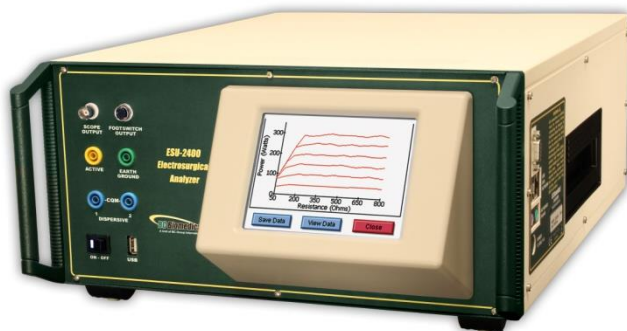




# ForceTriad™ PM Procedure Using ESU-2400 Autosequence



**ESU-2400**



**ForceTriad™**

**USER GUIDE**



<p><b>BC BIOMEDICAL FORCETRIAD™ PM AUTOSEQUENCE TABLE OF CONTENTS</b></p>
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### **WARNING - USERS**

The ESU-2400 is for use by skilled technical personnel only.

### **WARNING - USE**

The ESU-2400 is intended for testing only and should never be used in diagnostics, treatment or any other capacity where it would come in contact with a patient.

### **WARNING - USE**

Never touch exposed metal surfaces on test leads or other current-carrying parts while the ForceTriad™ is activated.

### **WARNING - MODIFICATIONS**

The ESU-2400 is intended for use within the published specifications. Any application beyond these specifications or any unauthorized user modifications may result in hazards or improper operation.

### **WARNING - CONNECTIONS**

All connections to patients must be removed before connecting the ForceTriad™ to the ESU-2400. A serious hazard may occur if the patient is connected when testing with the ESU-2400. Do not connect any leads from the patient directly to the ESU-2400 or ForceTriad™.

## **NOTICE – TRADEMARKS**

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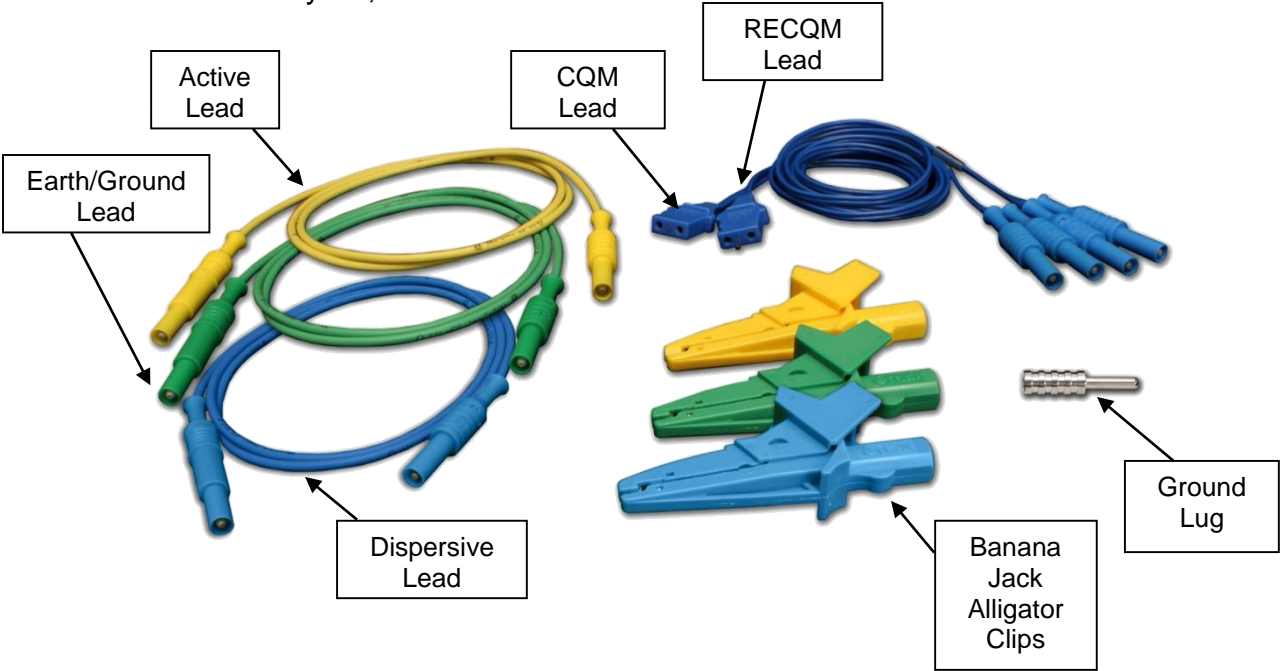
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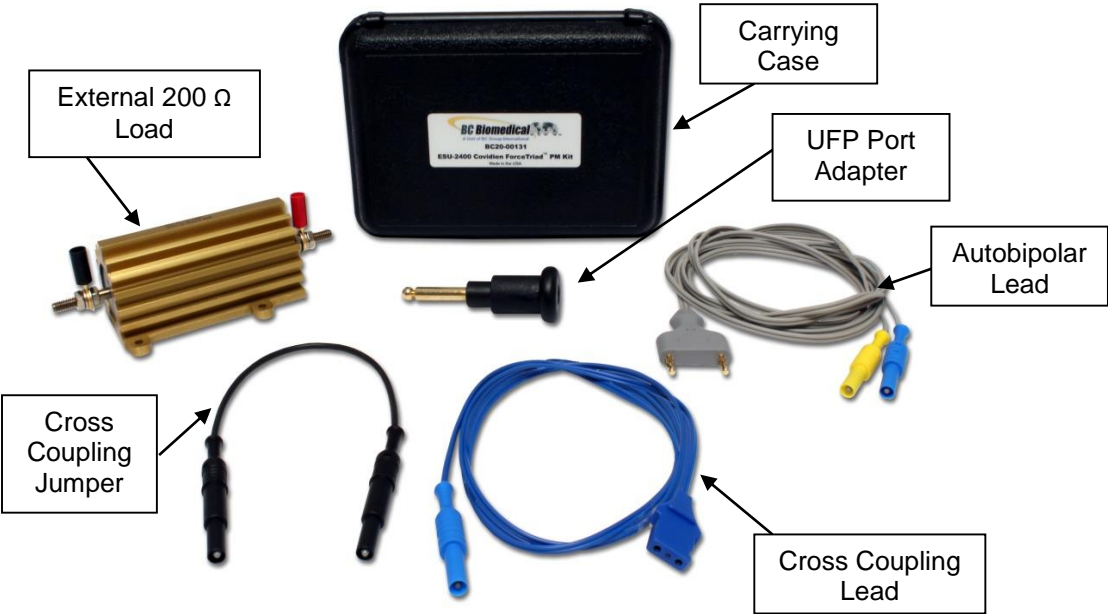
# OVERVIEW

