



# TISSUE RESPONSE LOAD



**TRL-2420**

**USER MANUAL**



**BC BIOMEDICAL  
TRL-2420  
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### **WARNING - USERS**

The TRL-2420 is for use by skilled technical personnel only.

### **WARNING - USE**

The TRL-2420 is intended for testing only and should never be used in diagnostics, treatment or any other capacity where they would come in contact with a patient.

### **WARNING - MODIFICATIONS**

The TRL-2420 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 Device Under Test (DUT) to the TRL-2420. A serious hazard may occur if the patient is connected when testing with the TRL-2420.  
Do not connect any leads from the patient directly to the TRL-2420 or DUT.

### **WARNING - LIQUIDS**

Do not submerge or spill liquids on the TRL-2420. Do not operate the unit if internal components not intended for use with fluids may have been exposed to fluid, as the internal leakage may have caused corrosion and be a potential hazard.

### **CAUTION - SERVICE**

The TRL-2420 is intended to be serviced only by authorized service personnel. Troubleshooting and service procedures should only be performed by qualified technical personnel.

### **CAUTION - ENVIRONMENT**

The TRL-2420 is intended to function between 15 and 30 °C. Exposure to temperatures outside this range can adversely affect the performance of the TRL-2420.

### **CAUTION - CLEANING**

Do not immerse. The TRL-2420 should be cleaned by wiping gently with a damp, lint-free cloth. A mild detergent can be used if desired.

### **CAUTION - INSPECTION**

The TRL-2420 should be inspected before each use for wear and the TRL-2420 should be serviced if any parts are in question.

### **CAUTION - OPERATION**

The TRL-2420 is not designed for continuous operation. Maximum ON time is 25 seconds. Allow at least 10 seconds between tests. Do NOT use the TRL-2420 with continuous generator outputs such as Cut, Coag, or Bipolar.

## CAUTION - OPERATION

Do not change power selection switch while the DUT RF output is active.

## NOTICE – SYMBOLS

### Symbol

### Description



Caution

(Consult Manual for Further Information)



Per European Council Directive 2002/95/EC, do not dispose of this product as unsorted municipal waste.

## NOTICE – ABBREVIATIONS

C	Celsius
°	degree
DUT	Device Under Test
ESU	ElectroSurgical Unit
kg	kilograms
lbs	pounds
mA	milliampere
RF	Radio Frequency

## **NOTICE – DISCLAIMER**

USER ASSUMES FULL RESPONSIBILITY FOR UNAUTHORIZED EQUIPMENT MODIFICATIONS OR APPLICATION OF EQUIPMENT OUTSIDE OF THE PUBLISHED INTENDED USE AND SPECIFICATIONS. SUCH MODIFICATIONS OR APPLICATIONS MAY RESULT IN EQUIPMENT DAMAGE OR PERSONAL INJURY.

## **NOTICE – DISCLAIMER**

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## **NOTICE – CONTACT INFORMATION**

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**BC BIOMEDICAL  
TRL-2420  
TISSUE RESPONSE LOAD ACCESSORY**

The TRL-2420 is an accessory to the BC Biomedical ESU-2400 that is used to simulate the effect of changing tissue impedance during electrosurgery. The TRL-2420 contains two incandescent bulbs that are silicone coated for safety. As RF energy from the ESU generator (DUT) is applied to the bulbs, the impedance of the bulb changes, simulating the impedance change of tissue.

Some RF generators have special output modes that detect the change of tissue impedance and automatically turn off the RF output when the change in impedance is detected. The ESU-2400 measures the current at the time when the RF output is turned off.

**CAUTION - OPERATION**

**The TRL-2420 is not designed for continuous operation. Maximum ON time is 25 seconds.  
Allow at least 10 seconds between tests.  
Do NOT use the TRL-2420 with continuous generator outputs such as Cut, Coag, or Bipolar.**

