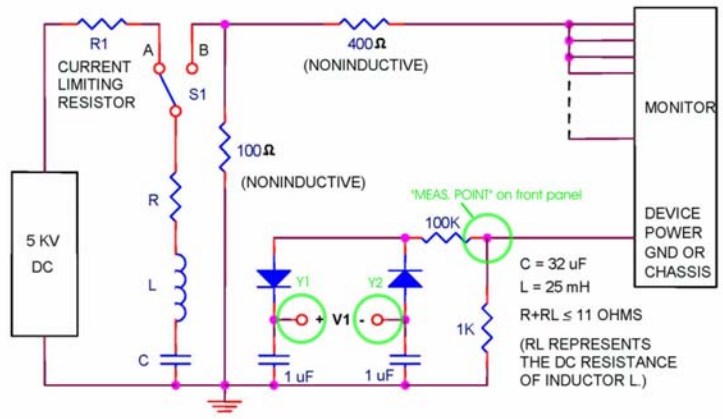


Figure 9B—Test circuit for operator safety test (5.2.2.2.3)

NOTE 1—The values of R, L , and C may be varied so long as the waveform conforms to the limits specified in applicable document 2.3.

NOTE 2—The manufacturer's recommended patient cable shall be used.

NOTE 3—The 470 K resistor of 9 A must withstand 5 KV. Using ten 47 K, 1/8 W resistors in series should suffice.

NOTE 4—The switch S1 must withstand peak currents of 60 A in the closed position, and in the open position it must not break down for voltages up to 5000 V.

Figure 2: EC-13 Figures 6 and 6A

Section 3

IEC 60601-2-27 Option

This section describes how to set up and use the Defib-5 with the IEC 60601-2-27 option.. This option allows the Defib-5 to act as the circuits described in IEC-60601, Figures 101, 104 and 105. Please refer to Figures 3, 4 and 5 for a schematic of the circuits in IEC 60601, and Figure 1-1 for the appropriate front panel connections needed to conduct these tests with the Defib-5.
The connection information for the Defib-5 is shown in blue text on the following Figures.

Notes on testing with the IEC 60601-2-27 option

Testing with the IEC 60601-2-17 option requires minor additions to the circuitry in the Defib-5, and these changes are accomplished using jumpers on the front panel.

The changes to the circuit are as follows, along with the appropriate actions to perform on the front panel:

1. 50 OHM jack: This is the standard output jack for IEC 60601-1 Table 50, and it is also used for the pulse output for testing in IEC 60601-2-27. This output provides the 50 ohm output impedance required by IEC 60601-2-27.

2. Impedance Jumper: For testing to IEC 60601, a 500uH inductance is required. To provide this inductance, the front panel jumper must be used to SHORT the two impedance jacks.

3. EC-13 SENSE jack: This jack allows verification of the 100 ohm resistor used in the Defib-5. The 100 ohm resistance value is measured between the EC-13 SENSE jack and the RETURN jack on the front panel of the Defib-5.

4. MEAS. POINT: This is the point which is connected to the voltage divider network within the Defib-5 to determine PASS/FAIL results of the test. See Fig. 3-1 for schematic details.

5. Y1 – Y2: These differential outputs are to be connected to two different channels of an oscilloscope, then the outputs are subtracted. This resulting waveform is used to judge acceptability of the EUT.

