Sonitron GTS

Sonoporation System

Instruction Manual

Important Information

This product is authorized for laboratory research use only, not medical product. The product has not been qualified or found safe and effective for any human or animal diagnostic or therapeutic application. Uses for other than the intended use may be a violation of applicable law.

The Sonitron GTS is a sonoporation device designed to provide a convenient way to introduce materials such as foreign DNA into sample's cells. This manual provides instructions for proper setup and operation of the Sonitron GTS and its components.

Safety Precautions

■ Safety Terms and Symbols

Danger	Disregarding instructions marked with this symbol may lead to serious injury or death.
Warning	Disregarding instructions marked with this symbol may lead to serious injury or property damage.
Caution	Disregarding instructions marked with this symbol may lead to injury or property damage.

■ General cautions

Danger

1) Do not use outside the range of product specification. Comply with the contents described in this instruction manual when using the product.

2) Do not modify or perform unnecessary disassembly. It may cause electrocution to the user and malfunction or damage to the device.

■ Handling precautions

Danger

Do not touch the tip of the transducer after pressing the start button or the foot switch.

Warning

1) Do not open the cover of the product when the power is ON.

2) Do not operate this product in any of the following scenarios:
   - There is physical damage to the product.
   - Smoke, strange noise or fumes come from the product.

   Contact your supplier immediately.

■ Power source, grounding and wiring cautions

⚠Warning

1) To avoid the risk of fire, or electrical shock, observe all ratings and markings on the product. Consult this manual for further ratings information before making connections to the product.

2) This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to an earth grounding.

3) Use only the following power supply cord. Using the wrong power cord could result in danger or fire.
   - For AC100-120V area
     UL Listed, detachable power cord set, 3 conductor grounding Type SVT, No. 18 AWG , 3 m long maximum, rated at AC125V minimum.
   - For AC220-240V area
     Approved according to EU/EN standards, 3 conductor grounding Type H05VV-F, 3 m long maximum, rated at AC250V minimum.

4) Do not bend the power cord forcibly or place heavy object on the cord because it might damage the cord and cause fire or electric shock.

⚠Caution

1) Be sure to hold the connector part of the power cable when disconnecting the cable. Pulling on the cord section may cause it to fray and break.

2) Disconnect power cable from the product if the product is not in use.

■ Usage environment precautions

⚠Caution

1) Do not install or store the product in locations such as those listed below:
   - Locations subject to direct sunlight
   - Locations subject to strong impact or vibration
   - Location subject to high temperatures or high humidity
   - Locations that are submerged in water

2) Do not use this product with corrosive fluids. Avoid operation in humid or corrosive environments.

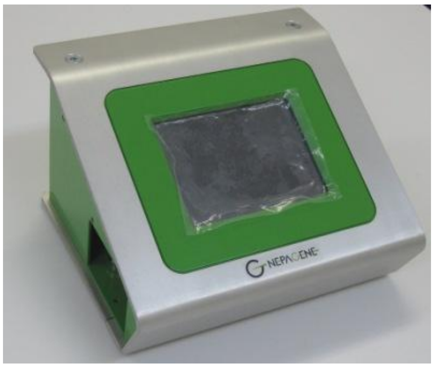
3) Do not bring a strong magnet or magnetic field close to the main body of the product.

4) Refer to installation instructions for details on installing the product to ensure proper ventilation.

Table of Contents

1 Checking the Package

■ ST-GTS Sonitron GTS Basestation x 1



■ Accessories

- Foot switch x 1

- Power cord x 1
- Instruction Manual (this manual) x 1

2 Related Products

■ Plane Wave Transducer Modules

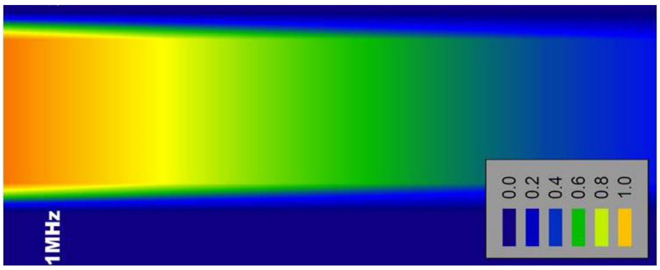
The Plane Wave Transducer Module can be connected to the ST-GTS Sonitron GTS Basestation. It has electronic parts to calibrate the output from the Basestation.
The folloinwg transducer sizes are available. (The photo above shows the ST-TM1-12.)

