LOW FREQUENCY STIMULATOR-T.E.N.S

(KM-2500T)

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1. Features

This device generates low frequency signals ranging from 1～1,000[㎐] and has various built-in auto mode programs which are designed to automatically control the frequency/stimulation type according to the preset mode. First-time users can easily operate the device with a few button settings or use the manual mode to freely operate the frequency/stimulation type as the user intends.

- LCD display window is used
  - LCD display window is used to provide a sophisticated design for medical device and for users to easily judge the current status while using the device

- Frequency generated via a digital method
  - By generating low frequency signals through a digital method, the frequency output is more stabilized.

- Various built-in auto mode programs
  - Automatic frequency mode is built-in for user convenience. Auto mode can be set with a few button touches.

- Two independent frequency outputs(for two-person use)
  - There are two frequency outputs separated circuit-wise and the two channels can each start/stop and operate independently regardless of the mode.

- Automatic saving of most recently used setting
  - The most recently used setting for the operating time and mode are automatically saved so the setting is maintained even when the power is turned ON/OFF.

- Voice Guide
  - Previously, only beep sounds were generated for the guiding sounds. This device generates voice guides such as “Hello”, “Thank you for using” for more user-friendly use of the device.

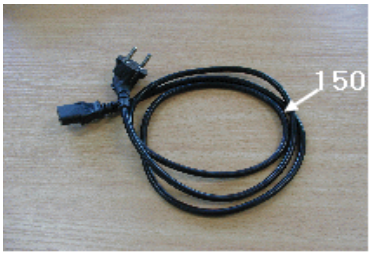
- Use of suction electrodes
  - By using suction electrodes, areas which were previously difficult to contact can be attached simply. Also, the contact force has improved to provide more smoother low frequency stimulation to the treatment area.
  - Low frequency output and suction electrode operation are functionally separated, so the suction electrode can be used independently.

2. Components of a low frequency stimulator

This stimulator consists of a main body, two aspirators and a power cable. Details are as followed;

[Main body]

[aspirator, hose, sponge]



[power cable]

- Components

  Main body : 1EA

  Low frequency ceramic cup : 4EA (2SET)

  Sponge for ceramic : 4EA (2SET)

  Power cord : 1EA

  Hose for drainage : 1EA

  Operating manual : 1EA

3. Installation and precautions

- check-ups and precautions before the use
- Locate the equipment at a place without moisture or heat of fire
  Remove water or dust at a joint of operating panel
- Make sure that the equipment is grounded, and the electricity rating is AC 220[V], 60[㎐]. Connect the electricity. Study operating manual.
- Push "DRAIN" key to get rid of water possibly remaining in the water container inside the equipment.
- Connect suction hoses at the blue connector(A A') and red connector(B B') each at the connecting terminal on the main body.
- Make sure the suction cup, stainless steal electrode and sponge are clean.
- When using the aspirator, put the watered sponge into the low frequency cup after squeezing it so it doesn't contain too much water.
- Keep the stimulated part clean and check the condition of skin
- Precautions for patients
  - Not allowed to attach the equipment : people with heart disorder or high fever, pregnant women, patients with venereal tumor, people having injury at the attached part, people inappropriate for the stimulator under a diagnose of a medical expert
  - Be careful the vacuum part of the aspirator is too strong.
  - Patient with transplanted electric medical instruments are not allowed to this stimulator without permission from a medical expert.

- While operating the equipment, check up the condition of a patient all the time.
- Time and intensity of the treatment should be dependent on individual physical strength and reaction.
- Do not use the equipment on a head, face and near the heart.
- When there are any malfunctions of the equipment, stop using it immediately.
- The equipment must be operated under the prescription and guidance of a medical expert.

• Precautions for the use

(1) Precautions for the use

① Avoid over-using the equipment more than the time necessary for diagnosing and prescribing.

② Check the condition of a patient and the equipment.

③ When there is a disorder of the equipment or an abnormal condition of a patient, take proper measurements such as stopping the equipment while the patient is in safe condition.

④ Only an expert is allowed to operate the equipment.

⑤ When there is a malfunction, indicate the situation at a proper place and let an expert to fix it.