This guide walks the operator through the Autosequence for the Covidien ForceTriad™ PM procedure. The cables and accessories used in this Autosequence come from the standard ESU-2400 accessory kit (BC20-00130) and the optional ForceTriad™ PM Accessory kit (BC20-00131).

Standard Accessory Kit, BC20-00130:



Optional ForceTriad™ PM Accessory Kit, BC20-00131



## EQUIPMENT LIST

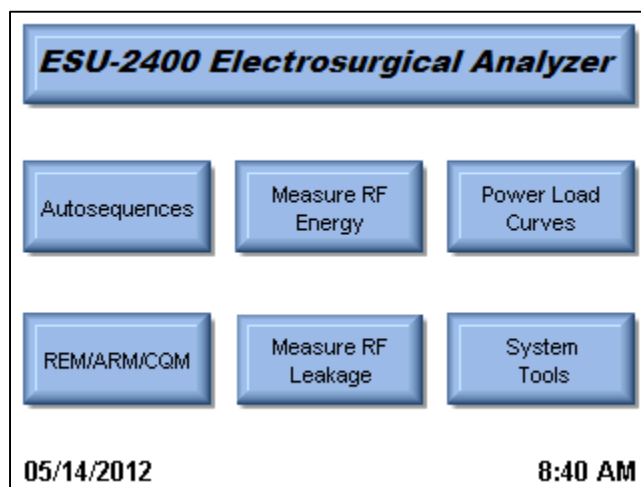
The following equipment is required to perform the ForceTriad™ PM procedure using the ESU-2400:

- Covidien ForceTriad™ (DUT, Software Version 3.50 or 3.60)
- BC Biomedical ESU-2400 (Software Version 1.0.3.16 or higher)
- ForceTriad™ Monopolar Footswitch
- ForceTriad™ Bipolar Footswitch
- ForceTriad™ LigaSure™ Handpiece
- ForceTriad™ LigaSure™ Footswitch
- Standard two-button or ForceTriVerse™ electro-surgical pencil
- UFP Adapter (included in BC20-00131 accessory kit)
- External 200 Ohm 250 Watt Load (included in BC20-00131 accessory kit)
- RS-232 Serial Communications cable (comes with ESU-2400)
- Test cables from BC20-00130 accessory kit (comes with ESU-2400)
- Test cables from BC20-00131 accessory kit (recommended)
- Digital Multi Meter (DMM)
- Safety Analyzer (for low frequency leakage testing) (BC recommends the BC Biomedical SA-2005)

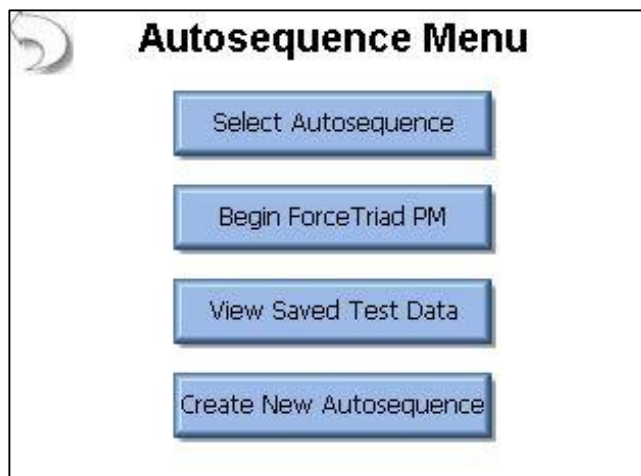


## LOADING THE AUTOSEQUENCE

Starting from the ESU-2400 Main Screen, press Autosequences



From the autosequence menu, press Begin ForceTriad™ PM



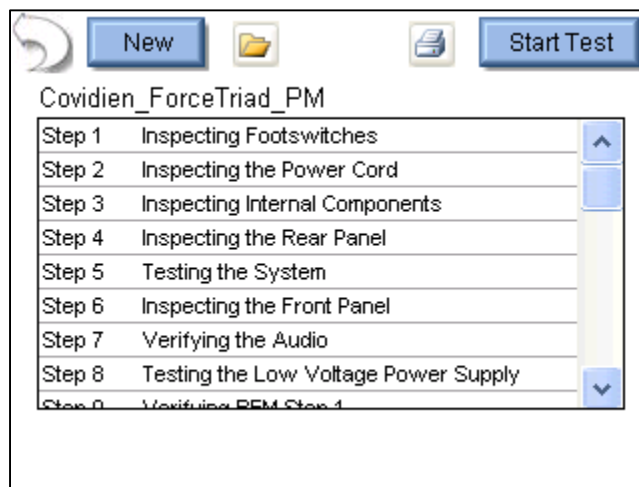
The following screen will appear.