Cat #	Description
ST-TM1-6	Plane Wave Transducer Module, 6mm diameter tip, 1MHz
ST-TM1-12	Plane Wave Transducer Module, 12mm diameter tip, 1MHz
ST-TM1-20	Plane Wave Transducer Module, 20mm diameter tip, 1MHz

ST-TM1-6

ST-TM1-12

ST-TM1-20

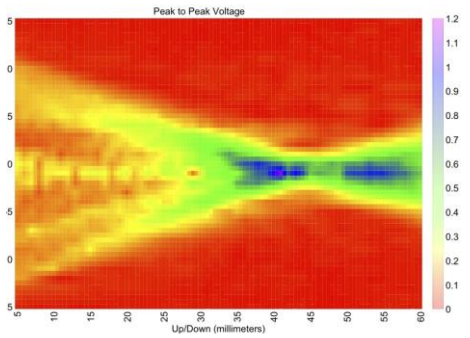


The image above shows the output ultrasound power emitted straight (from left to right).

■ FUS Transducer Modules

The FUS* Transducer Module can be connected to the ST-GTS Sonitron GTS Basestation. It has electronic parts to calibrate the output from the Basestation.
*FUS: Focused Ultrasound
The following transducers are available.

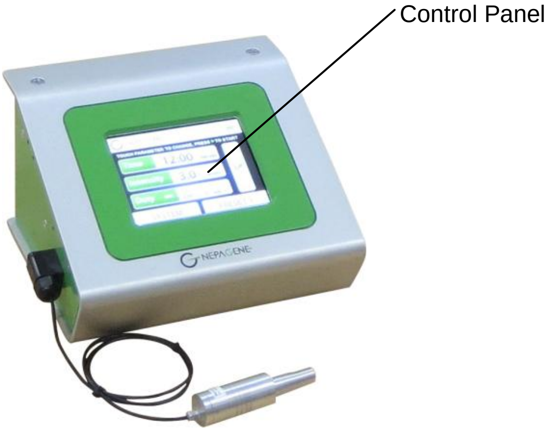
Cat #	Description
ST-FM2-20-20	FUS Transducer Module, 2MHz, 20mm focal depth, 20mm inside diameter
ST-FM3.5-20-20	FUS Transducer Module, 3.5MHz, 20mm focal depth, 20mm inside diameter



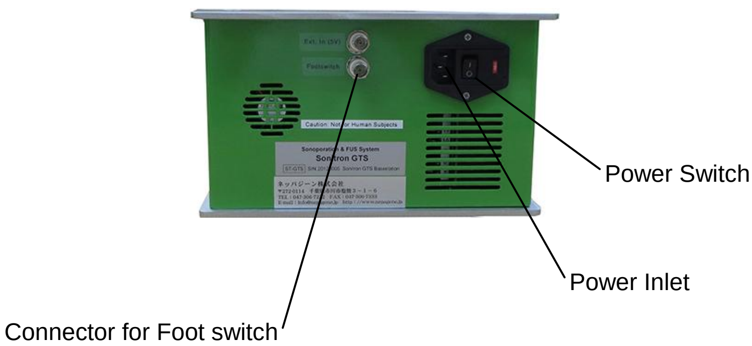
The image above shows the focused output ultrasound power.