⑥ Do not use the equipment other than the purposes what the equipment must operate for.

(2) Methods of proper storage of the equipment

① Keep the equipment away from moisture.

② Store the equipment at a place where air pressure, temperature, humidity, ventilation, sunlight dust and air containing salt can't affect on it.

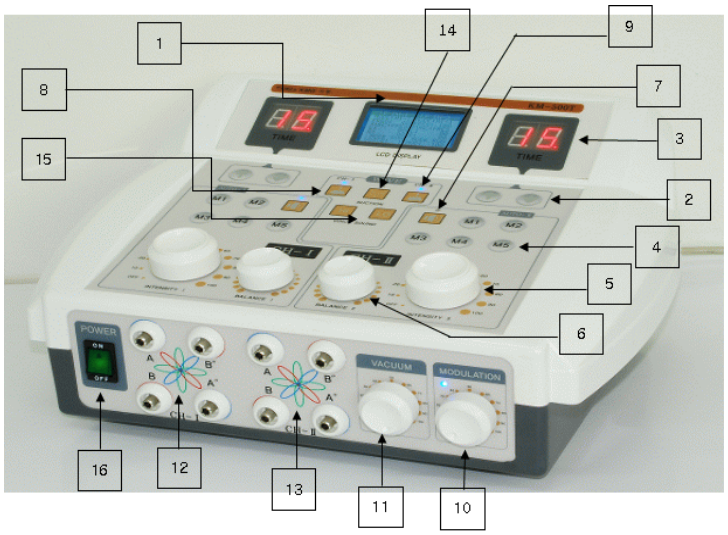
③Cautions are required under the circumstances of slant, vibration and shock.(operating included)

④ Keep the equipment away from a place where there are chemicals or gas.

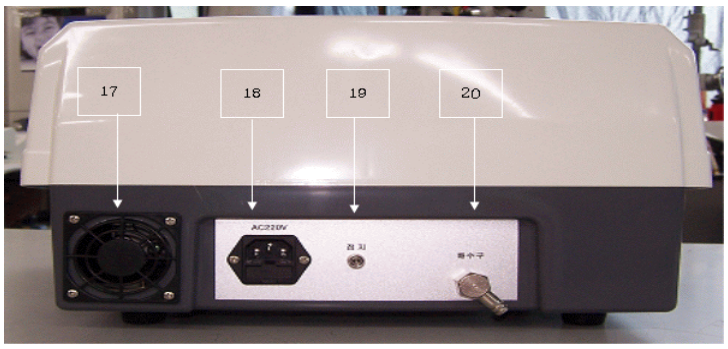
⑤ Regular check ups on the equipment and components are required.

⑥ When reusing the equipment after not operating it for a while, make sure to check up the cleanness and safety of the equipment.

4. Names of components and explanations of functions



[front side of main body]



[back side of main body]

No.	NAME	FUNCTION
①	Graphic LCD	Showing operating condition of the equipment at the moment. MODE SET, MODE RUN, TIME OVER, OVER CURR, ZERO CHK, ZERO CHK, DRN WATER. Output Frequency, L CH Output Bar, R CH Output Bar, Sound Output Level etc.
②	TIME Button	Setting an operating time by pushing UP/DOWN button.
③	TIME Display Screen	2 digit FND display screen, showing remaining time from 1 min.~60min.
④	M1~M5 Selecting Button	Selecting button (Memory M1~M5) on an automatic mode.
⑤	INTENSITY Volume	Controlling low frequency output. When turning the dial to clockwise from zero, low frequency output starts with a clicking sound. When turing it counterclockwise, the output stops.

