GOSSEN METRAWATT

SECULIFE UL

Leakage Current Tester for Ultrasound Transducers

3-349-976-03
1/8.17

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WARNING - USERS

The SECULIFE UL is for use by skilled technical personnel only.

WARNING - USE

The SECULIFE UL is intended for testing only and should never be used in diagnostics, treatment or any other capacity where it would come in contact with a patient.

WARNING - MODIFICATIONS

The SECULIFE UL is intended for use within the published specifications. Any application beyond these specifications or any unauthorized user modifications may result in hazards or improper operation.

WARNING - CONNECTIONS

All connections to patients must be removed before connecting the DUT to the SECULIFE UL. A serious hazard may occur if the patient is connected when testing with the SECULIFE UL. Do not connect any leads from the patient directly to the SECULIFE UL or DUT.

WARNING – POWER ADAPTER

Remove power before cleaning the surface of the SECULIFE UL.

WARNING - LIQUIDS

Do not submerge or spill liquids on the SECULIFE UL.
Do not operate the SECULIFE UL if internal components may have been exposed to fluid.

WARNING - VOLTAGE

High Voltages are generated by the SECULIFE UL when running tests. Do not touch any surface that is in contact with or connected to the SECULIFE UL, including the ultrasound transducer, adapter, conductivity probe, basin or liquid medium contained in the basin, as it might be at an electrical potential of 90 to 275 VAC.

CAUTION - SERVICE

The SECULIFE UL is intended to be serviced only by authorized service personnel. Troubleshooting and service procedures should only be performed by qualified technical

CAUTION - ENVIRONMENT

Exposure to environmental conditions outside the specifications can adversely affect the performance of the SECULIFE UL. Allow SECULIFE UL to acclimate to specified conditions for at least 30 minutes before

CAUTION - CLEANING

Do not immerse. The SECULIFE UL should be cleaned by wiping gently with a damp, lint-free cloth. A mild detergent can be used if desired.

CAUTION - INSPECTION

The SECULIFE UL should be inspected before each use for obvious signs of abuse or wear. The SECULIFE UL should not be used and should be serviced if any parts are in question.

NOTICE – CE

The SECULIFE UL Analyzers bear the CE mark
Based on the following testing standards:

ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

EMC – Directive 89/336/EEC and 2004/108/EC as amended by 92/31/EEC, 93/68/EEC and Directive 91/263/EEC [TTE/SES]

EN 61326-1:1997 + A1:1998 + A2:2001 + A3:2003
"Electrical equipment for measurement, control and laboratory use – EMC requirements"

This equipment has been type tested and compliance was demonstrated to the above standard to the extent applicable.

EMISSIONS
Radiated and Line Conducted Emissions

EN 61000-3-2	Harmonic Current Emissions
EN 61000-3-3	Voltage Fluctuation and Flicker

IMMUNITY– CLASS C

EN 61000-4-2	Electrostatic Discharge
EN 61000-4-3	Radiated Electric Field Immunity
EN 61000-4-4	Electrical Fast Transients / Bursts
EN 61000-4-5	Surge Voltage
EN 61000-4-6	Conducted Disturbance
EN 61000-4-11	Voltage Dips and Short Interrupts

LOW VOLTAGE DIRECTIVE

EC – Directive 73/23/EC

EN 61010-1:2001
"Safety requirements for electrical equipment for measurement, control, and laboratory use – General requirements"

This equipment has been type tested and compliance was demonstrated to the above standard to the extent applicable.

NOTICE – SYMBOLS

Symbol	Description
	Caution (Consult Manual for Further Information)
	Electrical Caution (Consult Manual for Further Information)
	Center Negative (Refers to Battery Eliminator Connector)
	Per European Council Directive 2012/19/EU, do not dispose of this product as unsorted municipal waste.

NOTICE – ABBREVIATIONS

ANSI	**American National Standards Institute**
C	**Celsius**
°	**degree(s)**
DC	**Direct Current**
DUT	**Device Under Test**
Euro	**European**
FS	**Full Scale**
Hz	**Hertz**
kg	**kilogram(s)**
µA	**microampere(s)**
mA	**milliampere(s)**
mm	**millimeter(s)**
NEDA	**National Electronic Distributors Association**
Ω	**ohm(s)**
PC	**Personal Computer**
Lbs	**pounds**
sec	**second(s)**
TEE	**Transesophageal Echocardiography**
ULT	**Ultrasound (Transducer) Leakage Tester**
USA	**United States of America**
V	**Volt(s)**
VAC	**Volts Alternating Current**
VDC	**Volts Direct Current**

NOTICE – DISCLAIMER

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NOTICE – CONTACT INFORMATION

GMC-I Messtechnik GmbH
Südwestpark 15
90449 Nürnberg
Germany
Fon: +49 911 8602-111
Fax: +49 911 8602-777

www.gossenmetrawatt.com
e-mail: info@gossenmetrawatt.com

Gossen Metrawatt
SECULIFE UL SERIES
ULTRASOUND TRANSDUCER LEAKAGE TESTER

The Model SECULIFE UL Series is a family of Microprocessor based, Ultrasound Transducer Leakage Testers. The Seculife UL measures both the conductivity of the cleaning medium and the leakage current of the ultrasound transducer. The Seculife UL offers as additional features a Meter mode and Data Logging.

The following are highlights of some of the main features:

SECULIFE UL (BASIC FEATURES):

- GRAPHICAL LCD DISPLAY WITH CURSOR SELECTION OF OPTIONS AND SETUP OF PARAMETERS
- USER-SELECTABLE SOURCE (CHALLENGE) VOLTAGE (90 TO 275 VAC) & FREQUENCY (50 OR 60 Hz)
- USER-SELECTABLE TEST LIMITS BY ULTRASOUND TRANSDUCER MANUFACTURER AND MODEL
- AUTO RANGING WITH 10, 250, OR 500 μA FS RANGES
- AUTOMATIC INTERNAL SELF TEST
- SINGLE BUTTON PRESS FOR FULL SYSTEM TEST
- SIMPLE PASS / FAIL MODE – FOR NON-TECHNICAL USERS
- ANALYTICAL MODE – FOR TECHNICAL USERS
- DIGITAL CALIBRATION – NO POTS TO TURN
- USER-SELECTABLE DISPLAY OPTIONS
- BATTERY LIFE DISPLAY (0 to 100%)
- PROGRAMMABLE BACKLIGHT TIMER
- CONTRAST IS SOFTWARE ADJUSTABLE
- FLASH UPGRADEABLE FIRMWARE
- RS232 INTERFACE
- PC SOFTWARE (LIMIT CONFIGURATION TOOL)
- SERIAL PRINTER OUTPUT WITH PROGRAMMABLE USER HEADER
- REAL TIME CLOCK ALLOWING TEST RECORDS TO HAVE A TIMESTAMP
- COMPATIBLE WITH DALE® TECHNOLOGY DALE800® AND FLUKE® Seculife UL® ULTRASOUND TRANSDUCER ADAPTERS AND DUAL CONDUCTIVITY PROBES

Seculife UL (METER, DATALOG)

HAS ALL THE BASIC MODEL FEATURES PLUS:

- METER MODE FOR EXTENDED MEASUREMENT PERIODS
- PROGRAMMABLE METER SOURCE (CHALLENGE) VOLTAGE AND FREQUENCY
- PROGRAMMABLE METER TIMER
- DATALOG WITH STORAGE OF 99 TEST RECORDS

STANDARD ACCESSORIES:

20-21111 Z695M	UNIVERSAL BATTERY ELIMINATOR
20-41357	PC SOFTWARE (LIMIT CONFIGURATION TOOL)

OPTIONAL ACCESSORIES:

20-30106	CASE, SMALL SOFT SIDED CARRYING(Instrument only)
20-30107	CASE, MEDIUM SOFT SIDED CARRYING (Instrument and printer)
	BC20-40614 BATTERY ELIMINATOR, 220V (US Version)
20-41337	RS-232 COMMUNICATIONS CABLE (7 Pin Mini-Din to DB-9F)
20-41339	USB COMMUNICATION CABLE ADAPTER (USB to DB-9M) (For use with 20-41337)
20-42200	CIDEX® COMPATIBLE TEST BASIN
20-42310	PACKAGE OF 5 ROLLS OF PAPER FOR PRINTER
20-42322	CABLE, CONDUCTIVITY TEST FIXTURE (For use with ULT-TF-T2)
20-42324	CABLE, BATH TEST FIXTURE (For use with ULT-TF-T2)
20-42325	PRINTER CABLE FOR PRN-1130
20-42331	ULT Kit - Includes 1: MEDIUM CARRY CASE (20-30107), FIVE ROLLS PAPER, (20-42310)
PRN-1120	DESKTOP PRINTER[1]
PRN-1130	MOBILE PRINTER[1]
ULT-TF-T2	ULT Test Box (Simulates conductivity and leakage current)
Z695M	Universal Power Supply 90 - 264 V AC

1 Printers include power supply, printer cable, and 1 roll of paper.

CONDUCTIVITY PROBES: (not included, order separately)

ULT-PC-10	DUAL CONDUCTIVITY PROBE (Short)
ULT-PC-15	DUAL CONDUCTIVITY PROBE (Medium)
ULT-PC-20	DUAL CONDUCTIVITY PROBE (Short & Long)
ULT-PC-25	FOR USE WITH GUS CLEANING SYSTEM
ULT-PC-30	DUAL CONDUCTIVITY PROBE (Flexible)

ULTRASOUND TRANSDUCER ADAPTERS: (not included, order separately)