Ensure the ForceTriad™ is connected by an RS232 cable as show below and powered on, then click OK.



After the sequence is loaded, the screen will display the list of tests that will be performed. Press the Start Test button to begin the PM procedure.



You will be prompted to enter information about the ForceTriad™. You can enter information by pressing on the text entry box. You can use the on-screen keyboard, USB keyboard, or USB barcode reader to enter information about the ForceTriad™. Press the Right Arrow to begin the test.

**Please Enter the following information  
for the test report.**

Generator ID:


Manufacturer:

Model:

Serial Number:

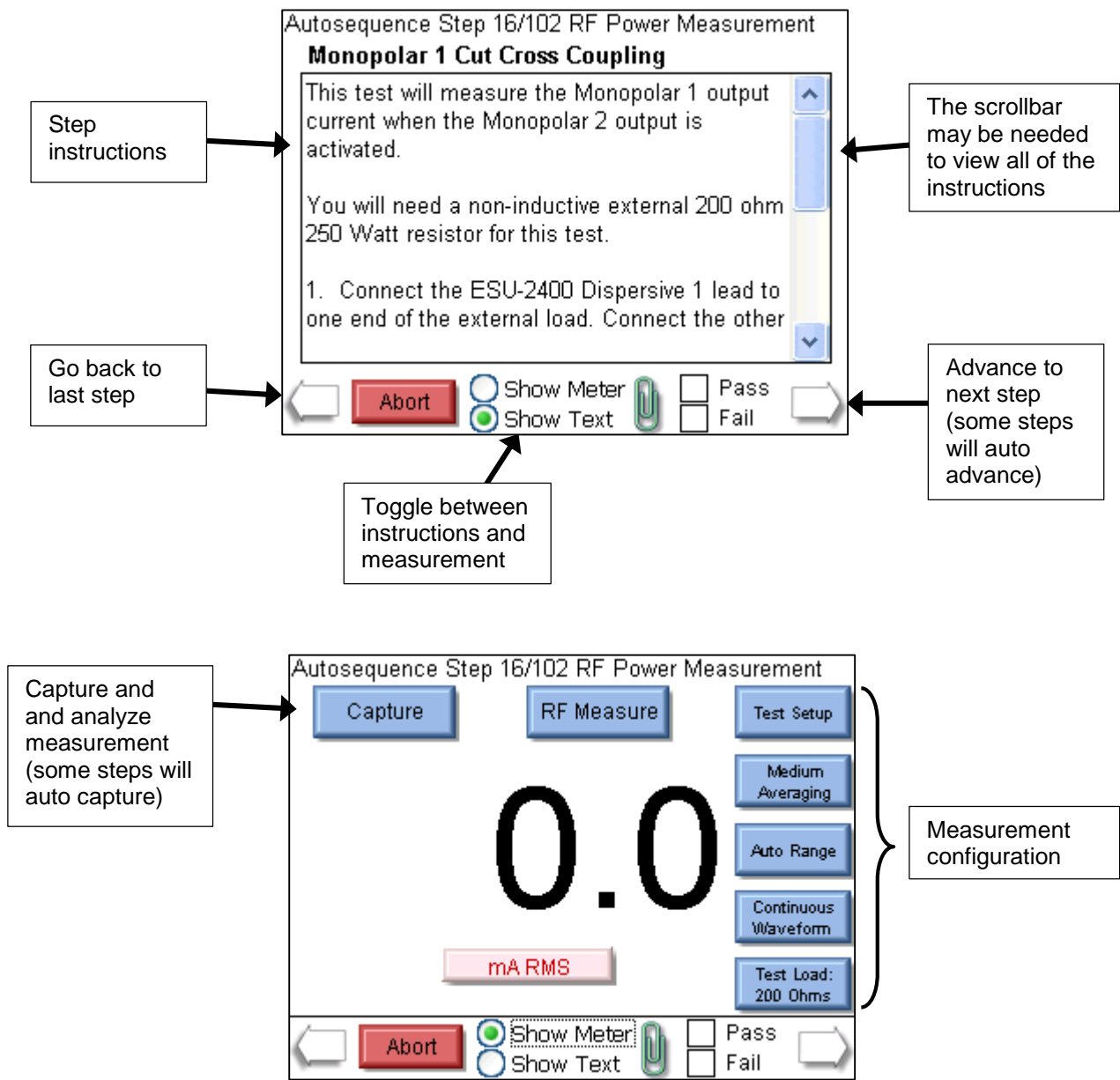
Tested By:

Signature:  
(Tap to insert  
signature)



# RUNNING THE AUTOSEQUENCE



When running the Autosequence, the screen of the ESU-2400 has two display modes. One is for showing the instructions to the user and the other is for showing the measurement. The following is an example of these screens along with a description of each part.



In this section of the guide each step of the Autosequence is separated into three blocks; the Step Header, Instructions, and Connections. The step header identifies the basic function of the step and which step or steps are being described.

**Note:** This manual is for the ForceTriad™ software versions 3.5 and 3.6. Most steps are the same for both versions. For the steps that are different the step numbers for the ForceTriad™ software version 3.5 are shown in grey and the step numbers for the ForceTriad™ software version 3.6 are shown in tan.

