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FLUKE®
Biomedical

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 µA
- 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)

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Specifications (continued)

Earth Resistance		
Modes	Two terminal and four terminal	
Test Current	.>200 mA ac into 500 mΩ with open circuit voltage ≤ 24 V 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) for 0.0 to 2.0 Ω
	Test current 1-16 A ac	±(2 % of reading + 0.015 Ω) for 0.0 to 0.2 Ω
		±(5 % of reading + 0.015 Ω) for 0.2 to 2.0 Ω
Four Terminal Mode	Test current >200 mA ac into 500 mΩ	±(2 % of reading + 0.005 Ω) for 0.0 to 2.0 Ω
	Test current 1-16 A ac	±(2 % of reading + 0.005 Ω) for 0.0 to 0.2 Ω
		±(5 % of reading + 0.005 Ω) 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 200 to 2000 µA 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 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 % ±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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