

Technical data

# ESA620 Electrical Safety Analyzer

The ESA620 Electrical Safety Analyzer, featuring smart technology to enhance productivity under any standard, represents the next generation in portable electrical safety testers. With selections of three test loads, two protective earth test currents and two insulation test voltages, this versatile device performs all primary electrical safety tests as well as several additional leakage tests for premium standards compliance worldwide.

A convenient 20 A device receptacle broadens the range of equipment that can be tested using the ESA620. Standard 2-wire and optional 4-wire protective earth measurement capabilities offer first-rate time savings, while new DSP technology offers better accuracy of leakage measurements throughout specified ranges.

Equipped with ten unique safety-enhanced ECG posts, the ESA620 offers simulation of ECG and performance waveforms so both electrical



safety and basic tests on patient monitors can be performed with a single connection. When combined with optional Ansur computer-based software, the ESA620 allows for test procedure automation, the capture of results and comparison to standard limits, printed reports, and total digital data management.

## Key features

- Superior compliance with multiple standards: IEC60601, EN62353, VDE 751, ANSI/AAMI ES1:1993, NFPA99, AN/NZS 3551, IEC61010
- Three test loads
- Expanded leakage ranges through 10,000  $\mu$ A
- Dual-lead resistance, leakage, and voltage tests
- AC only, DC only and true-RMS leakage readings
- 100 % and 110 % mains voltage for mains on applied part (lead isolation) test
- DSP filter technology for improved accuracy in leakage measurements
- 20 A equipment current
- More applied parts selections
- ECG and performance waveforms
- Intuitive user interface
- Easy-to-use applied parts (ECG) connections
- Insulation posts on applied parts connections
- Five different insulation tests
- Varying insulation test voltage 500 V DC and 250 V DC
- 2- or (optional) 4-wire ground wire resistance
- Optional Ansur plug-in software
- USB connection
- CE, C-TICK and CSA for USA and Canada
- RoHS compliance
- Designed, tested, and built to incomparable Fluke quality standards

## Specifications

| General                                       |   |
|---|---|
| Temperature                                   | Operating: 10 °C to 40 °C (50 °F to 104 °F)   |
|   | Storage: -20 °C to 60 °C (-4 °F to 140 °F)  |
| Humidity                                      | 10 % to 90 % non-condensing   |
| Altitude                                      | To 5,000 meters @ 115 V ac mains and ≤150 V measurements  |
|   | To 2,000 meters @ 230 V ac mains and ≤300 V measurements  |
| Display                                       | LCD display   |
| Communications                                | USB device port for computer control  |
| Modes of Operation                            | Manual and remote   |
| Power   | 120 Volt power outlet: 90 to 132 V ac rms, 47 to 63 Hz, 20 A maximum  |
|   | 230 Volt power outlet: 180 to 264 V ac rms, 47 to 63 Hz, 16 A maximum   |
| Size (L x W x H)                              | 32 cm x 23.6 cm x 12.7 cm (12.6 in x 9.3 in x 5 in)   |
| Weight  | 4.7 kg (10.25 lb)   |
| Safety  | IEC 61010-1: Overvoltage category II, Pollution Degree 2  |
|   | IEC 61010-2-030: Measurement 300 V, CAT II  |
| Electromagnetic Compatibility (EMC)           |   |
| International                                 | IEC 61326-1: Controlled Electromagnetic Environment   |
|   | CISPR 11: Group 1, Class A  |
|   | Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.   |
|   | Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances. |
|   | Emissions that exceed the levels required by CISPR 11 can occur when the equipment is connected to a test object.   |
| Korea (KCC)                                   | Class A Equipment (Industrial Broadcasting & Communication Equipment)   |
|   | Class A: Equipment meets requirements for industrial electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.   |
| USA (FCC)                                     | 47 CFR 15 subpart B. This product is considered an exempt device per clause.  |
| Voltage                                       |   |
| Mains voltage                                 | Ranges: .0.0 to 300 V ac rms  |
|   | Accuracy: ±(2 % of reading + 1.0 V ac)  |
| Accessible Voltage and Point to Point Voltage | Range: 0.0 to 300 V ac rms  |
|   | Accuracy: ±(2 % of reading + 2 LSD)   |

**Specifications (continued)**

| Earth Resistance   |   |   |
|--------------------|---|---|
| Modes              | Two terminal and four terminal  |   |
| Test Current       | .>200 mA ac into 500 mΩ with open circuit voltage ≤ 24 V<br>25 A short circuit ±10 % (with open circuit voltage 6 Vac at nominal mains) |   |
| Range              | 0.0 to 2.0 Ω  |   |
| Accuracy           |   |   |
| Two Terminal Mode  | Test current >200 mA ac into 500 mΩ   | ±(2 % of reading + 0.015 Ω)<br>for 0.0 to 2.0 Ω |
|                    | Test current 1-16 A ac  | ±(2 % of reading + 0.015 Ω)<br>for 0.0 to 0.2 Ω |
|                    |   | ±(5 % of reading + 0.015 Ω)<br>for 0.2 to 2.0 Ω |
| Four Terminal Mode | Test current >200 mA ac into 500 mΩ   | ±(2 % of reading + 0.005 Ω)<br>for 0.0 to 2.0 Ω |
|                    | Test current 1-16 A ac  | ±(2 % of reading + 0.005 Ω)<br>for 0.0 to 0.2 Ω |
|                    |   | ±(5 % of reading + 0.005 Ω)<br>for 0.2 to 2.0 Ω |

