NeuroTrac® Rehab

DUAL CHANNEL TENS & EMS UNIT

Operators Manual

Visit our website: www.veritymedical.com



English

VERITY MEDICAL LTD

Symbols on the unit and case

	Caution! (electrical output).
	Follow operating instructions! Failure to do so could place the patient or operator at risk.
	Stimulation (STIM) and EMG Triggered Stimulation (ETS) should not be used by Patients fitted with demand style cardiac pacemakers. Please seek advice from your health supervisor.
	Patient's shock protection type: BF (Body Floated) Equipment. This equipment is not earthed but contains a battery within an insulated unit.
MD	Indicates the item is a medical device.
REF	Indicates the manufacturer's catalogue number so that the medical device can be identified.
LOT	Manufacturer's LOT/Batch number. Present it together with the SN number if you report a technical fault or claim a warranty return.
SN	Manufacturer's serial number of the unit. Present it together with the LOT number if you report a technical fault or claim a warranty return.
	Name and address of manufacturer.
	Date of manufacture.
CE 0123	This product complies with European medical device regulations 0123 - Notified body identification.
	The Australian government requires that all imported or locally produced electrical and electronic equipment comply with electromagnetic compatibility (EMC) emission requirements. A compliant product must bear the C-Tick logo.
	This product should be kept dry.
IP22	The device protected from ingress of solid foreign objects of 12.5mm dia and greater and ingress of vertically falling water drops equivalent to 3 mm rainfall/minute when the enclosure is tilted at an angle of 15° from the normal position.
	Do not dispose in normal dustbin (see page 30 for the disposal instructions).



Warnings

Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

* **This unit must be used with the guidance of a clinician or therapist. This includes selection of the type of vaginal probe/skin electrodes and placement of skin electrodes.**
* Type BF equipment, Continuous Operation.
* Do not insert lead wires into a mains power supply.
* Do not immerse unit into water or any other substance.
* The unit is not protect from the ingress of water droplets from a shower of rain if used outside the carrying case.
* Do not use the NeuroTrac® Rehab unit in the presence of a flammable anaesthetic gas mixture and air or with Oxygen or Nitrous Oxide.
* If using rechargeable 9 Volt PP3 Nickel Metal Hydride batteries, be sure to use a CE approved battery charger. Never connect the NeuroTrac® Rehab directly to a battery charger or to any other mains powered equipment.

  We advise not to use Ni-Cad rechargeable batteries.
* Patient Electrodes are for single patient use only.
* Keep out of reach of children.
* Do not use this stimulator on your facial area unless you are under strict guidance from a qualified Clinician.
* Application of electrodes near the thorax may increase the risk of cardiac fibrillation.
* Operation in close proximity (e.g. 1m) to a shortwave or microwave therapy equipment may produce instability in the stimulator output.
* Simultaneous connection of a patient to a high frequency surgical equipment may result in burns at the site of the stimulator electrodes and possible damage to the stimulator.
* No modification of this equipment is allowed!
* The battery cover must be closed prior to use of the device.

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Intended Purpose

TENS uses a small battery operated unit to provide a non-invasive, drug free method of controlling acute and principally long term intractable pain. It can also be used as adjunctive treatment in the management of post surgical traumatic pain problems. Mild electrical impulses are transmitted through the skin via surface electrodes to modify the body's pain perception and/or to stimulate muscle and nerve fibres using precise electrical signals via various predetermined or programmable stimulation modulation options.

What is Pain?

When we feel pain it is the body's process of informing us that something is wrong. To feel pain is important, without this feeling abnormal conditions may go undetected, creating damage or injury to critical parts of the body.

Although pain is essential in warning our body of trauma or malfunction, nature may have gone too far in its design. Continued long-term chronic pain has no useful value apart from its importance in diagnosis. Pain begins when a coded signal travels to the brain where it is decoded and analysed. The pain message travels from the injured area of the body along small diameter nerves leading to the spinal cord. At this point the message is switched to a different kind of nerve that travels up the spinal cord to the brain area. The brain then analyses the pain message, refers it back and the pain is felt.

What is TENS?

Transcutaneous Electrical Nerve Stimulation (TENS) uses a small battery operated unit to provide a non-invasive, drug free method of controlling acute and principally long term intractable pain. It can also be used as an adjunctive treatment in the management of post surgical traumatic pain problems. In TENS mild electrical impulses are transmitted through the skin via surface electrodes to modify the body's pain perception. TENS does not cure problematic physiological conditions; it only helps to control the pain perception. TENS will not work for every user, please seek advice from your Doctor.

There are millions of small nerve fibres throughout the body and it only requires a few impulses to produce chronic pain. In addition to small fibres, which allow the sensation of pain to be felt, the body is also made up of larger diameter nerve fibres. These larger nerve fibres transmit less unpleasant sensations such as touch or warmth, assisting us to form an impression of our environment. Stimulating the larger nerve fibres using TENS may have the effect of inhibiting the transmission of pain along the smaller nerve fibres to the spinal cord [known as the 'Pain Gate Theory'].



What is STIM?

Neuromuscular Stimulation has been used for many years to stimulate muscle and nerve fibres to treat a number of muscle and nerve related conditions. Over the last 30 years numerous clinical trials and papers have been written.

The NeuroTrac® Rehab is a dual channel device combining several treatment programmes into one unit. Neuromuscular Stimulation is increasingly understood by Therapists and Doctors. There is a better understanding of the mechanisms which exist between nerves and muscles that makes it possible to stimulate the neuromuscular system with precise electrical signals. The NeuroTrac® Rehab offers precision giving full control of Pulse Widths, Rates, Ramp up times, Work / Rest cycles as well as alternating or synchronous application if two channels are being applied.

Customer Care

We welcome constructive comments regarding our equipment particularly those that might help us to improve existing features, add new ones or develop new products for the future.

