Zewa® TENS 502
Quality products for life
Transcutaneous Electrical Nerve Stimulator

Model: TENS 502
Art. No.: 21005

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OP-21-0051

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Instruction Manual

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Chapter 1: INTRODUCTION TO TENS

(1) EXPLANATION OF PAIN:

Pain is the body's natural warning mechanism and is intended to prevent additional injury. Pain is important, as without it, vital parts of our body might be injured or damaged without our knowledge. Whilst ointments, drugs or even surgery can be used to treat chronic pain, these are all utilised with varying degrees of success, as each individual patient and condition is different. TENS offers a unique alternative method of pain relief with no potentially harmful side effects.

(2) WHAT IS TENS

TENS is a battery powered electrical unit which uses electrodes placed onto the skin over a painful area to deliver electrical impulses to the nerve fibres which lie underneath the skin surface, providing pain relief by blocking pain signals to the brain via the spinal cord and peripheral nervous system, TENS stimulates production of endorphines, the body's own painkillers.

(3) HOW DOES TENS PROVIDE PAIN RELIEF

TENS utilises the nervous systems own pain relief mechanisms. This may be achieved in two ways : either by Stimulating Coarse nerve fibres mediating touch (conventional TENS), or by activating nerve fibres in Muscle (burst, acupuncture - TENS)

(4) COMMON CONDITIONS TREATABLE WITH TENS

Although dependant on your Specific pain problem, TENS devices have been used successfully to treat many conditions, including:

CHRONIC PAIN

Cervical (Neck) • Amputation • Phantom Limb • Headache • Lower Back • Lumbago • Leg Pain • Sciatica • Arthritis

ACUTE PAIN

Post - Operative • Muscle and Joint • Tendonitis • Fractures • Tennis Elbow

(5) POSITIONING OF ELECTRODES:

Different Electrode Positions may have to be tested to achieve optimum results.Often the most effective position or positions are to be found in or adjacent to the painful area. The distance between the electrodes should be approximately 1.5".

Chapter 2: WARNINGS & PRECAUTIONS

PLEASE NOTE:

It is imperative that patients read and understand these warnings and precautions before using the unit. Do not allow your machine or electrodes to be used by anyone else, as they are designed for single patients use only. It is highly recommended that proper medical advice on the use of TENS is sought from a Qualified Practitioner (Physiotherapist, Doctor, Nurse) Prior to use, in order to ensure safe and effective treatment is achieved. If you are taking any medication please carry on as normal with as usual but seek advice from your clinician before using the device.

WARNING! PATIENTS WITH PACEMAKER MAY NOT BE TREATED WITH TENS

- Exercise Caution during the first 3 months of Pregnancy
- Do Not place Electrodes over Arteria Sinus Caroticus
- Do Not use on broken or damaged skin
- Do Not place Electrodes around the head close to the eyes or in the mouth.
- Do Not use TENS driving or operating machinery. Tens is unsuitable and should not be used in the following situations.
- Persons suffering from Various conditions where circulation is impaired, Epilepsy, Heart Condition or any form of Malignancy.
- Patients with poorly enervated areas and non - compliant patients who are emotionally disturbed or have dementia.
- TENS units may not be used transcerebally across the head, over the carotid sinus (when the Jaw meets the neck) over metal implants or in conjunction with sleep apnea or heart monitors.
- You should be aware that TENS units provide symptomatic

therapy only and are not considered curative.

The degree of pain relief declines in some cases with time, TENS may have less effect after extended use. To reduce the risk of development of tolerance, the following measures may be taken:

- Frequent follow-ups.
- Teach the patient to use burst, modulated, and conventional stimulation.
- Vary electrode placement.

If despite this the patient should experience lessened or no effect from TENS, take a break from the TENS treatment for 1-2 weeks, and then resume treatment.

As with pain-killing medicines, TENS provides temporary pain relief, which often lasts up to four hours after treatment. Treatment usually lasts 30-60 minutes, 2-4 times daily.

The induction time to achieve pain relief varies from immediate effect up to about an hour. Some patients prefer continuous stimulation while others prefer intermittent stimulation with different intervals.

