FLUKE®
Biomedical

ULT800

TEE Transducer Leakage Current Tester

Users Guide

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Warranty and Product Support

Fluke Biomedical warrants this instrument against defects in materials and workmanship for one full year from the date of original purchase. During the warranty period, we will repair or, at our option, replace at no charge a product that proves to be defective, provided you return the product, shipping prepaid, to Fluke Biomedical. This warranty does not apply if the product has been damaged by accident or misuse or as the result of service or modification by other than Fluke Biomedical. IN NO EVENT SHALL FLUKE BIOMEDICAL BE LIABLE FOR CONSEQUENTIAL DAMAGES.

Only serialized products and their accessory items (those products and items bearing a distinct serial number tag) are covered under this one–year warranty. PHYSICAL DAMAGE CAUSED BY MISUSE OR PHYSICAL ABUSE IS NOT COVERED UNDER THE WARRANTY. Items such as cables and nonserialized modules are not covered under this warranty.

Recalibration of instruments is not covered under the warranty.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state, province to province, or country to country. This warranty is limited to repairing the instrument to Fluke Biomedical's specifications.

Warranty Disclaimer

Should you elect to have your instrument serviced and/or calibrated by someone other than Fluke Biomedical, please be advised that the original warranty covering your product becomes void when the tamper-resistant Quality Seal is removed or broken without proper factory authorization. We strongly recommend, therefore, that you send your instrument to Fluke Biomedical for factory service and calibration, especially during the original warranty period.

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Unpacking and Inspection

Follow standard receiving practices upon receipt of the instrument. Check the shipping carton for damage. If damage is found, stop unpacking the instrument. Notify the carrier and ask for an agent to be present while the instrument is unpacked. There are no special unpacking instructions, but be careful not to damage the instrument when unpacking it. Inspect the instrument for physical damage such as bent or broken parts, dents, or scratches.

Technical Support

For application support or answers to technical questions, either email techservices@flukebiomedical.com or call 1-800- 850-4608 or 1-440-248-9300. In Europe, email: techsupport.emea@flukebiomedical.com or call +31-40-2965314.

Claims

Our routine method of shipment is via common carrier, FOB origin. Upon delivery, if physical damage is found, retain all packing materials in their original condition and contact the carrier immediately to file a claim. If the instrument is delivered in good physical condition but does not operate within specifications, or if there are any other problems not caused by shipping damage, please contact Fluke Biomedical or your local sales representative.

Returns and Repairs

Return Procedure

All items being returned (including all warranty-claim shipments) must be sent freight-prepaid to our factory location. When you return an instrument to Fluke Biomedical, we recommend using United Parcel Service, Federal Express, or Air Parcel Post. We also recommend that you insure your shipment for its actual replacement cost. Fluke Biomedical will not be responsible for lost shipments or instruments that are received in damaged condition due to improper packaging or handling.

Use the original carton and packaging material for shipment. If they are not available, we recommend the following guide for repackaging:

- Use a double–walled carton of sufficient strength for the weight being shipped.
- Use heavy paper or cardboard to protect all instrument surfaces. Use nonabrasive material around all projecting parts.
- Use at least four inches of tightly packed, industry-approved, shock-absorbent material around the instrument.

Returns for partial refund/credit:

Every product returned for refund/credit must be accompanied by a Return Material Authorization (RMA) number, obtained from our Order Entry Group at 1-800-648-7952 or 1-425-446-6945.

Repair and calibration:

To find the nearest service center, goto www.flukebiomedical.com/service or

In the U.S.A.:

Cleveland Calibration Lab
Tel: 1-800-850-4606 x2564
Email:
globalcal@flukebiomedical.com

Everett Calibration Lab
Tel: 1-888-99 FLUKE
(1-888-993-5853)
Email: service.status@fluke.com

In Europe, Middle East, and Africa:

Eindhoven Calibration Lab
Tel: +31-40-2675300
Email: ServiceDesk@fluke.com

In Asia:

Everett Calibration Lab
Tel: +425-446-6945
Email:
service.international@fluke.com

To ensure the accuracy of the Product is maintained at a high level, Fluke Biomedical recommends the product be calibrated at least once every 12 months. Calibration must be done by qualified personnel. Contact your local Fluke Biomedical representative for calibration.