Contra Indications & Precautions

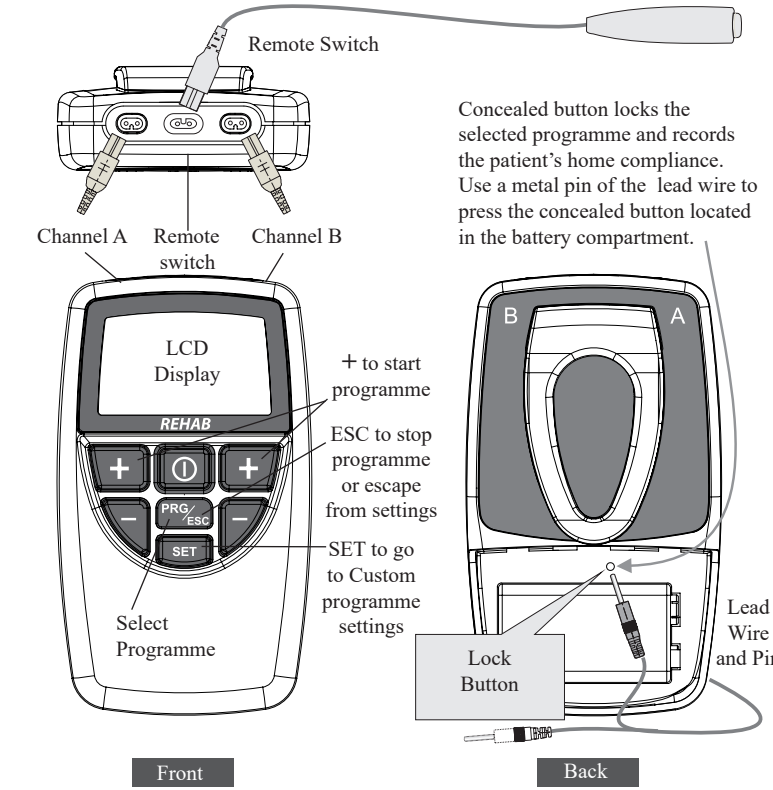
Before using this equipment you must first seek the advice of your Physiotherapist or Doctor.

Read this operating manual before using the unit

TENS and STIM should not be used:

* By patients fitted with a demand style cardiac pacemakers unless so advised by their Doctor
* During pregnancy [unless medically advised]
* By patients with undiagnosed pain conditions
* By patients with undiagnosed skin conditions
* With patients who have diminished mental capacity or physical competence who cannot handle the device properly
* On anaesthetised or desensitised skin
* When driving a vehicle or operating potentially dangerous equipment
* Do not place electrodes:
  - > Over carotid sinus nerves
  - > Over larynx or trachea
  - > Inside mouth
  - > Over the area of the heart unless so advised by your Doctor
  - > On your facial area unless under strict guidance from a qualified Clinician
  - > Do not apply stimulation across or through the head, directly on the eyes, covering the mouth, on the front of the neck (especially the carotid sinus) or via electrodes placed on the chest and upper back or crossing over the heart.
* The patient should use the unit only as prescribed
* Do not immerse the unit in water or any other liquid
* If you experience skin irritation this may be due to over-stimulation. In this case leave the skin to heal and use TENS only for the periods prescribed. Turning the current up too high can cause skin irritation. In this case allow the skin to heal and use TENS at a lower intensity. Some people experience an allergic reaction to the adhesive coating on the surface of the electrode. If this happens use a different make of electrode or change the electrode. If it continues try reducing the pulse width. If the problem still persists try moving the electrode position each day by just the width of the electrode, making sure the electrode positioning is still over the dermatome
* Keep unit out of reach of children
* Only use CE approved skin electrodes
* If in doubt about the use of the Rehab unit, call your Doctor, Therapist, Clinician or your distributor for advice.

Description of Unit & Functions



*** PRG button** Selects the desired set programme:
P01 - P08 - TENS programmes
P09 - P10 - TENS customised programmes
P11 - P14 - Remote hand switch STIM programmes
P15 - STIM customised programme
P16 - P19 - STIM programmes

*** SET button** Displays the menu and changes the parameters for Pulse Rate, Pulse Width and Time for custom programmes.

*** ESC button** Stores customised programme and returns to the home position.

*** ON / OFF button** Turns unit on, off and ends the current programme

Quick Start Instructions

1. Insert a 9 volt PP3 Alkaline battery. Alternatively insert a rechargeable Nickel Hydride battery [which is safer and has a much longer life than the Ni-Cad rechargeable batteries] into the battery compartment.
2. Insert lead wire/s to channel A and B if both channels are to be used.
3. Switch on the unit by pressing the ON/OFF button.
4. Press the PRG [Programme] button to select:
   P01 - P08 for preset TENS programmes (Page 12 of this manual).
   P11 - P14 for preset remote switch STIM programmes.
   (Page 17 of this manual)
   P16 - P19 for preset STIM programmes (Page 19 of this manual).
5. To start press channel A + and B + button if you are using both channels, increase the stimulation to the desired level.
6. Once the program is complete, you will hear five beeps.
7. To stop the programme, press the ON/OFF button which will turn the unit off.

Using the Remote Switch

1. Insert Remote switch lead wire into centre socket.
2. Switch on the unit by pressing the ON/OFF button.
3. Press the PRG [Programme] button to select:
   P11-P15 for preset STIM / Remote switch programmes
   (See page 17 - 19 of this manual).
4. Press the A+ and B+ button if you are using both channels, increase the stimulation to the desired level.
5. Press the Remote switch button to STOP the stimulation (when the desired level is set).
6. Press the Remote switch button to start and stop stimulation as desired.
7. If you need to change the intensity, ensure that the unit is in stimulation phase before altering the mA level. If the intensity is zero on both channels, press the remote button to go back to stimulation phase with the previously used intensity, then adjust the mA levels.
8. To stop the programme, press the ON / OFF button which will turn the unit off.

Setting up your own Continuous mode TENS parameters.

1. Select P09 by pressing the PRG button on the front panel.
   Press and hold the SET button for 3 seconds until **Hz** symbol flashes on the display, then press the + or – button on the front panel to adjust the Pulse Rate from 2-200 Hz.
2. Press the SET button again and the µS symbol will flash ON/OFF, then press the + or – button to adjust the Pulse Duration from 50 - 300 µS.

3. Press the SET button again and the Clock symbol will flash ON/OFF, then press the + or – button to adjust the time. Channel A + or – button to hours and Channel B + or – button to change minutes. [Maximum time 12 hours 59 min].

After setting up the customised programme parameters, press the ESC button to store the information. Simply repeating the above procedure can reprogramme customised programmes.

Setting up your own Modulation mode TENS parameters
The custom modulation TENS programme will opperate as follows: the current modulates linearly in 3 seconds from FHI, WLO to FLO, WHI, then another 3 seconds it modulates back to FHI, WLO, and so on.

1. Select P10 by pressing the PRG button on the front panel.
2. Press and hold the SET button for 3 seconds until **Hz** symbol flashes on the display. **FHI** (high frequency level) will appear on the LCD screen, then press the + or – button on the front panel to adjust the frequency in the range of 50-200 Hz.
3. Press the SET button to set the **FLO** (low frequency level), the Hz symbol will flash ON/OFF and FLO will appear on the LCD screen, then press the + or - button on the front panel to adjust the Pulse Rate from 50Hz to FHI.
4. Press the SET button to set the **WLO** (low pulse duration level), the µS symbol will flash ON/OFF and WLO will appear on the LCD screen, then press the + or - button on the front panel to adjust the Pulse Duration from 75 µS to WHI.
5. Press the SET button to set the **WHI** (high pulse duration level), the µS symbol will flash ON/OFF and WHI will appear on the LCD screen, then press the + or – button on the front panel to adjust the Pulse Duration from WLO to 200 µS.
6. Press the SET button again and the Clock symbolwill flash ON/OFF, then press the + or – button to adjust the time. Channel A + or – button to hours and Channel B + or – button to change minutes. [Maximum time 12 hours 59 min].

