SECULIFE ES TECH

High-End TRMS RF Surgical Generator Analyzer

3-447-147-03
1/8.22

- Industry standard RF current measurement
- DFA Technology™ ultra high-speed digitization
- RF energy
- RF leakage
- Load curves with multiple power settings per load setting
- REM/ARM/CQM testing via 500 Ω adjustable load in 1 Ω increments
- User-definable testing sequences (autosequence)
- Automatic or manual activation device under test
- Compatible with Covidien / Valleylab ForceTriad™, FT10™ and Ligasure™ generators, and most legacy generators by other manufacturers
- ± 2% measurement accuracy
- Internal precision test loads 0 … 5500 Ω in 5 Ω increments
- External test load compatibility
- Measurement/test setup aid screens
- Remote mode

Applications

The SECULIFE ES TECH is a high-accuracy True RMS RF measurement and testing system designed to be used for routine performance verification, safety evaluation, and calibration of electro-surgical generators.

It offers a higher degree of accuracy than previously attainable with conventional electro-surgical analyzer designs.

The SECULIFE ES TECH is microprocessor-based and utilizes a combination of unique hardware and software to provide accurate and reliable test results, even from “noisy” electro-surgical generator waveforms such as “spray”.

The DFA Technology™ utilized in the SECULIFE ES TECH allows the system to aggressively digitize the RF waveforms produced by electro-surgical generators, analyze each individual digital data point, and provide highly accurate measurement and test results.

Features

- Color touch screen
- Startup screen selection
- Displays up to 9 different measurement parameters (user selectable display choice)
- Compatible with external USB keyboard, USB flash drive, and USB barcode scanner
- Network capable
- Saving results in internal memory, on network drives, and on connected USB flash drive
  - load curves for later viewing
  - autosequences for later viewing and as PDF for DUT documentation
- Saving user-created load curves and autosequences in internal memory, on network drives, and on connected USB flash drive for easy re-use
- Saving user-specific device configuration in internal memory, on network drives, and on connected USB flash drive
- File transfer (internally for management and to USB flash drive for backup)

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Technical Data

Power Supply

Type	12 V_{DC}, minimum 4 A, universal power supply unit; 2 power connectors, Kycon 3 position locking receptacle

Ambient Conditions

Operating temperature	+15 °C … +30 °C
Storage temperature	–20 °C … +60 °C
Relative humidity	20 … 80%, no condensation allowed
Elevation	max. 2000 m
Place of use	Indoor use only

Measurements / Testing

Technology	True RMS using DFA Technology™ industry standard current sensing
Input connectors	4 mm safety banana, color coded
Output connectors	oscilloscope, BNC (50 Ω), uncalibrated
Foot switch	3 relay controlled foot switch controls; connector: Hirose HR10A-10R-12S(71), mating connector: Hirose HR10A-10P-12P(74)
Types	V_{Peak}, mA, crest factor, power (Watts), load voltage, programmable auto-sequences, programmable load curves, CQM testing with1 Ω resolution, footswitch outputs for DUT triggering
Reading accuracy	± 2%
A/D resolution	14 bit/s
A/D speed	64 MSPS
Calibration	digital

Electrical Safety

Measuring category	Cat II 1000 V
Pollution degree	2

Electromagnetic Compatibility

Interference emission	EN 61326- 1 class A
Interference immunity	EN 61326-1

Mechanical Design

Protection:	Housing: IP40 per EN 60529 (protection against ingress of solid foreign objects: ≥ 1.0 mm ∅; protection against ingress of water: not protected)
Housing	W × H × D: approx. 47 × 19,81 × 381 cm; enclosure: aluminum, face: LEXAN™
Weight	approx. 8.2 kg
Display	5.7” QVGA LCD,320 × 240 px, color with white LED backlight; touchscreen

Data Interfaces

Touchscreen (resistive)

USB	2 × USB port, type A connector to connect: keyboard, mouse, flash drive (FAT32 formatted)
Ethernet	1 × RJ-45 port; 10-Mbit/s,100-Mbit/s for connection to a network for data storage, remote control, software updates

System

Operating system	Windows Embedded Compact 7
RAM	512 DDR2
Data storage	32 GB
Setup memory	EEPROM, all parameters
Memory retention	10 years without power

Remote mode

System requirements	CERHost utility (included) installed and running on Windows 8.1, Windows 10, or Windows 11

SECULIFE ES TECH

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Relevant Standards

The instrument has been manufactured and tested in accordance with the following safety regulations:

DIRECTIVE 2014/30/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)

DIRECTIVE 2014/35/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast)

COMMISSION DELEGATED DIRECTIVE (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances

REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

EN 50581	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EN 60529	Test instruments and test procedures Degrees of protection provided by enclosures (IP code)
EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements
EN 61000-3-2	Electromagnetic compatibility (EMC) – Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61000-3-3	Electromagnetic compatibility (EMC) – Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection
EN 61326-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements

