

ESA Series Electrical Safety Compliance Analyzer

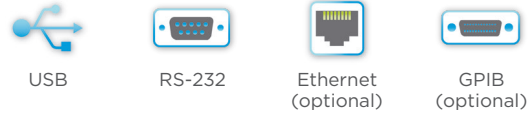


The ESA series is the world first 7-in-1 safety analyzer with color display and optional built-in 500VA AC power source to meet demanding testing needs. Designed with multiple connection interfaces, ESA is an one-stop total solution for an automation station.

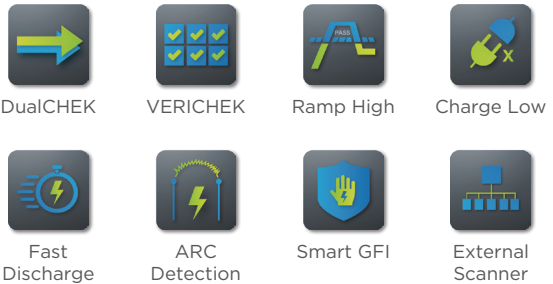
Key Highlight

- An all-in-one total solution analyzer.
- DualCHEK function: Hipot and ground bond testing could be executed simultaneously.
- EEC exclusive patent right on fast discharge function to help DUT expeditiously releases any excess electricity within 50ms.
- Hot line hipot: Capable of operating hipot test with DUT powered on.
- 7 different human body simulation measuring device (MD).
- Provided with touch current to measure AC/DC/AC+DC in conformity to the IEC 60601 standards for medical electrical equipment.
- MD is provided with BNC measuring-terminal which can be connected to oscilloscope or voltmeter for more user-friendly MD calibration.

Available Interface



Safety and Productivity Features



	AC Withstand	DC Withstand	Insulation Resistance	AC Ground Bond	Ground Continuity	Touch Current Test	Run Test	Built-in AC Source
ESA-140A	✓	✓	✓	✓	✓	✓	✓	Optional
ESA-150A	500VA	✓	✓	✓	✓	✓	✓	Optional

ESA Series Specifications		
MODEL	ESA-140A	ESA-150A
INPUT		
Voltage (AC)	115/230V \pm 15% Auto Range	
Frequency	50/60Hz \pm 5%	
AC WITHSTAND VOLTAGE		
Output Rating (AC)	5kV/50mA	5kV/100mA
Output Voltage Range	0-5.00kV	
Voltage Resolution	0.01kV	
Voltage Accuracy	Output 50/60Hz \pm (1.5% of setting + 5V)	
Current Measurement Range (Total)	0.000-50.00mA	0.000-100.00mA
Current Resolution (Total)	0.001/0.01mA	
Current Accuracy (Total)	0.000-3.500mA 3.00-100.00mA	\pm (2% of reading + 2 counts)
Current Measurement Range (Real)	0.000-50.00mA	0.000-100.00mA
Current Resolution (Real)	0.001/0.01mA	
Current Accuracy (Real)	0.000-9.999mA 10.00-99.99mA	\pm (3% of reading + 50 μ A)
Output Frequency	50/60Hz \pm 0.1%	
Ramp Up Timer	0.1-999.9s	
Ramp Down Timer	0.0-999.9s	
Dwell Timer	0, 0.3-999.9s (0 = continuous)	
Timer Resolution	0.1s	
Timer Accuracy	\pm (0.1% of setting + 0.05s)	
Ground Continuity	Current: DC 0.1A \pm 0.01A, Ground Resistance: 1.0 Ω \pm 0.1 Ω	
Current Offset	0.000-50.00mA (Total current + current offset \leq 50mA)	0.000-99.99mA (Total current + current offset \leq 100mA)
DC WITHSTAND VOLTAGE		
Output Rating (DC)	6kV/20mA	
Output Voltage Range	0-6.00kV	
Voltage Resolution	0.01kV	
Voltage Accuracy	\pm (1.5% of setting + 5V)	
Current Measurement Range	0.0 μ A-20.00mA	
Current Resolution	0.1 μ A/0.001mA/0.01mA	
Current Accuracy	0.0 -350.0 μ A 0.300-3.500mA 3.00-20.00mA	\pm (2% of reading + 2 counts)
Ramp Up Timer	0.4-999.9s	
Ramp Down Timer	0.0, 1.0-999.9s	
Dwell Timer	0, 0.3-999.9s (0 = continuous)	
Timer Resolution	0.1s	
Timer Accuracy	\pm (0.1% of setting + 0.05s)	
Ramp High Current	> 20mApeak maximum, ON/OFF User Selectable	
Discharge Timer	Less than 100msec for capacitor load	
Maximum Capacitive Load DC Mode	1 μ F < 1KV , 0.75 μ F < 2KV , 0.5 μ F < 3KV 0.08 μ F < 4KV , 0.04 μ F < 5KV , 0.015 μ F < 6KV	
Current Offset	0.0-20mA (Total current + current offset \leq 20mA)	
Arc Detection	The range is from 1-9 (9 is the most sensitive)	
Charge Low Current	0.0-350.0 μ A	
Discharge Timer	< 50ms for no load, < 100ms for capacitor load (all capacitance values in max load spec below)	
Ground Continuity	Current: DC 0.1 A \pm 0.01 A, fixed, Max. Ground Resistance: 1.0 Ω \pm 0.1 Ω	