TRANSDUCER MANUFACTURER	MODEL	ADAPTER PART NUMBER
Acuson / Siemens	V5M (TEE), V7M (TEE), EV8-C4, etc For Acuson Sequoia Ultrasound Systems	ULT-PA-10
Acuson / Siemens	ALL 260-pin Transducers	ULT-PA-12
Acuson / Siemens	ALL 156-pin Transducers	ULT-PA-13
Aloka	UST-934N/945BP, ASU-32-3-M, ASU-32-WSJ, UST-556/5512, UST-5514DTU	ULT-PA-22
ATL / Philips	HP/Agilent/Philips 21311A, 21369A, 21378A, 21381A. For HP Sonos 4500, 5500, 7500, and Imagepoint. For ATL HDI 1500,3000,3500, and 5000	ULT-PA-14
ATL / Philips	T6210, L7-4 and similar 260-pin transducers with bellhousing	ULT-PA-24
GE	GE LogiQ 3, 5, 7, 9 and GE Vivid 3, 5, 7, 6T, 9T	ULT-PA-16
GE	LogiqBook Probes - GE VIVID I 6T, 9T, etc.	ULT-PA-25
GE	YMS/RT	ULT-PA-27
GE	4C-D, 6VT-D, Voluson E8, Vivid E9	ULT-PA-30
Hitachi	HI VISION 900, 5500, 6500, 8500 EUB-2000, EUB-525, EUB-405 Plus	ULT-PA-21
Philips	Philips iE33 and iU22 diagnostic TEE - S7-2 (TEE), S7-3t (TEE), S3-1, C8-4v, C9-5, et all with bellhousing, Mindray DC8	ULT-PA-17
Philips / HP	HP/Agilent/Philips 21202A, 21364A, 21365A, 21366A, 21367A	ULT-PA-18
Philips	Cx50 series, X7-2T, EPIQ 7c	ULT-PA-19
Sonosite	ICT7-4, ITC8-5, C60, L38/10-5, TEEx For Sonosite Titan and Micromaxx Ultrasound Systems	ULT-PA-11
Terason	ALL	ULT-PA-31
Toshiba	Acuson/Toshiba for use with Acuson/Siemens XP, Aspen, Capasee, 3-needle guide C3 Transducers; ATL 3.5 DFT Transducers; Toshiba PSF-37HT and F series Transducers For Toshiba SSH-140A, SSA-270A, and 340A systems	ULT-PA-20
Zonare	E9-4	ULT-PA-29
All Manufacturers	Universal Pen Style (For small surface area testing)	ULT-PA-23

For compatibility with specific manufacturer and model ultrasound transducers, please visit our website at www.gossenmetrawatt.com . There may be additional adapters available that are not listed above.

BACKGROUND

The following is the minimal equipment needed to test the electrical safety of ultrasound transducers:

1) SECULIFE UL Series Ultrasound Transducer Electrical Leakage Tester
2) Dual Conductivity Probe (See list on page 10)
3) Ultrasound Transducer Adapter (See list on page 11)
4) Test Basin (20-42200)

The SECULIFE UL is designed to test the electrical safety of all types of diagnostic ultrasound transducers, independent of the ultrasound machines on which they are typically used. Although the SECULIFE UL can be used on virtually any type of ultrasound transducer, it is especially recommended in the testing of TEE (Transesophageal Echocardiography) transducers prior to each use, as recommended by many TEE ultrasound manufacturers. The SECULIFE UL tests the integrity of the outer insulation barrier of the transducer and transducer cable as well as the existing capacitive leakage currents. Due to the proximity of the TEE transducer to the human heart during a normal procedure, abnormally elevated electrical leakage currents can be hazardous to the patient. Excessive electrical leakage could induce microshock, resulting in cardiac fibrillation. It is therefore vital to routinely test TEE (and other types of) ultrasound transducers prior to their use.

All ultrasound transducers have inherent electrical leakage characteristics, and the manufacturers of these transducers have carefully tested and documented these characteristic leakages. These transducers each have characteristic minimum and maximum leakage currents and associated PASS / FAIL limits as prescribed by the

manufacturer. These are different than the acceptable electrical leakage current limits for the actual ultrasound machines. The SECULIFE UL is the only battery-operated handheld tester on the market today that tests according to these established protocols, which have been adopted by diagnostic ultrasound manufacturers. It tests both the upper and lower limit thresholds for electrical leakage currents.

Typical electrical safety (leakage) testing of the diagnostic ultrasound transducer should occur as part of the routine cleaning and disinfecting activity that is performed between patient ultrasound procedures. The ultrasound transducer (see Item 5 in Figure 1) is immersed in a basin (see Item 4 in Figure 1) containing conductive liquid (see Item 7 in Figure 1) suitable for performing electrical safety tests. This liquid can be the routine cleaning and disinfecting agent used, as long as it is suitably conductive to electrical current flow. Cidex® is an example of a widely used disinfecting agent used for cleaning ultrasound transducers, and is suitably conductive for performing electrical safety tests on transducers.

The ultrasound transducer is immersed in this conductive liquid and the electrical connector of the transducer (see Item 6 in Figure 1) is attached to a suitable adapter (see Item 3 in Figure 1) for that particular manufacturer and model transducer. This creates one electrical “pole” for the test. The transducer adapter is then attached to the SECULIFE UL as shown in Figure 1. A special conductive probe (see Item 2 in Figure 1) is then attached to the SECULIFE UL. This conductive probe is also immersed in the basin of conductive liquid, creating the second electrical pole. The setup is now complete for the testing of the connected transducer.

During testing, the transducer is subjected to a user selectable source voltage. This voltage is typically set to the normal operating voltage of the transducer's ultrasound machine. In North America, the source voltage is typically set to 120 VAC @ 60 Hz. For countries where the normal operating voltage is 230 VAC, the source voltage can be set to this level, at either 50 or 60 Hz, as appropriate.

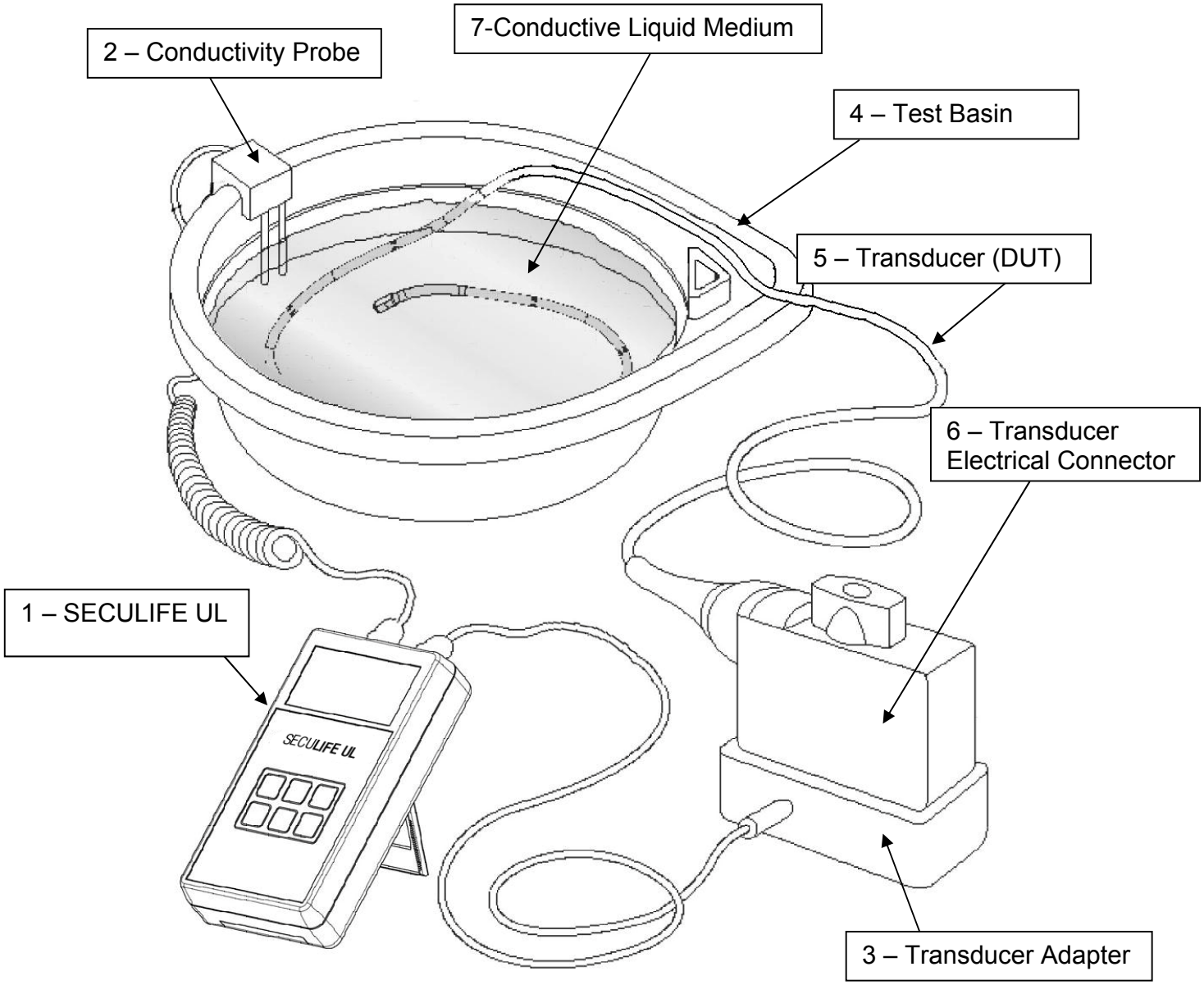


Figure 1
Typical Test Setup for SECULIFE UL

NOTICE – TESTING

CONDUCTIVE SURFACES SUCH AS METAL CARTS OR TABLETOPS CAN CAUSE ERRONEOUS READINGS DUE TO ALTERNATE LEAKAGE PATHS FROM TRANSDUCER ADAPTERS, CABLES, ETC. ENSURE TEST IS DONE ON A NON-CONDUCTIVE SURFACE FOR BEST RESULTS.

TEST PROCESS

The SECULIFE UL series completes four intermediate tests as part of the Full Test to fully evaluate the integrity of an ultrasound probe. The following is the details of each test step:

Source Voltage Test - The first step is to read the actual source (challenge) voltage that will be applied during the testing to ensure that it is within range. If it is not, an alarm is activated and the test is halted.