After setting up the customised programme parameters, press the ESC button to store the information. Simply repeating the above procedure can reprogramme customised programmes.

mA Lock
For added safety, the device includes an mA lock function. After the mA is adjusted and there is no action for 60 seconds, the mA intensity will be locked and pressing the mA+ button will not have any action. This is to prevent unwanted mA increase. To increase the mA, firstly press the mA- button, which will unlock the mA, and then press the mA+ button to adjust.



Setting up your own STIM (NMS) parameters.

1. Select P15 by pressing the PRG button on the front panel. Press and hold the SET button for 3 seconds until **Hz** symbol flashes on the display, then press the + or – button on the front panel to adjust the Pulse Rate from 2 - 100 Hz.

2. Press the SET button again and the **µS** symbol will flash on/off, then press the + or – button to adjust the Pulse Duration from 50 to 450 µS.

3. Press the SET button again and the Clock [Time] symbol will flash ON/OFF, then press the + or – button to adjust the time Channel A +/- button to alter the hours and Channel B +/- button to adjust minutes [Maximum time 1 hour 30 minutes].

4. Press the SET button again and the WRK [Work] symbol will flash ON/OFF, then press the + or – button to adjust the work period from 1 – 99 seconds.

5. Press the SET button again and the RST [Rest] symbol will flash ON/OFF, then press the + or – button to adjust the rest period 1– 99 seconds.

6. Press the SET button again and the RMU [Ramp up] symbol will flash ON/OFF, then press the + or - button to adjust the ramp up period from 0.1 - 9.9 seconds.

7. Press the SET button again and the RMD [Ramp down] symbol will flash ON/OFF, then press the + or - button to adjust the ramp up period from 0.1 - 9.9 seconds.

8. Press the SET button again and ALT [Alternating] or SYN [Synchronous] symbol will flash on/off, then press the + or – button to select ALT or SYN.

9. If SYN [Synchronous] has been selected, press the SET button again to set the required delay time of Ch. B stimulation after Ch. A one. DLY will flash on the LCD display. Select the delay by pressing the Ch. B +/- buttons to read the appropriate delay value (between 0.0 sec. and 4 sec). The delay of 0.0 sec. means no delay, this setting is typical for Work/Rest stimulation.

After setting up the programme, press the ESC button to install and store the customised programme. Repeat the above procedure to re-programme.

NOTE: If the Remote Switch is plugged in work and rest times will not function.

Programmes

Programme: P01 Continuous	**TENS 1**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	4 Hrs				
Mode		Cont				
Frequency work	Hz	85				
Pulse duration	µS	200				
Modulation time	secs					
Ramp up time	secs					
Ramp down time	secs					
Work time	secs					
Rest time	secs					
Alternating						
Synchronous		*				
Overall time	4 Hrs					

Programme: P02 Continuous	**TENS 2**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	4 Hrs				
Mode		Cont				
Frequency work	Hz	35				
Pulse duration	µS	200				
Modulation time	secs					
Ramp up time	secs					
Ramp down time	secs					
Work time	secs					
Rest time	secs					
Alternating						
Synchronous		*				
Overall time	4 Hrs					



Programme: P03 Continuous	**TENS 3**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	4 Hrs				
Mode		Cont				
Frequency work	Hz	30				
Pulse duration	µS	200				
Modulation time	secs					
Ramp up time	secs					
Ramp down time	secs					
Work time	secs					
Rest time	secs					
Alternating						
Synchronous		*				
Overall time	4 Hrs					

Programme: P04 Continuous	**TENS 4**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	4 Hrs				
Mode		Cont				
Frequency work	Hz	85				
Pulse duration	µS	60				
Modulation time	secs					
Ramp up time	secs					
Ramp down time	secs					
Work time	secs					
Rest time	secs					
Alternating						
Synchronous		*				
Overall time	4 Hrs					

Programme: P05 Burst	**TENS 5**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	4 Hrs				
Mode		Burst				
Frequency work	Hz	150				
Pulse duration	µS	200				
Modulation time	secs					
Ramp up time	secs					
Ramp down time	secs					
Work time	secs					
Rest time	secs					
Alternating						
Synchronous		*				
Overall time	4 Hrs					

Burst of 9 pulses over 2 seconds
If hand switch is inserted into unit before programme starts, hand switch mode is activated. In this mode the timer is disabled and each press of the hand switch button toggles between programmes P05 & P13 (with 20% intensity increase on P13).

Programme: P06 Burst	**TENS 6**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	4 Hrs				
Mode		Burst				
Frequency work	Hz	185				
Pulse duration	µS	200				
Modulation time	secs					
Ramp up time	secs					
Ramp down time	secs					
Work time	secs					
Rest time	secs					
Alternating						
Synchronous		*				
Overall time	4 Hrs					

Burst of 9 pulses over 2 seconds



Programme: P07 Modulated	**TENS 7**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	4 Hrs				
Mode		Mod				
Frequency work	Hz	20-85				
Pulse duration	µS	50-250				
Modulation time	secs	6				
Ramp up time	secs					
Ramp down time	secs					
Work time	secs					
Rest time	secs					
Alternating						
Synchronous		*				
Overall time	4 Hrs					
Modulates pulse width from 50-250-50 µS over 6 seconds Modulates Frequency from 20-85-20 Hz over 6 seconds						

Programme: P08 Modulated	**TENS 8**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	4 Hrs				
Mode		Mod				
Frequency work	Hz	32-100				
Pulse duration	µS	200				
Modulation time	secs	6				
Ramp up time	secs					
Ramp down time	secs					
Work time	secs					
Rest time	secs					
Alternating						
Synchronous		*				
Overall time	4 Hrs					
Modulates Frequency from 32-100-32 Hz over 6 seconds						

Programme: P09 Continuous Custom	**TENS 9**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	Cust				
Mode		Cont				
Frequency work	Hz	Cust				
Pulse duration	µS	Cust				
Modulation time	secs					
Ramp up time	secs					
Ramp down time	secs					
Work time	secs	Cust				
Rest time	secs	Cust				
Alternating						
Synchronous		*				
Overall time	Cust					
Continuous Custom mode programme						

Programme: P10 Modulated Custom	**TENS 10**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	Cust				
Mode		Mod				
Frequency work	Hz	Cust				
Pulse duration	µS	Cust				
Modulation time	secs	6				
Ramp up time	secs					
Ramp down time	secs					
Work time	secs					
Rest time	secs					
Alternating						
Synchronous		*				
Overall time	Cust					
Continuous Modulation mode programme						



Programme: P11 Remote EMS	**EMS 1**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	20				
Mode		W/R				
Frequency work	Hz	45				
Pulse duration	µS	200				
Modulation time	secs					
Ramp up time	secs	1.0				
Ramp down time	secs	0.8				
Work time	secs	4.0				
Rest time	secs	12				
Alternating						
Synchronous		*				
Overall time	20					
Remote switch EMS programme. Press remote switch to start and stop the work and rest modes. Programme has no time limit if remote switch is used.						

