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# Технические характеристики на анализаторы электробезопасности ESA614

КОМПАНИИ **FLUKE BIOMEDICAL**

## ESA614 Electrical Safety Equipment 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 safety analyzer and ECG simulator in a single electrical safety test instrument. Just set and forget it.



# Set it and forget it. Using on-board test automation.

## 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

> 200 mA ac

### Test ranges

0 Ω to 2 Ω

### Test accuracy

± (2 % of reading + 0.015 Ω)

### Resistance tests

Earth resistance and point to point

## Equipment current

### Mode

AC rms

### Range

0 A to 20 A

### Accuracy

± (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

$\leq 3$

### Ranges

0  $\mu\text{A}$  to 199.9  $\mu\text{A}$

200  $\mu\text{A}$  to 1999  $\mu\text{A}$

2 mA to 10 mA

Frequency Response/Accuracy	Response	Accuracy
	DC to 1 kHz	$\pm (1 \% \text{ of reading} + (1 \mu\text{A or } 1 \text{ LSB, whichever is greater}))$
	1 kHz to 100 kHz	$\pm (2 \% \text{ of reading} + (1 \mu\text{A or } 1 \text{ LSB, whichever is greater}))$
	1 kHz to 5 kHz (current > 1.6 mA)	$\pm (4 \% \text{ of reading} + (1 \mu\text{A or } 1 \text{ LSD, whichever is greater}))$
	100 kHz to 1 MHz	$\pm (5 \% \text{ of reading} + (1 \mu\text{A or } 1 \text{ LSB, whichever is greater}))$

Accuracy for Isolation, MAP, leakage tests all ranges are:

- At 120 V ac + (2.5  $\mu\text{A}$  or 1 LSD, whichever is greater)

- At 230 V ac  
additional  $\pm 3.0\%$   
and + (2.5  $\mu\text{A}$  or 1  
LSD, whichever is  
greater)

#### 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

### Differential leakage

#### 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

$\pm (10\%$  of reading + (2 counts or  
20  $\mu\text{A}$ , whichever is greater))

### Insulation Resistance

	Range	Accuracy
	0.5 M $\Omega$ to 20 M $\Omega$	$\pm (2\%$ of reading + 0.2 M $\Omega$ )
	20 M $\Omega$ to 100 M $\Omega$	$\pm (7.5\%$ of reading + 0.2 M $\Omega$ ) $\pm (2\%$ of reading + (1 $\mu\text{A}$ or 1 LSB, whichever is greater))

#### 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)

## **ECG performance waveforms**

### **Accuracy**

± 2 %

± 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	0.5 M $\Omega$ to 20 M $\Omega$	$\pm$ (2 % of reading + 0.2 M $\Omega$ )
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 oC to 40 oC (50 oF to 104 oF)

### Storage temperature

-20 oC to 60 oC (-4 oF to 140 oF)

### 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)

**Standard Accessories**

3111008 USA/AUS/ISR Test Lead Accessory Kit

3111008 USA/AUS/ISR Accessory Kit

ECG Adapter Box Assembly

1210 ECG 1-to-10 Adapter Box Assembly (part# 3392119)

Retractable Test Leads

Retractable Test Leads (part# 2070133 - TL221-4201, 175-266-011 TEST LEADS, S2S)



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