⑥	BALANCE Volume	Controlling the balance of low frequency output. The right and left output volume of aspirator could be different depending on a touching part or rate. This dial is to control the balance of right and left output.
⑦	 frequency button	The buzzer sound the same as the output of low frequency is selected. One push for ON, and the other one for OFF are required.
⑧	 CH I suction mode button	A button to select suction mode of CH 1. One push for ON, and the other one for OFF are required.
⑨	 CH II suction mode button	A button to select suction mode of CH 2. One push for ON, and the other one for OFF are required.
⑩	air pressure-controlling volume	A dial to select the air pressure of the aspirator.
⑪	suction period controlling volume	A dial to select the suction period of aspirator.
⑫	CH I suction hose connecting terminal	A terminal which connects the main body and suction hose.
⑬	CH II suction hose connecting terminal	A terminal which connects the main body and suction hose.
⑭	 drainage button	In the process of suction, this button allows moisture in water container to be drained out of the main body using solenoid. (It starts draining solenoid.) - In case of manual draining by "DRAIN" key. - In case of automatic draining when the water container inside the equipment is full. - 15 seconds after all draining process, an inner draining valve is closed automatically.
⑮	SOUND button	Controlling high and low of the sound.
⑯	Electricity switch	A green switch to turn on/off the equipment.
⑰	Ventilating opening	A ventilating opening inside the equipment.
⑱	Electricity plug	Connecting electric cable and equipment. (Double fuse is built in.)
⑲	Grounding	A midway terminal which let leakage current caused by a malfunction flow to the ground.
⑳	Waterway	For draining water in the water container to the outside.
	Left & Right (CH I, CH II) bilateral same functions	Functional buttons on the main body are for the bilaterally same functions for the left and the right.(CH I, CH II)

▸  VACUUM key : For ON/OFF of suction of ceramic cups. Without this button, VACUUM doesn't work. VACUUM operates separately from low frequency output, so inspiration and ventilation functions work without using low frequency.

▸ DRAIN key : This button functions for draining water in the process of suction from inside a water container to outside the equipment through the waterway at the back or the equipment. To prevent this function from working by mistake, the button must be pushed more than 1 second. After the draining for 15 seconds, it stops automatically. While draining, the equipment doesn't work.

▸ time UP/DOWN key : The key is to control the time of low frequency output. When the time is set up while the equipment stops, it is stored after the power is off. When there is a time change in the middle of low frequency output, it only extends the time length of low frequency output.

▸ HI LO VOICE SOUND UP/DOWN key : The key is to control sound volume of announcements such as "Hello," or "Thank you."

▸ sound key of low frequency output : By pushing the button in the middle of low frequency output, the sound comes out through a speaker. Buttons exist separately for CH1 and CH2, since sounds coming out from both CH1 and CH2 at the same time can be a noise. In case that the sound is unnecessary, push the button of the side that the sound comes out at the moment to make it mute.

▸ M1 M2 M3 M4 M5 storage buttons, Memory M1~M2 function explanations

– M1 AUTO mode : output MODE2, MODE3, MODE1, MODE4 complexly
· Push once : Output automatically changed frequency from 10Hz to 200Hz.
· Push twice : Output automatically changed frequency from 1Hz to 50Hz.
· Push three times : Output automatically changed frequency from 1Hz to 40Hz.
· Push four times : Output automatically changed frequency from 10Hz to 20Hz.
· Push five times : Output automatically changed frequency from 10Hz to 100Hz.

– M2 MODE3 mode : The amplitude of vibration increases and goes back to the base level. Then repeat the same process.
· Push once : Output automatically changed frequency from 50Hz to 500Hz.
· Push twice : Output low frequency at the level of 50Hz.
· Push three times : Output low frequency at the level of 100Hz.
· Push four times : Output low frequency at the level of 500Hz.
· Push five times : Output low frequency at the level of 1000Hz.

– M3 MODE1 : Repeat sending and pausing an electric current without changes of the amplitude.
· Push once : Output automatically changed frequency from 100Hz to 1000Hz.
· Push twice : Output low frequency at the level of 100Hz.

· Push three times : Output low frequency at the level of 250 Hz.
· Push four times : Output low frequency at the level of 500Hz.
· Push five times : Output low frequency at the level of 1000Hz.

– M4 MODE4 : Repeat increasing and decreasing amplitude gradually and periodically.
· Push once : Output automatically changed frequency from 7Hz to 500Hz.
· Push twice : Output low frequency at the level of 20Hz.
· Push three times : Output low frequency at the level of 100Hz.
· Push four times : Output low frequency at the level of 250Hz.
· Push five times : Output low frequency at the level of 500Hz.