Certification

This instrument was thoroughly tested and inspected. It was found to meet Fluke Biomedical's manufacturing specifications when it was shipped from the factory. Calibration measurements are traceable to the National Institute of Standards and Technology (NIST). Devices for which there are no NIST calibration standards are measured against in-house performance standards using accepted test procedures.

WARNING

Unauthorized user modifications or application beyond the published specifications may result in electrical shock hazards or improper operation. Fluke Biomedical will not be responsible for any injuries sustained due to unauthorized equipment modifications.

Restrictions and Liabilities

Information in this document is subject to change and does not represent a commitment by Fluke Biomedical. Changes made to the information in this document will be incorporated in new editions of the publication. No responsibility is assumed by Fluke Biomedical for the use or reliability of software or equipment that is not supplied by Fluke Biomedical, or by its affiliated dealers.

Manufacturing Location

The ULT800 Ultrasound Transducer Leakage Current Tester is manufactured in Everett, WA, U.S.A.

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Introduction

The ULT800 TEE Transducer Leakage Current Tester measures the leakage current of ultrasound transducers independent of their ultrasound systems. Use the hand-held, battery-operated instrument during the routine transducer cleaning procedure conducted between patients.

Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

⚠⚠ Warning

To prevent possible electric shock, fire, or personal injury:

- **Read all safety Information before you use the Product.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Remove the batteries if the Product is not used for an extended period of time, or if stored in temperatures above 50 °C. If the batteries are not removed, battery leakage can damage the Product.**
- **The battery door must be closed and locked before you operate the Product.**
- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **Carefully read all instructions.**
- **Do not touch voltages >30 V ac rms, 42 V ac peak, or 60 V dc.**
- **Do not use and disable the Product if it is damaged.**
- **Do not use the Product if it operates incorrectly.**
- **Examine the case before you use the Product. Look for cracks or missing plastic. Carefully look at the insulation around the terminals.**
- **Use this Product indoors only.**

- **Do not use the Product around explosive gas, vapor, or in damp or wet environments.**

Symbols

Table 1 is a list of symbols used on the Product and in this Users Guide.

Table 1. Symbols

Symbol	Description
	Important information. Refer to manual.
	Hazardous Voltage
	Conforms to European Union directives
	Conforms to relevant North American Safety Standards.
	Conforms to relevant Australian EMC requirements
	Conforms to relevant Australian EMC standards
	Standby - On
	Battery
	Conforms to relevant South Korean EMC Standards.
	This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product. Do not dispose of this product as unsorted municipal waste. Go to Fluke's website for recycling information.

In addition to verifying that the ultrasound transducers are safe for patient use, the ULT800 makes it possible to reduce expensive repairs. Identifying transducers that exceed safe leakage currents early may allow for repairs to be made before a transducer becomes non-repairable.

Key Features

- Hand-held instrument
- Stand-alone operation
- Direct measurement of leakage current
- Pass/Fail display of test results
- Battery operation for safety
- Independent of 120 or 240 V ac systems
- Built-in self-test circuit
- Auto shut off to conserve battery

Controls and Indicators

Input connectors are interchangeable and provide for inputting an ultrasound transducer adapter and the dual conductivity electrode. Refer to Figure 1 and Table 2 for complete control and indicator descriptions.

