

ESA601 Electrical Safety Analyzer

Technical Data



ESA601 Electrical Safety Analyzer tests medical equipment to both US and international standards. Users simply flip a switch to change between AAMI or IEC electrical safety testing load. The US version includes overlays in AAMI or IEC nomenclature so technicians use the terms that are most familiar to them. Multiple language overlays, outlets, and power cords are available for convenient use in many countries.

Ten applied part connections allow for lead-to-ground (patient), lead-to-lead (patient auxiliary), and lead isolation (mains on applied part) leakage testing of equipment with multiple applied parts.

Designed for on-the-go testing, the portable analyzer is lightweight and compact and comes with a sturdy handle for easy carrying.

For an automated solution, Fluke Biomedical's Ansur software plug-in for the ESA601 allows technicians to use a PC to run autosequences, document results, and print reports.

Key features

- Selectable AAMI or IEC test loads
- Ten applied parts-lead connectors
- 90 V (min) to 264 V (max) autoswitching power supply
- Dual-lead leakage and dual-lead voltage tests
- Easy-to-read display
- Compact and portable
- Ansur plug-in software available to automate testing and document results
- Multiple outlets and power cords for compatibility in multiple countries
- Overlays in English, German, French, and Italian
- Overlay for USA version with either IEC or AAMI nomenclature
- RS-232 serial port for PC control and printing

Technical specifications

Power

Mains power operating range
90 min to 264 max V ac
(47 Hz to 63 Hz), autoswitching

Power ratings
16 A at 264 V max

Mains inlet

The instrument uses a standard IEC 60320-1/C20 mains inlet rated at 16 A and 250 V for class-1 equipment in cold conditions

Equipment outlet
(See models)

Voltage measurements

Autoranging
Yes

Display units
V

Display resolution
1 V

Range (mains voltage)
90 V to 264 V true RMS

Range (accessible voltage)
0 V to 264 V true RMS

Accuracy
 $\pm 2\%$ of reading ± 2 V

Frequency response
DC to 1000 Hz (-3 dB point)

Crest factor
< 3

DC input impedance
1 M Ω

Earth-resistance measurements

Autoranging
Yes

Display units
 Ω

Display resolution
0.001 Ω

Range
0 Ω to 1.999 Ω

Accuracy
 $\pm 2\%$ of reading ± 5 M Ω

Current source amplitude
1 A DC ($\pm 10\%$)

Insulation measurements

Autoranging
Yes

Display units
M Ω

Display resolution
0.1 M Ω

Range
0.5 M to 100 M Ω

Accuracy
0.5 M Ω to 20 M Ω , $\pm 2\%$ of reading, ± 200 k Ω ; above 20 M Ω , $\pm 5\%$ of reading, ± 200 k Ω

Voltage source amplitude
500 VDC ($\pm 10\%$)

VDE differential current

Autoranging
Yes

Display units
 μ A

Display resolution
10 μ A

Range
10 μ A to 10000 μ A

Accuracy
 $\pm 2\%$ of full scale

Leakage-current measurements

Autoranging
Yes

Display units
 μ A

Display resolution
1 μ A

Configuration
RMS current flowing through the ANSI/AAMI ES1 1993 or IEC60601-1 test load

Measurement range
0 μ A to 8000 μ A true RMS

Accuracy
 $\pm 1\%$ of reading (± 2 μ A) @ dc and 25 Hz to 1000 Hz*; $\pm 2.5\%$ of reading (± 2 μ A) 1 kHz to 200 kHz*

***Full scale input**
Accuracy of mains-on-applied-part leakage currents: $\pm 2\%$ of reading ± 6 μ A

Measuring instrument frequency response
DC to 1 MHz (-3 dB)

Crest factor
< 3

Input impedance
Per figure 15 of IEC601-1 or AAMI ES 1

Applied-part connections

The instrument contains ten banana jacks that serve as the applied-part connectors
RA (or R and AP1), RL (or N and AP2), LA (or L and AP3), LL (or F and AP4), and V1-V6 (or C1-C6 and AP5-AP10)

RS-232 serial port

The ESA601 utilizes a null modem serial cable connection to its RS-232 port.

This port is used to
Provide test-result outputs (sent in ASCII format when the PRINT pushbutton is pressed) to a computer or serial ASCII printer

Download processor firmware
Provide an interface for remote operation of the ESA601

Protection circuitry

All signal I/O connections, excluding the RS-232 port and earth connections, withstand a continuous input of 264 Vac, 47 Hz to 63 Hz, or ± 264 Vdc without causing permanent damage. (Blowing a fuse does not cause permanent damage)

The mains input is protected by a double-pole circuit breaker

Ordering information

Model

- 2249883** ESA601-AUS (ESA601 Electrical Safety Analyzer with Australian outlet, Australian line cord, and English 1 overlay)
- 2249909** ESA601-DEU (ESA601 Electrical Safety Analyzer with Schuko outlet, Schuko line cord, and German overlay)
- 2249927** ESA601-FRA (ESA601 Electrical Safety Analyzer with Schuko outlet, Schuko line cord, and French overlay)
- 2249948** ESA601-ITAL (ESA601 Electrical Safety Analyzer with Schuko outlet, Schuko line cord, and Italian overlay)
- 2434154** ESA601-ISR (ESA601 Electrical Safety Analyzer with Israeli outlet, Israeli line cord, and English 1 overlay)
- 2404834** ESA601-SHK (ESA601 Electrical Safety Analyzer with Schuko outlet, Schuko line cord, and English 1 overlay)
- 2249966** ESA601-UK (ESA601 Electrical Safety Analyzer with UK outlet, UK line cord, and English 1 overlay)
- 2249982** ESA601-USA/IEC (ESA601 Electrical Safety Analyzer with US outlet, US line cord, and English 1 overlay utilizing IEC nomenclature)
- 2404852** ESA601-USA (ESA601 Electrical Safety Analyzer with US outlet, US line cord, and English 2 overlay utilizing AAMI [NFPA99] nomenclature)

Note: All ESA601 models have the same testing abilities.

Included accessories

- 2388919** User Manual and Ansur ESA601 Plug-in Demo Software on CD
- 2243822** Getting Started Guide
- 2248650** Soft-Sided Carrying Case
- 2391738** Red Lead
- 2391723** Black Lead
- 2391714** Alligator/Banana Adapters (five each)

Optional accessories

- 2556755** Ansur ESA601 Plug-in
- 2004175** Alligator Clamp
- 2391669** Banana/ECG Adapter
- 2248899** Printer, Seiko DPU-414-30B (with choice of 120 V power supply, p/n 2235375; or 220 V power supply p/n 2235382)
- 2185787** North American 220 V Adapter Kit
- 2238659** Interface Cable (RS-232; male DB9 to female DB9)

Temperature

Operating

10 °C to 40 °C (50 °F to 104 °F)

Storage

-25 °C to 50 °C (-13 °F to 122 °F)

Maximum Humidity

80 % relative humidity up to 31 °C (88 °F), decreasing linearly to 50 % relative humidity at 40 °C (104 °F)

Dimensions (WxDxH)

21.1 cm 24 cm x 7.6 cm
(8.2 in x 9.8 in x 3 in)

Weight

2.4 kg (5.2 lb)

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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.

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

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

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