

Technical data

# ESA614 Electrical Safety Analyzer

The ESA614 Electrical Safety Analyzer brings fast and simple automated testing in the form of a portable analyzer to healthcare technology professionals that perform electrical safety testing on medical equipment both in the field and in facilities. Whether it is simple testing or comprehensive analysis, the ESA614 can do it all. The ESA614 is an all-in-one solution with a multimeter, safety analyzer and ECG simulator in a single electrical safety test instrument. Just set and forget it.



## Key features

- Ergonomic design with an integrated handle and tilt stand makes it portable and easy to use
- Automated test sequences with compliance to US electrical safety standards using on-board automation (ANSI/AAMI ES1:1993 and NFPA-99)
- Streamlined testing with a user-friendly interface
- Combined functionality of a simulator multimeter and safety analyzer in a single test tool with ECG waveform tests and dual-lead measurements
- Five applied parts jacks and easy ECG snap connection; optional expander box for up to 12-lead ECG testing
- Easy data entry through barcode external keyboard or on-board keypad
- Fast and convenient data storage and exchange through wireless communication or a removable memory card
- Keep your unit in the field and out of the repair shop with replaceable mains fuses
- Get Fluke quality and ruggedness for long-term reliability for rugged field applications with CE and CSA
- Two-year extended warranty (no-cost available after first-year calibration at any authorized Fluke Biomedical Service Center)
- Available in the United States only

**Automated:** Pre-set templates allow you to test to the global standard of your choices at the push of a button. Let the unit guide you through the test steps quickly and accurately in three simple steps:

1. Select the test sequence corresponding to your standard of choice
2. Initiate the automated test sequence.
3. Store the results on-board or wirelessly export to your PC in seconds.

It is that easy. The automated test sequences are easily customized to suit individual testing requirements.

**Portable:** The ESA614 is a small, lightweight analyzer with an integrated handle to carry from place

to place for on-the-go field service. It is designed for operation in tight spaces, and is easy to fit on any cart. A light, protective carrying case makes it easy to store and transport.

**Simple:** A push-button interface allows quick access to highly-comprehensive functions and features, and an intuitive interface guides the user through tests. The ESA614 features a large display for clear indication of available functions, set-up criteria, device under test receptacle conditions, and test results. Data can be entered quickly with a plug-and-play keyboard, barcode scanner and/or on-board data entry interface. Data archival is fast and simple with wireless communication or through a removable memory card with capacity for thousands of test results.

## Specifications

Voltage			
Range (mains voltage)	90 V ac rms to 132 V ac rms		
	180 V ac rms to 264 V ac rms		
Range (accessible voltage)	0 V ac rms to 300 V ac rms		
Accuracy	± (2 % of reading + 0.2 V)		
Voltage tests	Mains and point to point		
Earth resistance			
Modes	Input: 100 V to 240 V with adaptors 50 Hz/60 Hz		
Test current/ranges/accuracy	> 200 mA ac	0 Ω to 2 Ω	± (2 % of reading + 0.015 Ω)
Resistance tests	Earth resistance and point to point		
Equipment current			
Mode	AC rms		
Range/Accuracy	0 A to 20 A	± (5 % of reading + (2 counts or 0.2 A, whichever is greater))	
Duty cycle	15 A to 20 A, 5 min. on/5 min. off 10 A to 15 A, 7 min. on/3 min. off 0 A to 10 A continuous		
Leakage current			
Modes*	AC + DC (True rms)		
	AC only		
	DC only		
*Modes are available in all leakage tests with the exception of MAP leakages that are available only in true-rms			
Patient load selection (input impedance)	AAMI ES1-1993 Fig.1		
Crest factor	≤ 3		
Ranges	0 μA to 199.9 μA		
	200 μA to 1999 μA		
	2 mA to 10 mA		