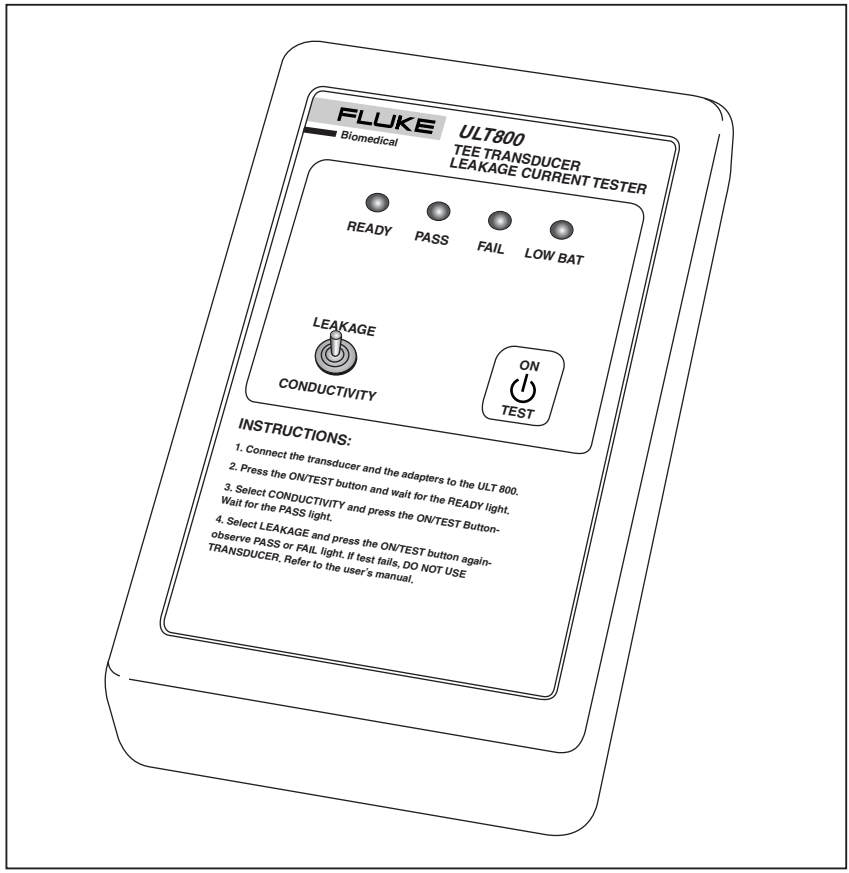

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Figure 1. Controls and Indicators

Table 2. Controls and Indicators

Item	Description
READY	Glows amber when the self-test procedure completes (approx. 8 sec.). The ULT800 is then ready for testing.
PASS	Glows green when either the Conductivity Test or Leakage Test passes.
FAIL	Glows red when either the Conductivity Test or the Leakage Test fails. Pulses red when the Leakage Test results in less than 20 μA, indicating a possible open circuit condition with invalid test results.
LOW BAT	Flashes red to indicate that the battery requires replacement.
LEAKAGE/CONDUCTIVITY SWITCH	Selects the test to perform.
ON/TEST BUTTON	Turns the ULT800 on and initiates the selected test.
BATTERY COMPARTMENT	(not shown): Holds a 9-volt alkaline battery. The instrument automatically powers off if you do not perform a test within 12 seconds.

Specifications

Power	9 V Alkaline Battery
No. of Measurements	Approx. 1000 measurements on a single battery
Conductivity	Pass limit is >250 µA ±5 %
Leakage	Pass limit is <185 µA ±5 % and >20 µA ±5 µA
Dimensions	6.6 in x 3.7 in x 1.5 in (17 cm x 19 cm 4 cm)
Weight	12 oz (340 g)
Temperature	
Operation	15 °C to 40 °C
Storage	15 °C to 65 °C
Relative Humidity	90 % max.
Altitude	2000 m
IP Rating	IEC 60529: IP20
Safety	IEC 61010-1: Pollution Degree 2
Electromagnetic Environment	IEC 61326-1: Basic
Emissions Classification	IEC CISPR 11: Group 1, Class A. Group 1 have intentionally generated and/or use conductively coupled radio-frequency energy which is necessary for the internal functioning of the equipment itself. Class A equipment is suitable for use in non-domestic locations and/or directly connected to a low-voltage power supply network.
Electromagnetic Compatibility	Applies to use in Korea only.Class A: Equipment (Industrial Broadcasting & Communication Equipment) [1]

[1] This product meets requirements for industrial (Class A) electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and is not to be used in homes.