3 Part Names

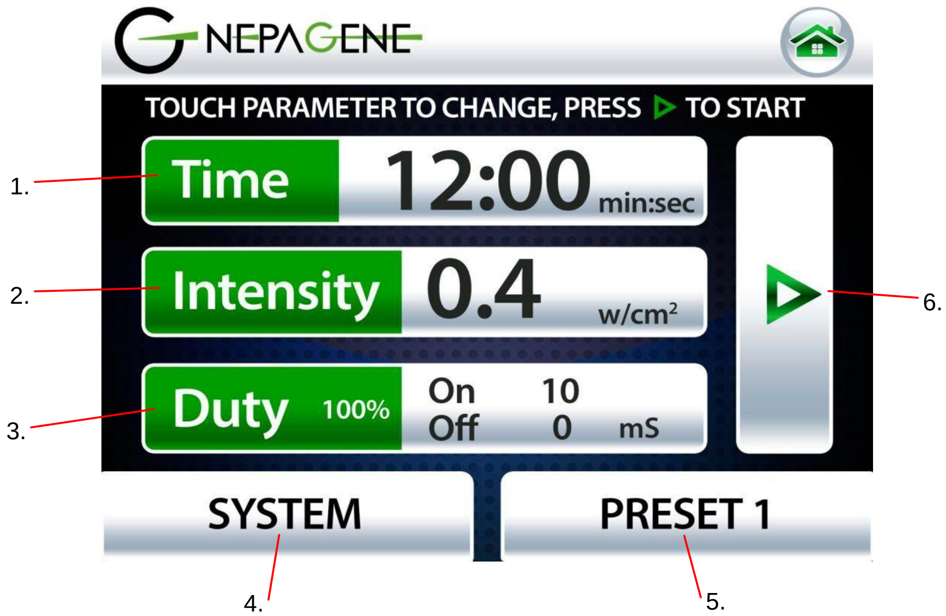
■ Front



■ Rear



■ Control Panel



1. Time Button	Display the current set ultrasound treatment time. Time can be changed by pressing the Time button.
2. Intensity Button	Display the current set ultrasound intensity. Intensity can be changed by pressing the Intensity button.
3. Duty Button	Display the current set duty rate, on time and off time. Duty can be changed by pressing the Duty button.
4. System Button	Time unit (msec or sec) of Duty and Power range of Intensity can be changed by pressing the System button.
5. Preset Button	Display the latest preset condition number. The preset conditions can be recalled by pressing the Preset button
6. Start Button	Emit ultrasound under the condition displayed on the above 1., 2., and 3.

4 Installation and Connecting

4.1 Installation

Precautions for installation

- Installation site

  The Sonitron GTS must be installed on a flat-level area.

- Spacing for the cooling fan

Caution Be sure to leave a clearing of at least 20 cm behind the instrument for proper ventilation.

4.2 Connecting

Precautions for wiring a power supply and grounding

Warning

1) Observe all ratings and markings on the product and confirm that they correspond to the electrical conditions in the laboratory.

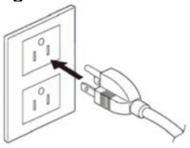
2) Use only the power cord specified for this product and certified for the country of use. If no power cord is provided, please select the power cord by referring to the section 6.2 Proper Selection of The Power Supply Cord.

3) Connect the cabelling after confirming that the power switch is set to OFF.

4) Be sure to ensure that there is a protective earth before using the instrument. Otherwise, there is a danger of electric shock. For safety reasons and to minimize or remove unnecessary noise, be sure to ground the instrument.

- Grounding with the 3-pin plug

  Insert the 3-core plug into a three-core outlet according to the following figure



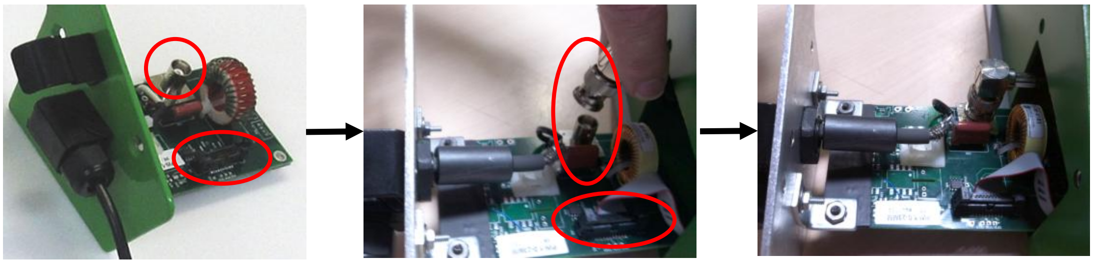
Precautions for wiring of Transducer Modules

Warning Connect the caballing after confirming that the power switch is set at OFF.

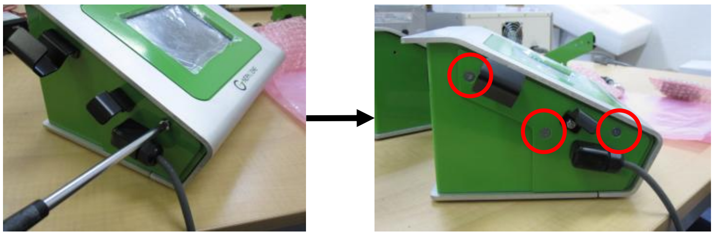
■ Connecting Transducer Module

1) Put the transducer module at the left of the basestation.

