

# LIFEPAK®20e Defibrillator/Monitor Test Calibration Procedure (TCP)

## LIFEPAK®20e Defibrillator/Monitor



Test Calibration Procedure (TCP)



# LIFEPAK®20e Defibrillator/Monitor

## Test Calibration Procedure (TCP)

This section contains the Test and Calibration Procedures (TCP). Perform the procedures in this section as necessary after replacing device components or to correct out-of-specification conditions detected during the PIP. The following procedures may be performed in any order.

**NOTE:** Whenever the device is calibrated or opened for repair or component replacement, it must successfully pass all portions of the closed-case Performance Inspection Procedures.

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# LIFEPAK®20e Defibrillator/Monitor

## Test Calibration Procedure (TCP)

### [TCP- Scope and Applicability](#)

This TCP applies to the LIFEPAK 20e Defibrillator/Monitor exclusively. You may perform the procedures outlined in this section in any order.

**Note:** Prior to its return to active use, the LIFEPAK 20e Defibrillator/Monitor must successfully pass all portions of the closed-case Performance Inspection Procedures (PIP) anytime the device is opened for repair, component replacement, upgrade, or after calibration.

See [TCP – Test Equipment Requirements](#) for a list of test equipment, including specifications, required to complete the TCP.

### [TCP – Resource Requirements](#)

This section describes the requirements for TCP equipment, TCP test equipment verification, TCP workstation power.

### [TCP – Equipment](#)

To perform the TCP, you must use the equipment listed in [TCP – Test Equipment Requirements](#) table. Although the table lists specific test equipment by manufacturer, test equipment with equivalent specifications may be substituted. Refer to the test equipment manufacturer’s operating instructions for usage details where not specifically covered herein.

**Note:** Using test equipment other than that specified in the Test Equipment Requirements table may provide test results that are different from those specified in this manual. It is the responsibility of the biomedical personnel who maintain this device to determine test equipment equivalency. Use only Physio-Control device accessories, including cables, batteries, and the appropriate Physio-Control battery charger.

### [TCP – Test Equipment Verification](#)

All test equipment used to perform the TCP must have a current calibration label. The calibration label must be issued by a certified calibration facility.

# LIFEPAK®20e Defibrillator/Monitor Test Calibration Procedure (TCP)

## TCP-Test Equipment Requirements

Equipment	Specification or Description	Manufacturer or Part Number
Defibrillator Analyzer with external noninvasive pacer measurements *	Energy range: 0 to 450 J Load resistance: 50 ohms $\pm$ 1% Accuracy: $\pm$ 2% +2 J Waveforms: NSR, VF, and sine wave Amplitude: 1.1mV $\pm$ 10%	Fluke® Biomedical Impulse 7000DP with QUIK-COMBO adapter accessory 16/7 D/P ADPT104**
Defibrillator isolation test load	Resistor test load: 200 ohms, 50 Watt, 5%	21300-007736
QUIK-COMBO Therapy Cable		11110-000040
Cable Assembly, Fast Patch		11110-000052
Banana plug cable with clip		Fluke ESA612 Accessory kit
<p>* Some energy meters are not accurate for biphasic waveforms; for more information, contact your defibrillator analyzer manufacturer.</p> <p>** Equivalent equipment is required to meet the specifications listed in the specification column.</p>		

# LIFEPAK®20e Defibrillator/Monitor

## Test Calibration Procedure (TCP)

### TCP - Setup

#### WARNING

##### SHOCK HAZARD

When discharged during this TCP, the device discharges up to 360 joules of electrical energy through the defibrillator cable. You must safely discharge this electrical energy as described in this TCP. Do not attempt to perform this procedure unless you are thoroughly familiar with the operation of the device.

To set up the device for the TCP:

Install a roll of paper in the printer.