Using the ULT800

⚠⚠ Warning

To avoid personal injury, do not touch the dual conductivity electrode rods. Voltage is present on the rods during a test.

Inspect the conductivity probe for damaged insulation or exposed metal. To avoid personal injury, replace a damaged conductivity probe before using.

⚠ Caution

To avoid damage to the transducer, observe the immersion levels. Do not immerse or allow the cable or connector of a transducer to become wet.

The ULT800 TEE Transducer Leakage Current Tester is a portable, self-contained, battery-operated device. It measures the leakage current of the devices attached to its connectors. The ULT800 applies 120 V ac, 60 Hz to devices placed in a conductive bath (basin or storage tube). The ULT800 measures the current and compares the results to an internal threshold. The instrument displays the results as a **PASS** or **FAIL** indication. It also performs an internal self-calibration on each measurement cycle.

Connect the transducer to be tested to the ULT800 via a unique adapter. The ULT800 performs the measurement with the transducer immersed in either the cleaning solution or saline. To insure that the leakage current test is accurate, first test the conductivity of the fluid. A special dual element probe also connected to the ULT800 tests the conductivity of the fluid. A green **PASS** light or a red **FAIL** light indicates the results of the conductivity and leakage current tests.

The ULT800 makes two types of measurements. The Leakage Test measures the current between the probe and the electrode. The Conductivity Test measures the conductivity of the bath solution between the two electrodes.

Figures 2 and 3 show some typical test setups. You can use other setups, as long as you observe the following rules:

1. Connect the ultrasound probe you are testing to the probe adapter. See the list of available adapters under Accessories.
2. Place the probe you are testing in a saline bath with the entire critical area of the probe fully immersed.
3. Place the dual electrode (Part No. 2392502 or 2392569) in the saline bath to a depth of at least one inch.
4. Plug the probe adapter and the electrode wire connectors into the ULT800. The connections are fully interchangeable.

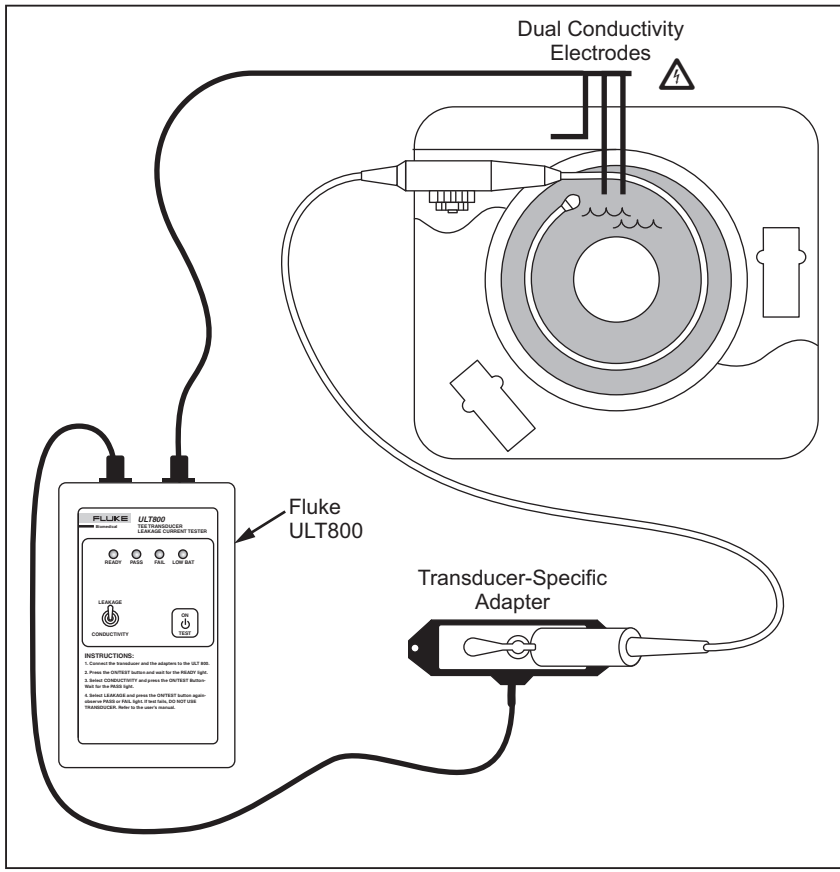

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Figure 2. Disinfection Basin Test Setup