MODEL		ESA-140A	ESA-150A
INSULATION RESISTANCE			
Output Rating (DC)		1kV/50GΩ	
Output Voltage Range		30-1000V	
Voltage Resolution		1V	
Voltage Accuracy		±(1.5% of setting + 2 counts)	
Resistance Measurement Range		0.050MΩ-50GΩ	
Resistance Resolution		0.001/0.01/0.1/1MΩ	
Resistance Accuracy	0.050-999.9MΩ under 30-499V	±(7% of reading + 2 counts)	
	0.050-999.9MΩ under 500-1kV	±(2% of reading + 2 counts)	
	1G-9.999GΩ under 500-1kV	±(5% of reading + 2 counts)	
	10G-50GΩ under 500-1kV	±(15% of reading + 2 counts)	
Ramp Up Timer		0.1-999.9s	
Ramp Down Timer		0.0, 1.0-999.9s	
Dwell Timer		0, 0.5-999.9s (0 = continuous)	
Delay Timer		0.5-999.9s	
Timer Resolution		0.1s	
Timer Accuracy		±(0.1% of setting + 0.05s)	
Charge Low Current		0.000-3.500μA	
GROUND BOND			
Output Rating (AC)		40 A/600mΩ/8V	
Output Current		1.00-40.00A	
Current Resolution		0.01A	
Current Accuracy		±(2% of setting + 2 counts)	
Output Voltage		3.00-8.00V	
Voltage Resolution		0.01V	
Voltage Accuracy		±(2% of setting + 3 counts)	
Lead Resistance Offset Range		0-200mΩ	
Lead Resistance Offset Resolution		1mΩ	
Lead Resistance Offset Accuracy		±(1% of reading + 3 counts)	
Resistance Measurement Range		0-600mΩ	
Resistance Resolution		1mΩ	
Resistance Accuracy	1.00-2.99A	±(3% of reading + 3 counts)	
	3.00-40.00A	±(2% of reading + 2 counts)	
Output Frequency		50/60Hz ± 0.1%	
Output Regulation		±(1% of output + 0.02A), Within maximum load limits, and over input voltage range	
Dwell Timer		0, 0.5-999.9s (0 = continuous)	
Timer Resolution		0.1s	
Timer Accuracy		±(0.1% of setting + 0.05s)	
CONTINUITY			
Output Rating (DC)		0.1A for 0-10.00Ω, 0.01A for 10.1-100.0Ω, 0.001A for 101-1kΩ, 0.0001A for 1.001-10kΩ, 0.1A is Max.	
Resistance Offset		0.00-10.00Ω	
Resistance Offset Resolution		0.01Ω	
Resistance Offset Accuracy		±(1% of reading + 3 counts)	
Resistance Measurement Range		0.00-10kΩ	
Resistance Resolution		0.01/0.1/1Ω	
Resistance Accuracy	0.00-10.00Ω	±(1 % of reading + 3 counts)	
	10.1-100.0Ω		
	101-1000Ω	±(1 % of reading + 10 counts)	
	1001-10000Ω		
Dwell Timer		0.0, 0.3-999.9s (0 = continuous)	
Timer Resolution		0.1s	
Timer Accuracy		±(0.1% of setting + 0.05s)	