**Note:** Do not connect anything to the therapy connector, except as directed during these procedures.

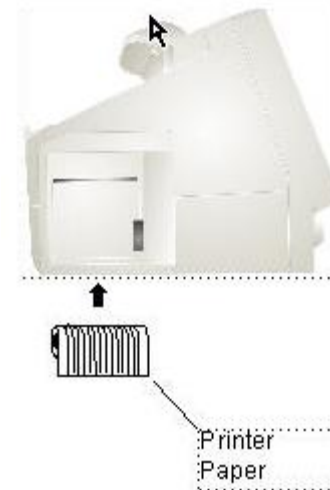


Figure 2.1: TCP Setup

# LIFEPAK®20e Defibrillator/Monitor Test Calibration Procedure (TCP)

## TCP-Defibrillator Energy Calibration

### **WARNING**

#### **SHOCK HAZARD**

Avoid contact with the energy meter. Dangerous voltages are present on energy meter electrode plates/posts.

# LIFEPAK®20e Defibrillator/Monitor

## Test Calibration Procedure (TCP)

1. Establish the setup as shown in Figure 2.2.

**Note:** Ensure proper test setup connections to the Defibrillator Analyzer. To avoid damage to the Analyzer or defibrillator, do NOT apply defibrillator pulses to the pacer inputs of the analyzer.

2. Set Impulse 7000DP to measure ENERGY: Press **DEFIB** button and press F1/Energy.
3. Turn the device ON.
4. Select **DEFIB CAL** from the Service menu.
5. Select **START** to initiate the calibration routine.
6. Follow the instructions on the device screen.
7. Turn the device **OFF** when the calibration procedure is complete

Continue with the Delivered Energy Test with this setup in place.

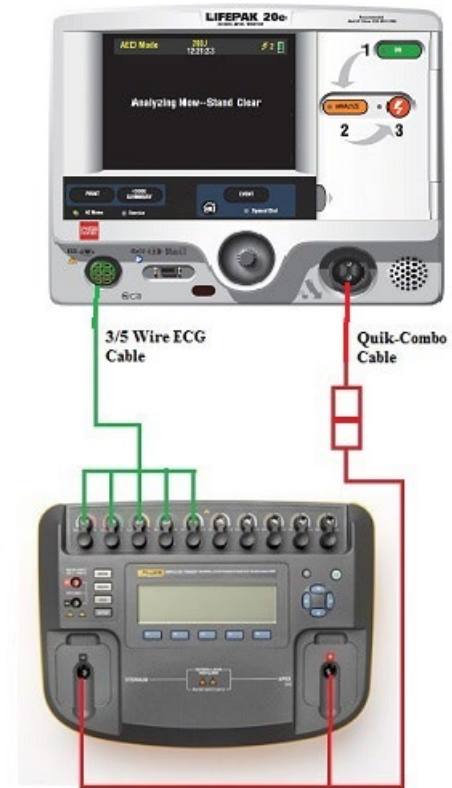


Figure 2.2: Defibrillator Energy Calibration Setup

# LIFEPAK®20e Defibrillator/Monitor

## Test Calibration Procedure (TCP)

### TCP-Defibrillator Delivered Energy Test

#### WARNING

##### SHOCK HAZARD

Avoid contact with the energy meter. Dangerous voltages are present on energy meter electrode plates/posts.

1. Turn the device ON.
2. Press **ENERGY SELECT** on the device and select **2 J**.
3. Press the **CHARGE** button and wait for the UUT to reach full charge. Press the **SHOCK** button to discharge the UUT energy.
4. Verify that the defibrillator analyzer shows an energy level between 1.0 J and 3.0 J.
5. Repeat Steps 2 through 5 for the remaining available energy levels specified in the Delivered Energy Test table below:

Energy Level (J)	Acceptable Output (J)
2	1 - 3
10	9 - 11
15	12.7 – 17.2
50	42.5 – 57.5
70	59.5 – 80.5
100	85.0 – 115.0
360	306.0 – 414.0