2) Make connections in the red circles on the images below using your fingers.

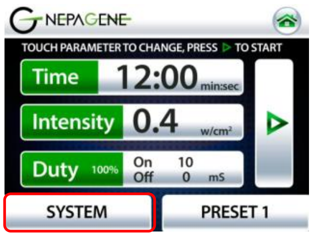


3) Screw up the three points in the red circles on the image below using a screw driver.

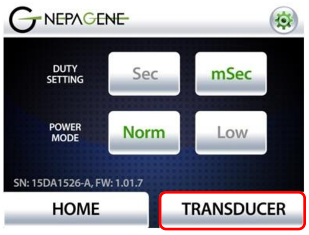


4) Turn on the Power Switch.

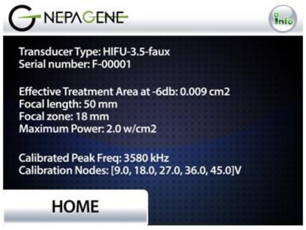
5) Press ths System Button.



6) Press the Transducer Button.



7) Confirm the transducer information on the display.



5 Operating Instructions

5.1 Setting Ultrasound Parameters

5.1.1 Set Parameters of Ultrasound

■ Time

The ultrasound treatment time can be set from 5 seconds to 20 minutes

■ Intensity

The ultrasound intensity can be set as follows.
Plane Wave Transducer

- Normal Power Mode: 0.1-5.0 W/cm2
- Low Power Mode: 0.01-0.50 W/cm2

FUS Transducer

- Normal Power Mode: 0.1k-2.0k W/cm2
- Low Power Mode: 0.01k-0.20k W/cm2

■ Duty Cycle

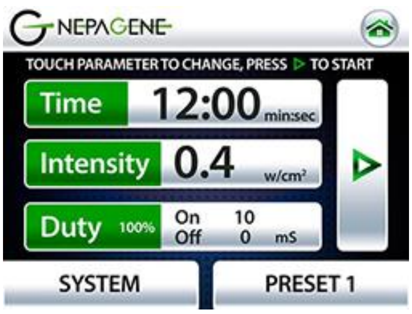
The duty cycle can be set as follows.
[On: 0-20 msec, Off: 0-20 msec] or [On: 0-20 sec, Off: 0-20 sec]

■ Frequency

The ultrasound frequency is set automatically. It varies depending on the transducer.
For example,
Cat # ST-TM1-X transducer: 1 MHz
Cat # ST-H2-20-20: 2 MHz
Cat # ST-H3.5-20-20: 3.5 Mhz

5.1.2 Home Screen

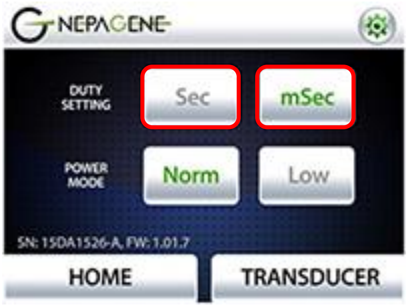
After the Power Switch is turned on, the home screen below will be displayed.



5.1.3 Setting a time unit of duty cycle (On time and Off time)

1 Press the System Button at the home screen.

2 Press the Sec or mSec Button to select the time unit of duty cycle.



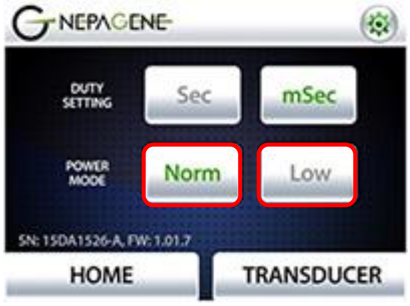
3 Press the Home Button to go back to the home screen.

5.1.4 Setting Power Mode of ultrasound intensity

1 Press the System Button at the home screen.

2 Press the Norm or Low Button to select the Power Mode of intensity.

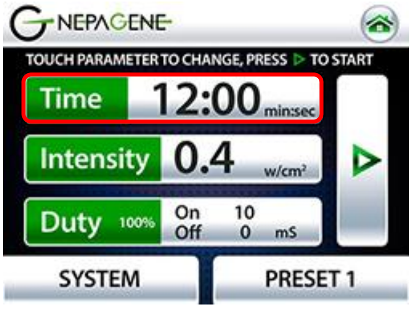
Plane Wave Transducer - [Normal Power Mode: 0.1-5.0 W/cm2] [Low Power Mode: 0.01-0.50 W/cm2]
FUS Transducer - [Normal Power Mode: 100-2000 W/cm2] [Low Power Mode: 10-200 W/cm2]