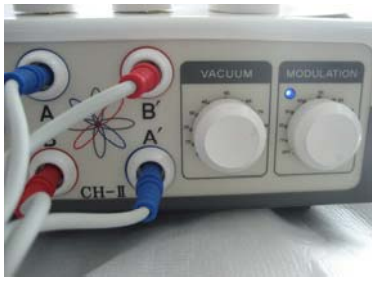
– M5 MODE2 : The amplitude of vibration increases gradually and goes back to the base level. Then repeat the same process.
· Push once : Output automatically changed frequency from 1Hz to 10Hz.
· Push twice : Output low frequency at the level of 1Hz.
· Push three times : Output low frequency at the level of 3Hz.
· Push four times : Output low frequency at the level of 7Hz.
· Push five times : Output low frequency at the level of 10Hz.

▸ BALANCE volume : The right and left output volume of aspirator could be different depending on a touching part or rate. This dial is to control the balance of right and left output.

▸ INTENSITY volume : When turning the dial to clockwise from zero, low frequency output starts with a clicking sound. When turing it counterclockwise, the output stops.

5. How to use

1) How to use
① Turn on the power switch at the front side of the main body.
② Make sure that every switch indicates zero or "0".



③ Connect the blue connector (A A') and the red connector (B B') to the suction hose terminal at the main body.

④ Make sure that suction cups, and stainless steal electrode and sponges are clean.
⑤ When using the aspirator, put the watered sponge into the low frequency cup after squeezing it so it doesn't contain too much water.
⑥ Keep the part to be stimulated clean and check the condition of skin.
⑦ Push suction mode button and check weather the suction works normally.
⑧ Attach the aspirator to the part to be stimulated.
The electrode allocation method can either be 2 or 4 terminals.
⑨ Operate the equipment under the operating order described below.
After the operation finishes, initialize the equipment in a reverse order.
⑩ Keep the aspirator clean with 70% of isopropyl alcohol after the use.

2) Operating order

(1) Fixed frequency stimulation

Fixed frequency stimulation operates for the case when repeated stimulation of low frequency is needed. The stimulation is classified into MODE2, MODE3S, MODE1 and MODE4 according to the output signal. The way of using it is described below.

① Turn on the power switch. Zero Start alarm would sound if the output controlling volume was not set up on zero point.
② Select one among M1~M4 using the memory button.
③ Set up the time by pushing UP/DOWN button of TIME.
④ Select suction mode of CH1 or CH2. Push once for ON, and another for OFF.
⑤ Turn air pressure controlling volume to the necessary level.
⑥ Turn suction period controlling volume to start.
⑦ Attach the aspirator to the necessary part.
⑧ Turn INTENSITY volume to start the output of low frequency.
⑨ Turn the same volume at the level of necessary output strength.
⑩ When stoping the equipment, turn the INTENSITY volume as low as possible.
⑪ Stop SUCTION function of CH1 or CH2. Push once for OFF.
⑫ Pull out the electricity cord when the equipment is not used.

(2) Automatic mode(built-in programmed stimulation)

Built-in programmed stimulations indicates stored stimulation patterns in advance for the easy use of effective stimulation. The program can be found in AUTO #1.

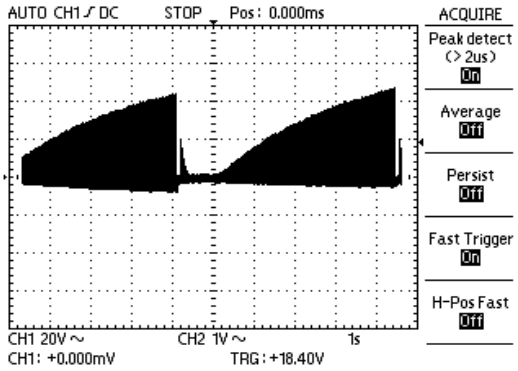
▶ AUTO mode : Output MODE2, MODE3, MODE1, MODE4 complexly.