Step Number(s) ForceTriad™ v3.5	Step Number(s) ForceTriad™ v3.6	Step Description
<p><b>Instructions</b>            These instructions tell the user what needs to be done to perform the step. These instructions are a summary of what is shown on the ESU-2400 screen. The user should follow the instructions on the screen and use the guide as support for how to interface with the ForceTriad™.</p>		
<p><b>Connections</b>            This section shows the user how to make the connections between the ESU-2400 and ForceTriad™. Not every step description has this section.</p>		

Step Number 1-2	ForceTriad™ Inspections
<p><b>Instructions</b>          These steps involve physical inspection of the footswitches and power cord. Follow the ESU-2400 on-screen instructions to perform these steps.</p> <p>On each step, use the scroll bar on the right side of the screen to view and follow the instructions. After you have completed the instructions, press on the Pass or Fail checkbox to mark the results of the test. Then press the Right Arrow to proceed to the next step.</p>	
Step Number 3	Internal Inspections
<p><b>Instructions</b>          These steps involve physical inspection of the internal components and connectors of the generator and generator wiring. Follow the ESU-2400 on-screen instructions to perform this step.</p> <p>Use the scroll bar on the right side of the screen to view and follow the instructions. After you have completed the instructions, press on the Pass or Fail checkbox to mark the results of the test. Then press the Right Arrow to proceed to the next step.</p>	
<p><b>Connections</b>          You will need to remove the generator's cover for this step. There are four screws on the back of the generator that need to be removed before the cover can be slid back and off the generator.</p>	
<div style="display: flex; justify-content: space-around;">   </div>	
Step Number 4-7	ForceTriad™ Inspections
<p><b>Instructions</b>          These steps involve physical inspection of the generator and generator accessories. You will be checking the front panel connectors, rear panel connectors, footswitches, accessories, and internal components of the generator. Follow the on-screen instructions to perform these steps.</p> <p>On each step, use the scroll bar on the right side of the screen to view and follow the instructions. After you have completed the instructions, press on the Pass or Fail checkbox to mark the results of the test. Then press the Right Arrow to proceed to the next step.</p>	

## Step Number 8

## Testing Low Voltage Power Supply

### Instructions

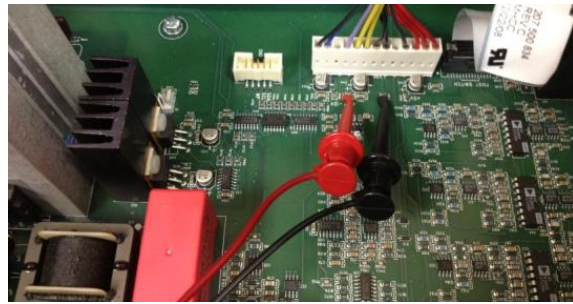
You will need a DMM to measure internal ForceTriad™ power supplies. The connections are described on the screen. The following pictures may help in finding the required test points.

### Connections

#### +5V Supply



#### +12V Supply



#### -12V Supply



After the supplies have been measured, Turn Off the ForceTriad™, reinstall the ForceTriad™ Cover and Connect the Serial cable between the ESU-2400 and ForceTriad™.



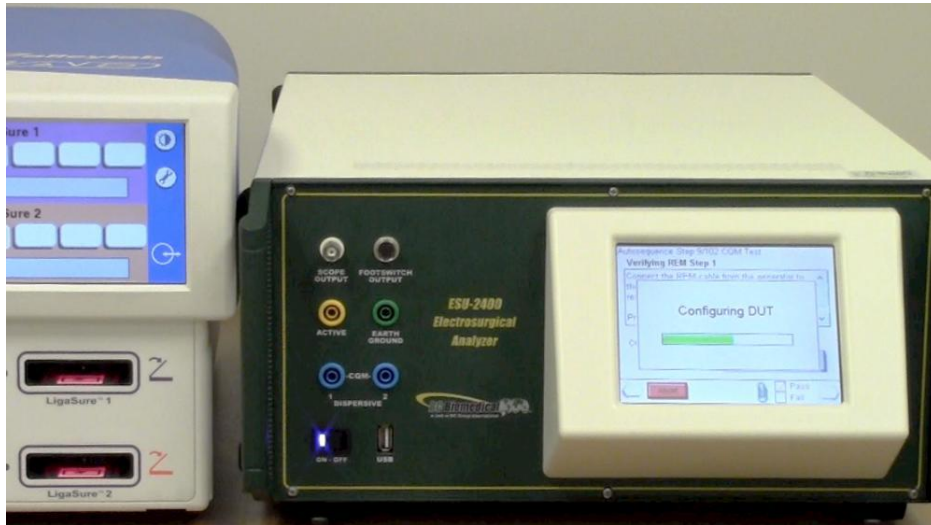
Turn the ForceTriad™ back on and wait for the system to finish booting. Then select the Pass or Fail status of the step and the right arrow to advance to the next step.