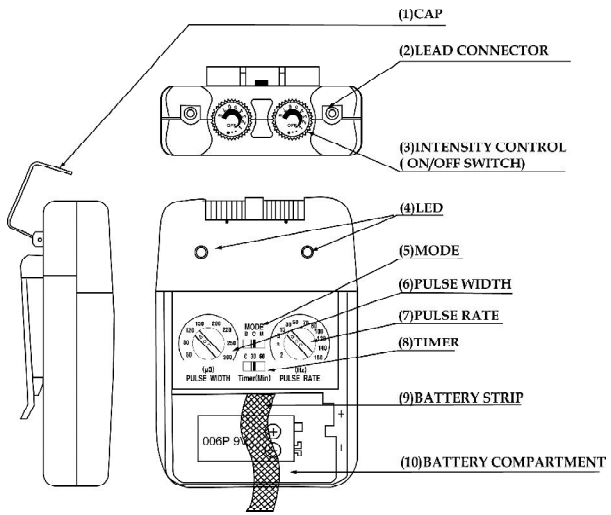
- Remove the electrodes and discontinue stimulation if you experi ence skin irritation or discomfort.

Chapter 3 : GENERAL DESCRIPTION

The device is a battery operated pulse generator that sends electrical impulses electrodes to the body and reach the nerves causing pain. The device is provided with two controllable output channels, each independent of each other. An electrode pair can be connected to each output channel.

The electronics of the device create electrical impulses whose Intensity, duration, number per second and modulation may be altered with the controls or switches. Dial controls are very easy to use and the slide cover prevents accidental changes in the setting.

Chapter 4 : CONSTRUCTION



Chapter 5 : TECHNICAL SPECIFICATIONS

The technical specification details of TENS 502 are as follows.

	MECHANISM	TECHICAL DESCRIPTION
01	Channel	Dual, isolated between channels
02	Modes of Operations	Continuous, Burst, Modulation
03	Pulse Intensity	Adjustable, 0-80mA peak into 500 ohm load each channel, constant current
04	Pulse Rate	2 Hz to 150 Hz(adjustable)
05	Pulse Width	50 µs to 300 µs(adjustable)
06	Timer	Cont., 30 min, 60 min.
07	Burst Mode	Burst consist 2 burst per sec at 100 Hz
08	Wave Form	Asymmetrical Bi-Phasic square pluse
09	Voltage	0-100 Valt. (open current)
10	Power source	9 Volt battery (alkaline, or nickel-cadium rechargeable)
11	Dimensions	95(H) x 65(W) x 23.5(T) mm
12	Weight	115 grams (battery included)

Output Parameters

Mode	Intensity (mA)	Width (µSec)	Pulse Rate Freq(Hz)	Cycle Time (Sec)
Continuous	Adj.0-80	Adj.50-300	Adj.2-150Hz	N/A
Burst	Adj.0-80	Adj.50-300	100 Hz fixed 2-burst per sec.	N/A
Modulation	Adj.0-80	Modulates down from preset width setting by 60% the back to original setting	Adj.2-150Hz	5.5 sec total time

Chapter 6 : ACCESSORIES

Each set TENS 502 are completed with standard accessories and standard label as given below

I. Accessories

REF. NO.	DESCRIPTION	Q'TY
1.	TENS unit	1 pieces
2.	Lead Wires	2 pieces
3.	Electrodes	4 pieces
4.	9V battery	1 piece
5	Storage case	1 piece
6.	Instruction Manual	1 piece
7.	Warranty Book	1 piece

Chapter 7 : GRAPHIC SYMBOLS

1.  Note Operating Instructions
2.  Degree of Electrical Protection BF
3.  Do not insert the plug into AC power supply socket.
4.  Direct Current (DC power source)
5.  Consult Instructions for use
6.  Manufacturer
7.  Serial Number

Chapter 8 : PARAMETER CONTROLS

PULSE DURATION

Wider pulse duration settings will deliver stronger stimulation for any given intensity setting. As mentioned in the Controls section, by using a combination of intensity and pulse duration, it is felt that various pulse widths are capable of stimulating different groups of nerve fibers.

The choice of which pulse duration to use is partially dependent upon the Treatment Mode and Protocol selected (refer to the appropriate section).

PULSE RATE

The Pulse Rate (hertz or pulses per second) chosen depends greatly upon the type of electrode placement given to the patient.

When using contiguous and dermatome electrode placements (i.e. stimulating directly through the area of pain or localized enervation), a quick pulse rate (setting greater than 80Hz on the Pulse Rate Control) is desired. The patient should not perceive individual pulses but rather have the sensation of steady continuous stimulation.

Despite above recommendations, these individual patients may require slight variations of the above settings, according to the nature of their condition.