MODEL	ESA-140A	ESA-150A
TOUCH CURRENT		
Probe Setting	G-L, PH-PL, PH-L (Use HV relay and HV terminal connector)	
Leakage Current Range ¹ (RMS)	0.0μA-10.00mA	
Leakage Current Resolution (RMS)	0.0-999.9μA	0.1μA
	1000-8399μA	1μA
	8.40-10.00mA	0.01mA
Leakage Current Accuracy (RMS) (AC + DC)	DC	±(2% of reading + 3 counts) ²
	15Hz < f < 100kHz	±(2% of reading + 3 counts) ²
	100kHz < f < 1MHz	±(5% of reading) (> 10.0μA)
Leakage Current Accuracy ³ (RMS) (AC)	15Hz < f < 30Hz	±(3% of reading + 5 counts) ²
	30Hz < f < 100kHz	±(2% of reading + 3 counts) ²
	100kHz < f < 1MHz	±(5% of reading) (> 10.0μA)
Leakage Current Accuracy ⁴ (Peak) (DC)	±(2% of reading + 3 counts) ² (> 10.0μA)	
Leakage Current Range ¹ (Peak)	0.0μA-10.00mA	
Leakage Current Resolution (Peak)	0.0-999.9μA	0.1μA
	1000-8399μA	1μA
	8.40-10.00mA	0.01mA
Leakage Current Accuracy (Peak) (AC + DC)	DC	±(2% of reading + 3 counts)
	15Hz < f < 1MHz	±(10% of reading + 2μA) ⁵
Leakage Current Accuracy ² (Peak) (AC)	15Hz < f < 1MHz	±(10% of reading + 2μA) ⁵
Leakage Voltage Range ¹ (RMS)	MD Resistance is 0.5kΩ	0.0mV - 10.00V
	MD Resistance is 1kΩ	0.0mV - 20.00V
	MD Resistance is 1.5kΩ	0.0mV - 30.00V
Leakage Voltage Resolution (RMS)	0.0-999.9mV	0.1mV
	1000-8399mV	1mV
	8.40-10.00V	1V
Leakage Voltage Accuracy (RMS) (AC + DC)	DC	±(2% of reading + 3 counts) ⁶
	15Hz < f < 100kHz	±(2% of reading + 3 counts) ⁶
	100kHz < f < 1MHz	±(5% of reading) (> 10.0mV)
Leakage Voltage Accuracy ² (RMS) (AC)	15Hz < f < 30Hz	±(3% of reading + 5 counts) ⁶
	30Hz < f < 100kHz	±(2% of reading + 3 counts) ⁶
	100kHz < f < 1MHz	±(5% of reading) (> 10.0mV)
Leakage Voltage Accuracy ³ (RMS) (DC)	±(2% of reading + 3 counts) ⁶	
Leakage Voltage Range ¹ (Peak)	MD Resistance is 0.5kΩ	0.0mV - 5.00V
	MD Resistance is 1kΩ	0.0mV - 10.00V
	MD Resistance is 1.5kΩ	0.0mV - 15.00V
Leakage Voltage Resolution (Peak)	0.0-999.9mV	0.1mV - 5.00V
	1000-8399mV	1mV
	8.40-15.00V	1V
Leakage Voltage Accuracy (Peak) (AC + DC)	DC	±(2% of reading + 3 counts)
	15Hz < f < 1MHz	±(10% of reading + 2mV) ⁷
Leakage Voltage Accuracy ² (Peak) (AC)	±(10% of reading + 2mV) ⁷	
Measuring Device (MD)	MD A.	UL544 Non Patient, UL484, IEC60598, UL1363, UL923, UL471, UL867, UL697
	MD B.	UL544 Patient Care
	MD C.	UL2601-1, IEC60601-1, EN60601-1
	MD D.	UL1563
	MD E.	IEC60990 Fig4 U2, IEC 60950-1, IEC 62368-1, IEC60335-1, IEC60598-1, UL484, IEC60065, IEC61010, IEC60065
	MD F.	IEC60990 Fig5 U3, IEC60598-1, IEC 62368-1
	MD G.	Basic measuring element 1k ohm of frequency check
	External MD	User can add one extra MD for his application.

MODEL	ESA-140A	ESA-150A
MD Components Accuracy	Capacitance: $\pm 1\%$; Resistance: $\pm 1\%$	
MD Voltage Limit	Maximum 30V _{peak} or 30V _{dc}	
Current Measurement	The leakage current is fitting range by leakage current Hi-limit setting value	
Frequency Range	DC, 15Hz \leq F \leq 1MHz	
Internal Leakage	1. Internal Leakage current = 65 μ A, 2. 277V applied to PH max leakage current = 70 μ A.	
DUT Power Rating (AC)	277V/16A	
Short Circuit Protection	23Arms or Inrush Current 68A _{peak} , Response time RMS < 3s ; Peak < 10uS	
Delay Timer	AC + DC	0.5-999.9s
	AC/DC only Auto range	1.8-999.9s
	AC/DC only Fixed range	1.3-999.9s
Dwell Timer	AC + DC	0, 0.5-999.9s
	AC/DC only	0.1-999.9s (0 = continuous)
Timer Resolution	0.1s	
Timer Accuracy	$\pm(0.1\%$ of reading + 0.05s)	