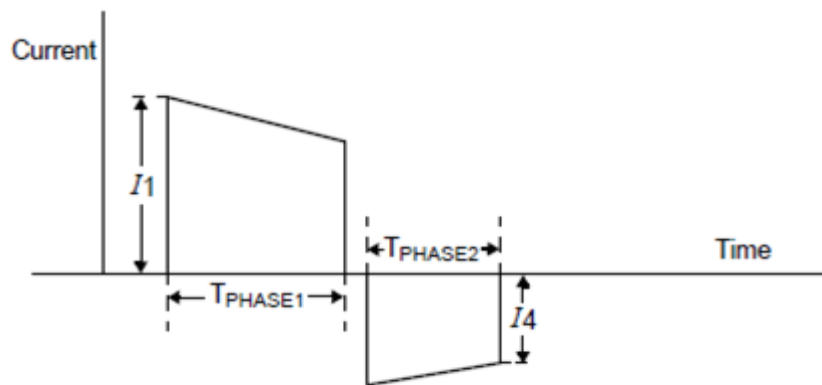


# LIFEPAK®20e Defibrillator/Monitor

## Test Calibration Procedure (TCP)

### TCP-Defibrillator Output Waveform @ 360 J (Optional)

1. Turn the device ON.
2. Press **ENERGY SELECT** on the device and select 360 J.
3. Press the **CHARGE** button.
4. After the capacitor charges (the SHOCK indicator is blinking), press the **SHOCK** button to deliver the energy to the analyzer.
5. Verify that the waveform meets specifications



$$\text{Tilt} = \frac{(I1 - I4)}{I1}$$

Patient Impedance ( $\Omega$ )	$T_{\text{PHASE1}}$ (ms)		$T_{\text{PHASE2}}$ (ms)		Tilt	
	Min	Max	Min	Max	Min	Max
50	6.8	7.9	4.5	5.3	63.9	71.0

**Note 1:** Graphic is a delivered waveform at 360 J into given resistive load.

**Note 2:** Discharge polarity is APEX positive, STERNUM negative for Phase 1.

6. When testing is complete, turn the device OFF.

# LIFEPAK®20e Defibrillator/Monitor Test Calibration Procedure (TCP)

## TCP-Defibrillator Isolation Test

### WARNING

#### SHOCK HAZARD

Electrical energy is discharged during this procedure. Do not allow the paddle electrodes to contact any person or conductive surfaces except as described below.

1. Establish TCP- Defibrillator Isolation Test setup as shown in Figure 2.3.
2. On the Impulse 7000DP, Press **DEFIB** button and press **F1/Energy**
3. Turn the device ON.
4. Press ENERGY SELECT on the LIFEPAK 20e and select **360 J**.
5. Press **CHARGE**.
6. When the device is fully charged (the Shock LED is blinking), press **SHOCK** to deliver the energy to the Impulse 7000DP.
7. Verify the **Delivered Energy** message on the device screen and Defib Energy delivered on Defib Analyzer is less than 2 J.
8. Turn the device OFF and disconnect the test setup.