Frequency response/accuracy	DC to 1 kHz	$\pm (1 \% \text{ of reading} + (1 \mu\text{A or 1 LSB, whichever is greater}))$
	1 kHz to 100 kHz	$\pm (2 \% \text{ of reading} + (1 \mu\text{A or 1 LSB, whichever is greater}))$
	1 kHz to 5 kHz (current > 1.6 mA)	$\pm (4 \% \text{ of reading} + (1 \mu\text{A or 1 LSD, whichever is greater}))$
	100 kHz to 1 MHz	$\pm (5 \% \text{ of reading} + (1 \mu\text{A or 1 LSB, whichever is greater}))$
	Accuracy for Isolation, MAP, leakage tests all ranges are: <ul style="list-style-type: none"> <li>• At 120 V ac + (2.5 <math>\mu\text{A}</math> or 1 LSD, whichever is greater)</li> <li>• At 230 V ac additional <math>\pm 3.0 \%</math> and + (2.5 <math>\mu\text{A}</math> or 1 LSD, whichever is greater)</li> </ul>	
Leakage tests	Ground wire	
	Chassis	
	Lead to ground	
	Lead to lead	
	Lead isolation	
	Point to point	
Mains on applied part test voltage	100 % $\pm 7 \%$ of Mains for AAMI, current limited to 1 mA $\pm 25 \%$ per AAMI	
<b>Differential leakage</b>		
Ranges	75 $\mu\text{A}$ to 199 $\mu\text{A}$	
	200 $\mu\text{A}$ to 1999 $\mu\text{A}$	
	2 mA to 20 mA	
Accuracy	$\pm (10 \% \text{ of reading} + (2 \text{ counts or } 20 \mu\text{A, whichever is greater}))$	
<b>Insulation resistance</b>		
Ranges/accuracy	0.5 M $\Omega$ to 20 M $\Omega$	$\pm (2 \% \text{ of reading} + 0.2 \text{ M}\Omega)$
	20 M $\Omega$ to 100 M $\Omega$	$\pm (7.5 \% \text{ of reading} + 0.2 \text{ M}\Omega)$
Source test voltage	500 V dc or 250 V dc (+ 20 %, -0 %) 2.0 $\pm$ 0.25 mA short-circuit current	
Insulation resistance tests	Mains-PE, AP-PE, Mains-PE, Mains-NE (non-earthed accessible conductive part) and AP-NE (non-earthed accessible conductive part)	
<b>ECG performance waveforms</b>		
Accuracy	$\pm 2 \%$	
	$\pm 5 \%$ for amplitude of 2 Hz square wave only, fixed @ 1 mV lead II configuration	
Waveforms	Rates	
	ECG complex	30 BPM, 60 BPM, 120 BPM, 180 BPM, and 240 BPM
	Ventricular fibrillation	
	Square wave (50 % duty cycle)	0.125 Hz and 2 Hz
	Sine wave	10 Hz, 40 Hz, 50 Hz, 60 Hz, and 100 Hz
	Triangle wave	2 Hz
	Pulse (63 ms pulse width)	30 BPM and 60 BPM

Built-in test sequences		
NFPA-99 (Hospital)	Patient monitor, defibrillator, infusion pump, ultrasound device and generic device	
ANSI/AAMI ES-1	Patient monitor, defibrillator, infusion pump, ultrasound device and generic device	
Communications		
USB device upstream port	Mini-B connector for control by a computer	
USB host controller port	Type A, 5 V output, 0.5 A max load. Connector for keyboard and barcode reader	
Wireless	IEEE 802.15.4 for control by a computer	
Modes of operation	Manual and remote	
Power ratings		
Mains voltage outlet	120 V ac	230 V ac
Mains voltage inlet power range	90 V ac rms to 132 V ac rms	180 V ac rms to 264 V ac rms
Maximum current	20 A	16 A
Hz	47 to 63 Hz	47 to 63 Hz
Physical case		
Dimensions (WxDxH)	17.6 cm x 8.4 cm x 28.5 cm (6.9 in x 3.3 in x 11.2 in)	
Weight	1.6 kg (3.5 lb)	
Environmental		
Operating temperature	10 °C to 40 °C (50 °F to 104 °F)	
Storage temperature	-20 °C to 60 °C (-4 °F to 140 °F)	
Operating humidity	10 % to 90 % non-condensing	
Altitude	120 V ac mains supply voltage up to 5000 meters 230 V ac mains supply voltage up to 2000 meters	
Warranty	Two-year extended warranty (no-cost, available after first-year calibration at any authorized Fluke Biomedical Service Center, otherwise standard one year warranty applies)	



## Ordering information

### Models/descriptions

5031918      ESA614 US, 115 V

### Standard accessories

5006602      Getting started guide, hard copy, multilingual  
 4034393      Data transfer cable  
 3111008      USA accessory kit: test lead set, TP1 test probe set, AC285 alligator clip set  
 3326842      Null post adapter  
 3359538      5-to-5 banana jack to ECG (BJ2ECG) adapter (ESA612-2016)  
 2248650      Carrying case  
 2238644      Power cord

### Accessory kits (country specific)

3111008      USA accessory kit: test lead set, TP1 test probe set, AC285 alligator clip set (ESA T/L kit, USA)

### Optional accessories

1903307      Retractable test leads (6358)  
 2392639      Ground pin adapter (US receptacle testing ground lug) (9503-0004)  
 3392119      1-to-10 ECG adapter box assembly (1210 ECG)  
 3341333      ZigBee USB dongle  
 3472633      Ultrasound test cable adapter  
 2462072      Universal snap to banana adapter



## About Fluke Biomedical

Fluke Biomedical is the world's leading manufacturer of quality biomedical test and simulation products. In addition, Fluke Biomedical provides the latest medical imaging and oncology quality-assurance solutions for regulatory compliance. Highly credentialed and equipped with a NVLAP Lab Code 200566-0 accredited laboratory, Fluke Biomedical also offers the best in quality and customer service for all your equipment calibration needs.

Today, biomedical personnel must meet the increasing regulatory pressures, higher quality standards, and rapid technological growth, while performing their work faster and more efficiently than ever. Fluke Biomedical provides a diverse range of software and hardware tools to meet today's challenges.

## Fluke Biomedical regulatory commitment

As a medical test device manufacturer, we recognize and follow certain quality standards and certifications when developing our products. We are ISO 9001 and ISO 13485 medical device certified and our products are:

- CE Certified, where required
- NIST Traceable and Calibrated
- UL, CSA, ETL Certified, where required
- NRC Compliant, where required

## Fluke Biomedical.

*Trusted for the measurements that matter.*

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11/2018 6011513b-en

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