3 Press the Home Button to go back to the home screen.

5.1.5 Setting a parameter of ultrasound treatment time

1 Press the Time Button at the home screen.



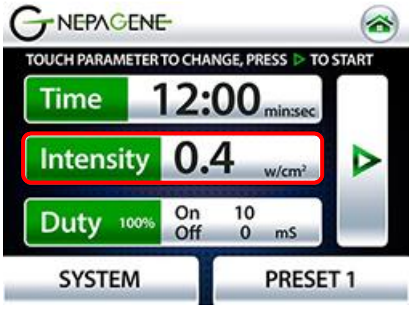
2 Press the ▲ or ▼ Button to set the treatment time.

By pressing the Unit-change Button in the red circle below, the set-time unit can be selected, 5 sec or 1 min.

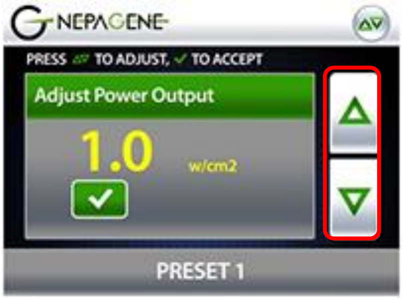
3 Press the Check Button in the red box below to accept the set treatment time.

5.1.6 Setting a parameter of ultrasound intensity

1 Press the Intensity Button at the home screen.



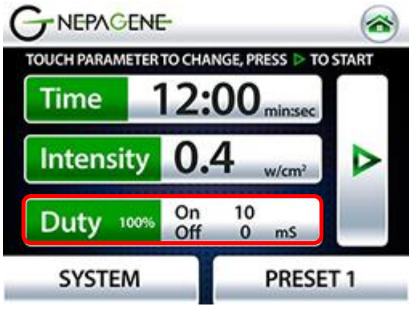
2 Press the ▲ or ▼ Button to set the intensity.



3 Press the Check Button to accept the set intensity.

5.1.7 Setting a parameter of duty cycle

1 Press the Duty Button at the home screen.



2 Press the ▲ or ▼ button to set the On time.

3 Press the Check Button in the red box below to accept the On time.

4 Press ▲ or ▼ button to set the Off time.

5 Press the Check Button in the red box below to accept the Off time.

5.2 Saving/Recalling the Program

■ Saving the program

1 After setting a new parameter and pressing the Check Button, you will find the Save New Button.

2 Then the current program will be saved as a preset. The preset number of the saved program will be the one that is currently displayed on the home screen.

3 If you do not want to save the current program, just press the Start button to emit ultrasound.

■ Recalling the program

1 Press the Preset Button.

2 Select the program from P1-18.

5.3 Executing Program (Emitting Ultrasound)

NOTE: As preconditioning, run at 5 W/cm2 for 3-4 minutes before starting an experiment when a Plane Wave Transducer is used.

1 Press the Start Button in the home screen to execute the program. Right after pressing the Start Button, ultrasound will be emitted from the tip of the transducer.

Danger	Do not touch the exposed tip of the transducer when ultrasound is being emitted.

2 After pressing the Start Button, the remaining time is displayed. When the remaining time becomes “00:00”, the ultrasound treatment will be completed.

If you press the Pause Button during the treatment, the ultrasound emission will be stopped.

To restart the program, press the Play Button.

To discontinue the program during the treatment, press the Stop Button.

6 Additional Information

6.1 Specifications

Ultrasound Intensity Range	*Plane Wave Transducer Module:* ・Normal Power Mode: 0.1-5.0 W/cm2 ・Low Power Mode: 0.01-0.50 W/cm2 *FUS Transducer Module:* ・Normal Power Mode: 100-2000 W/cm2 ・Low Power Mode: 10-200 W/cm2
Treatment Time	1 second to 20 minutes
Frequency	Automatically set depending on the transducer module
Duty Cycle	On: 1-9999 msec Off: 0-9999 msec
Presets	18 programs