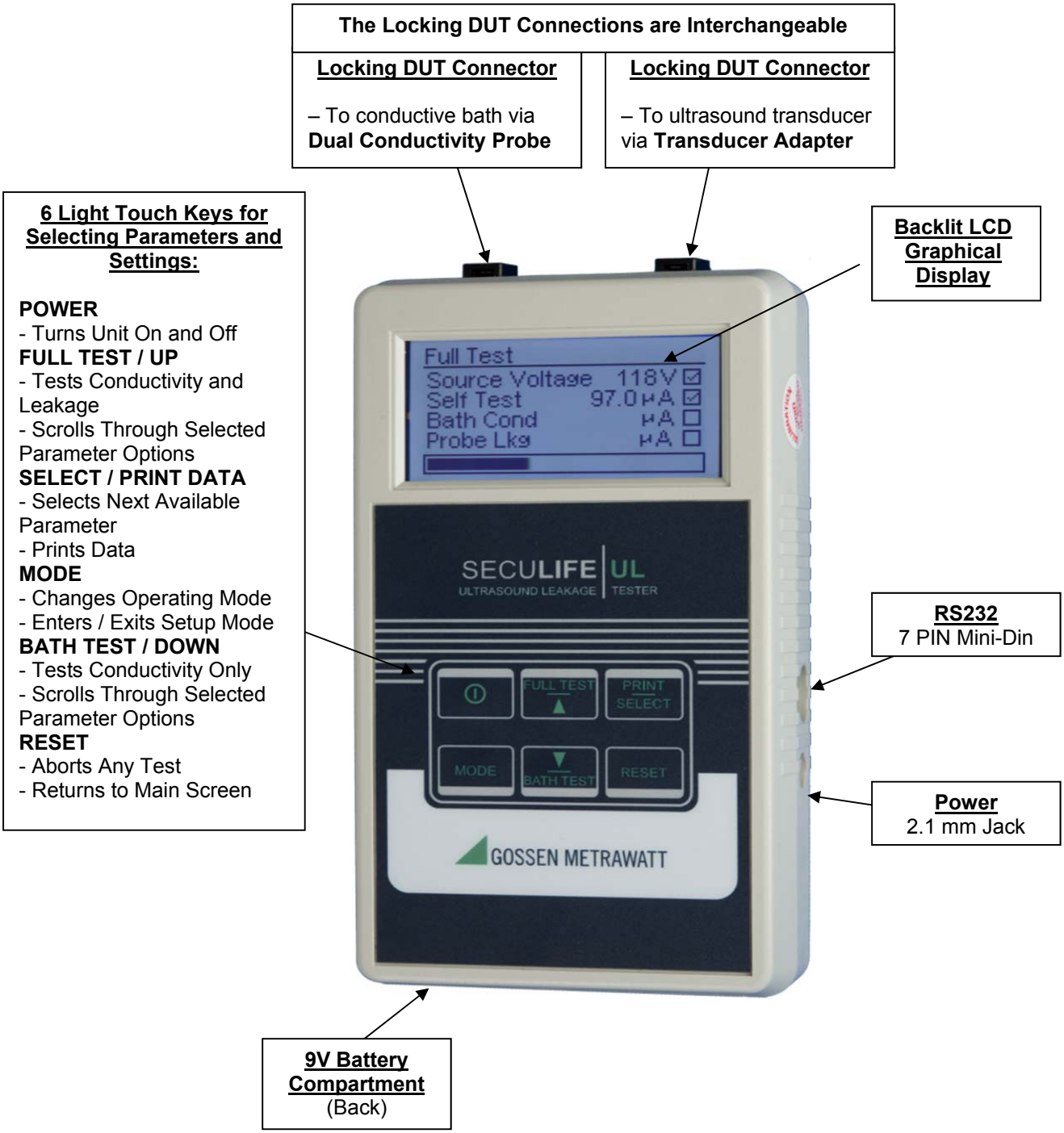
Self Test - The second step checks the Leakage Measuring Circuitry. A relay switches to a dummy internal load. The source (challenge) voltage is then applied to this load. The unit must correctly read the known leakage current. If it is not read correctly, an alarm is activated and the test is halted.

Bath Conductivity Test – The third step tests the conductivity of the liquid in the test basin. The SECULIFE UL accomplishes this task quite easily and reports a simple PASS / FAIL, or the actual numerical conductivity of the liquid (depending on the system configuration). If the conductivity of the liquid is insufficient to perform a valid electrical leakage current test, the SECULIFE UL will report this and will not allow the probe test to be performed.

Probe Leakage Test – The fourth step tests the electrical leakage of the ultrasound transducer. The measured leakage current is compared to the selected upper and lower limits. Again, the results of the test will be reported as a simple PASS / FAIL, or the actual leakage current values. This step is only included when the user performs a Full Test.

LAYOUT

This section looks at the physical layout of the SECULIFE UL Series and gives descriptions of the elements.



KEYS

Six tactile-touch keys with audio feedback are provided for system operation:

– This key turns the unit on and off. The unit will initiate with the Main Screen.

– At the Main Screen, this key initiates the Full Test, which includes a Source Voltage Test, a Self Test, a Bath Test, and a transducer Probe Test.
– All other screens, this key scrolls up through the selected parameter options.

– At the Main Screen, this key initiates a conductivity test of the conductive liquid medium in the bath.
– All other screens, this key scrolls down through the selected parameter options.

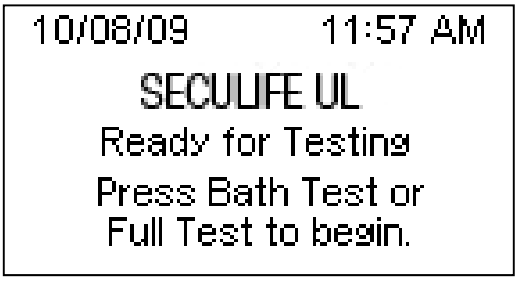
– At the Datalog Screen, this key prints the latest test results to the serial port.
– All other screens, this key selects the next available parameter.

– When not in a SETUP menu, this key resets the system to the main screen.
– When in a SETUP menu, this key has no function.

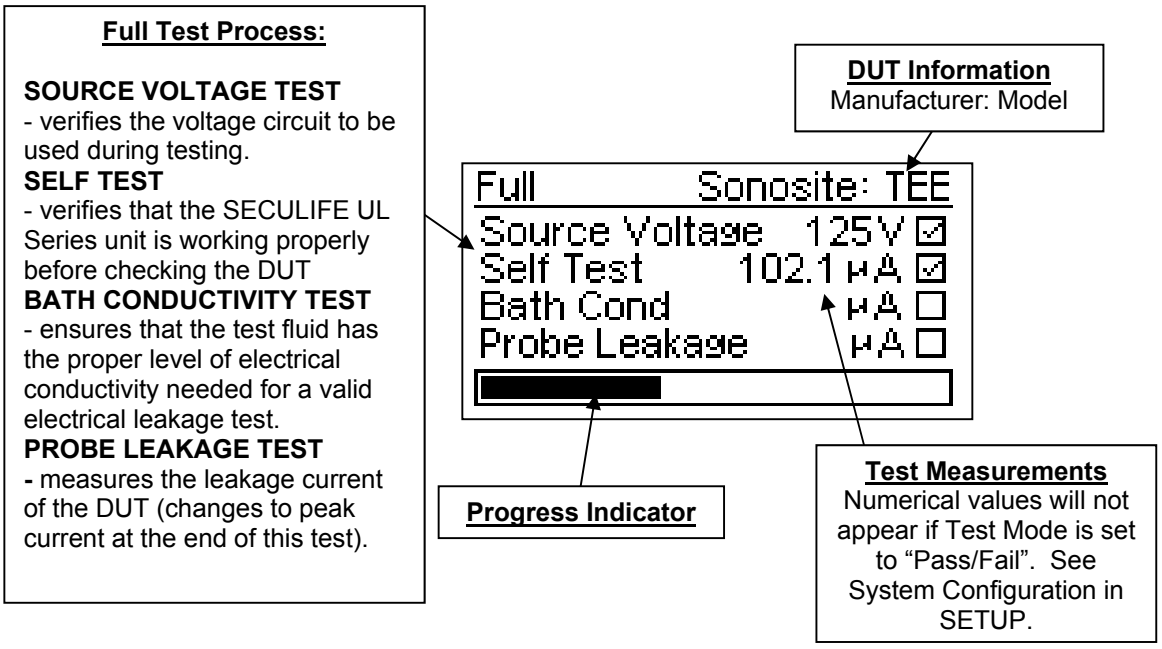
– This key toggles the unit through operating modes. Pressing this key toggles from the Main Screen, to the Meter Screen (Seculife UL Only), to the Datalog Screen (Seculife UL only), and then to the Device Configuration Screen.
– Pressing and holding this key allows entry to the SETUP menus where system configurations can be viewed and adjusted. When in a SETUP menu, this key exits the SETUP menu and returns to the previously viewed screen. This also saves the system settings to the internal EEPROM memory so they are retained with the power turned off or battery removed.

SCREENS

MAIN SCREEN – The main screen indicates that the SECULIFE UL Series unit is initialized and ready for testing. This screen displays after power-up initialization, and can be accessed by pressing the RESET key at any time other than during setup mode.



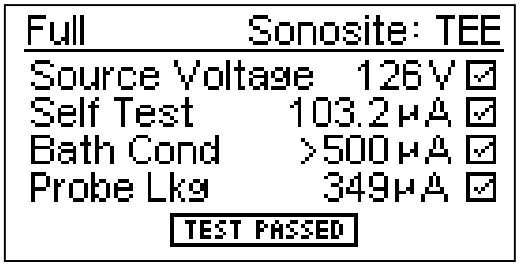
FULL TEST SCREEN – This screen is accessed from the Main Screen by pressing the FULL TEST button. It displays Full Test information, measurements, and progress.



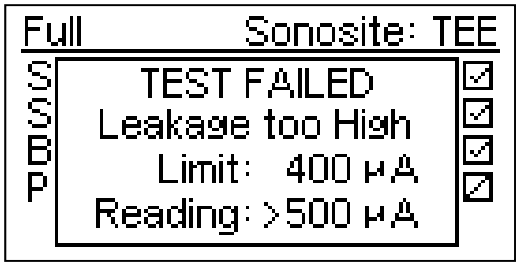
BATH TEST SCREEN – This screen is accessed from the Main Screen by pressing the button. It displays Bath Test information, measurements, and progress.

TEST MESSAGES – Messages appear after each FULL or BATH test is completed.