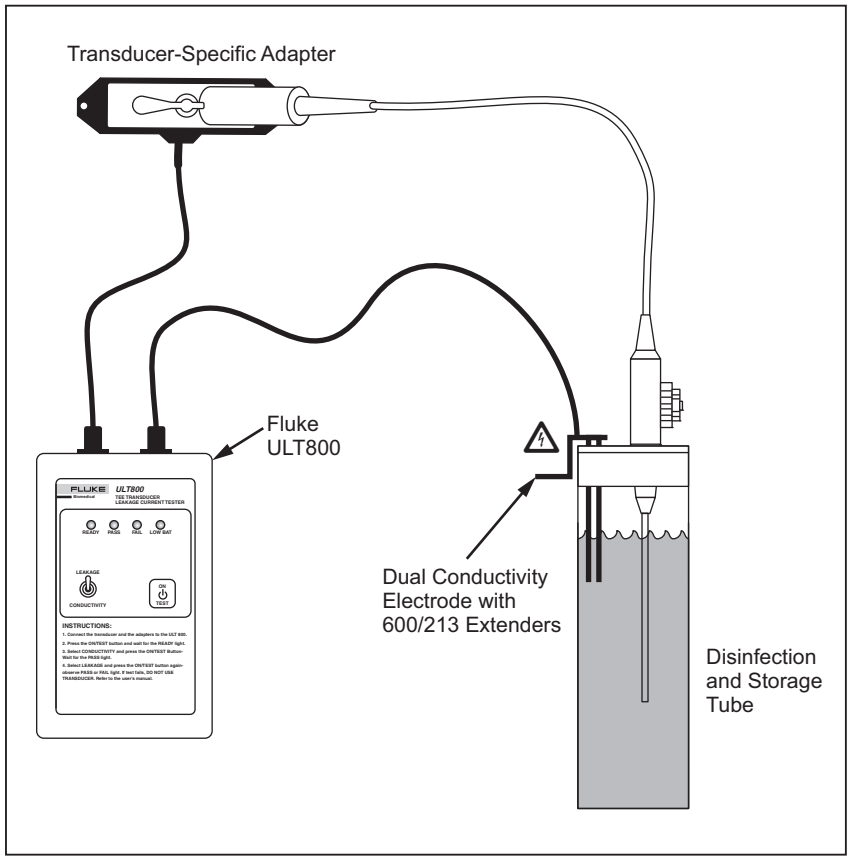

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Figure 3. Disinfection/Storage Tube Setup

Checking the Battery

Note

The **LOW BAT** *light flashes red to indicate that the battery needs replacement.*

1. Use the **LEAKAGE/CONDUCTIVITY** switch to select **CONDUCTIVITY**.
2. Press the **ON/TEST** button to turn on the ULT800.

The self-check routine starts, calibrating the unit. All four LED indicators flash in sequence, continuing for five cycles. The **READY** light glows amber when the self-test routine completes with a successful battery test.

Checking Solution Conductivity

Note

The LED indicating a test result remains on for 12 seconds. The ULT800 then powers off to conserve the battery. To resume testing, power on the ULT800, allow the self-check/battery test to complete, and then reinitiate the test.

1. Select **CONDUCTIVITY**.
2. Press the **ON/TEST** button to perform a measurement cycle.
3. At the end of the measurement cycle (two seconds), the LED indicates the results of the test.