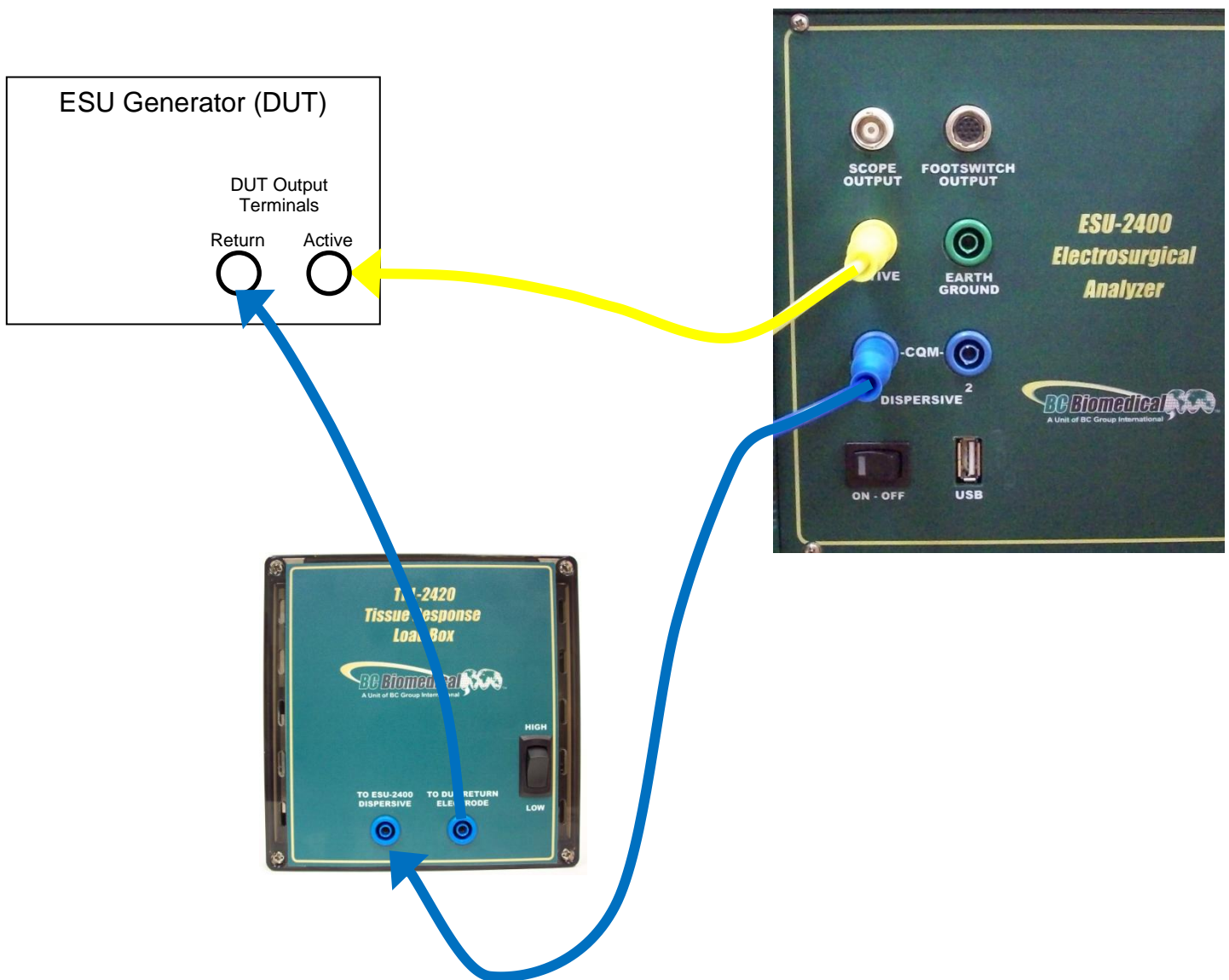
## OVERVIEW

This section looks at the layout of the TRL-2420 and gives descriptions of the elements that are present.

