Instrument Familiarity

The Analyzer is shown in Figure 1-1 , and Table 1-2 describes its labeled components.

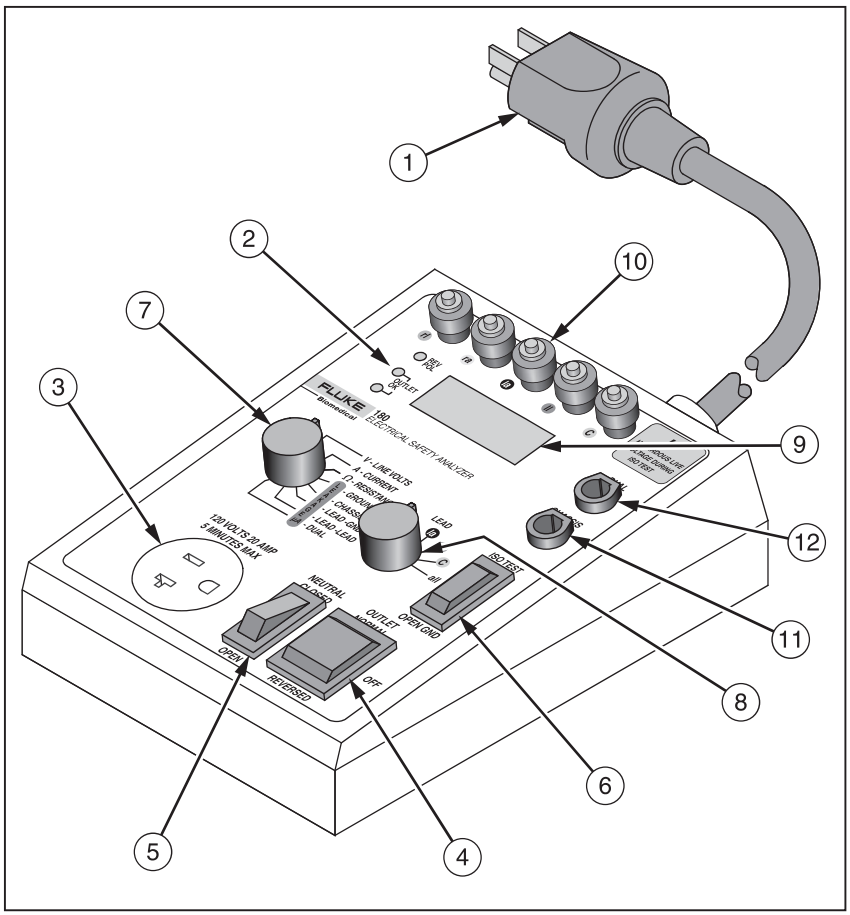

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Figure 1-1. Fluke Biomedical 180 Electrical Safety Analyzer

Table 1-2. Components and Controls of the Analyzer

Label	Name	Function
①	Power Cord	Supplies power to the Electrical Safety Analyzer and to the device under test (DUT). The measurement circuits are energized when the power cord is plugged into an outlet. There is no on/off switch.
②	Outlet Indicators	Verify the polarity and wiring of the outlet to which the Analyzer is connected. Only correctly wired outlets should be used. Not applicable to isolated power systems.
③	Test Receptacle	Supplies power to the DUT. This outlet is powered if the OUTLET switch is set to NORMAL or REVERSED and the NEUTRAL switch is CLOSED.
④	Outlet Switch	If in the center off position, there is no power to the DUT receptacle. This switch permits testing with both normal (forward) and reversed polarity of the line. It is recommended that the switch be paused in the center OFF position before changing polarity. Note: Failure to pause the three-position switch in the OFF position may cause switch damage or blow the internal pico fuse.
⑤	Neutral Switch	Permits making leakage current measurements under the OPEN condition as required by UL and IEC.

Table 1.2. Components and controls of the Analyzer (cont.)