Programme: P12 Remote EMS	**EMS 2**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	20				
Mode		W/R				
Frequency work	Hz	45				
Pulse duration	µS	350				
Modulation time	secs					
Ramp up time	secs	1.5				
Ramp down time	secs	1.0				
Work time	secs	6.0				
Rest time	secs	18				
Alternating						
Synchronous		*				
Overall time	20					
Remote switch EMS programme. Press remote switch to start and stop the work and rest modes. Programme has no time limit if remote switch is used.						

Programme: P13 Remote EMS	**EMS 3**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	20				
Mode		W/R				
Frequency work	Hz	80				
Pulse duration	µS	250				
Modulation time	secs					
Ramp up time	secs	1.0				
Ramp down time	secs	0.8				
Work time	secs	4.0				
Rest time	secs	18				
Alternating						
Synchronous		*				
Overall time	20					
Remote switch EMS programme. Press remote switch to start and stop the work and rest modes. Programme has no time limit if remote switch is used.						

Programme: P14 Remote EMS	**EMS 4**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	20				
Mode		W/R				
Frequency work	Hz	80				
Pulse duration	µS	350				
Modulation time	secs					
Ramp up time	secs	1.5				
Ramp down time	secs	1.0				
Work time	secs	6.0				
Rest time	secs	14				
Alternating						
Synchronous		*				
Overall time	20					
Remote switch EMS programme. Press remote switch to start and stop the work and rest modes. Programme has no time limit if remote switch is used.						



Programme: P15 Remote and Normal Custom EMS	**EMS 5**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	Cust				
Mode		W/R				
Frequency work	Hz	Cust				
Pulse duration	µS	Cust				
Modulation time	secs					
Ramp up time	secs	Cust				
Ramp down time	secs	Cust				
Work time	secs	Cust				
Rest time	secs	Cust				
Alternating		Cust				
Synchronous		Cust				
Overall time	Cust					
Remote switch and normal custom EMS programme. Press remote switch to start and stop the work and rest modes. Programme has no time limit if remote switch is used.						

Programme: P16 Normal EMS	**EMS 6**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	3	20	3		
Mode		W/R	W/R	Cont		
Frequency work	Hz	10	45	6		
Pulse duration	µS	150	200	150		
Modulation time	secs					
Ramp up time	secs	1.0	1.0			
Ramp down time	secs	0.8	0.8			
Work time	secs	4.0	4.0			
Rest time	secs	4.0	12			
Alternating						
Synchronous		*	*	*		
Overall time	26					
Normal EMS programme (will not work with remote switch)						

Programme: P17 Normal EMS	**EMS 7**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	3	20	3		
Mode		W/R	W/R	Cont		
Frequency work	Hz	10	45	6		
Pulse duration	µS	150	350	150		
Modulation time	secs					
Ramp up time	secs	1.0	1.5			
Ramp down time	secs	0.8	1.0			
Work time	secs	4.0	6.0			
Rest time	secs	4.0	18			
Alternating						
Synchronous		*	*	*		
Overall time	26					
Normal EMS programme (will not work with remote switch)						

Programme: P18 Normal EMS	**EMS 8**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	3	20	3		
Mode		W/R	W/R	Cont		
Frequency work	Hz	10	80	6		
Pulse duration	µS	200	250	200		
Modulation time	secs					
Ramp up time	secs	1.0	1.0			
Ramp down time	secs	0.8	0.8			
Work time	secs	4.0	4.0			
Rest time	secs	4.0	18			
Alternating						
Synchronous		*	*	*		
Overall time	26					
Normal EMS programme (will not work with remote switch)						



Programme : P19 Normal EMS	**EMS 9**	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Phase time	min	3	20	3		
Mode		W/R	W/R	Cont		
Frequency work	Hz	10	80	6		
Pulse duration	µS	200	350	200		
Modulation time	secs					
Ramp up time	secs	1.0	1.5			
Ramp down time	secs	0.8	1.0			
Work time	secs	4.0	6.0			
Rest time	secs	4.0	14			
Alternating						
Synchronous		*	*	*		
Overall time	26					
Normal EMS programme (will not work with remote switch)						

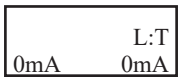
MOD = MODULATED FREQUENCY IN LINEAR STEPS
W/R = INTERMITTENT WORK/REST
CONT = CONTINUOUS

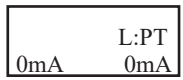
MODULATION TIME = EXPONENTIALLY
Example: Modulation time 6 seconds 50 µS-250 µS:- means starting at 50 µS increasing exponentially (fast then slow) to 250 µS in 3 seconds and returning (fast then slow) back to 50 µS to complete the cycle in 6 seconds.

Lock Mode Function

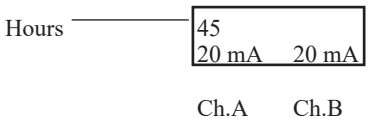
Lock Mode Function
A "concealed" Lock button is included in the NeuroTrac® Rehab unit, which allows the clinician to accurately monitor the "Home Compliance" of the patient between appointments. The lock function allows the device to be locked in two ways:- One {L:T} to measure the time in use over one hour, and the average mA current used, leaving the parameters i.e. Constant, Burst, Modulation and the Rate and Pulse Width to be freely altered by the user or alternatively {L:PT} Locking the device to measure, time, mA current used and locking the parameters in place, which then cannot be changed or altered by the patient during use.

Locking the Unit
Remove the battery cover and, using the end of the lead wire, gently press on the concealed lock button as shown in the diagram on page 8 until you hear a double bleep. {L:T} Lock time and Current will appear on the LCD screen. If you want to lock the parameters as well press the +/- button until {L:PT} appears. Press the ESC button to lock parameters in place.





To Unlock the Unit
To unlock the unit and display the lock information, remove the battery cover, using the end of the 2mm dia pin press the concealed switch once and you will here a single bleep, this indicates the unit is now unlocked. The information for time in use and the average m A current used can be read on the front of the LCD display as seen on the diagram below. When you have noted the information press the ESC button to bring the unit back to the Home position.