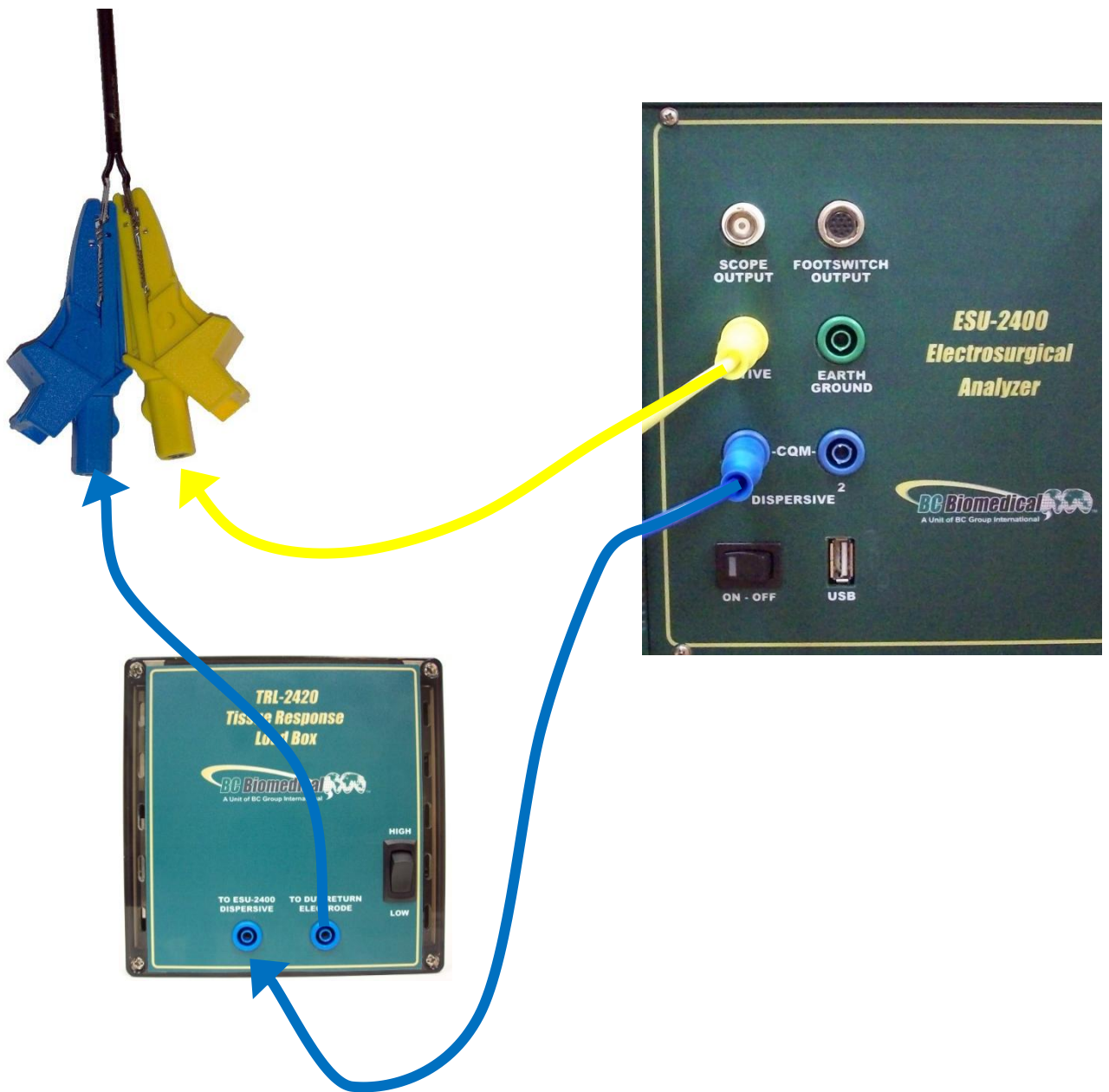


# TEST SETUP

The TRL-2420 is connected in series with the return electrode of the ESU generator (DUT) as shown in the connection diagram below. The DUT Return terminal shown below is typically not the Patient Return electrode. The terminals are labeled Return and Active for reference only. Refer to the DUT service manual to determine which DUT ports are used for the tissue response output.

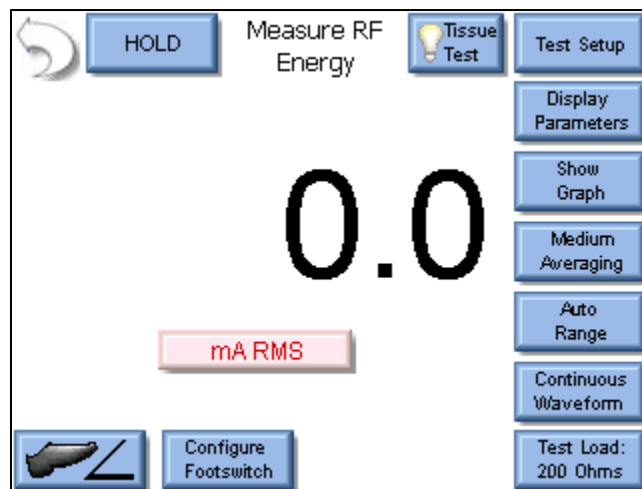



If the output terminals of the DUT are not compatible with the standard ESU-2400 safety test leads, the alligator clips supplied with the ESU-2400 accessory kit can be used to connect directly to the electro-surgical instrument as shown in the connection diagram below.