Power Consumption	50 watts
Power Source	*Setting 1(default):* ・100V/50Hz, 110V/60Hz *Setting 2:* ・230V/50Hz
Power Supply Cords	- For AC100-120V area UL Listed, detachable power cord set, 3 conductor grounding Type SVT, No. 18 AWG , 3 m long maximum, rated at AC125V minimum. - For AC220-240V area Approved according to EU/EN standards, 3 conductor grounding Type H05VV-F, 3 m long maximum, rated at AC250V minimum.
Operating Environment	Temperature: 5-40℃, Humidity: 85%RH Max (Non-condensing)
Dimensions	310 (W) x 230 (D) x 140 (H) mm
Weight	5 kg

6.2 Proper Selection of The Power Supply Cord

If no power supply cord is provided, please select the proper power supply cord for the Sonitron GTS by referring to “Specifications” and “Certified Cord” below:

Warning In case you use a non-approved power supply cord for Nepa Gene products, Nepa Gene can no loger warrant the electrical safety of the device.

Specifications

Voltage Rating	125V AC (for 100-120V AC area) or 250V AC (for 220V AC area)
Current Rating	7A min. (for 100-120V AC area) 10A min. (for 220V AC area)
Temperature	60℃ min.
Length	3m max.
Fittings Configuration	Grounding type attachment plug cap. Opposite terminals in molded-on IEC Configuration appliance coupling.

Table 1 Certified Cord

A power supply cord should be certified by one of the agencied listed in Table 1, or comprised of cordage marked with an agency marking per Table 1 or marked per Table 2. The fittings are to be marked with at least one of agencies listed in Table 1. In case you are unable to buy locally in your country the power supply cord which is approved by one of the agencies mentioned in Table 1, please use replacements approved by any other equivalent and authorized agencies in your country.

Country	Agency	Certification Mark	Country	Agency	Certification Mark
Argentina	IRAM		Italy	IMQ	
Australia	SAA		Japan	JET, JQA, TÜV, UL-APEX / MITI	
Austria	ÖVE		Netherlands	KEMA	
Belgium	CEBEC		Norway	NEMKO	
Canada	CSA		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		United Kingdom	ASTA BSI	
Germany	VDE		U.S.A	UL	
Ireland	NSAI				

■ Table 2 HAR Flexible Cord

Approval Organizations and Cordage Harmonization Marking Methods

Approval Organization	Printed or Embossed Harmonization Marking (May be located on jacket or insulation of internal wiring)	Alternative Marking Utilizing Black-Red-Yellow Thread (Length of color section in mm)		
		Black	Red	Yellow
Comite Electrotechnique Belge (CEBEC)	CEBEC ‹HAR›	10	30	10
Verband Deutscher Elektrotechniker (VDE) e.V. Prüfstelle	‹VDE› ‹HAR›	30	10	10
Union Technique de l´Electricite´ (UTE)	USE ‹HAR›	30	10	30
Instituto Italiano del Marchio di Qualita´ (IMQ)	IEMMEQU ‹HAR›	10	30	50
British Approvals Service for Electric Cables (BASEC)	BASEC ‹HAR›	10	10	30
N.V. KEMA	KEMA-KEUR ‹HAR›	10	30	30
SEMKO AB Svenska Elektriska Materielkontrollanstalter	SEMKO ‹HAR›	10	10	50
Österreichischer Verband für Elektrotechnik (ÖVE)	‹ÖVE› ‹HAR›	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	‹DEMKO› ‹HAR›	30	10	30
National Standards Authority of Ireland (NSAI)	‹NSAI› ‹HAR›	30	30	50
Norges Elektriske Materiellkontroll (NEMKO)	NEMKO ‹HAR›	10	10	70
Asociacion Electrotecnica Y Electronica Espanola (AEE)	‹UNED› ‹HAR›	30	10	70
Hellenic Organization for Standardization (ELOT)	ELOT ‹HAR›	30	30	70
Instituto Portages da Qualidade (IPQ)	np ‹HAR›	10	10	90
Schweizerischer Elektro Technischer Verein (SEV)	SEV ‹HAR›	10	30	90
Elektriska Inspektoratet	SETI ‹HAR›	10	30	90

Underwriters Laboratories Inc. (UL) SV, SVT, SJ or SJT, 3 X 18AWG
Canadian Standards Association (CSA) SV, SVT, SJ or SJT, 3 X 18AWG