① Turn on the power switch. Zero Start alarm would sound if the output controlling volume was not set up on zero point.
② Select M1 by pushing memory button.
③ Set up the time by pushing UP/DOWN button of TIME.
④ Select suction mode of CH1 or CH2. Push once for ON, and another for OFF.
⑤ Turn air pressure controlling volume to the necessary level.
⑥ Turn suction period controlling volume to start.
⑦ Attach the aspirator to the necessary part.

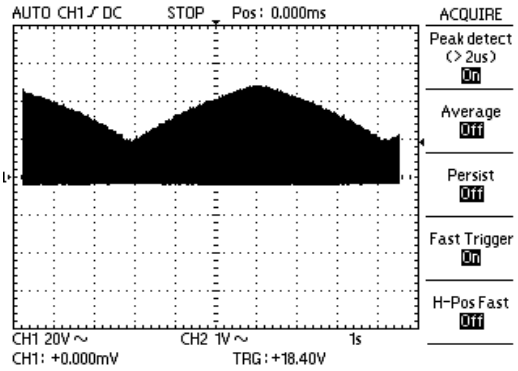
⑧ Turn INTENSITY volume to start the output of low frequency.
⑨ Turn the same volume at the level of necessary output strength.
⑩ When stoping the equipment, turn the INTENSITY volume as low as possible.
⑪ Stop SUCTION function of CH1 or CH2. Push once for OFF.
⑫ Pull out the electricity cord when the equipment is not used. Set up modes.

Mode types

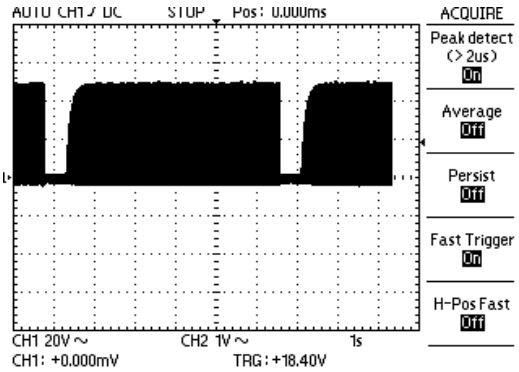
- MODE2 : Output standard frequency without amplitude changes.
- MODE3 : Repeat sending and pausing electric current without amplitude changes.
- MODE1 : Repeat gradual increase of amplitude and pause.
- MODE4 : Repeat gradual increase and decrease of amplitude. When frequency on the left increases, the one on the right decreases, and vice versa. This process is repeated.



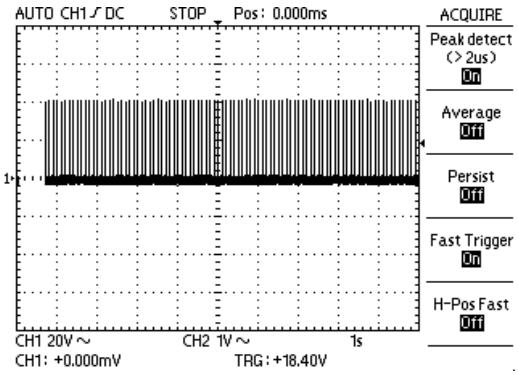
Mode1 [Waveform1]



Mode4 [Waveform2]



Mode3 [Waveform3]



Mode2 [Waveform4]

AUTO MODE (Built-in programmed)

- AUTO Mode : MODE2, MODE3, MODE1, MODE4 output in combination
  - M1 MODE2 Mode
    - · Pressed 1 time : Automatic output change from 1Hz to 10Hz frequency.
    - · Pressed 2 times : Low frequency output with 1Hz frequency
    - · Pressed 3 times : Low frequency output with 3Hz frequency
    - · Pressed 4 times : Low frequency output with 7Hz frequency
    - · Pressed 5 times : Low frequency output with 10Hz frequency

▸ M2 MODE3 mode

· Pressed 1 time : Automatic output change from 50Hz to 500Hz frequency.
· Pressed 2 times : Low frequency output with 50Hz frequency.
· Pressed 3 times : Low frequency output with 100Hz frequency.
· Pressed 4 times : Low frequency output with 500Hz frequency.
· Pressed 5 times : Low frequency output with 1000Hz frequency.