**Additional error caused by series inductance**

| Resistance | Series Inductance |         |         |         |
|------------|-------------------|---------|---------|---------|
|            | 0 μH              | 100 μH  | 200 μH  | 400 μH  |
| 0.000 Ω    | 0.000 Ω           | 0.030 Ω | 0.040 Ω | 0.050 Ω |
| 0.020 Ω    | 0.000 Ω           | 0.025 Ω | 0.030 Ω | 0.040 Ω |
| 0.040 Ω    | 0.000 Ω           | 0.020 Ω | 0.025 Ω | 0.030 Ω |
| 0.060 Ω    | 0.000 Ω           | 0.015 Ω | 0.020 Ω | 0.025 Ω |
| 0.080 Ω    | 0.000 Ω           | 0.010 Ω | 0.015 Ω | 0.020 Ω |
| 0.100 Ω    | 0.000 Ω           | 0.010 Ω | 0.010 Ω | 0.015 Ω |
| >0.100 Ω   | 0.000 Ω           | 0.010 Ω | 0.010 Ω | 0.010 Ω |

**Equipment Current**

|            |   |
|------------|---|
| Range      | 0 – 20 A ac rms   |
| Accuracy   | 5 % of reading ± (2 counts or 0.2A, 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                                    |

**Specifications (continued)**

| Leakage Current   |   |
|---|---|
| Modes*  | AC+DC (True-rms)  |
|   | AC only   |
|   | DC only   |
| * Modes: AC+DC, AC only, and DC only available for all leakages with exception of MAP that are available in True RMS (shown as AC+DC)   |   |
| Patient Load Selection  | AAMI ES1-1993: Fig 1  |
|   | IEC 60601: Fig 15   |
|   | IEC 61010: Fig A-1  |
| Crest factor  | ≤3  |
| Ranges  | 0.0 to 199.9 μA   |
|   | 200 to 1999 μA  |
|   | 2.00 to 10.00 mA  |
| Accuracy  | DC to 1 kHz: ±(1 % of reading ± (1 μA or 1 LSD, whichever is greater))                  |
|   | 1 to 100 kHz: ±(2 % of reading ± (1 μA or 1 LSD, whichever is greater))                 |
|   | 100 kHz to 1 MHz: ±(5 % of reading ± (1 μA or 1 LSD, whichever is greater))             |
| Mains on applied part test voltage  | 110 % ±5 % of Mains, current limited to 7.5 mA ±25 % @ 230V for IEC 60601               |
|   | 100 % ±5 % of Mains for AAMI, current limited to 1 mA ±25 % @ 115V per AAMI             |
|   | 100 % ±5 % of Mains for 62353 current limited to 3.5 mA ±25 % @ 230V per 62353          |
| Note: For Alternative and Direct applied parts leakage tests, the leakage values are compensated for nominal mains as per 62353. Therefore, the accuracy specified for other leakages is not applicable. The actual leakage readings given during these tests will be higher. |   |
| Note: For all Map Voltage, additional residual leakage up to 5 μA @120 V ac, 9 μA @240 V ac applies on all measurements. Additional 2% error applies for all measurements within ±30 % of chosen current limit.   |   |
| Differential leakage  |   |
| Ranges  | 50 to 199 μA<br>200 to 2000 μA<br>2.00 to 20.00 mA                                      |
| Accuracy  | ±10 % of reading ±(2 counts or 20 μA, whichever is greater)                             |
| Insulation resistance   |   |
| Ranges  | 0.5 to 20 MΩ<br>20 to 100 MΩ  |
| Accuracy  | 20 MΩ Range: ±(2 % of reading + 2 counts)   |
|   | 100 MΩ Range: ±(7.5 % of reading + 2 counts)  |
| Source test voltage   | 500 V dc (+20 %, -0 %) 1.5 mA short-circuit current or 250 V dc selectable              |
| ECG Performance Waveforms   |   |
| Accuracy  | ±2 %<br>±5 % for amplitude of 2 Hz square wave only, fixed @ 1 mV Lead II configuration |
| Waveforms   | ECG Complex: 30, 60, 120, 180, and 240 BPM  |
|   | Ventricular Fibrillation  |
|   | Square wave (50 % duty cycle): 0.125 and 2 Hz   |
|   | Sine wave: 40, 50, 60, and 100 Hz   |
|   | Triangle wave: 2 Hz   |
|   | Pulse (63 ms pulse width): 30 and 60 BPM  |



## Ordering information

### Models/descriptions

|         |  |
|---------|--|
| 2785725 | ESA620 Electrical Safety Analyzer US, 115 V 20 A |
| 3051408 | ESA620 Electrical Safety Analyzer EUR, 230 V     |
| 3051390 | ESA620 Electrical Safety Analyzer FR, 230 V      |
| 3051413 | ESA620 Electrical Safety Analyzer ISR, 230 V     |
| 3051436 | ESA620 Electrical Safety Analyzer AUS, 230 V     |
| 3051449 | ESA620 Electrical Safety Analyzer UK, 230 V      |
| 3051451 | ESA620 Electrical Safety Analyzer SWI, 230 V     |

### Standard accessories

|                      |                                    |
|----------------------|------------------------------------|
| 2814971              | Multilingual Getting Started Guide |
| 2195732              | 15 A to 20 A Adapter (USA only)    |
| 2814980              | Carrying Case                      |
| 1626219              | Data Transfer Cable                |
| Power Cord           | Country specific                   |
| ESA620 Accessory Kit | Country specific                   |

### Optional accessories

|         |   |
|---------|---|
| 1903307 | Retractable Test Leads                  |
| 2242165 | Ground Pin Adapter                      |
| 2067864 | Kelvin Cable Set for 4-Wire Measurement |

## 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

*We empower our everyday heroes to focus only on protecting lives.*

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