Analyzer Modes

RF energy	Allows use as a general-purpose RF meter, including current, voltage, power and timing measurement.
Leakage test, 1a	Tests the open circuit leakage of an isolated type CF generator. The test complies with IEC 601-2-2, section 201.8.7.3.101 a) 2), figure 201.106 for unloaded monopolar tests (active lead) and section 201.8.7.3.101 a) 3), figure 201.107 for unloaded bipolar tests (bipolar lead 1).
Leakage test, 1b	Tests the open circuit leakage of an isolated type CF generator. The test complies with IEC 601-2-2, section 201.8.7.3.101 a) 2), figure 201.106 for unloaded monopolar tests (dispersive lead) and section 201.8.7.3.101 a) 3), figure 201.107 for unloaded bipolar tests (bipolar lead 2).
Leakage test 2	Tests the leakage to ground of earth-referenced type BF generators. This test complies with IEC 601-2-2, section 201.8.7.3.101 a) 1) test 1, figure 201.104 for monopolar tests and section 201.8.7.3.101 a) 3), figure 201.107 for bipolar tests.
Leakage test 3	Tests the leakage to ground of earth-referenced type BF generators. This test complies with IEC 601-2-2, section 201.8.7.3.101 a) 1) test 2, figure 201.105 for monopolar tests.
Load curve	Allows to automatically generate a power curve based on varying load, commonly seen in the generator data sheets.
REM/ ARM/ CQM	Uses internal load bank as a variable resistor to test the DUT's CQM/RECQM circuit.
Autosequence mode	Allows you to follow a standard or custom defined protocol to sequentially buildup a test record, applicable to many DUT manufacturer's recommended verification and calibration procedures.

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Characteristic Values

Calculated Ranges

Load voltage	0 … 1000 V_{RMS}	
	Resolution:	1 V
	Accuracy:	± 5%
Power	0 … 999.9 W	
	Resolution:	0.1 W
	Accuracy:	± (4% of reading + 1W)
Crest factor	1.4 – 500	
	Resolution:	0.1

RF Measurement/Testing

Calculated Ranges

Load voltage	0 … 1000 V_{RMS}	
	Resolution:	1 V
	Accuracy:	± 5%
Power	0 … 999.9 W	
	Resolution:	0.1 W
	Accuracy:	± (4% of reading + 1W)
Crest factor	1.4 – 500	
	Resolution:	0.1

Characteristics

Input	Impedance:	0 … 5500 Ω
	Connection:	4 mm safety jack
	Maximum voltage:	10 kV
	Frequency:	10 kHz …10 MHz
	Method:	Pearson current to voltage converter, 0.1 V : 1 A
Voltage	pk, pk – pk:	2.0 … 1000.0 mV
	Resolution:	0.1 mV
Current	Range:	2 … 7000 mA RMS
	Resolution:	1 mA RMS

Accuracy

	$f \leq 2.5$ MHz	2.5 MHz < f ≤ 5 MHz	$f > 5$ MHz
Input ≤ 50 mA	± 2% reading or ± 1 mA	± 2 reading or ± 1 mA	± 2% reading or ± 1 mA
50 mV < Input ≤ 400.0 mA	± 2% reading	± 4% reading	± 6% reading
Input > 400.0 mA	± (2% reading + 0.25% range)	± (4% reading + 0.25% Range)	± (6% reading + 0.25% range)

Load Bank Specifications

Maximum current

0 Ω	8 A RMS external load Using “ACTIVE” and “LOOP” terminals only
5 – 5500 Ω	3.5 A RMS internal or internal + external load

Internal load selection

Range	0 … 5500 Ω, 5 Ω steps
Resolution	5 Ω
Accuracy	1% ±0.5 Ω, non-inductive
Power rating	< 50 Ω: 400 W 50 to < 800 Ω: 500 W ≥ 800 Ω: 300 W
Duty cycle	10 seconds on, 30 seconds off
Load cooling	Dual 120 mm variable speed fans (controlled by load temperature or input power measurement)

External load selection

Resolution:	0 … 5500 Ω
Accuracy:	1 Ω

Digital Fast Acquisition Technology™ (DFA) Information

The Digital Fast Acquisition Technology™ (short DFA) is a revolutionary new method of measuring/testing the generator output power of electro-surgical generators.

A high-speed analog to digital converter is used to digitize the high frequency, high power output of the electro-surgical generator. An RF current transformer is used to convert the current signal to a voltage signal, which is read by the analog to digital converter. By digitizing the signal a more accurate, frequency independent measurements/testing is made possible.

US Patent No. 9,883,903.

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Scope of Delivery

1	SECULIFE ES TECH (M695F)
1	Operating instructions
1	Universal power supply
1	Power adapter with international plugs
1	Test lead kit (bipolar lead, active lead, earth/ground lead, jumper leads, ground lug, banana jack alligator clips, dispersive leads, RECQM lead (pin), CQM lead (no pin))
1	Test report
1	Calibration certificate

Order Information

Description	Type	Article number
High-end TRMS RF surgical generator analyzer	SECULIFE ES TECH	M695F

For additional information regarding accessories please refer to

- Measuring Instruments and Testers catalog
- www.gossenmetrawatt.com

Optional Accessories

Type	Article number
FT10 calibration cable kit	20-00141
Communications cable, USB null modem	20-41360
BNC to BNC cable	20-00232
Footswitch cable, unterminated	Z699A
Footswitch cable for Covidien ForceFx	Z699B
Footswitch cable for CONMED System 5000	Z699C
Footswitch cable for Covidien ForceTriad	Z699D
Footswitch Simulator for Covidien ForceFx and ForceTriad, triggers cut, COAG, bipolar	20-03004
Footswitch cable for Olympus ESG-100	20-03006
Footswitch cable for Olympus ESG-40	20-03007
Footswitch simulator	20-03004
Footswitch port adapter	20-03050

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