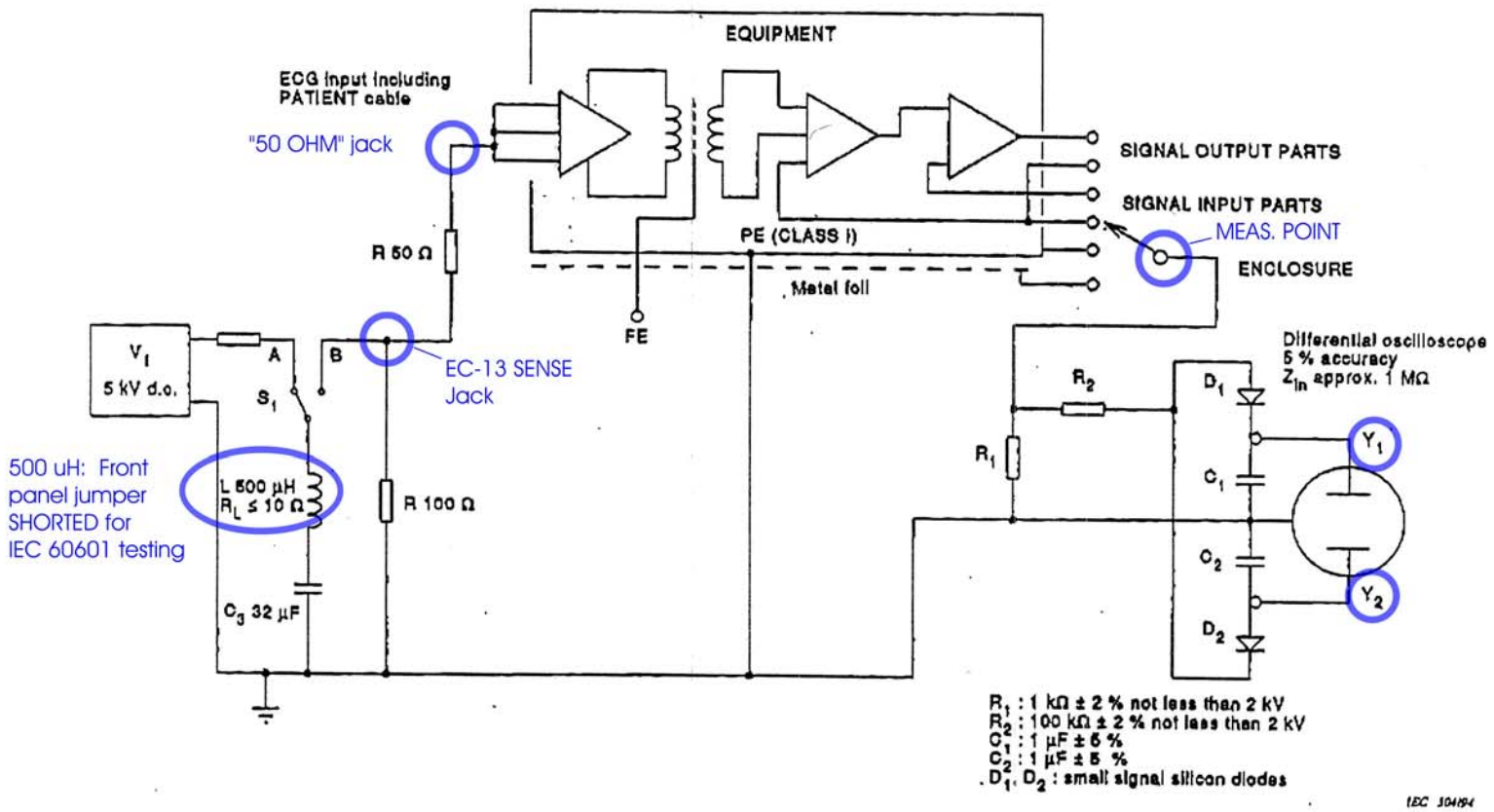
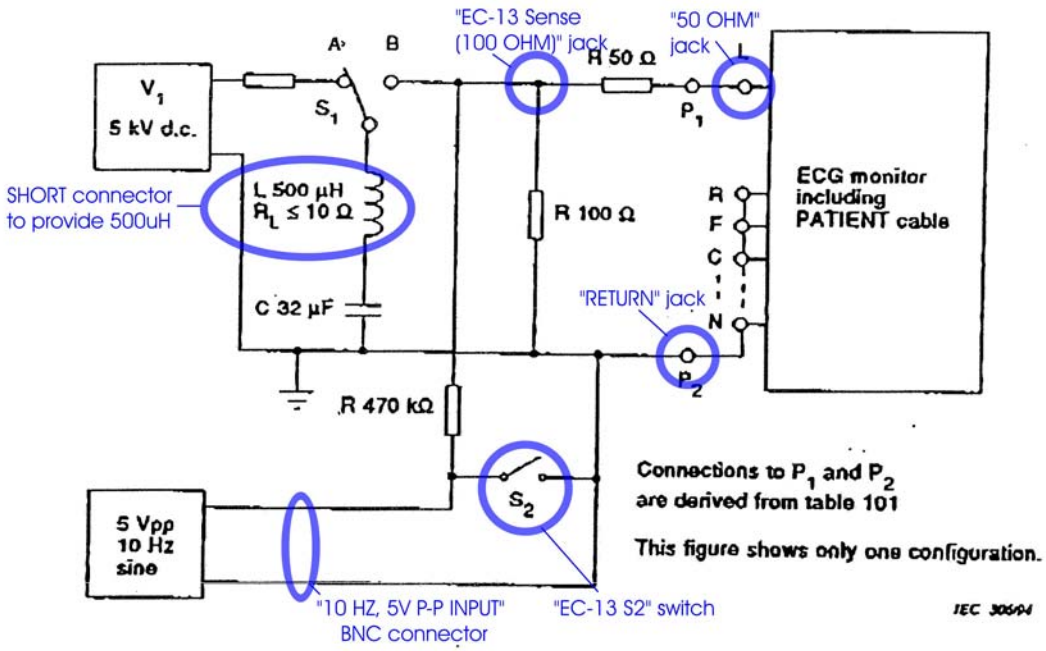