▸ M3 MODE1 mode

· Pressed 1 time : Automatic output change from 100Hz to 1000Hz frequency.
· Pressed 2 times : Low frequency output with 100Hz frequency.
· Pressed 3 times : Low frequency output with 250Hz frequency.
· Pressed 4 times : Low frequency output with 500Hz frequency.
· Pressed 5 times : Low frequency output with 1000Hz frequency.

▸ M4 MODE4 mode

· Pressed 1 time : Automatic output change from 7Hz to 500Hz frequency.
· Pressed 2 times : Low frequency output with 20Hz frequency.
· Pressed 3 times : Low frequency output with 100Hz frequency.
· Pressed 4 times : Low frequency output with 250Hz frequency.
· Pressed 5 times : Low frequency output with 500Hz frequency.

▸Operating Step AUTO MODE

– Selection Mode

▸ M1 MODE2 Mode

· Pressed 1 time : Automatic output change from 1Hz to 10Hz frequency.
· Pressed 2 times : Low frequency output with 1Hz frequency
· Pressed 3 times : Low frequency output with 3Hz frequency
· Pressed 4 times : Low frequency output with 7Hz frequency
· Pressed 5 times : Low frequency output with 10Hz frequency

▸ M2 MODE3 mode

· Pressed 1 time : Automatic output change from 50Hz to 500Hz frequency.
· Pressed 2 times : Low frequency output with 50Hz frequency.
· Pressed 3 times : Low frequency output with 100Hz frequency.
· Pressed 4 times : Low frequency output with 500Hz frequency.
· Pressed 5 times : Low frequency output with 1000Hz frequency.

▸ M3 MODE1 mode

· Pressed 1 time : Automatic output change from 100Hz to 1000Hz frequency.
· Pressed 2 times : Low frequency output with 100Hz frequency.

· Pressed 3 times : Low frequency output with 250Hz frequency.
· Pressed 4 times : Low frequency output with 500Hz frequency.
· Pressed 5 times : Low frequency output with 1000Hz frequency.

▸ M4 MODE4 mode
· Pressed 1 time : Automatic output change from 7Hz to 500Hz frequency.
· Pressed 2 times : Low frequency output with 20Hz frequency.
· Pressed 3 times : Low frequency output with 100Hz frequency.
· Pressed 4 times : Low frequency output with 250Hz frequency.
· Pressed 5 times : Low frequency output with 500Hz frequency.

▸ M5 AUTO mode : MODE2, MODE3, MODE1, MODE4 output in combination
· Pressed 1 time : Automatic output change from 10Hz to 200Hz frequency.
· Pressed 2 times : Automatic output change from 10Hz to 200Hz frequency.
· Pressed 3 times : Automatic output change from 1Hz to 40Hz frequency.
· Pressed 4 times : Automatic output change from 10Hz to 20Hz frequency.
· Pressed 5 times : Automatic output change from 10Hz to 100Hz frequency.

6. Troubleshooting

• Description of LED display window status
The current status is displayed in the top part of the LED. The status meanings are shown in the following.

- "MODE SET" : Waiting state of mode setting. Nothing is being done in this state and the user can select the mode to use here.
- "MODE RUN" : This is displayed during low frequency output.
- "OVER CURR" : This is the state in which the output surpasses 55[mA] and becomes overloaded during low frequency output. If in this state, the output is automatically stopped and the alert sound is generated.
- "-- " TIME FND : When the low frequency output is overloaded, surpassing the maximum output, the output is automatically stopped and the alert sound is generated.- "ZERO CHK" : When the INTENSITY volume is not at the zero position when the main power is turned on or the start key is pressed, the alert sound is generated.
- "OVR WATER" : This message is displayed when the water bucket inside the device is full. The water is automatically drained through the drain at the back of the device. If the low frequency output was being performed, then it will automatically be stopped.
- "DRN WATER" : This message is displayed when the DRAIN key is pressed to manually drain the water bucket.