Step Number 9

Verifying REM™

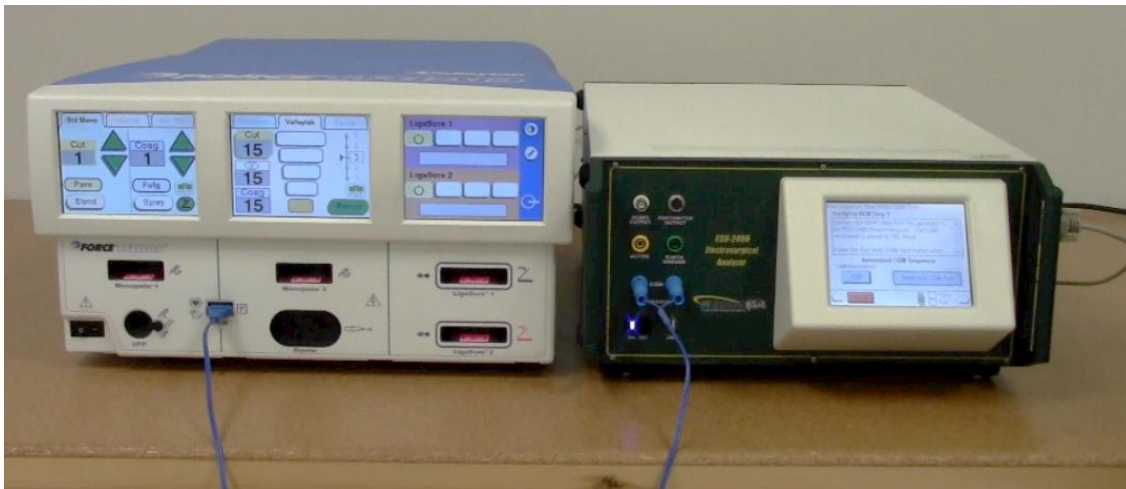
Instructions

Wait for the ESU-2400 to configure the ForceTriad™.



Connect the REM™ cable from the ForceTriad™ to the ESU-2400 Dispersive 1 and 2 ports. On the ESU-2400 press Run Auto CQM Test.

Connections



Step Number 10-15

Verifying REM™

Instructions

No action from user is required.



Step Number 16

Monopolar 1 Cut Cross Coupling

Instructions

Connect the Monopolar 1 output from the ForceTriad™ to one end of the 200 ohm external load. Connect the other end of the external load to the ESU-2400 Dispersive 1 port. Connect the ForceTriad™ REM™ port to the ESU-2400 Active port. On the ESU-2400 press the Show Meter button and then the Capture button.

Connections



Step Number 17

Monopolar 1 Spray Cross Coupling

Instructions

No action from user is required.

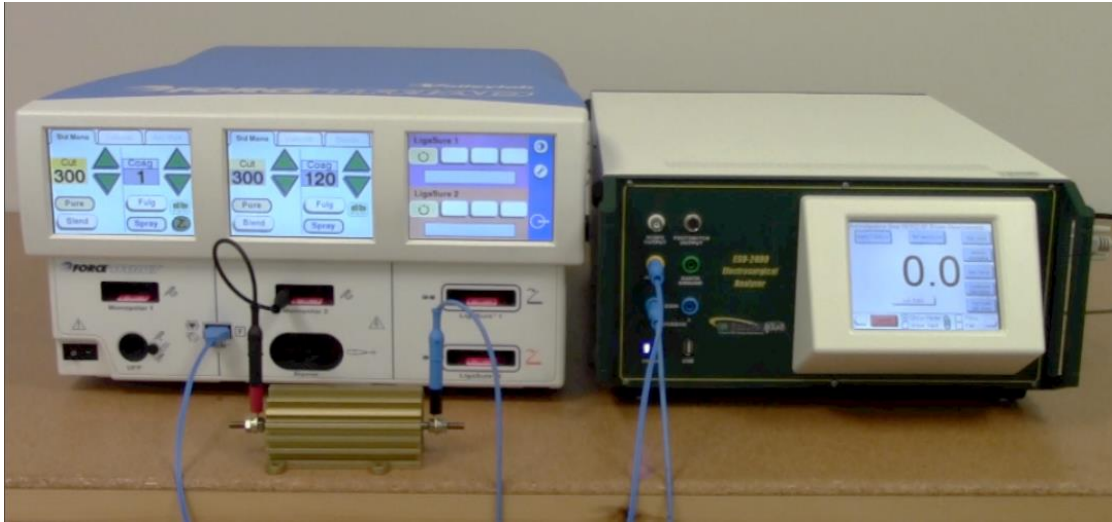
Step Number 18

Monopolar 2 Cut Cross Coupling

Instructions

Move the short jumper lead from Monopolar 1 output to Monopolar 2 output. Don't change any connections on the ESU-2400. On the ESU-2400 press the Show Meter button and then the Capture button.

Connections



Step Number 19

Monopolar 2 Spray Cross Coupling

Instructions

No action from user is required.

Step Number 20

UFP Cut Cross Coupling

Instructions

Move the short jumper lead from Monopolar 2 output to the UFP output port using the UFP Adapter in the BC20-00131 accessory kit. Don't change any connections on the ESU-2400. On the ESU-2400 press the Show Meter button and then the Capture button.

Connections



Step Number 21 UFP Spray Cross Coupling

Instructions  
No action from user is required.

Step Number 22 Bipolar Cut Cross Coupling

Instructions  
Remove the UFP adapter from the UFP port. Connect the ESU-2400 Active lead to one end of the external load. Connect the other end of the external load to the Left Tine Bipolar port. Connect the Right Tine Bipolar output of the ForceTriad™ to the Dispersive 1 port on the ESU-2400. On the ESU-2400 press the Show Meter button and then the Capture button.