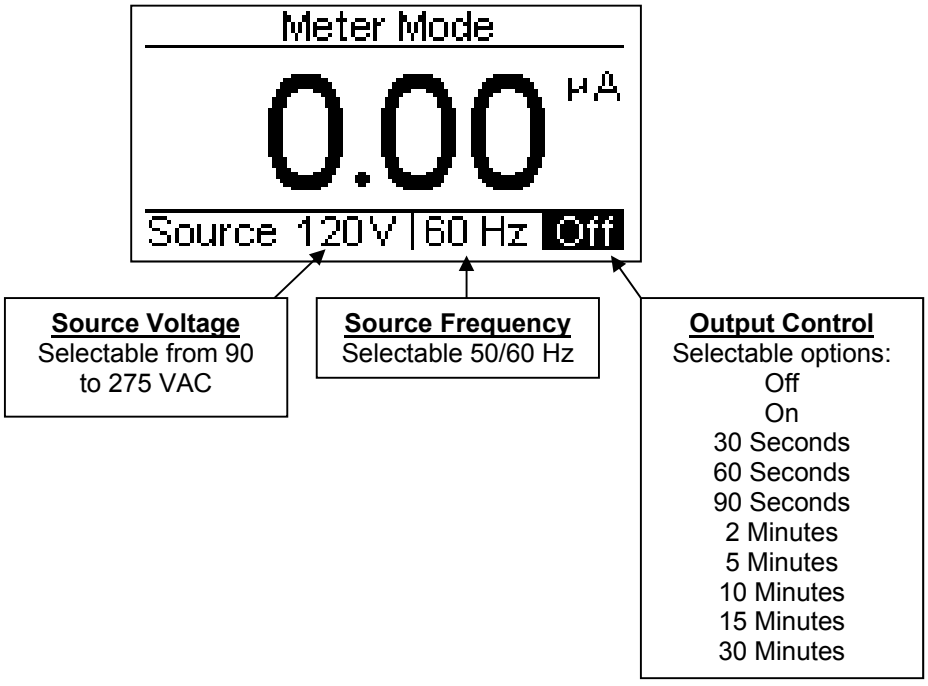
TEST PASSED – This message indicates a successful test within the selected limits.



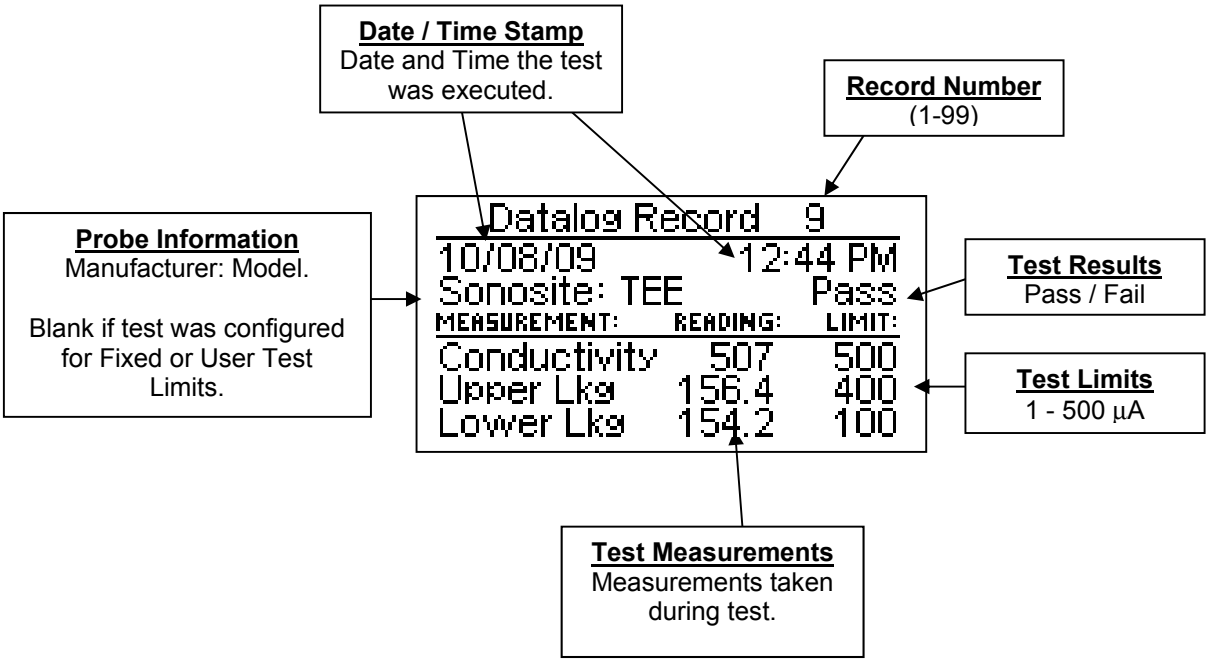
TEST FAILED – This message indicates a test failure, and provides failure details. The example shown below indicates that the probe leakage current is above the selected upper limit.



METER MODE SCREEN (SECULIFE UL ONLY) – The meter mode screen allows extended leakage current measurements, which can be useful when troubleshooting ultrasound transducer probes and cables. This screen displays the current leakage current reading and user-selectable Source Voltage, Source Frequency, and Output Control. This screen is accessed from the Main Screen by pressing the MODE key. The Source Voltage, Frequency, and Output Control are selected by pressing the PRINT SELECT key until the desired parameter is highlighted. Scroll through the highlighted parameter options using the FULL TEST ▲ BATH TEST ▼ keys.



DATALOG SCREEN (SECULIFE UL ONLY) – The Datalog Screen displays the test results of up to 99 test records. The Datalog Screen includes a Record Number, Date / Time Stamp, Probe Information, Test Results, Test Measurements, and Test Limits. This screen is accessed from the Meter Screen by pressing the MODE key. Scroll through the Datalog Records using the FULL TEST ▲ BATH TEST ▼ keys.



Use the

key to print the displayed record to the serial printer. Below is a sample print.

SECULIFE | UL

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Ultrasound Transducer Leakage Test Report

Test Instrument: SECULIFE UL

TEST DATE: 01/20/17 TIME: 07:58 AM

TRANSDUCER: Klaus 213, US30434206

TRANSDUCER UNIQUE ID: _____

TEST VOLTAGE: 125 VAC @ 60 HZ

TEST LIMITS: Custom

TEST RESULTS: Test Passed

BATH CONDUCTIVITY TEST

BATH CONDUCTIVITY TEST LIMIT:	500uA
BATH CONDUCTIVITY MEASURED:	>500uA
BATH CONDUCTIVITY TEST STATUS:	PASS

TESTED BY: _____

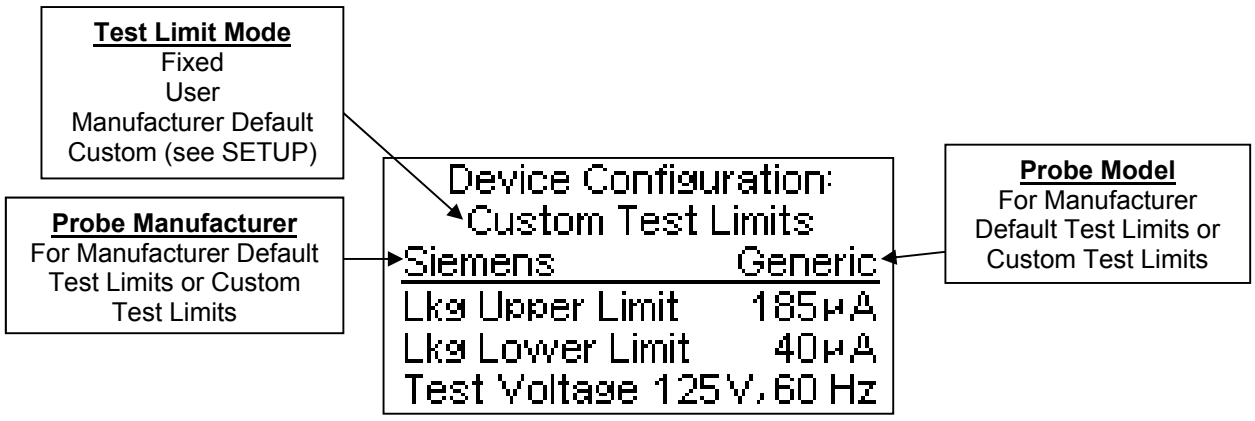
* * * PASSED * * *

DEVICE CONFIGURATION SCREEN – The Device Configuration displays the current test configuration. Device Configuration parameters include Test Limit Mode, Probe Manufacturer, and Probe Model. This screen is accessed from the Datalog Screen by pressing the MODE key. The parameters are selected by pressing the PRINT SELECT key until the desired parameter is highlighted. Scroll through the highlighted parameter options using the FULL TEST ▲ BATH TEST ▼ keys.

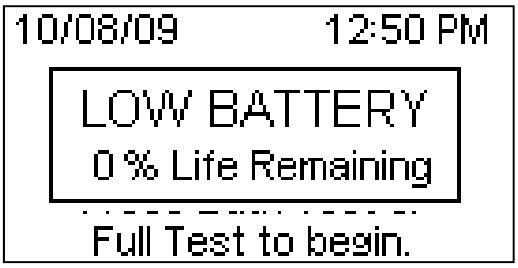
TEST LIMIT MODES

Fixed – Limits are set by the manufacturer and cannot be adjusted.
User – Limits are user-selectable. Refer to USER TEST CONFIGURATION.
Manufacturer Default – Limits suggested by the probe manufacturer and cannot be adjusted.
Custom – Manufacturer, Model, and Limits are programmable by the user with the PC configuration program. Refer to the PC Software section of this manual.

NOTE: If the "Allow User Config" parameter is set to NO, the user will not be able to modify the test parameters. See SETUP for more details.



LOW BATTERY – When the battery life is 10% or less, the LOW BATTERY message box appears and indicates the remaining battery life.



BATTERY ELIMINATOR INPUT – A 2.1 mm receptacle is provided for the 10 V DC Battery Eliminator (20-21103, 20-21106) that may be used for continuous run applications. It bypasses the internal battery when plugged in.