7. Electrical and Mechanical Characteristics

(1) Voltage : AC 220V, 50/60㎐
(2) Power consumption : 55VA
(3) Output current : Maximum 55㎃ (in 500Ω non-inductive load resistance)
(4) Output voltage : Maximum 60Vp-p (in 500Ω non-inductive load resistance)
(5) Output frequency : (1㎐ ~ 1,000㎐)
- Pulse shape definition : symmetrical trapezoidal waveform
(6) Mode

Waveform shape	Characteristic
M1	The amplitude gradually increases and then returns to the initial value. This is repeated.
M2	Outputs the basic waveform without amplitude changes.
M3	Repeats applying the electric current and then pausing without amplitude changes.
M4	Amplitude changes are gradually increased and then decreased periodically. This is repeated.

(7) Timer : maximum 60 minutes
Electrical sound(buzzer) is generated when digital timer stops
(8) Pressure Suction : maximum pressure is ±15% inside of 385 mmHg
(9) Suction/pressure interval : Minimum : 1 Second Suction, 1 Second Pressure (20%)
Maximum : 2 Second Suction, 2 Second Pressure (20%)
(10) Dimension : 400㎜×300㎜×210㎜
(11) Weight : 9.5㎏

8. Repair and A/S

! Before requesting maintenance
- Please note that this device has passed through rigorous testing performed at our factories. If you believe that the device is broken please contact our sales representative.
- Do not attempt to repair the device on your own. Contact our sales representative or your place of purchase.
- When requesting repairs please present the following information.

Please present the address (address, name, phone number, map) in which the product is to be returned.

CAUTION : Do not disassemble or repair and remodel other than the medical device manufacturer.
(Device repaired/remodeled by the unauthorized can not receive A/S.)
The device may catch fire or operate abnormally and injure people.

9. Items

(1) Product Name : Low frequency Stimulator (A16010), KM-2500T
(2) Manufacturer : KMG(KuMyung)
(3) Manufacturer Address : 2F / 5F, Samsan B/D, 419 Hasinbeonyeong-ro, Saha-gu, Busan
(4) Manufacturer Tel. : +82 51 804-2213
(5) Manufacturer License No. : No. 1780
(6) Manufacturing Product License No. : _____
(7) Date of Manufacture: _____
(8) Voltage: AC 220V, 50/60㎐
(9) Power consumption : 55VA
(10) Low frequency voltage : Maximum 65Vp-p (in 500Ω non-inductive load resistance)
Low frequency current : Output current : Maximum 55mA (in 500Ω non-inductive load resistance)
Low frequency range : (1㎐～1,000㎐),
Low frequency waveform : symmetrical trapezoidal waveform
Low frequency usage time : 1 min. to maximum 60 min.
(11) Quantity : 1SET (12) Weight : approximately 9.5㎏
(13) How to use and cautions on use : Refer to attached document(User Manual)
(14) Protection method against electrical shock and degree of protection :
Class 1, BF-type device
(15) This device is for medical use.

10. Product Warranty

<Warranty Regulation>
The warranty period for the main body of the device is one year from the date of purchase. Accessories are excluded.
In the case of trouble/defect, include this product warranty in the product when requesting maintenance to the purchased store or manufacturer.

Please take care as maintenance fees will be charged in the following situations during the warranty period.

- Trouble due to mishandling
- Trouble due to product remodeling or maintenance from places other than the designated A/S shops.
- Trouble and loss due to natural disasters such as fire, earthquake and flood damage.
- External cause of trouble, that is caused from somewhat other than the product
- Not mentioned in the product warranty

※ These regulations are valid for use inside the country.

※ These regulations are not to restrict the customer's rights.

※ The customer shall pay the transportation fees or other costs occurred for maintenance.

Product Warranty

Product Name	Low Frequency Stimulator	Model Name	KM-2500T
SN	DT		
Intended Use		Package	1Box 1Set
Voltage	220V, 50/60㎐	Power Consumption	55VA
	CAUTION – Refer to accompanying documents.		
	KMG Co.,Ltd. 2F/5F Samsan B/D, 419, Hasinbeonyeong-ro, Saha-gu, Busan 604-851, Korea		
			
CE 0120			

※ Please confirm the purchase location during purchase to be entitled to free maintenance and support.

※ Other Information :