Connections



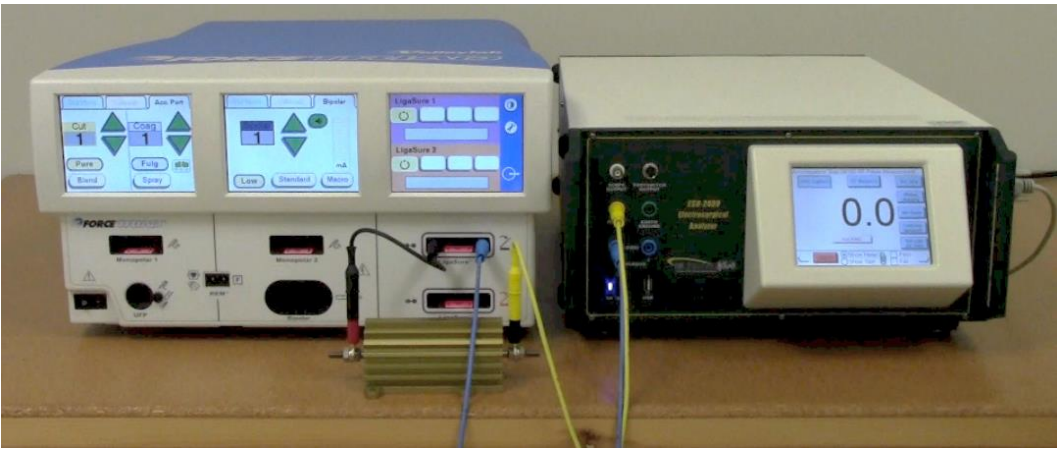
Step Number 23 Bipolar Spray Cross Coupling

Instructions  
No action from user is required.

Step Number 24 Ligasure™ 1 Cross Coupling

**Instructions**  
Move the short jumper lead from the Left Tine Bipolar port to the Left Tine LigaSure 1 output of the ForceTriad™. Connect the Right Tine LigaSure 1 output of the ForceTriad™ to the Dispersive 1 port on the ESU-2400. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



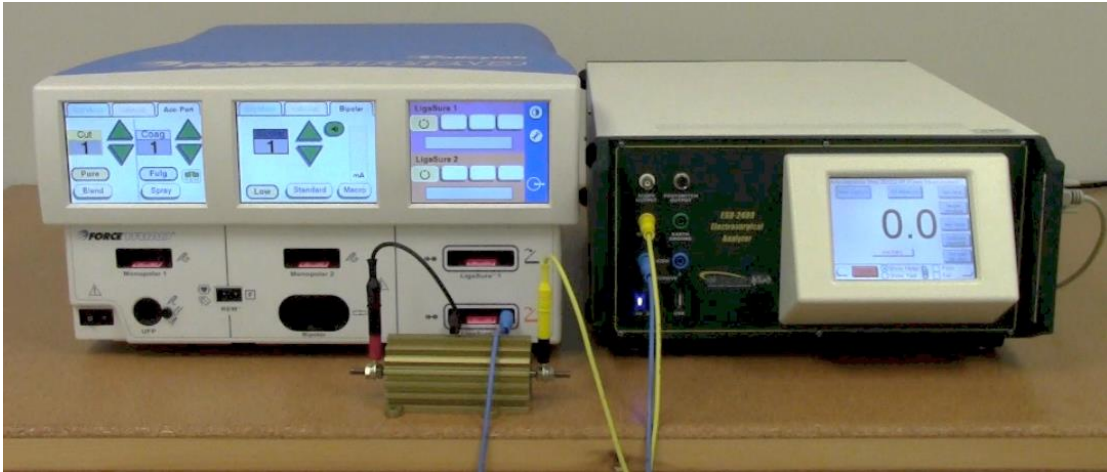
Step Number 25 Ligasure™ 1 Spray Cross Coupling

**Instructions**  
No action from user is required.

Step Number 26 Ligasure™ 2 Cross Coupling

**Instructions**  
Move the short jumper from the LigaSure 1 output of the ForceTriad™ to the Left Tine LigaSure 2 output of the ForceTriad™. Connect the Right Tine LigaSure 2 output of the ForceTriad™ to the Dispersive 1 port on the ESU-2400. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 27 LigaSure™ 2 Spray Cross Coupling

Instructions  
No action from user is required.

Step Number 28 Monopolar 1 Cut Pure 300W

Instructions  
Connect the Monopolar 1 output to the ESU-2400 Active port. Connect the REM™ port to the Dispersive 1 and Dispersive 2 ports. On the ESU-2400 press the Show Meter button and then the Capture button.

Connections



Step Number 29- 32 Monopolar 1 Output Power

Instructions  
No action from user is required.