NOTE: The unit is shipped with a Red Battery Lock-Out plug installed into the line power connector as shown below. Its purpose is to prevent the unit from accidentally being turned on during handling and transport, subsequently depleting the battery. This plug must be removed before any use.

SETUP

System Configuration

Two user-selectable setup menus are provided, SYSTEM CONFIGURATION and USER TEST CONFIGURATION. Enter a setup menu by pressing and holding the MODE key until the Access Code Screen appears (5 sec). The FULL TEST ▲ BATH TEST ▼ arrows are then used to enter the access code.

DEFAULT ACCESS CODES
SYSTEM CONFIGURATION = 1
USER TEST CONFIGURATION = 2

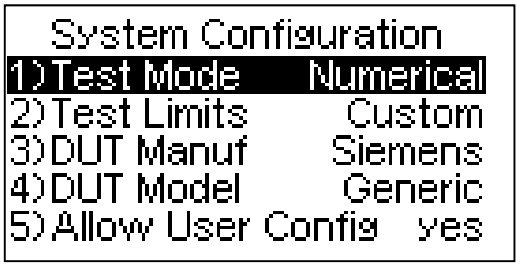
NOTE: The access codes may be changed once you have entered the selected configuration. See System Configuration and User Configuration for access code details.

When the desired access code is displayed, press the MODE key again to access the selected setup menu. The configuration parameters are selected by pressing the PRINT SELECT key until the desired parameter is highlighted. Scroll through the highlighted parameter options using the FULL TEST ▲ BATH TEST ▼ keys.

Exit the setup menu using the MODE key.

SYSTEM CONFIGURATION

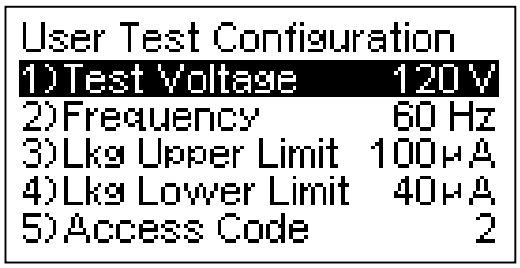
Below is the typical System Configuration Screen, followed by a table of the available parameters and a brief description of each option.



Parameter	Description	Options
Test Mode	Determines whether the test measurements (actual test readings) are shown in the test screen, or if the unit will simply give a PASS or FAIL result. The Default setting is Numerical.	PASS / FAIL or Numerical
Test Limits	Determines the settings for the test limits. Fixed limits are set by the factory and cannot be adjusted. User limits are programmed by the user through a special access code. Manufacturer Default limits are suggested test settings by probe manufacturers. Custom limits are programmable by the user with the PC configuration program.	Fixed, User, Manufacturer Default, or Custom
DUT Manuf	Selects the DUT manufacturer. NOTE: Only available when Test Limit mode is set to Manufacturer Default or Custom.	User Defined
DUT Model	Selects the DUT Model. NOTE: Only available when Test Limit mode is set to Manufacturer Default or Custom.	User Defined
Allow User Config	Selects whether the user is allowed to modify the DUT Manufacturer/Model in the Device Configuration Screen. This allows an administrator to "Lock Down" the test configuration.	yes/no
Setup Clock	Pressing the Up arrow while this parameter is selected displays the Clock Configuration screen where the Date and Time are configured.	Press UP
Printer	Pressing the Up arrow while this parameter is selected changes which model printer is selected.	BC Group, Extech
Erase Log	Pressing the Up arrow while this parameter is selected will erase the test records stored in the Datalog (ULT-2020 Only)	Press UP
Battery Life	Displays the current battery life.	0-100% (Read Only)
Contrast Adjust	Sets the contrast of the display.	0-20
Backlight	Off – Always off 1-30 sec – The elapsed time after which the backlight will automatically turn off. ON – Always ON. The Default setting is 30 seconds.	Off, 1-30 sec, ON
Auto Off Timer	Determines the period of inactivity before the meter is turned OFF. A timer is started when the meter is turned ON and is reset each time a key is pressed. When the timer reaches the value set in this parameter, the power is automatically turned OFF. The Default setting is 15 minutes. (NOTE: Setting this parameter to 0 disables the Auto Off timer.) (NOTE: Using a battery eliminator disables the Auto Off Timer.)	0-30 minutes
Access Code	Sets the required code entry to gain access to the Setup Menu. If this parameter is set to Zero, the Access Code feature is disabled and the user will gain direct access to the Setup Menu.	0-9999
Software	Displays current software program.	(Read Only)

USER TEST CONFIGURATION

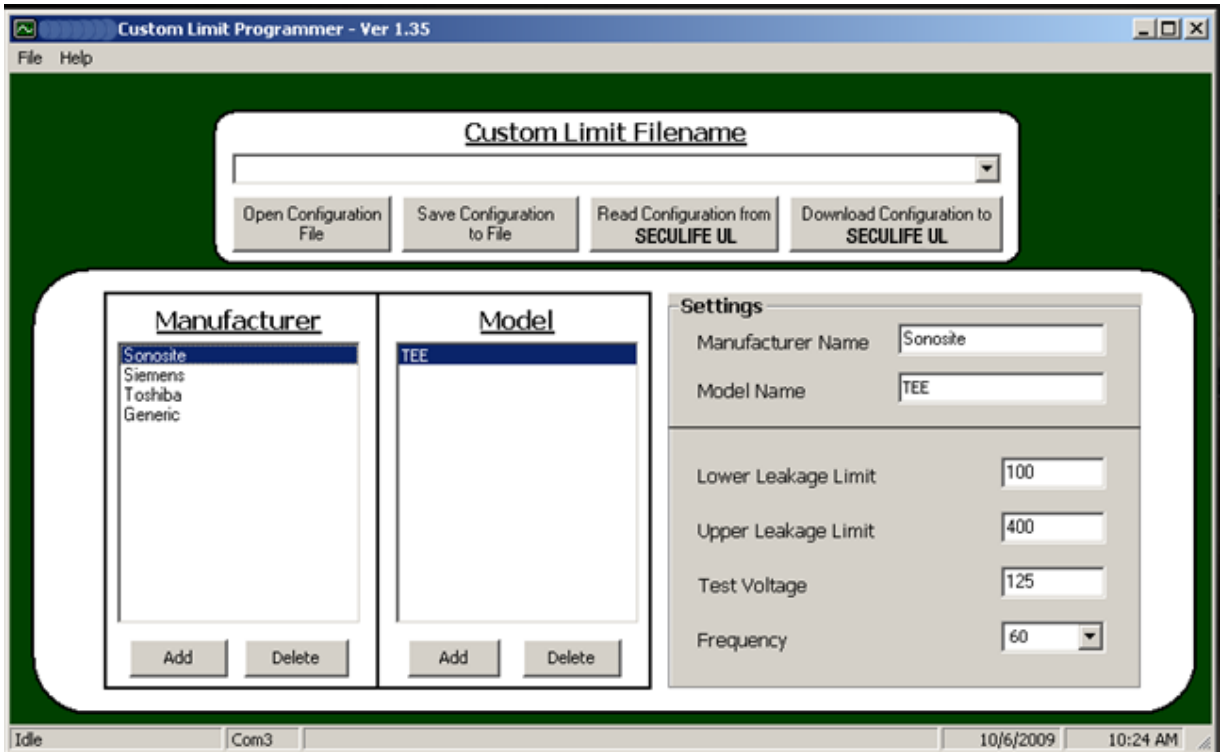
Below is the typical User Test Configuration Screen, followed by a table of the available parameters and a brief description of each option.



User Test Configuration		
Parameter	**Description**	**Range**
Test Voltage	The Source Voltage applied during a test when Device Configuration is set to User Test Limits.	90-275 VAC
Frequency	The Frequency of the Test Voltage when Device Configuration is set to User Test Limits.	50 or 60 Hz
Lkg Upper Limit	The maximum allowable current leakage during a test when Device Configuration is set to User Test Limits.	1-500 µA
Lkg Lower Limit	The minimum allowable current leakage during a test when Device Configuration is set to User Test Limits.	1-500 µA
Access Code	Sets the required code entry to gain access to the User Test Configuration Menu. If this parameter is set to Zero, the Access Code feature is disabled and the user will gain direct access to this Menu.	0-9999

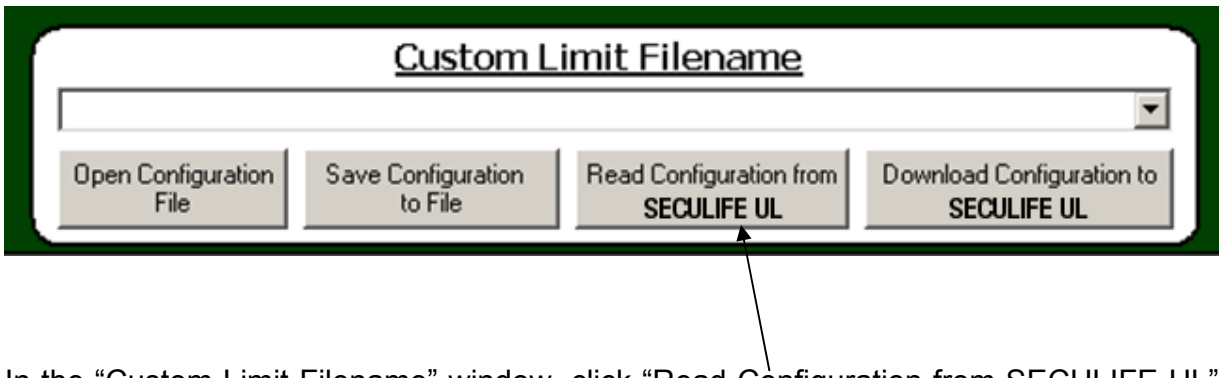
PC SOFTWARE

The included PC Software allows the user to create custom limit configurations including Manufacturer, Model, Leakage Limits, Test Voltage, and Frequency. Install and launch the PC Software, then connect the PC and SECULIFE UL via cable 20-41337 (See OPTIONAL ACCESSORIES at the beginning of this manual). Once connected, the software allows the user to download/read custom configurations to/from the SECULIFE UL. Below is a sample PC Software screen.