TREATMENT MODE

Normal or Conventional TENS offers the practitioners complete control over all the various treatment parameters of the instrument.
Burst Mode is analogous to the Low Rate TENS technique except the low frequency individual pulses are replaced by individual “bursts” of 7-10 individual pulses. It is thus a combination of Conventional TENS and Low Rate TENS. In Burst Mode, the treatment frequency is fixed by the instrument and is not adjustable with the Frequency Rate control.
Modulated Mode attempts to prevent nerve accommodation by

continuously cycling the treatment intensity. When using Modulated Mode increase the intensity only when the unit is at the maximum intensity of the modulation cycle. If the intensity is increased during a low intensity period of the cycle, the patient may turn up the control very slowly, so that they may feel the intensity any higher.

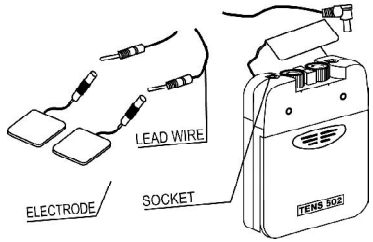
TIME DURATION

The onset of pain relief should occur shortly after the intensity setting has been determined. However, in some cases, pain relief may take as long as 30 minutes to achieve. TENS units are typically operated for long periods of time, with a minimum of 20 – 30 minutes and in some post-operation protocols, as long as 36 hours.

In general, pain relief will diminish within 30 minutes of the cessation of stimulation.

Chapter 9 : ATTACHMENT OF ELECTRODE LEAD WIRES

The wires provided with the system insert into the jack sockets located on top of the device. Holding the insulated portion of the connector, push the plug end of the wire into one of the jacks (see drawing); one or two sets of wires may be used.



After connecting the wires to the stimulator, attach each wire to

an electrode. Use care when you plug and unplug the wires. Jerking the wire instead of holding the insulated connector body may cause wire breakage.

CAUTION

Do not insert the plug of the patient lead wire into the AC power supply socket.

Chapter 10: LEAD WIRE MAINTENANCE

Clean the wires by wiping with a damp cloth.

Chapter 11 : ELECTRODE OPTIONS

The electrodes should be routinely replaced when they start to lose their adhesive nature. If you are unsure of your electrode adhesive properties, order replacement electrodes. Replacement electrodes should be re-ordered through or on the advice of your physician to ensure proper quality. Follow application procedures outlined in electrode packing, to maintain optimal stimulation and to prevent skin irritation.

Chapter 12 : ELECTRODE PLACEMENT

The placement of electrodes can be one of the most important parameters in achieving success with TENS therapy. Of utmost importance is the willingness of the clinician to try the various styles of electrode placement to find which method best fits the needs of the individual patient.

Every patient responds to electrical stimulation differently and their needs may vary from the conventional settings suggested here. If

the initial results are not positive, feel free to experiment. Once an acceptable placement has been achieved, mark down the electrodes sites and the settings, so the patient can easily continue treatment at home.

CONTIGUOUS PLACEMENT

This is the most common placement technique. It involves placing the electrodes alongside the area of localized pain site, in such a way as to direct the flow of current through or around the area of pain. In a single channel application, this would involve placing each pad on either side of the pain site if the pain is localized on a limb and deep within the tissue. Pad placement on the posterior and anterior aspects of the affected limb will allow the current to flow completely through the limb and thus through the endogenous pain site.
With a two channels application, the clinician may either direct the current flow to cross through the pain site or, in what is called the "bracket" method allowing the current flow on either side of the painful area, generally through the nerve branches that feed into the pain site.

Chapter 13 : TIPS FOR SKIN CARE

To avoid skin irritation, especially if you have sensitive skin, follow these suggestions:

1. Wash the area of skin where you will be placing the electrodes, using mild soap and water before applying electrodes, and after taking them off. Be sure to rinse soap off thoroughly and dry skin well.
2. Excess hair may be clipped with scissors; do not shave stimulation area.
3. Wipe the area with the skin preparation your clinician has recommended. Let this dry. Apply electrodes as directed.
4. Many skin problems arise from the "pulling stress" from adhesive

patches that are excessively stretched across the skin during application. To prevent this, apply electrodes from center outward; avoid stretching over the skin.

5. To minimize “pulling stress”, tape extra lengths of lead wires to the skin in a loop to prevent tugging on electrodes.
6. When removing electrodes, always remove by pulling in the direction of hair growth.
7. It may be helpful to rub skin lotion on electrode placement area when not wearing electrodes.
8. Never apply electrodes over irritated or broken skin.

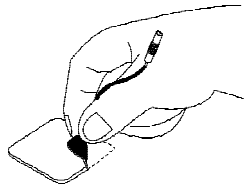
Chapter 14 : APPLICATION OF RE-USABLE SELF ADHESIVE ELECTRODES

Application

1. Clean and dry the skin at the prescribed area thoroughly with soap and water prior to application of electrodes.
2. Remove the electrodes from the protective liner and apply the electrodes firmly to the treatment site.