RUN TEST	
Power Measurement Range	0 - 4500W
Power Accuracy	\pm (5% of reading + 3 counts)
Power Factor	0.000 - 1.000
Power Factor Accuracy	\pm (8% of reading + 2 counts)
Voltage Measurement Range(AC)	0.0 - 277.0V , 1 \emptyset
Voltage Accuracy	\pm (1.5% of reading + 2 counts)
Current Measurement Range(AC)	0.00 - 16.00A
Current Accuracy	\pm (2% of reading + 2 counts)
Leakage Current Measurement Range	0.00 - 10.00 mA
Leakage Current Accuracy	\pm (2% of reading + 2 counts)
MD (L-G)	Resistor 2k Ω \pm 1%

GENERAL	
Remote Input Signal	Test, Reset, Interlock, Recall File 1 through 3, Recall File 1 through 7
Remote Output Signal	Pass, Fail, Test-in-Process
Memory	It has 10000 steps and allow the user to create different memories and steps
Display	800 x 480 resolution digital TFT LCD/Contrast 9 Levels 1-9
Interface ⁸	Standard USB & RS232, Optional Ethernet, GPIB
External Scanner port	Yes
DualCHEK	5kVac/25mAac and 25Aac/150m Ω 5kVac/50mAac and 30Aac/150m Ω
Hot Hipot Tests	To detect the line input voltage to produce a simultaneous sine wave of line power at hipot output
Language	English/Traditional Chinese/Simplified Chinese
Op./Non-Op. Temp./Humidity	0 to 40°C/-40 to 75°C/20 to 80%RH
Dimension (W x H x D), mm	430 x 133 x 500
Weight	36kg 41kg

INBOX ACCESSORIES
Power Cable (10A)*1; Power Cable (16A)*1; Fuse*1; 1101 Hipot Output Lead - Alligator Clip*3; 1137 Ground Bond Output Lead - Alligator Clip (40A)*1; 1138 Ground Bond Return Lead - Alligator Clip (40A); 1224 USB Cable*1; 1402 Rack Mount Kit for 3U Instrument (with handle)*2; 1505 Interlock Disable Key*1; 1905 Touch Current Testing Fixture Socket*1; Signal Cable*1

*Product specifications are subject to change without notice

- For Leakage Current: if the final measured signal is > 5.3 mA, then the maximum composite signal can be measured is 28V_{peak}. If the final measured signal is ≤ 5.3 mA, then the maximum composite signal can be measured is 12V_{peak}.
For Leakage Voltage: if the final measured signal is > 8 V, then the maximum composite signal can be measured is 28V_{peak}. If the final measured signal is ≤ 8 V, then the maximum composite signal can be measured is 12V_{peak}.
- When current > 5.3 mA, the accuracy is $\pm(5\%$ of reading).
- AC cutoff frequency for High Pass Filter is 15Hz on AC only mode.
- AC cutoff frequency for Low Pass Filter is 15Hz on DC only mode.
- When current > 5.3 mA & 15Hz $< f < 100$ kHz, the accuracy is $\pm(10\%$ of reading + 2 counts).
- When voltage > 8 V, the accuracy is $\pm(5\%$ of reading).
- When voltage > 8 V & 15Hz $< f < 100$ kHz, the accuracy is $\pm(10\%$ of reading + 2 counts).
- Only one interface can be selected among RS232 & USB, GPIB & Ethernet interface card.

Models

● ESA-140A Electrical Safety Compliance Analyzer

● ESA-150A Electrical Safety Compliance Analyzer (500VA)

Options

- OPT.109 Replace RS232 Interface by GPIB Interface
- OPT.769 AC Source (500VA)
- OPT.790 IR Output 6kV
- OPT.7020 MD 1k ohm (non-inductive resistor)
- OPT.7021 MD NFPA99 Figure A.8.4.1.3.3
- OPT.7022 MD IEC60974
- OPT.7023 MD IEC60598-1
- OPT.7024 MD NFPA99 Figure A.4.3.3.1.3b

- OPT.7025 MD NFPA99 Figure A.4.3.3.1.3a
- OPT.7027 MD 2k ohm (non-inductive resistor)
- OPT.7030 External HV (P-G/S-G/P-S), Touch Current Measurement (AC/DC/AC + DC) & Cold Resistance Function
- 6600 Series Programmable AC Power Source (6605, 6610, 6620, 6630, 6650)
- 6700 Series Programmable AC Power Source (6705, 6710, 6720, 6730, 6740)

Note: OPT.7020 to OPT.7027 are mutually exclusive, only one Option can be selected.