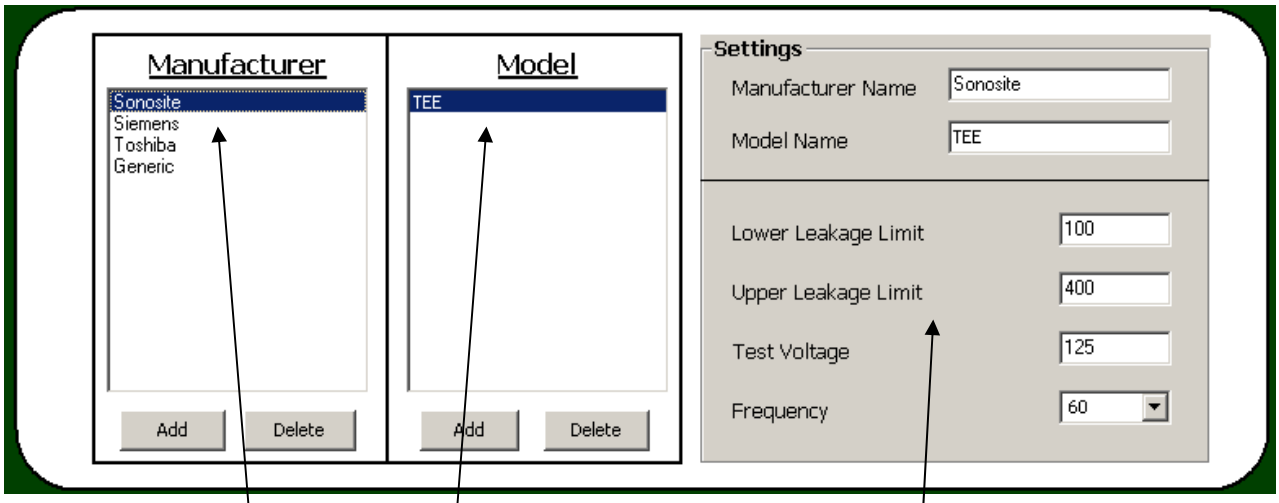
NOTE: The PC Software only manipulates the “Custom Test Limits” portion of the “Device Configuration” screen. Refer to the SCREENS section for details.

VIEW THE CURRENT CUSTOM TRANSDUCER CONFIGURATION



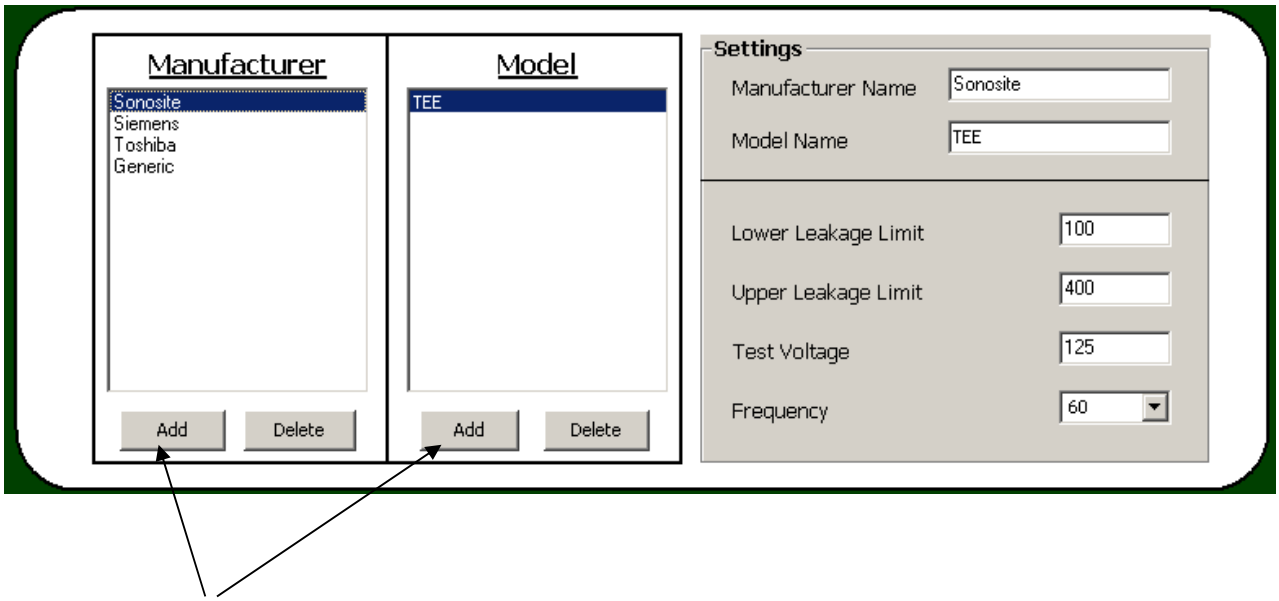
In the “Custom Limit Filename” window, click “Read Configuration from SECULIFE UL” to view the custom transducer configuration currently stored on the device. The loaded Manufacturers and Models are displayed in the respective labeled windows. The user may alter these transducer settings if desired.

ALTER TRANSDUCER SETTINGS



Select the Manufacturer and Model to be altered. Within the “Settings” window, enter the desired changes including Manufacturer Name, Model Name, Lower and Upper Leakage Limits, Test Voltage, and Frequency. To submit the changes to the SECULIFE UL series, click “Download Configuration to SECULIFE UL” in the “Custom Limit Filename” window.

ADD A MANUFACTURER or MODEL

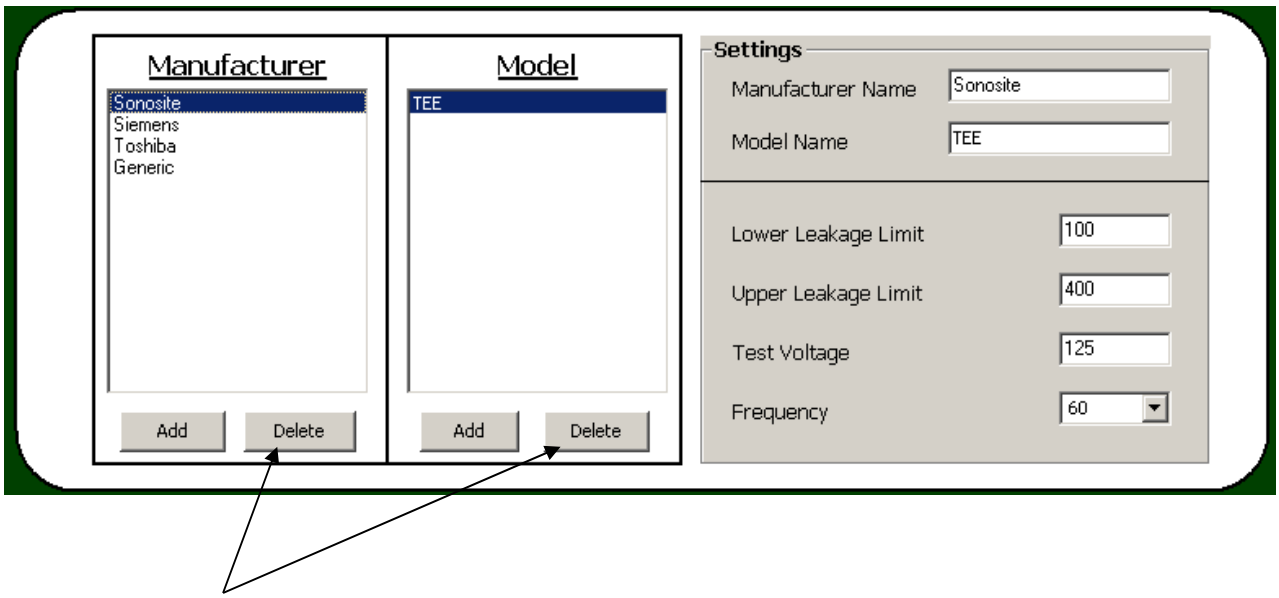


Using the “Add” buttons in the “Manufacturer” and “Model” windows, the user may create a Manufacturer and/or Model entry. If the desired Manufacturer is not currently displayed, click “Add” in the Manufacturer window. This introduces two “New” entries, one each in the “Manufacturer” and “Model” windows. See the previous section to alter the “New” transducer settings.

If the desired Manufacturer currently exists, simply click and highlight the Manufacturer of the transducer to be added. Click “Add” in the “Model” window to create a “New” transducer model of the highlighted Manufacturer. See the previous section to alter the “New” transducer settings.

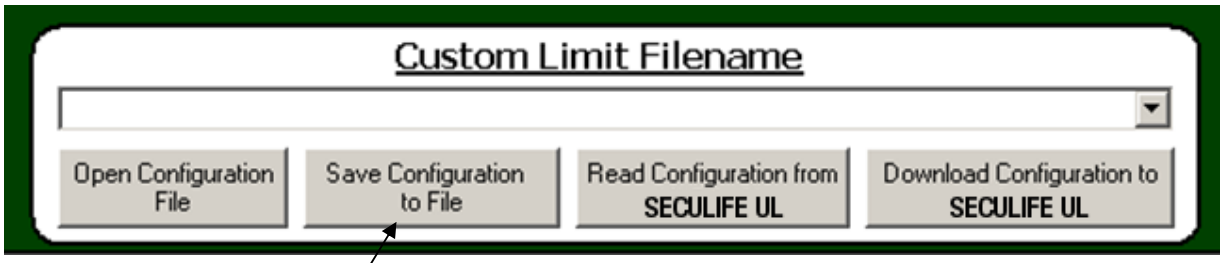
To submit the changes to the SECULIFE UL series, click “Download Configuration to SECULIFE UL” in the “Custom Limit Filename” window.