Using the NeuroTrac® Rehab Unit in TENS mode



RATE [Hz or pulses per second]

The **RATE** to be selected depends primarily on the electrode placement on the patient's body. If one uses contiguous and dermatome (the electrodes alongside or over the area of pain) electrode placement, a higher rate of 80 Hz - 100 Hz is desirable. The patient should experience steady continuous stimulation. It has been found that an optimal setting of 80 or 90 Hz with a pulse width of 200 μS has good effect for most patients and is a good first choice for pain-gating. Patients using Trigger, motor or acupuncture points tend to respond to low rate stimulation 2 Hz - 10 Hz and pulse width of 200 μS. The desired effect is for the patient to feel individual pulses.

PULSE WIDTH [Duration]

The wider pulse widths will deliver stronger stimulation for any given intensity [mA] setting. By using a combination of intensity and pulse duration, it is felt that various pulse widths are capable of stimulating different groups of nerve fibres. The wider pulse duration is needed to recruit motor fibres, where as the narrow pulse duration is used more on the sensory fibres.
The selection of which pulse duration to use is dependent upon the intended treatment protocol.

Stimulating the larger nerve fibres is thought to reduce the speed and the amount at which information is transmitted along the smaller nerve fibres. Also under certain circumstances the brain is thought to produce its own analgesic pain-killing substances, known as endorphins or endogenous opiods.

Intensity [mA]

Patients respond differently to the level of intensity, this is due to differences in individual patient's skin resistance, enervation and the type and condition of electrode being used.

A good formula for setting the intensity is to increase the current so that the patient feels slight muscle contraction, but not strong enough to move a joint, and then slightly reduce the intensity so that it feels comfortable. When using low rate TENS settings, individual twitches will occur. The higher rate TENS settings will increase muscle tension. It is not advised to increase the intensity to experience strong muscle contraction.

Treatment Modes (TENS)

There are three treatment modes available on the NeuroTrac® Rehab unit:

1. C**onventional TENS or normal.** This mode enables the user to select any rate between 2 Hz - 200 Hz, and a pulse width between 50 μS - 300 μS. This is the most frequently used of the three modes. The most common selection is 80 - 90 Hz with a 200 μS pulse width.

2. **Burst Mode**. This mode is comparable to the low rate TENS technique except that each low rate pulse is substituted for by a short BURST of 9 pulses [200 μS] at 150 Hz or 185 Hz. It is a combination of conventional and low rate TENS. The burst mode is often referred to as acupuncture - like TENS.

3. **Modulation TENS.** This mode was designed to help prevent nerve accommodation that some patient's experience. It is achieved by continuously cycling the pulse width and rate.

How Long Do I Use TENS For?

This depends on the individual patient's condition, accuracy of electrode placement, stimulation and the characteristics selected, but typically the onset of pain relief starts after 20 - 30 minutes. Generally TENS is used for longer periods of normally 1 hour 30 minutes per session. With some patients it can be much longer.

Electrode Placement (TENS)

The placement of electrodes is one of the most important parameters in achieving effective pain relief using TENS. This is best left to your Physiotherapist or Doctor to advise as to which location is most appropriate. It may transpire that various positions need to be experimented with before the user finds the most effective positioning. The positioning may be via the contiguous, dermatome, myotome, motor, trigger or acupuncture points.

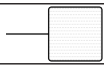
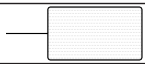
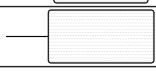
Dermatomes & Myotomes
These are areas of the body enervated by a single nerve root via the spinal cord. Each nerve root serves a known area of the skin. The dermatomes are named after the nerve root which serves it. For details of dermatome sites refer to diagrams on pages 40-41.

Contiguous Placement
This form of electrode placement is the most common method used. It involves placing the red lead [proximal] alongside the spine where the dermatome [on which your pain lies] enters and exits. The black lead [distal] is normally placed over or near to the pain site. Your Physiotherapist or Doctor may direct the current to cross through the pain area or using the 'bracket' system allow the current to flow on either side of the pain site through the nerve branches that supply the pain location.

Acupuncture Points
The placement of the red and black electrodes on the skin forms the electrical circuit for TENS. It is the skin itself that creates the highest electrical resistance to stimulation. The Physiotherapist or Doctor may consider using acupuncture loci, which offer much lower resistance properties, as a more effective site for placing the electrodes.
Accurately locating an acupuncture point can be difficult, please seek advice from you doctor or physiotherapist.

Electrodes Types and Tips

Compatible Electrodes and Probes

SHAPE	CODE	DESCRIPTION
	VS.4040	40 x 40 mm, square [* max 53mA]
	VS.5050	50 x50 mm, square (recommended for general use)
	VS.9040	90x40mm, rectangular
	VS.9050	90 x 50 mm, rectangular
	VS.10050	100 x 50 mm, rectangular
	VS.30	30mm diameter, round [** max 46mA]
* IMPORTANT : Don't use VS 4040 at more than 53mA and VS3030 at more than 46 mA. Using smaller electrodes may lead to current density greater than 2mA/cm^2. In such cases, special caution is to be exercised when adjusting the current level as too high values may cause skin irritation or possibly burns.		

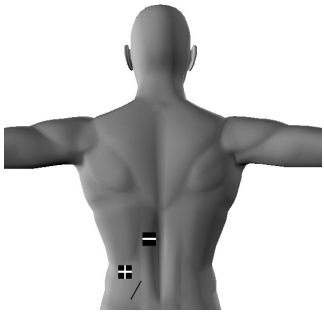
Note: Electrodes are not supplied with the device. They must be selected/ recommended and applied under the supervision of a clinician/ therapist**.**

Note: For skin electrodes order see our website: www.veritymedical.com

A Few Good Tips [Self- Adhesive Electrodes]:

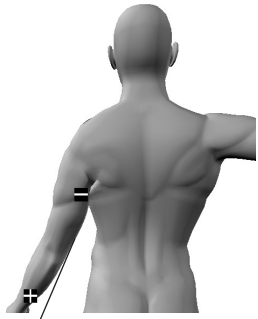
* If you find the electrodes will not stick due to oily skin, cleanse the skin with soap and water, then rinse and dry the area around the electrode site. If this does not work, try cleansing the skin with a swab impregnated with alcohol.
* Clip away hairy skin using a scissors; do not use a razor to remove the hair!
* The electrodes conductive material is water- based. If it becomes saturated (e.g. from perspiration), it will lose its adhesive qualities. After use leave the electrodes face up overnight to dry out (replace on plastic film in the morning).
  At some point the electrodes will become dry. Moisten the adhesive surface with a few drops of water, and apply onto the plastic film overnight. This procedure will give you a few more days of electrode life.