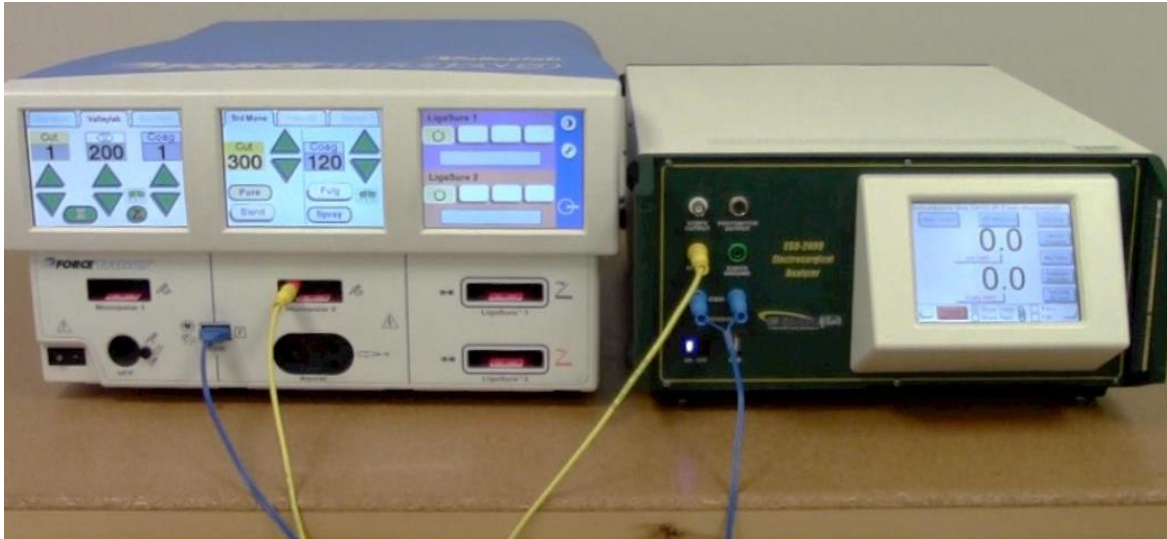
Step Number 33

Monopolar 2 Cut Pure 300W

Instructions

Move the Active Lead from the Monopolar 1 output to the Monopolar 2 output. On the ESU-2400 press the Show Meter button and then the Capture button.

Connections



Step Number 34- 35

Monopolar 2 Output Power

Instructions

No action from user is required.

Step Number 36

UFP Cut Pure 10W

Instructions

Move the Active Lead from the Monopolar 2 output to the UFP output using the UFP Adapter. On the ESU-2400 press the Show Meter button and then the Capture button.

Connections



Step Number 37- 47

UFP Output Power

Instructions

No action from user is required.

Step Number 48 Autobipolar

**Instructions**  
 Disconnect all test cables. Connect the Autobipolar cable from the Bipolar output to the ESU-2400 Active and Dispersive 1 ports. Connect a Bipolar footswitch to the ForceTriad™. Follow the ESU-2400 on-screen instructions. Select the Pass or Fail checkmark and then the right arrow to advance to the next step.

**Connections**



Step Number 49 Autobipolar Footswitch mode

**Instructions**  
 Activate the ForceTriad™ using a Bipolar footswitch. Then release the footswitch. The generator output should stay on. Disconnect one test cable from the ESU-2400, the Bipolar output should turn off. If so, reconnect the test table and press the Pass Check mark on the ESU-2400 and the test will automatically proceed.

Step Number 50-64	Step Number 50-63	Autobipolar and Manual Bipolar tests
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**Instructions**  
 No action from user is required.



Step Number 65	Step Number 64	LigaSure™ 1 1.0A
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**Instructions**  
 Disconnect Bipolar test cable. Connect the LigaSure™ 1 output to the ESU-2400 Active and Dispersive 1 ports . On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



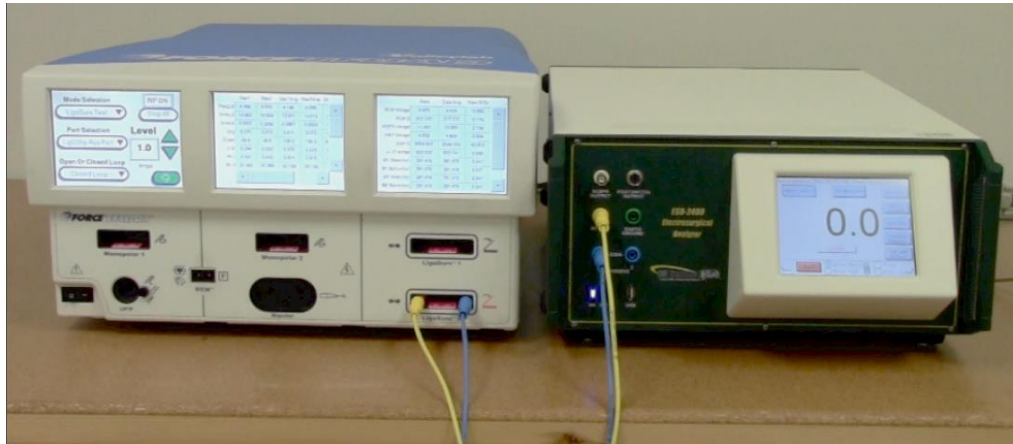
Step Number 66-67	Step Number 65-66	LigaSure™ 1 Output test
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**Instructions**  
 No action from user is required.

Step Number 68	Step Number 67	LigaSure™ 2 1.0A
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**Instructions**  
 Move the LigaSure™ 1 output cables to the LigaSure™ 2 output. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 69-70	Step Number 68-69	LigaSure™ 2 Output test
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**Instructions**  
 No action from user is required.

Step Number 71	Step Number 70	LigaSure™ 2 Left Tine Leakage
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**Instructions**  
 Remove the Dispersive Lead from the Right Tine LigaSure™ 2 output and ESU-2400 Dispersive 1 port. Connect the ESU-2400 Earth Ground port to the Ground lug on the back of the ForceTriad™. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 72	Step Number 71	LigaSure™ 2 Right Tine Leakage
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**Instructions**  
 Move the test cable from the LigaSure™ 2 Left Tine to the Right Tine. Do not change any connections on the ESU-2400. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 73	Step Number 72	LigaSure™ 1 Left Tine Leakage
----------------	----------------	-------------------------------

**Instructions**  
 Move the test lead from the LigaSure™ 2 output to the LigaSure™ 1 Left Tine. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 74	Step Number 73	LigaSure™ 1 Right Tine Leakage
----------------	----------------	--------------------------------

**Instructions**  
 Move the test cable from the LigaSure™ 1 Left Tine to the Right Tine. Do not change any connections on the ESU-2400. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 75	Step Number 74	Bipolar Left Tine Leakage
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**Instructions**  
 Move the test lead from the LigaSure™ 1 output to the Bipolar Left Tine output. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 76-77	Step Number 75-76	Bipolar Left Tine Leakage
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**Instructions**  
 No action from user is required.