DELETE A MANUFACTURER or MODEL

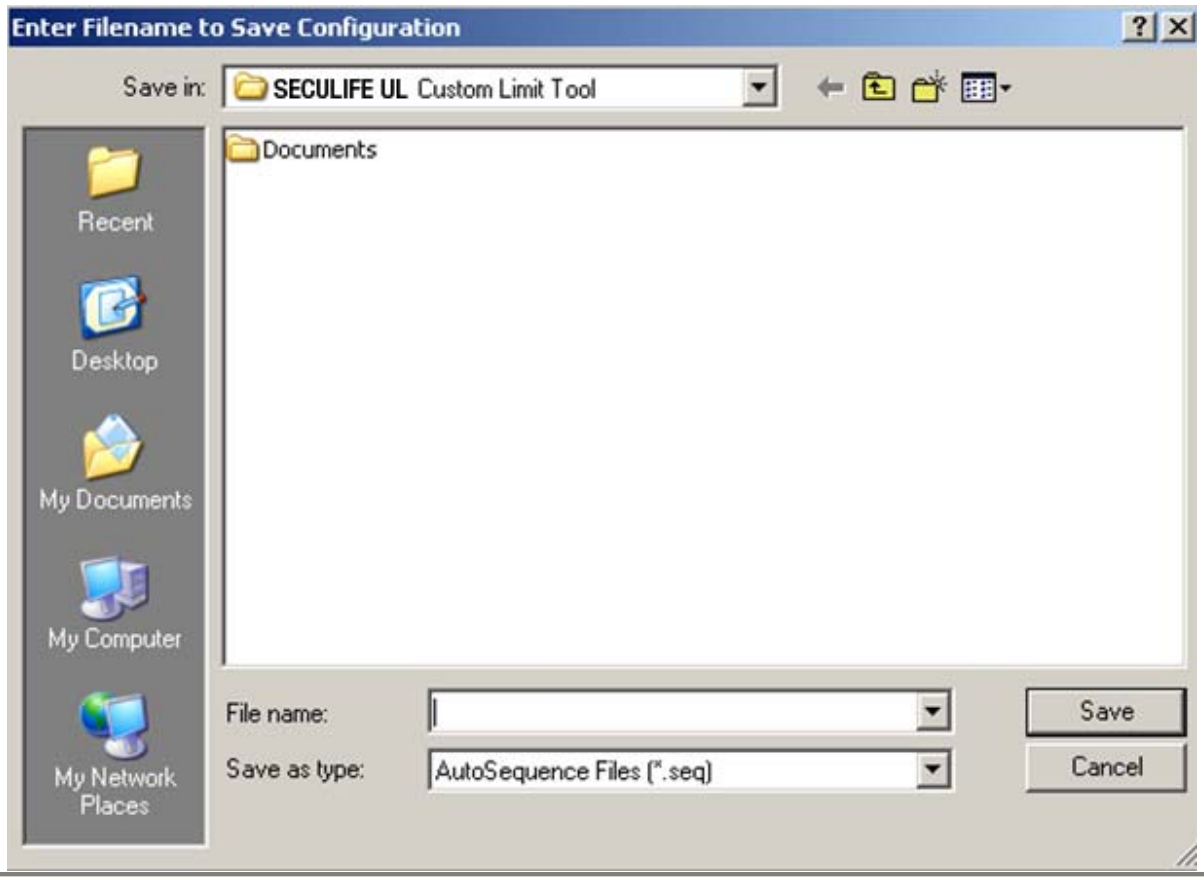


Using the “Delete” buttons in the “Manufacturer” and “Model” windows, the user may remove a Manufacturer and/or Model entry. To delete an entire Manufacturer, highlight the Manufacturer’s name and click “Delete” in the “Manufacturer” window. To delete a single Model from a specific Manufacturer, highlight the Manufacturer, then highlight the Model, and click “Delete” in the “Model” window. To submit the changes to the SECULIFE UL series, click “Download Configuration to SECULIFE UL” in the “Custom Limit Filename” window.

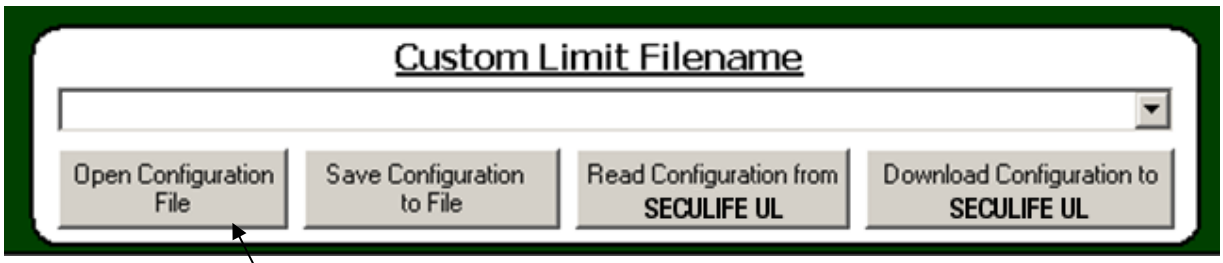
SAVE CONFIGURATION



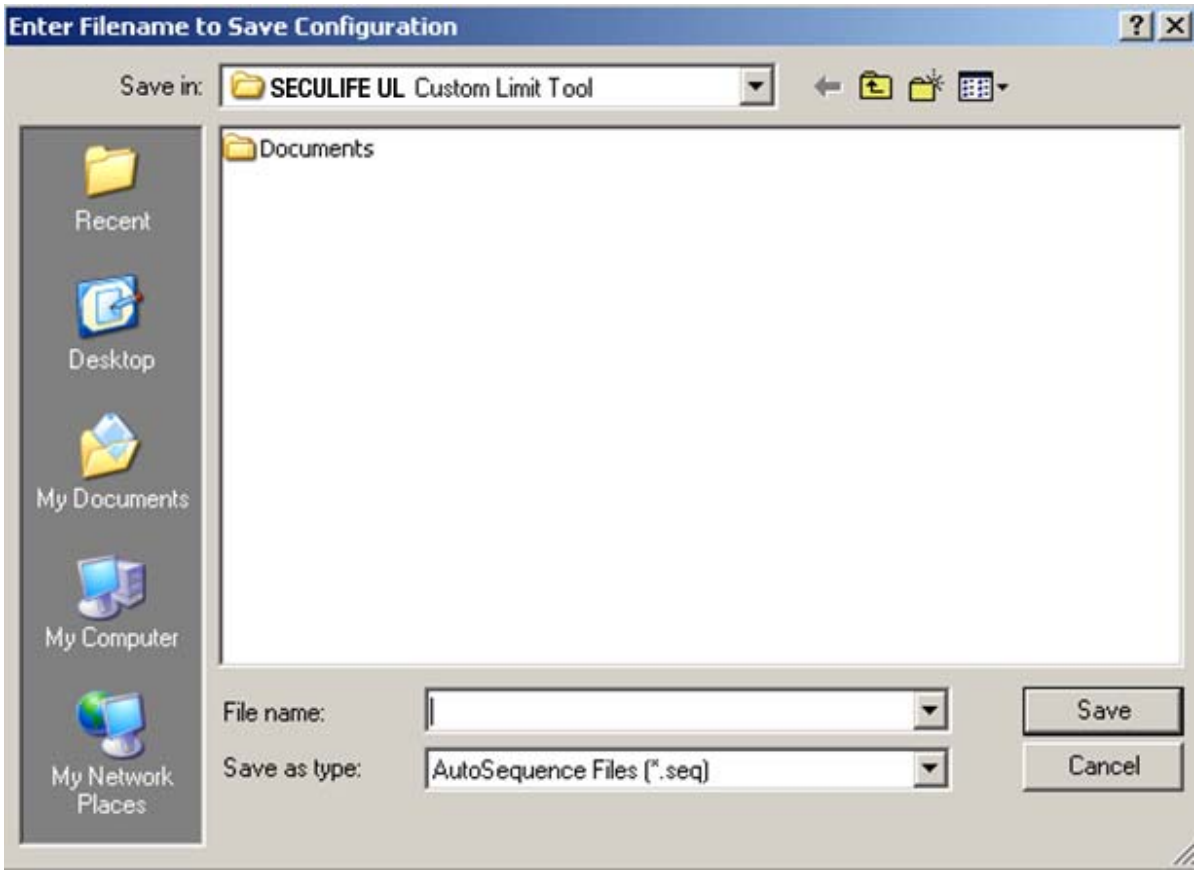
Using the “Save Configuration to File” button in the “Custom Limit Filename” window, the user may save the manipulated Custom Limit Configuration. This allows the user to download the changes at a later time, or to download the changes to several SECULIFE UL series devices. Clicking “Save Configuration to File” prompts a save window which allows the user to name the Custom Limit Configuration. Below is a sample save window.



OPEN CONFIGURATION



Using the “Open Configuration File” button in the “Custom Limit Filename” window, the user may open saved Custom Limit Configurations. This allows the user to download the saved Custom Limit Configuration to several SECULIFE UL series devices. Clicking “Open Configuration File” prompts a load window which allows the user to select the desired Custom Limit Configuration. Below is a sample load window.



COMMUNICATION PROTOCOL

The communication protocol provides a means to completely configure and use the SECULIFE UL from a PC, allowing hands free or automated operation.

Communication Port

The Serial port is configured as 115,200 Baud Rate, 8 Data Bits, 1 Stop Bit, and No Parity.

Command Syntax

The command description is broken into columns; the KEYWORD, the NODE, and the VALUE.

The KEYWORD provides the name of the command. The actual name of the command consists of one or more keywords since SCPI commands are based on a hierarchical structure, also known as a **tree system**.

In such a system, associated commands are grouped together under a common node in the hierarchy, analogous to the way leaves at a same level are connected at a common branch. This, and similar branches are connected to fewer and thicker branches, until they meet at the root of the tree. The closer to the root, the higher a node is considered in the hierarchy. To activate a particular command, the full path to it must be specified.

This path is represented in the following table by placing the highest node in the left-most position. Further nodes are indented one position to the right of the parent node.

The highest level node of a command is called the Keyword, followed by the Node(s), and then the value. Keywords and Nodes are separated by a colon to create the parent structure. The parent structure is separated from the value by one space, and the command is executed with a carriage-return (<cr>). For example, to change the system display contrast to a value of ten, use “SYSTem:CONtrast 10<cr>”.

Some commands allow for reading and writing data and some commands are Read Only. To indicate a read function, a question mark (?) is placed at the end of the command path. For example, to read the system version, use “SYSTem:VERsion?<cr>”. This command would return the current system version.