6.3 Warranty

■ Limited warranty for products

Nepa Gene Co.,Ltd., warrants that its products, as delivered, shall conform to its specification and be free of defects in materials and workmanship when used in accordance with their intended use. This warranty is limited to twelve (12) months from the product's original date of shipment from Nepa Gene Co., Ltd.. The warranty for non-durable products is limited to thirty (30) days from the product's original date of shipment from Nepa Gene Co., Ltd.. Further, this warranty dose not apply to modifications made to the products by the customer, or damage to products resulting from modifications or repairs effected by customer or other personnel not authorized by Nepa Gene Co., Ltd. to perform such work. This warranty shall not apply to damage resulting from (I) loss or damage in transit, (II) unreasonable use, (III) customer's negligence, or (IV) accident. Nepa Gene Co., Ltd. reserves the right to examine the alleged defective goods in order to determine whether the warranty is applicable.

■ Limited warranty and disclaimer

Nepa Gene Co., Ltd. warrants that all services supplied hereunder will be performed in a workmanlike manner, except for the express warranties provided to customer under the above "limited warranty for products", Nepa Gene Co., Ltd. makes no other warranties or conditions, expressed or implied, as to the services or parts supplied hereunder, and Nepa Gene Co.,Ltd. expressly disclaims all warranties or conditions of merchant-ability or fitness for a particular use.

■ Limitation of liability

Nepa Gene Co., Ltd. liability under this agreement is limited to the expense of providing product repair, neither Nepa Gene Co., Ltd. nor its employees or agents shall be liable for indirect, special, incidental, or consequential damages, including without limitation, business interruption, loss of profits or loss of revenues, loss of wages or injury to persons, property or customers. Furthermore, Nepa Gene Co. ,Ltd. categorically states that the sole and exclusive remedy for nonconforming goods shall be replacement of defective goods or, at Nepa Gene's option, refund of the purchase price to customer. The parties acknowledge that the price of Nepa Gene Co., Ltd.'s products would be much greater if Nepa Gene Co., Ltd. undertook more extensive liability.

Any action by customer for any alleged breach of the warranty stated in this section must be brought to the attention of Nepa Gene Co. Ltdl within 90 calendar days after the end of the warranty period.

Notice:

Products returned to Nepa Gene Co., Ltd. for repair or replacement shall be received prepaid.
If found not to be defective under the terms of warranty a charge will be made for repair or replacement and freight costs will be at customer's expense.
Specifications are subject to change without notice. For this reason and at its sole discretion, Nepa Gene Co., Ltd. reserves the right to upgrade products during a repair process. Prices for out of warranty repairs are subject to change without notice.

Contact

Area	Distributor	Address
Australia	Berthold Australia Pty Ltd	40 Clements Avenue, Bundoora, Victoria 3083 Phone: (03) 9467 6277 fax: (03) 9467 7493
Canada USA	Bulldog Bio, Inc.	One New Hampshire Ave, Suite 125, Portsmouth, NH 03801, USA phone: +1-603-570-4248 fax: +1-603-766-0524
China	Applitech Pharmaceutical Equipment Technology Co. Ltd.	483, Xingnan Road, Nancun, Panyu,Guangzhou, 511442 phone:+86-20-34821111 fax:+86-20-34820098
Europe	Sonidel Limited	32 Tonlegee Drive Cameron Park Raheny Dublin 5, Republic Ireland phone: +353-1-4434358 fax: +353-1-6865462
Germany	Xceltis GmbH	Im Tal 12, 74909 Meckesheim, Germany phone: +49-6226-972418 fax: +49-6226-972419
India	Medi Analytika India Pvt. Ltd	6, Adyar Bridge road, Adyar, Madras - 600 020, India phone: +91-44-2446 0988 fax: +91-44-2446 3931
Israel	Almog Diagnostic	P.O Box 349, Shoham, 73142, Israel phone: +972-3-977-3390 fax: +972-3-977-3391
Korea	Bio-Medical Science Co., Ltd.	BMS Bldg., 22 Yeoksam-ro 7 gil, Gangnam-ku, Seoul 135-936, Korea phone: +82-(0)2-3471-6500 fax: +82-(0)2-3471-7001
Singapore	Insta BioAnalytik Pte, Ltd.	21 Biopolis Road, #03-01 Nucleos 138567 Singapore phone: +65-6515-0110 fax: +65-6515-0220
Taiwan	Bio-East Technology Co., Ltd.	9F., No.21 Fu-Kor Rd. Shi-Lin, Taipei, 111, Taiwan phone: +886-2-2831-3061 fax: +886-2-2831-6374

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