Step Number 78	Step Number 77	Bipolar Right Tine Leakage
----------------	----------------	----------------------------

**Instructions**  
 Move the test lead from the Bipolar Left Tine output to the Bipolar Right Tine output. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 79-80	Step Number 78-79	Bipolar Right Tine Leakage
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**Instructions**  
 No action from user is required.

Step Number 81	Step Number 80	Monopolar 1 Leakage
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**Instructions**  
 Move the test lead from the Bipolar Right Tine output to the Monopolar 1 output. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 82-85	Step Number 81-84	Monopolar 1 Leakage
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**Instructions**  
 No action from user is required.

Step Number 86	Step Number 85	Monopolar 2 Leakage
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**Instructions**  
 Move the test lead from the Monopolar 1 output to the Monopolar 2 output. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 87-90	Step Number 86-89	Monopolar 2 Leakage
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**Instructions**  
 No action from user is required.

Step Number 91	Step Number 90	UFP Leakage
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**Instructions**  
 Move the test lead from the Monopolar 2 output to the UFP output using the UFP Adapter. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



Step Number 92-95	Step Number 91-94	UFP Leakage
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**Instructions**  
 No action from user is required.

Step Number 96	Step Number 95	Patient Return Leakage
----------------	----------------	------------------------

**Instructions**  
 Remove the test lead from the UFP output. Connect the REM™ port to the ESU-2400 Dispersive 1 and Dispersive 2 ports. On the ESU-2400 press the Show Meter button and then the Capture button.

**Connections**



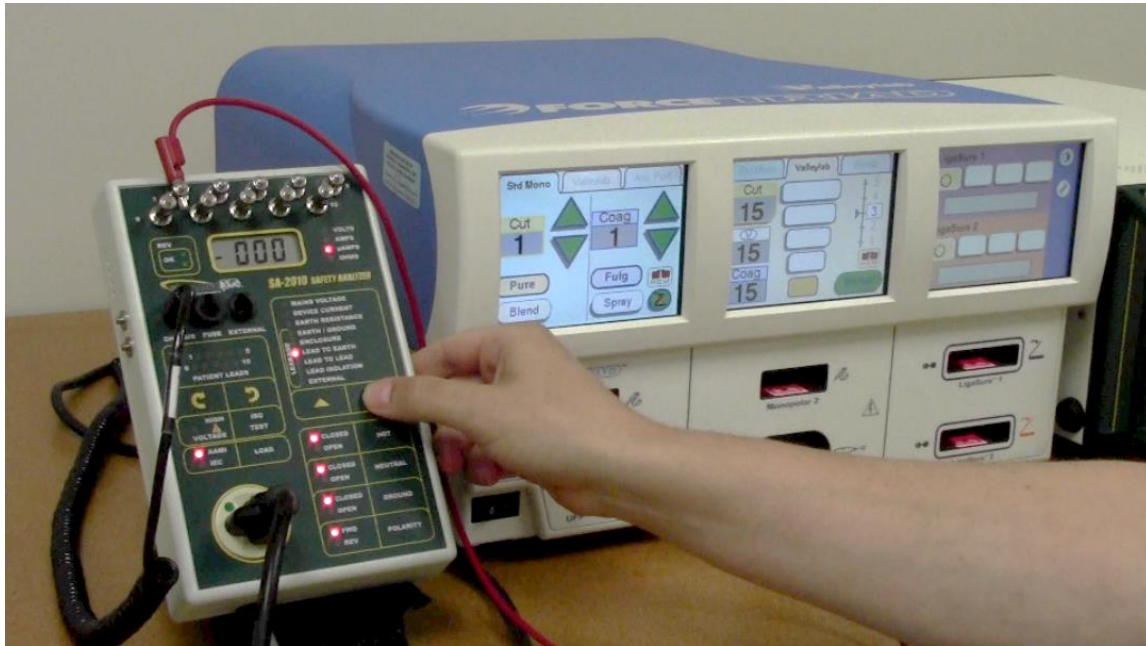
Step Number 97-100	Step Number 96-99	Patient Return Leakage
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**Instructions**  
 No action from user is required.

Step Number 101	Step Number 100	Low Frequency Leakage
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**Instructions**

Disconnect the test leads from the ESU-2400 and ForceTriad™. Using a safety analyzer, perform the low frequency leakage measurements as described on the ESU-2400 screen. Check the appropriate Pass or Fail checkbox based on the results of the low frequency leakage tests. Then press the Right Arrow to continue the test.



Step Number 102	Step Number 101	Valleylab Exchange
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**Instructions**

Dock the ForceTriad™ to Valleylab Exchange to log any changes to the system. The ForceTriad™ Energy Platform User's Guide contains instructions for docking to Valleylab Exchange. Check the appropriate Pass or Fail checkbox based on the status of the Valleylab Exchange and then press the Right Arrow to show the test results.

The test can then be printed or saved.

Note: PDF files cannot be viewed on the ESU-2400.

.tst files can only be viewed on the ESU-2400.

## USER GUIDE REVISIONS

<b>Revision #</b>	<b>Revisions Made</b>
Rev 01	Origination
Rev 02	Pictures Updated, Format Updated, Miscellaneous Edits
Rev 03	Setup for PM sequence updated for new software.



**NOTES**

**NOTES**





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ForceTriad™ PM Procedure Using ESU-2400 Autosequence  
08/14 – Rev 03  
LM-7378-AS**

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