Removal

1. Lift at the edge of electrodes and peel; do not pull on the lead wires because it may damage the electrodes.



Care and Storage

1. Between uses, store the electrodes in the resealed bag in a dry place.
2. It may be helpful to improve repeated application by spreading a few drops of cold water over the adhesive and turn the surface up to air dry. Over Saturation with water will reduce the adhesive properties.

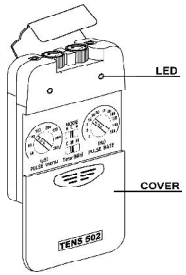
Important

1. Do not apply to broken skin.
2. The electrodes should be discarded when they are no longer adhering.
3. The electrodes are intended for single patient use only.
4. If irritation occurs, discontinue use and consult your clinician.
5. Read the instruction for use of self-adhesive electrodes before application.

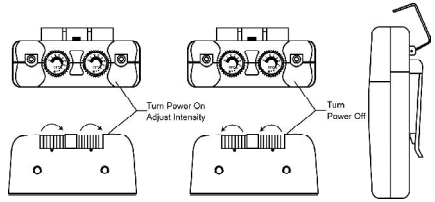
Chapter 15 : ADJUSTING THE CONTROLS

1. Slide Cover:
   A slide-on panel cover covers the controls for Pulse Width, PulseRate, Mode Selector and Modulation Selector. Your medical professional may wish to set these controls for you and request that you leave the cover in place.

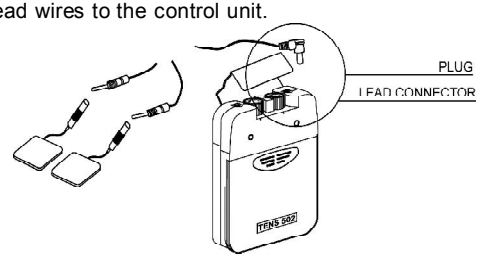
2. Display Led
   Each of the leds illuminates whenever the electronics of the device create a current impulse. Due to the capacity of the human eye, the illumination of the lamp can only be recognized up to a frequency of approximately 30 Hz. At higher frequencies, the lamp will appear to be constantly illuminated.



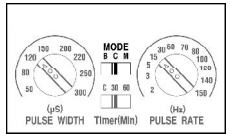
3. On/Off Switch and Intensity Control :
   If both controls are in the off-position (white markings on the housing), the device is switched off.
   By turning the controls clockwise, the appropriate channel is switched on and the impulse display led will illuminate and begin to pulse according to the frequency set.
   The current strength of the impulses transmitted to the electrodes increases further when the control is turned clockwise.
   To reduce the current strength or switch the device off , turn the controls counter clockwise to the required setting or off- position.



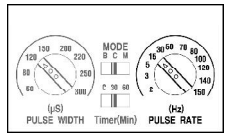
4. Lead Connector :
   The device must be turned off before connecting the lead wires. To connect the electrodes to the control unit use the enclosed lead wires. Connect them to the electrodes first and than connect the lead wires to the control unit.



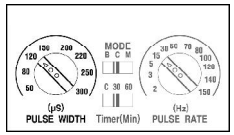
5. Mode Control
   Expose the controls by sliding front cover down from top of unit. This switch has 3 positions: B for Burst stimulation, N for Constant stimulation, and M for modulation stimulation. Push the Mode Selector until engaged in position desired.



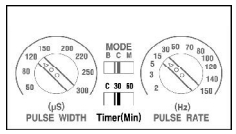
6. Pulse Rate Control:
   This dial determines how many electrical impulses are applied through the skin each second. By turning these controls, the number of current impulses per second(Hz) for both channels can be continually adjusted. Unless otherwise instructed, turn the pulse rate control to the 70-120 Hz range.



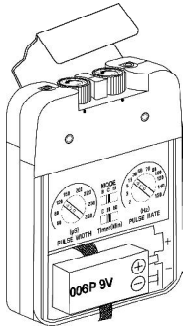
7. Pulse Width Control:
   This dial adjusts the length of time each electrical signal is applied through the skin, which controls the strength and sensation of the stimulation. If no instructions regarding the pulse width are given in therapy, set the control to the suggested 70-120 μs setting.



8. Timer Control
   Treatment time of TENS can be preset with Timer Control. This switch has 3 positions, 15, 30 and C(Continue). .
   Push the Timer Control until engaged in position desired.