Electrode Positioning (TENS)



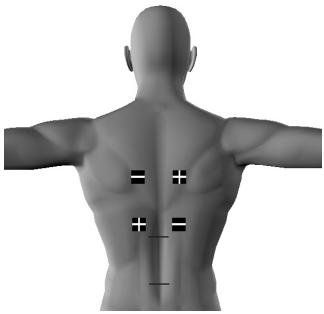
\+ = ***Red***

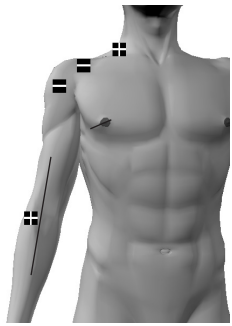
\- = ***Black***



Herpes Zoster

Phantom Limb





Back Pain

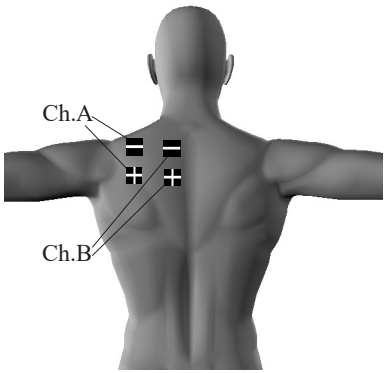
Shoulder Pain





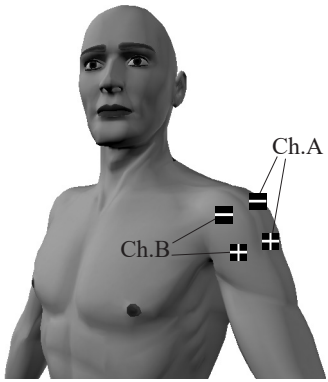
Lumbar Pain (2 Positions)

Electrode Positioning (STIM / NMS)



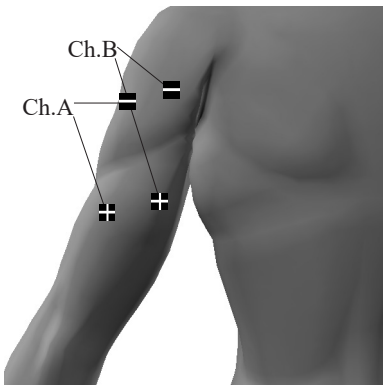
Upper back

Suggested Settings
Electrode Size: 50 x 50 mm
Pulse Width: 220 - 250 µS



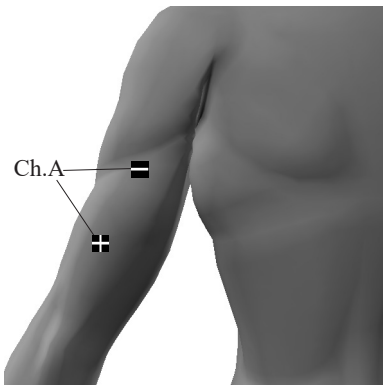
Deltoids

Suggested Settings
Electrode Size: 50 x 50 mm
Pulse Width: 220 - 250 µS



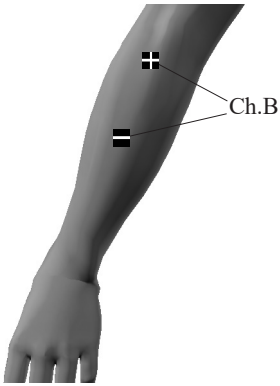
Triceps

Suggested Settings
Electrode Size: 50 x 50 mm
Pulse Width: 220 - 250 µS



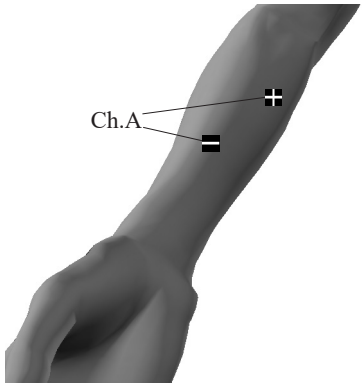
Biceps

Suggested Settings
Electrode Size: 50 x 50 mm
Pulse Width: 220 - 250 µS



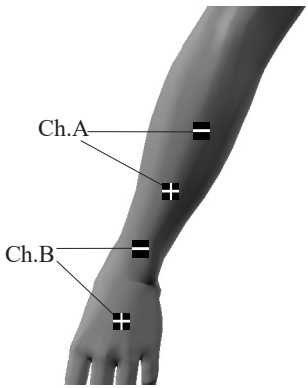
Extensor of the wrist

Suggested Settings
Electrode Size: 50 x 50 mm
Pulse Width: 220 µS



Flexor of the wrist

Suggested Settings
Electrode Size: 50 x 50 mm
Pulse Width: 220 µS



Wrist

Suggested Settings
Electrode Size: 50 x 50 mm
or 30 mm dia
Pulse Width: 220 µS

If you are using electrodes on your face, we recommend you contact your physiotherapist or clinician for guidance

Care, Maintenance, Accessories and Disposal

WARNING! Only medically approved accessories should be used!

CONTROL UNIT

* Wipe the surface after each use with a damp cloth or antiseptic wipe or baby wipe.
* Do not use cleaning sprays or alcohol based cleaning solutions.
* Control unit disposal: must be disposed of in compliance with national regulatory requirements.

ACCESSORIES

Battery:

* To change the battery, open the battery door on the rear of the control unit by pressing down on the raised rib pattern just below the belt clip. Lift the battery out of the compartment. This is very easy and can be done by the user.
* Check periodically for any discharge from the battery.
* Remove battery completely from unit if not in use for any extended period of time (typically one week).
* Low battery indicator shown on LCD display, when flashing change battery for a new one.
* Preferably use a PP3 alkaline battery.
* Battery disposal: must be disposed of in compliance with national regulatory requirements.

Lead Wires and Remote Control:

* The lead wires and remote control should be handled carefully and never stretched, as this can cause the stimulation to function below normal standards or not at all.
* Examine lead wires and remote control before each treatment for loose connections or damage.
* Avoid stretching and twisting the lead wires and remote control.
* Store the lead wires and remote control carefully after each use.
* Lead wires and remote control Disposal: must be disposed of in compliance with national regulatory requirements.

Self-Adhesive Electrodes:

Note: Self-Adhesive Electrodes are not supplied with the device. They must be selected/recommended and applied under the supervision of a clinician/therapist.

* **Use only CE-marked skin electrodes**
* Check that the short connectors are well connected to the electrodes.
* Replace electrodes onto plastic film after use. If they drop onto the floor debris will adhere to the conductive gel making the electrodes ineffective.



Electrode life can be considerably reduced by:

* The type and condition of the skin.
* Deep seated moisturisers or make-up.

For the Best Results:

* Before each use cleanse the skin.
* After each use stick the pads on the shiny insert card and store in a cool and dry place, such as the fridge (not freezer).