The green **PASS** light illuminates if the solution passed the Conductivity Test. The red **FAIL** light illuminates if the solution failed the Conductivity Test. Check that you have immersed the electrodes to a depth of at least 25 mm (1 inch) and that they are firmly connected to the ULT800, then retest. If the failure repeats, replace the solution and then retest.

Testing for Transducer Leakage Current

Note

Perform the Leakage Test only if the Conductivity Test passes.

1. Select **LEAKAGE**.
2. Press the **ON/TEST** button to perform a leakage measurement.

The green **PASS** light illuminates if the transducer passed the leakage current test. The red **FAIL** light illuminates if the transducer failed the leakage current test. If there is less than 20 µA of leakage current, the red light pulses, indicating a possible open circuit condition with invalid test results.

Maintenance

Your ULT800 needs little maintenance or special care. However, treat it as a calibrated measuring instrument. Avoid dropping or other mechanical abuse that could cause a shift in the calibrated settings.

⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury:

- **Batteries contain hazardous chemicals that can cause burns or explode. If exposure to chemicals occurs, clean with water and get medical aid.**
- **Do not disassemble the battery.**
- **Do not disassemble or crush battery cells and battery packs.**
- **Do not keep cells or batteries in a container where the terminals can be shorted.**
- **Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.**

- **Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.**
- **Use only specified replacement parts.**
- **Have an approved technician repair the Product.**

For safe operation and maintenance of the Product:

- **Repair the Product before use if the battery leaks.**
- **Do not short the battery terminals together.**
- **Keep cells and battery packs clean and dry. Clean dirty connectors with a dry, clean cloth.**

Cleaning

⚠ Caution

Do not put fluid on the Product surface. Fluid leakage into the electrical circuitry may cause the Product to fail.

⚠ Caution

Do not use spray cleaners on the Product. This can push fluid into the Product and cause electronic component damage.

Clean the ULT800 occasionally; use a damp cloth and mild detergent. Take care to prevent the entrance of liquids.

Wipe down the adapter cables with the same care. Inspect them for damage to and deterioration of the insulation. Check the connections for integrity. Keep transducer adapter clean and dry.

Battery

⚠ Warning

The 9-volt alkaline battery provided with the ULT800 may explode or leak if recharged, inserted improperly, disposed of in a fire, or mixed with different battery types. Dispose of the battery in accordance with any applicable state or local regulations.

The ULT800 uses a standard 9-volt alkaline battery. The battery has a life expectancy of approximately 1000 measurements. Replace the battery yearly, regardless of its condition.

Calibration

⚠ Warning

Examine the calibration label on the back of the ULT800 prior to each use. Do not use a ULT800 with an expired calibration label. A ULT800 without a calibration label or with the anti-tamper case label broken is out of calibration. A ULT800 that is out of calibration can cause excessive leakage current exposure to the patient; risk of injury to the patient could result.

⚠ Caution

Avoid dropping the ULT800 or allowing other mechanical abuse that could cause a shift in the ULT800's calibrated settings.

The ULT800 requires yearly Fluke factory calibration, which uses appropriate tools and reference instruments that are traceable to the National Institute of Standards and Technology (NIST). Factory calibration provides a calibration sticker on the back of the ULT800 to verify that the calibration was performed.

To locate a service center, visit the Fluke web site at www.fluke.com, or contact Fluke at service@fluke.com. Call from anywhere in the world at +1-425-446-5500 or call for service in the USA at 1-888-99-FLUKE (1-888-993-5853.)

Accessories

Refer to Table 3 for a list of accessories for the ULT800. Available transducer-specific adapters are listed on Fluke Biomedical's web site. www.flukebiomedical.com/electrical safety analyzers/ULT800.

Table 3. Accessories

Part Number	Model Number	Description
2392427	600/102FG	Chassis ground probe, 8-foot coiled cord
2392502	600/212FG	Dual conductivity electrode
2392525	600/214FG	Hard-sided carrying case
2392533	600/215FG	Conductivity cable
2392569	600/220FG	Dual conductivity probe – for use with Cidex 2032 tray.