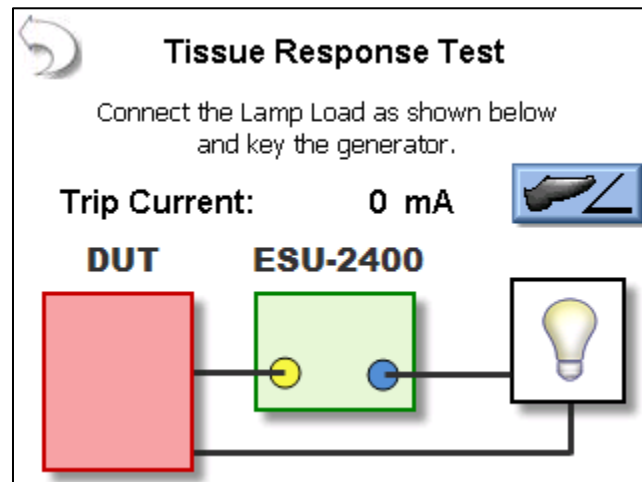


## OPERATION

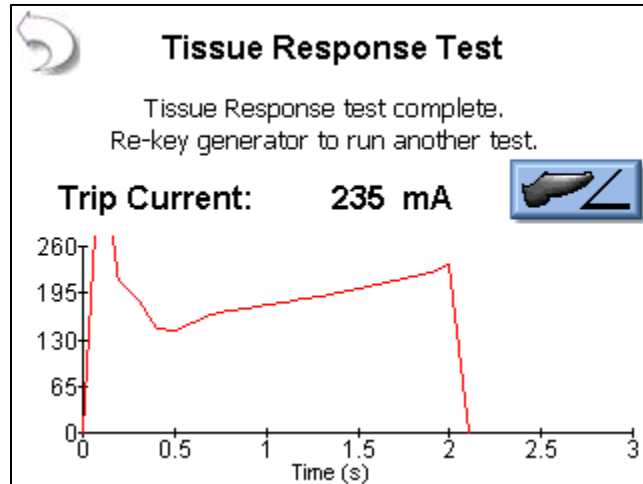
From the ESU-2400 main menu, select Measure RF Energy. This will display the RF Measurement screen as shown below.



Press the  button in the top right corner of the screen. This will display the Tissue Response test screen shown below:



With the TRL-2420 connected as the Lamp Load shown in the screen and in the Test Setup section, activate the output of the DUT. The DUT should detect the change in impedance of the TRL-2420 and automatically turn off the output. At this point, the ESU-2400 display will change to a graph of the measured current and the current measured just before the DUT output was turned off.



The test can be repeated by re-activating the DUT. At the end of the test the ESU-2400 display will automatically refresh with the new measurements.

The switch on the front of the TRL-2420 can be used to select a high or low power mode. This will select one or two bulbs as the load for the generator.

**CAUTION - OPERATION**

**Do not change power selection switch while the DUT RF output is active.**

The footswitch button on the ESU-2400 screen can be used to trigger the DUT by activating the footswitch output 4 of the footswitch connector. Refer to the Footswitch Output section of the ESU-2400 User Manual for more details.

## MANUAL REVISIONS

Revision #	Revisions Made
Rev 01	Origination

## LIMITED WARRANTY

**WARRANTY:** BC GROUP INTERNATIONAL, INC. WARRANTS ITS NEW PRODUCTS TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP UNDER THE SERVICE FOR WHICH THEY ARE INTENDED. THIS WARRANTY IS EFFECTIVE FOR TWELVE MONTHS FROM THE DATE OF SHIPMENT.

**EXCLUSIONS:** THIS WARRANTY IS **IN LIEU OF** ANY OTHER WARRANTY EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF **MERCHANTABILITY** OR FITNESS FOR A PARTICULAR PURPOSE.

**BC GROUP INTERNATIONAL, INC.** IS NOT LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

NO PERSON OTHER THAN AN OFFICER IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR ASSUME ANY LIABILITY.

## SPECIFICATIONS

<b>General</b>	
LOW POWER MODE	40 Watts
HIGH POWER MODE	80 Watts
DUTY CYCLE	Maximum 25 Seconds On Minimum 10 Seconds Off
LAMP TYPE	Special-Purpose Incandescent Light Bulb 40 Watt, 120V, A15, Medium Base, Silicon Coated
LAMP REPLACEMENT PART NUMBER	BC80-00695

<b>Physical</b>	
ENCLOSURE	6.5 x 6.5 x 4.0 Inches (165.1 x 165.1 x 101.6 mm) ABS Plastic
WEIGHT	< 2 Lbs (0.91 Kg)
OPERATING RANGE	15° to 30° C
STORAGE RANGE	0° to 60° C

**NOTES**