Caution: Static electricity may damage this product

NOTE: *Only Verity Medical Ltd or appointed distributors / importers are approved to undertake servicing.*

Conditions that respond to TENS

* phantom limb pain
* postoperative pain
* back pain

Conditions that respond to STIM (NMS)

* upper limb rehabilitation in early stroke

Also used for non medical purposes to:

* warm up prior to exercises
* maintain and improve movement
* increase and improve the blood supply to the muscle in cases of intermittent claudication

Specifications

TENS and STIM

1. Dual channel: individually isolated circuits.
2. Amplitude: 0-90 mA into 500 Ohm load ; indication only. Actual mA will tend to be less than indicated due to electrode impedance: at 1000 Ohms load (Electrodes in poor condition) the maximum will be limited to 70 mA, at 1500 Ohms load the maximum will be limited to 65 mA.
3. Type: Constant Current, maximum output voltage 180 V +10 / -30 V.
4. Waveform: Asymmetrical, rectangular bi-phasic with zero DC current.
5. Selectable pulse width: 50 µS - 450 µS [10% accuracy].
6. Pulse Rate selection: in the continuous mode 2 – 200 Hz [5% accuracy].
7. Mode: Continuous, Burst or Modulated.
8. Burst mode: Bursts of 9 pulses [200 µS] at 150 Hz or 185 Hz repeating twice per second.
9. Modulation mode: 6-second cycle of concurrent width modulation and pulse repetition rate modulation.
   TENS 7: Width starting at 50 µS and increasing exponentially to 250µS in three seconds and then returning back to 50 µS in the next three seconds. Rate starting 20 Hz, increasing exponentially to 85 Hz and then returning to 20 Hz.
   TENS 8: Width fixed at 200 µS. Rate starting 32 Hz, increasing exponentially to 100 Hz over 3 seconds and then returning to 32 Hz in the next 3 seconds.
10. Selectable treatment time duration: 1 second to 12 hours 59 minutes.
11. Battery: PP3 Alkaline, 9V. Expected average battery life [of standard 800 mAh, alkaline]: 34 h.
    Low battery indication at 6.9 V (+/- 0.2 V), automatic shut off when voltage drops below 6.2 V (+/- 0.2 V). Replace the batteries immediately! If the battery voltage is below 6.6 V (+/-0.2 V) the unit will not turn on.
12. **Open Electrode Detect: If an open circuit is detected at the output of channel A or B the output current will be reset at zero**.

Expected service life: 5 years. Careful use and maintenance extend the life of the unit over the service life limit.

Environmental Conditions for use: +5 to +40 degrees Centigrade. 15-90% Humidity. Atmospheric pressure: 700 hPa to 1 060 hPa.

Environmental conditions for storage & transport: -25 to +70 degrees Centigrade. 15-90% Humidity. Atmospheric pressure: 700 hPa to 1 060 hPa.

Additional requirements for device use.
1 hour required to warm from the minimum storage temperature between uses until it is ready for intended use.
1 hour required to cool from the maximum storage temperature between uses until it is ready for intended use.

Physical dimensions: 119.2mm x 69mm x 28.7mm
Weight: 104 g without battery



Information regarding Electromagnetic compatibility and interference (EMC)

NeuroTrac® products are designed to produce very low levels of radio frequency (RF) emissions (interference), to be immune from effects of interference produced by other equipment operating in their vicinity and damage due to electrostatic discharge all when operating in a typical domestic and or clinical environment. They are certified to meet the international EMC standard EN60601-1-2. For more information please refer to the tables 201, 202, 204 and 206 overleaf.

Table 201: Guidance and manufacturer's declaration - electromagnetic emission

The NeuroTrac® product is intended for use in the electromagnetic environment specified below. The customer or the user of the The NeuroTrac® product should ensure that it is used in such environment.

Emission test	Compliance	Electromagnetic environment guidance
RF emission CISPR 11	Group 1	The NeuroTrac® product uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment
RF emission CISPR 11	Class B	The NeuroTrac® product is suitable for use in all establishments , including domestic establishments and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable	

Table 202: Guidance and manufacturer's declaration – electromagnetic immunity

The NeuroTrac® product is intended for use in the electromagnetic environment specified below. The customer or the user of theNeuroTrac® product should assure that it is used in such an environment, and that precautions regarding that environment are heeded.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment guidance
Electrostatic discharge (ESD) IEC 61000-4-2	6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Table 204: Guidance and manufacturer's declaration – electromagnetic immunity

The NeuroTrac® product is intended for use in the electromagnetic environment specified below. The customer or the user of the NeuroTrac® product should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the NeuroTrac® product, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms 150 kHz to 80 MHz	d = 1.2 √P 150 kHz to 80 MHz, d = 1.2 √P 80 MHz to 800 MHz d = 2.3 √P 800 MHz to 2.5GHz
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m 80 MHz to 2,5 GHz	where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey [a], should be less than the compliance level in each frequency range [b]. Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which NeuroTrac® product is used exceeds the applicable RF compliance level above, the NeuroTrac® product should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the NeuroTrac™ product.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Table 206: Recommended separation distances between portable and mobile RF communications equipment and NeuroTrac® product

The NeuroTrac® product is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the NeuroTrac® product can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the NeuroTrac® product as recommended below, according to the maximum output power of the communications equipment

Rated maximum output power of transmitter W	**Separation distance according to frequency of transmitter**		
	150 kHz to 80 MHz d =1.2 √P	**80 MHz to 800 MHz** d =√1.2 P	**800 MHz to 2,5 GHz** d = √2.3 P
0,01	0.12	0.12	0.23
0,1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Troubleshooting

Problem:

- Cannot reach maximum mA level; or
- The unit cuts off stimulation at certain level; or
- When increase the intensity, zero mA is flashing; or
- Power is cutting off when using

Solution:

It is normal behaviour in our and any other quality muscle stimulators (and TENS machines), and in most cases resolves itself - please read the guideance below.
The stimulation intensity will drop to zero if you simply press the mA+ button and no electrodes are connected to the channel on which you increase the intensity. You should attach a pair of electrodes to the lead wire and the lead should be connected to the channel on which you increase the stimulation intensity (mA).
Our unit is designed to detect any poor or intermittent connection across the electrodes and to cut off the stimulation output (mA) when it does so. This is a safety precaution. It is designed to prevent the user from inadvertently turning up the output stimulation current in the presence of a poor or intermittent connection and then experiencing a large unexpected powerful surge in the stimulation, if and when the connection is re-established.

Reasons for no connection if you use surface skin electrodes:

* Check if both electrodes are connected to the same dual conductor lead wire, one electrode to the black connector (-) and another to red connector (+).
* Check if both electrodes are making a sticky contact on your skin, some electrode edges could not be stuck due to electrode wear & tear, but the electrode should be sticking with at least 80% of it's field. You may have lots of grease after long term use, try new electrodes. You may have dry gel on electrodes, try to make it more sticky by dropping a small amount of water on the black (conductive) side of the electrode and leave for an hour for the gel to absorb. Don't use wet electrodes! Try some fresh electrodes as electrodes loose conductivity proportionally to the use time due to grease and gel getting drier.
* This is the most frequent reason: check if the dual conductor leadwire cable is not broken, as it might be bent or pulled out too much which results in no conductivity: try another cable. To check if the cable is good, cross the red and black pin and increase mA on the unit. If the cable conducts the electricity, the mA will go above 10mA and you would feel the stimulation mild tickling in your fingers which holds the crossed pins. If you feel a mild electrical current, this means the problem is with surface skin electrodes.