Lowercase letters indicate the **long-form** of the command (for example, **CONFigure:OUTput:VOLTage 120<cr>**) and can be omitted for simplification. Uppercase letters indicate the abbreviated, or **short-form,** of the commands and must be included (for example, **CONF:OUT:VOLT 120<cr>**).

NOTE: Commands can be entered in either upper or lowercase or a mixture of the two, uppercase and lowercase. Commands sent to the device are not case sensitive. Upper and lower cases are only used when documenting the commands.

SECULIFE UL Communication Command Summary

Keywords	Nodes	Subnodes	Values
CONFigure	OUTput	VOLTage	90-275
		FREQuency	50 hz, 60 hz
	TEST	MODE	NUMerical, PASSfail
		LIMits	FIXed, DEFaults, CUSTom
		DMANufacturer	1-5 (Selects Manufacturer 1-5)
		DMODel	1-20 (Selects Model 1-20)
	LIMits	CONDuctivity	0 - 500 (uA)
		ULEAkage	0 - 500 (uA)
		LLEAkage	0 - 500 (uA)
	METer (Seculife UL ONLY)	VOLTage	90-275
		FREQuency	50 hz, 60 hz
		OUTput	OFF, ON
INITiate	FULLtest, BATHonly, METrmode		
ABORt			
SYSTem	TIME		hh,mm (24hr mode only)
	TFORmat		AMpm, 24hr
	DATE		yy,mm,dd
	DFORmat		MMddyy,DDmmyy
	BATlife?		[read only]
	CONtrast		0-20
	BTIMe		OFF, 1-20, ON
	AOFF		0-30
	VERsion?		[read only]
	HEADer		String - Up to 40 Chars
	MODEL?		[read only]
	DMANufacturer <m>, xxx		<m> = 1-5, xxx = String data up to 10 chars
	DMODel <m>, <n>		<m> = 1-5 (Manuf), <n> = 1-20 (model), Model String
	DLIMits <m>, <n> , Limits		<m> = 1-5 (Manuf), <n> = 1-20 (model), Limits
	DSAVe		Saves DUT tables to Eeprom
	KEY		1-6
SENSe	VOLTage?		90 - 275 VAC [read only]
	LEAKage?		0 - 500 uA [read only]

SECULIFE UL Communication Command Summary (cont.)

Keywords	Nodes	Values
STATus?	**Bit Value**	**Definition**
	0 1	Test Running
	1 2	Bath Only Test
	2 4	Full Test
	3 8	
	4 16	
	5 32	
	6 64	Test Failed
	7 128	Test Passed
	8 256	
	9 512	
	10 1024	
	11 2048	Program Mode
	12 4096	Meter Mode
	13 8192	
	14 16384	
	15 32768	Calibration Mode
FACTory	VTOLerance	0-25 %
	FVOLtage	90 - 275 VAC
	FCONductivity	0 - 500 uA
	FULeakage	0 - 500 uA
	FLLeakage	0 - 500 uA
DATAlog (Seculife UL)	NUMrecords	1 - 100
	ERASelog	[Set to '1' to erase datalog]
	RECord <n>?	Returns Record <n> (Omit <n> to read last record)

MANUAL REVISIONS

Revision #	Program #	Revisions Made
Rev 01	DT7331CA	Origination
Rev 02	DT7331CA	Misc. Edits
Rev 03	DT7331CA	Adapter Information Updated
Rev 04	DT7331CB	Model Information Updated
Rev 05	DT7331CC	Dynamic Device Configuration Screen
Rev 06	DT7331CC	Edits to Euro Transformer, Conductivity Probe and Transducer Adapter List Updated, and Misc. Edits
Rev 07	DT7331CE	Address Updated
Rev 08	DT7331CF	Transducer Adapter List Update, Accessories List Updated, Communication Protocol Added, Sample Data Print Added, PC Software Section Added, Misc. Edits
Rev 09	DT7331CF	Euro Transformer Edited
Rev 10	DT7331CG	Specifications Updated, Misc. Edits
Rev 11	DT7331CG	Misc. Edits
Rev 12	DT7331CG	Format Updated, Printer cable part number updated, Misc. Edits
Rev 13	DT7331CG	Specifications Updated
Rev 14	DT7331CJ	Transducer Adapter List Update, Conductivity Probe List Update, Printer Feature Update

LIMITED WARRANTY

WARRANTY: BC GROUP INTERNATIONAL, INC. WARRANTS ITS NEW PRODUCTS TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP UNDER THE SERVICE FOR WHICH THEY ARE INTENDED. THIS WARRANTY IS EFFECTIVE FOR TWELVE MONTHS FROM THE DATE OF SHIPMENT.

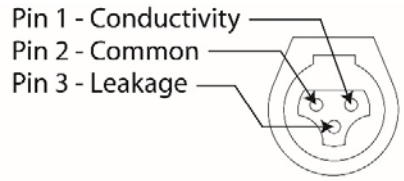
EXCLUSIONS: THIS WARRANTY IS **IN LIEU OF** ANY OTHER WARRANTY EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF **MERCHANTABILITY** OR FITNESS FOR A PARTICULAR PURPOSE.

BC GROUP INTERNATIONAL, INC. IS NOT LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

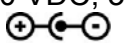
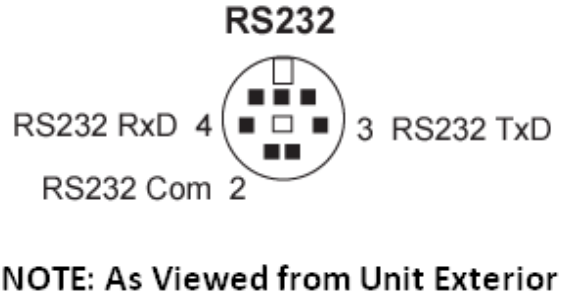
NO PERSON OTHER THAN AN OFFICER IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR ASSUME ANY LIABILITY.

REMEDIES: THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY SHALL BE: (1) THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS OR PRODUCTS, WITHOUT CHARGE. (2) AT THE OPTION OF **BC GROUP INTERNATIONAL, INC.**, THE REFUND OF THE PURCHASE PRICE.

SPECIFICATIONS

SOURCE, LEAKAGE AND CONDUCTIVITY		
SOURCE (CHALLENGE) VOLTAGE	90 - 275 VAC, ± 1% FS 500 µA Max Load	
SOURCE (CHALLENGE) FREQUENCY	50 or 60 Hz, ± 0.5 Hz	
CURRENT MEASUREMENT	LEAKAGE	0.50 - 10.00 µA, ± 0.5 µA 10.0 - 250.0 µA, ± 1% Range 250.0 - 500 µA, ± 1% Range
	CONDUCTIVITY	0.5 - 500 µA, ± 1% FS
CONNECTIONS	 Note: As Viewed From Unit Exterior	

PHYSICAL & ENVIRONMENTAL		
DISPLAY	128 X 64 Pixels Graphical LCD, White LED Backlight	
MEMORY	SETUP	EEPROM, All parameters
	RETENTION	10 Years Retention w/o Power
CONSTRUCTION	ENCLOSURE	ABS Plastic
	OVERLAY	Back-printed Lexan
SIZE	7.27 x 3.97 x 1.80 Inches (184.7 x 100.8 x 45.7 mm)	
WEIGHT	≤ 1.1 Lbs (0.50 kg)	
OPERATING RANGE	15 to 30 °C (59 to 86 °F)	
STORAGE RANGE	-40 to 60 °C (-40 to 140 °F)	

<table>
<tr><th colspan="3">ELECTRICAL & MISC.</th></tr>
<tr><td>BATTERY</td><td colspan="2">9 V Lithium Battery, 1200 mAh
(ANSI/NEDA 1604LC or equivalent)</td></tr>
<tr><td>BATTERY
ELIMINATOR</td><td colspan="2">10 VDC, 300mA
 
BC20-21111 (Universal)
BC20-21103 (USA Version)
BC20-21106 (Euro Version)
External Power Supply (Option): Z695M</td></tr>
<tr><td rowspan="2">BATTERY LIFE</td><td>CONTINUOUS</td><td>> 100 Full Tests
(Note: Backlight set to OFF)</td></tr>
<tr><td>OFF</td><td>1 year</td></tr>
<tr><td rowspan="8">RS-232
COMMUNICATIONS</td><td>BAUD</td><td>115200</td></tr>
<tr><td>DATA BITS</td><td>8</td></tr>
<tr><td>START BITS</td><td>1</td></tr>
<tr><td>STOP BITS</td><td>1</td></tr>
<tr><td>PARITY</td><td>none</td></tr>
<tr><td>HANDSHAKING</td><td>none</td></tr>
<tr><td>CONNECTIONS</td><td>Seven (7) pin Mini-DIN
<u>Pinout:</u>
 

NOTE: As Viewed from Unit Exterior</td></tr>
</table>

NOTICE

PRODUCT SUPPORT

If required please contact:

GMC-I Messtechnik GmbH
Product Support Hotline
Phone +49 911 8602-0
Fax +49 911 8602-709
E-Mail support@gossenmetrawatt.com

SERVICE CENTER

Repair and Replacement Parts Service
Calibration Center *
and Rental Instrument Service
When you need service, please contact:

GMC-I Service GmbH
Service Center
Thomas-Mann-Straße 20
90471 Nürnberg • Germany
Phone +49 911 817718-0
Fax +49 911 817718-253
E-Mail service@gossenmetrawatt.com
www.gmci-service.com

This address is only valid in Germany.
Please contact our representatives or subsidiaries for service in other countries.

* DAkkS Calibration Laboratory
for Electrical Quantities D-K-15080-01-01
accredited per DIN EN ISO/IEC 17025

Accredited measured quantities: direct voltage, direct current -values, DC -resistance, -alternating voltage, -alternating current -values, AC active power, AC apparent power, DC power, -capacitance, -frequency and temperature

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GOSSEN METRAWATT

GMC-I Messtechnik GmbH
Südwestpark 15
90449 Nürnberg• Germany

Phone +49 911 8602-111
Fax +49 911 8602-777
E-mail info@gossenmetrawatt.com
www.gossenmetrawatt.com