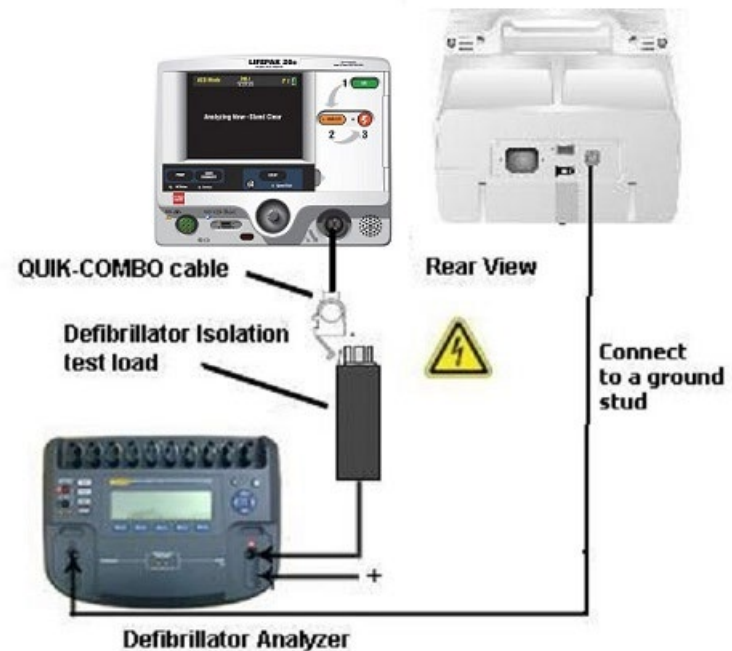


Figure 2.3: Defibrillator Isolation Test Setup

# LIFEPAK®20e Defibrillator/Monitor

## Test Calibration Procedure (TCP)

### [TCP - QUIK-COMBO Defibrillator Charge Time Test at 360J \(AC Powered\)](#)

#### **WARNING**

##### **SHOCK HAZARD**

Electrical energy is discharged during this procedure. Do not allow the paddle electrodes to contact any person or conductive surfaces except as described below.

# LIFEPAK®20e Defibrillator/Monitor

## Test Calibration Procedure (TCP)

To perform Quik-Combo Defibrillator Charge Time Test at 360 J (AC Powered)

1. Establish the setup as shown in Figure 2.4.
2. Remove a battery from the device.
3. Connect the AC Power cable to the device and turn the device ON.
4. Press **ENERGY SELECT** on the device and select 360 J.
5. Start a Stopwatch, then press the **CHARGE** button and wait for the device to reach full charge.
6. Stop a Stopwatch, and then press the **SHOCK** button to discharge the device.
7. Verify the Charge Time is within 1s to 25 s.

After testing is complete reinstall a battery into the device.



Figure 2.4: Quik-Combo Defibrillator Charge Time Test-Setup

# LIFEPAK®20e Defibrillator/Monitor Test Calibration Procedure (TCP)

## TCP – Standard Paddles Defibrillator Charge Time Test at 360J (AC Powered)

### WARNING

#### SHOCK HAZARD

Electrical energy is discharged during this procedure. Do not allow the paddle electrodes to contact any person or conductive surfaces except as described below.

To perform Standard Paddles Defibrillator Charge Time Test at 360 J (AC Powered)

1. Establish the setup as shown in Figure 2.5.
2. Remove a battery from the device.
3. Connect the AC Power cable to the device and turn the device ON.
4. Press **ENERGY SELECT** on the Standard Paddles and select 360 J.
5. Start a Stopwatch, then press the **CHARGE** button and wait for the device to reach full charge.
6. Stop a Stopwatch, and then press the **SHOCK** button to discharge the device.
7. Verify the Charge Time is within 1s to 25 s.

After testing is complete reinstall a battery into the device.

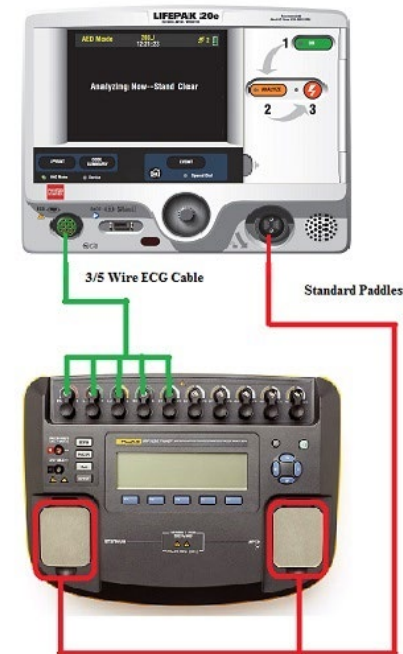


Figure 2.5: Standard Paddles Defibrillator Charge Time Test Setup



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# LIFEPAK<sup>®</sup> 20e Defibrillator/Monitor

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## Test Calibration Procedure (TCP)

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For further information, please call Stryker at 1.800.442.1142 or visit [www.strykeremergencycare.com](http://www.strykeremergencycare.com)

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