Warranty

Verity Medical Ltd. provides a warranty to the original purchaser that this product will be free from defects in the material, components and workmanship, for a period of 2 years from the date of purchase by the distributor [invoice date from Verity Medical to the appointed distributor]. If the distributor - from whom the product was purchased by the user - is satisfied that the product is defective, the user may return the unit directly to this distributor who will forward it to Verity Medical Ltd. All such returns from the distributor to Verity Medical must be authorised by Verity Medical Ltd., in advance. The liability of Verity Medical Ltd., under this limited product warranty does not extend to any misuse or abuse such as dropping or immersing the unit in water or other liquid substance or tampering with the unit or normal wear and tear. Any evidence of tampering will nullify this warranty.

Customer Service:
Please contact your distributor for any customer service enquiries, including the warranty returns.
Your invoice of purchase and/or the rear cover of this manual should state the name and the contact details of your distributor.
For assistance, if needed, in setting up, using or maintaining the unit, or report unexpected operation or events, please visit the manufacturer's website for further details: www.veritymedical.com.

Manufactured by: Verity Medical Ltd.
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Tagoat
Co. Wexford, Y35 XY44
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Tel: +353 (0) 53 913 2433
+44 (0) 1794 367 110
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+44 (0) 1794 367 890

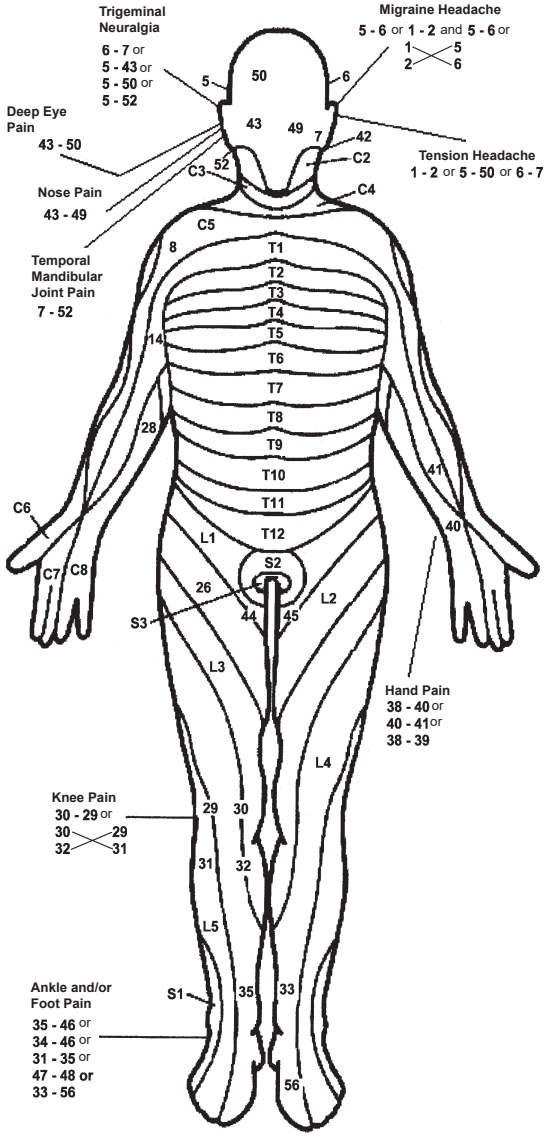
This product is manufactured by Verity Medical Ltd.

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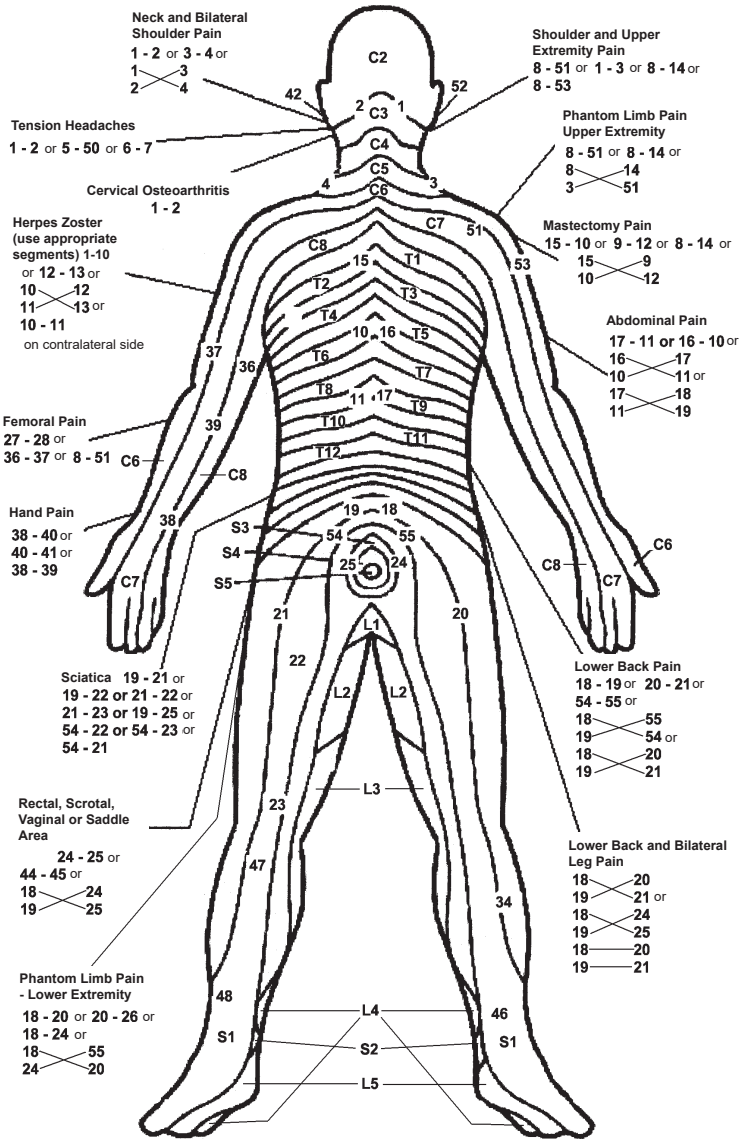
Verity Medical Ltd. is certified to the ISO13485:2016 Quality Standard.

Dermatome Charts

Anterior View



Posterior View.



Notes



Not for sale or use in the USA

Distributor:

NeuroTrac® Rehab

Accessory control information:

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NeuroTrac®
Rehab manual
(English)