Figure 101 – Dynamic test for limitation of energy from different parts (see 17.101)

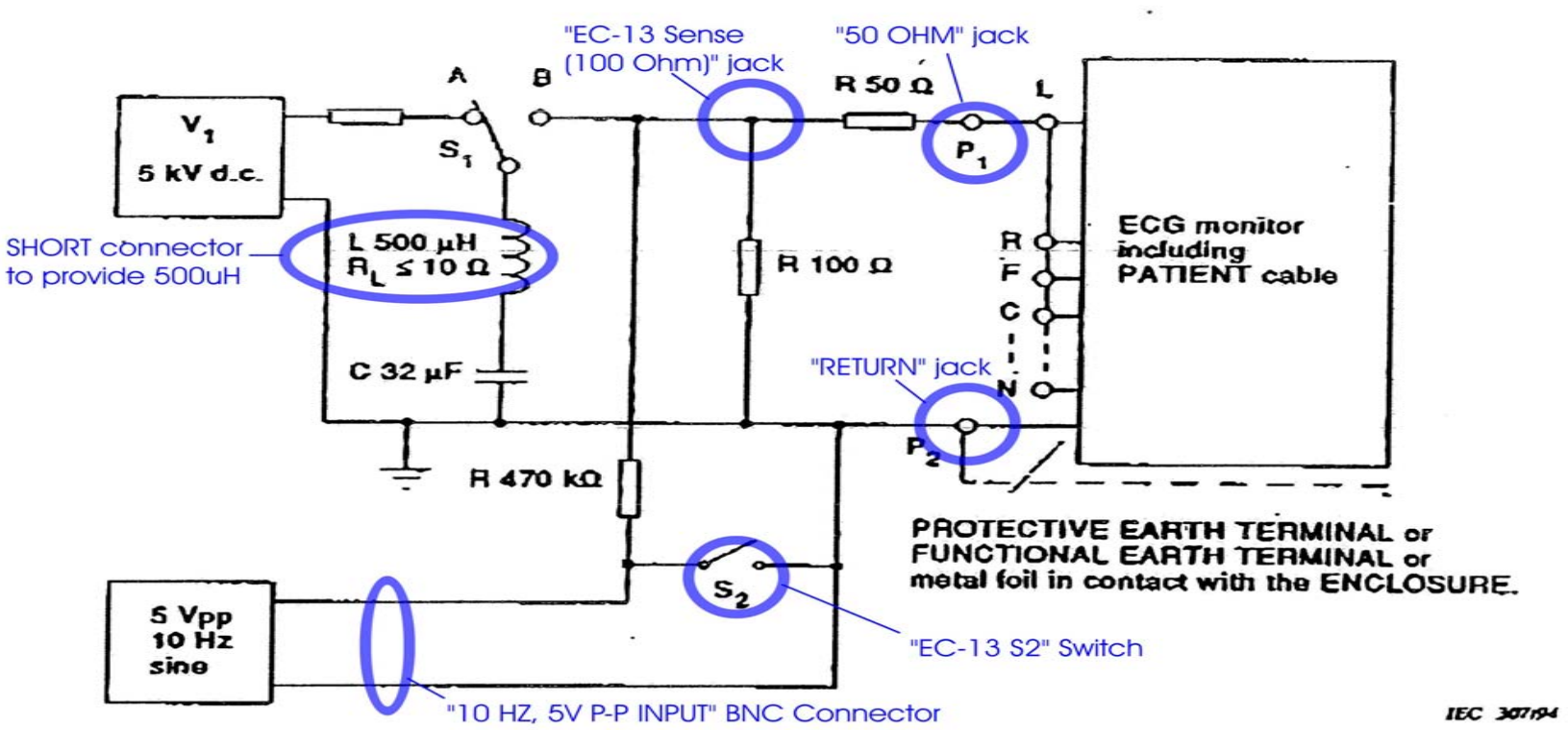
Figure 3 IEC 60601-2-27 Fig. 101



NOTE - 5 Vpp means 5 V peak-to-peak.

Figure 104 – Test of protection against the effects of defibrillation (see 51.101.1)

Figure 4 - IEC 60601-2-27 Figure 104



NOTE - 5 Vpp means 5 V peak-to-peak.

Figure 105 – Test of protection against the effects of defibrillation (see 51.101.2)

Figure 5 - IEC 60601-2-27 Figure 105

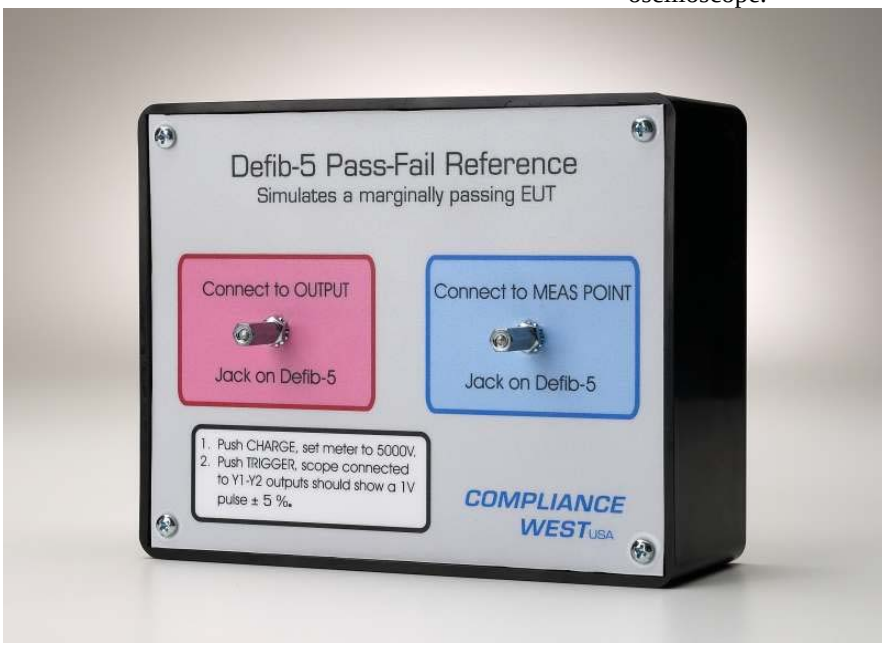
Section 4

Defib-5 Pass/Fail Reference

The Defib-5 Pass/Fail Reference is designed to allow the operator to ensure operation of the Defib-5 high voltage output circuit and the measurement circuit at full voltage. It augments Section "Verification of Measurement Circuit Operation" of the MegaPulse Instruction Manual.

Description

The Defib-5 Pass/Fail Reference relies on a common ground between the Return jack and the oscilloscope.



To use:

Connect the OUTPUT (or 50 OHM) jack to the RED electrode on the Pass/Fail Reference.

Connect the MEAS. POINT jack to the BLUE electrode on the Pass/Fail Reference.

There is no ground connection on the Pass/Fail reference, which takes the place of the DUT in EN 60601, Figure 50. Oscilloscope ground is supplied by the BNC jack connections.

Connect the Y1 and Y2 outputs of the Defib-5 to an oscilloscope in accordance with the instructions in the MegaPulse Instruction Manual, Defib-5 section.

Set the oscilloscope in accordance with the instructions in Paragraph 1 of the Verification of Measurement Circuit Operation.

Set the Defib-5 meter to read 5000V, and Trigger the output.

The oscilloscope should display a waveform similar to Figure D-2 in the MegaPulse Manual, with a peak value of 1 volt.

Section 5

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.

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