⑥	Lift Ground/ISO Test Switch	This is a dual-function momentary switch that must be held in position while performing the test. The OPEN GND position will open ground to the device for leakage current measurements. The ISO TEST position will energize the selected patient lead at 110 percent line voltage, current limited, to measure the isolation current when the main FUNCTION switch is in the LEAD ISO position. With the FUNCTION switch in the DUAL position, the isolation test voltage is supplied to the DUAL connector for measuring the isolation current of a probe or transducer.
⑦	Function Switch	Provides direct, one-step selection of the measurement to be made. These are line V ac, instrument current, grounding resistance, ground (internal) and chassis (external) leakage currents, and the patient leakage currents. These include lead to ground (source), lead to lead (auxiliary) and isolation (sink) current. A dual position is provided to measure leakage current between two points or isolation current of probes and transducers independent of their instruments.
⑧	Lead Switch	Directs the selected patient lead measurement to the desired lead. When testing a 10-lead device, a second pass will be required for the C leads.
⑨	Meter	This is a large, ½ inch, high-contrast LCD, 3½-digit display of the measured parameter. This will read up to 1999 with decimal points added where required.
⑩	Universal Patient Lead Terminals	Provide means for connection of the patient leads for leakage current measurement.

Table 1.2. Components and controls of the Analyzer (cont.)

⑪	Chassis Connector	Provides a means for inputting the chassis cable with its clip for connection to the DUT chassis or enclosure. The chassis ground resistance is measured with the FUNCTION switch in the RESISTANCE position, and the chassis leakage current is measured in the CHASSIS position.
⑫	Dual Connector	Used to make point-to-point measurements with optional leads available for purchase. For leakage and voltage measurements, the black cable with the clamp with black insulation is attached to the CHASSIS connector, and the black cable with the clamp with red insulation to the DUAL connector. For point-to-point resistance measurements, the black cables with clamps with black insulation are attached to the DUAL and CHASSIS connectors.

Specifications

The following are specifications for the Analyzer. Please contact your Fluke Biomedical service representative for more information regarding the device specifications.

Line Voltage

Range.....90 – 240 V ac 50/60 Hz
Accuracy..... ±3 % of reading, ±1 LSD

Load Current

Range.....0 – 19.99 A
Accuracy.....±5 % of reading, ±1 LSD

Ground Resistance

Range	0 – 2.00 Ω
Accuracy	±1 % of reading, ±1 LSD
Range	2.01 – 19.99 Ω
Accuracy	±3 % of reading, ±1 LSD
Current source	10 mA dc
Type	4-wire bridge

Leakage Current

Range	0 – 1999 µA
Accuracy:	
DC and 25 Hz to 1 kHz	±1 % of reading, ±3 LSD
1.0 kHz to 100 kHz	±2.5 % of reading, ±3 LSD
100 kHz to 1 MHz	±5 % of reading, ±3 LSD
Type measurement	True rms
Impedance	1000 Ω, AAMI ESI 1993

Isolation Test

Voltage	110 % Line voltage ±5%
Current	limited by 120 kΩ resistor

Current Capacity

Line 90 to 140 V ac	20 A max. on time 5 min. 15 A max. on time 30 min.
Line over 140 V ac	10 A

Current Consumption

ESA 180	0.1 A @ 120 V – 60 Hz

Environmental

Operating Temperature	15 – 40 °C
Storage Temperature	-20 – 65 °C
Relative Humidity	90 % max.
Mains voltage range	90 to 240 V ac

Accessories

The following are accessories for the Analyzer. To order, contact your Fluke Biomedical equipment dealer and use the Fluke Biomedical part numbers provided. Table 1-3 lists standard accessories shipped with the Analyzer; Table 1-4 lists optional accessories that must be ordered.

Table 1-3. Standard Accessories

Description	Quantity Shipped	Part Number
Users Guide	1	2185829
8-foot black cable – with large clamp with black insulation	1	2392409

Table 1-4. Optional Accessories

Description	Part Number
8-foot black cable – with large clamp with black insulation (used for dual lead resistance)	2392409
16-foot black cable – with large clamp with black insulation	2392411
8-foot black cable – with large clamp with red insulation	2392448
16-foot black cable – with large clamp with red insulation	2231563
Soft carrying case	2248864
220 V Adapter kit	2185787