9. Check/Replace the Battery:
   Over time, in order to ensure the functional safety of TENS, changing the battery is necessary.
   1. Make sure that both intensity controls are switched to off position.
   2. Slide the battery compartment cover and remove.
   3. Remove the battery from the compartment.
   4. Insert the battery into the compartment. Note the polarity indicated on the battery and in the compartment.
   5. Replace the battery compartment cover and slide to close



CHAPTER 16 : BATTERY CHARGING (RECHARGEABLE BATTERY AND CHARGER NOT INCLUDED)

PRECATIONS

1. Remove battery if equipment is not likely to be used for some time.
2. Please recycle the used battery in accordance with domestic regulation.

3. Do not throw the used battery into fire.

If you use rechargeable batteries, please follow the instructions.

RECHARGEABLE BATTERIES

Prior to the use of a new unit, the rechargeable battery should be charged according to the battery manufacturer's instructions. Before using the battery charger, read all instructions and cautionary markings on the battery and in this instruction manual.

After being stored for 60 days or more, the batteries may lose their

charge. After long periods of storage, batteries should be charged prior to use.

BATTERY CHARGING (RECHARGEABLE BATTERIES ONLY)

(1) Plug the charger into any working 110 or 220/240v mains electrical outlet. The use of any attachment not supplied with the charger may result in the risk of fire, electric shock, or injury to persons.

(2) Follow the battery manufacturer's instructions for charging time.

(3) After the battery manufacturer's recommended charging time has been completed, unplug the charger and remove the battery.

(4) Batteries should always be stored in a fully charged state. To ensure optimum battery performance, follow these guidelines:

   (a) Although overcharging the batteries for up to 24 hours will not damage them, repeated overcharging may decrease useful battery life.
   (b) Always store batteries in their charged condition. After a battery has been discharged, recharge it as soon as possible. If the battery is stored more than 60 days, it may need to be recharged.
   (c) Do not short the terminals of the battery. This will cause the battery to get hot and can cause permanent damage. Avoid storing the batteries in your pocket or purse where the terminals may accidentally come into contact with coins, keys or any metal objects.
   (d) WARNINGS:
      1. Do not attempt to charge any other types of batteries in your charger, other than the nickel-cadmium rechargeable batteries. Other types of batteries may leak or burst.
      2. Do not incinerate the rechargeable battery as it may explode!

Chapter 17: MAINTENANCE, TRANSPORTATION AND STORAGE OF TENS DEVICE

1. Non-flammable cleaning solution is suitable for cleaning the device. Note: Do not smoke or work with open lights (for example, candles, etc.) when working with flammable liquids.
2. Stains and spots can be removed with a cleaning agent.
3. Do not submerge the device in liquids or expose it to large amounts of water.
4. Return the device to the carrying box with sponge foam to ensure that the unit is well-protected before transportation.
5. If the device is not to be used for a long period of time, remove the batteries from the battery compartment (acid may leak from used batteries and damage the device). Put the device and accessories in carrying box and keep it in cool dry place.
6. The packed TENS device should be stored and transported under the temperature range of -20℃— +60℃, relative humidity 20% — 95% , atmosphere pressure 500 hPa — 1060 hPa.

Chapter 18: SAFETY-TECHNICAL CONTROLS

For safety reasons, check your TENS 502 each week based on the following checklist.

1. Check the device for external damage.
   - deformation of the housing.
   - damaged or defective output sockets.
2. Check the device for defective operating elements.
   - legibility of inscriptions and labels.
   - make sure the inscriptions and labels are not distorted.

3. Check Led
   - led must be illuminated when switched on.
4. Check the usability of accessories.
   - patient cable undamaged.
   - electrodes undamaged.

Please consult your distributor if there are any problems with device and accessories.

Chapter 19: MALFUNCTIONS

Should any malfunctions occur while using the TENS, check

- whether the switch/control is set to the appropriate form of therapy. Adjust the control correctly.
- whether the cable is correctly connected to the device. The cables should be inserted completely into the sockets.
- whether the impulse display led is illuminated. If necessary, insert a new battery.
- for possible damage to the cable. Change the cable if any damage is detected.

* If there is any other problem, please return the device to your distributor. Do not try to repair a defective device.

For more information and troubleshooting visit www.zewa.com

Chapter 20: CONFORMITY TO SAFETY STANDARDS

The TENS 502 devices are in compliance with the EN 60601-1-2:2001 and EN 60601-1:1990+A1:1993+A2:1995+A13: 1996 safety standards.