

TENS: How to Set Those Dials v2.0

By Thomas A. McKean (Updated 08/30/06)

About the Author: Thomas A. McKean has been studying the technical aspects of TENS (and has been using TENS) for many years to treat his pain caused by Fibromyalgia and Sensory Dysfunction.

He is the author of two books, [Soon Will Come the Light](#) and [Light on the Horizon](#). He has also been published in the medical journal, [Focus on Autism and Other Developmental Disabilities](#). That article, as well as many others he has published in various places, are available to read by [clicking here](#).

A disabilities advocate (specializing in autism), Thomas has traveled across the USA and Canada to speak at conferences and to do private disability consulting with families and school systems. He has been a [guest on the Oprah Winfrey Show](#) and on NPR, and has spoken before both the Senate and Congress regarding disability issues, research and awareness. Thomas has served two nonconsecutive terms on the national board of directors of the [Autism Society of America](#).

You can read some personal interviews with Thomas by [clicking here](#), or you can visit his extensive web site by [clicking here](#). Please feel free to check the site. There is a lot to see!

Introduction:

TENS stands for Transcutaneous Electrical Nerve Stimulation. TENS units are tiny boxes running on nine volt or AA batteries that produce harmless, low grade, electrical current which blocks pain. This technique has been used for many years with no addiction or side effects. It is an effective, drug free alternative to pain management.

Pain is a warning system, letting us know something is wrong. However, once we have diagnosed the pain, the pain becomes redundant. TENS works by one or both of two ways. First, it can block pain signals from reaching the brain, and second, it can release natural endorphins, which provide a morphine like effect on the individual. Unlike morphine, however, TENS is not habit forming.

Precautions:

TENS should not be used if you have a pacemaker, or if you are pregnant or have a heart disease. TENS should not be used until etiology of the pain is established by a medical professional. Do not use TENS on the sinuses or carotid arteries. You should also avoid placing electrodes anywhere on the head. TENS has been shown to have no curative value, and the effects of TENS while delivering a baby are unknown, as are the long term effects of TENS.

TENS Unit:

TENS come in all shapes and sizes. Some will have added features. Analog models will often have timers, preset to 30, 45, and/or 60 minutes. You can also turn the timer off and go continuously. The digital models allow more control, usually allowing you to set the time in five minute increments.

Most TENS are portable and have a belt clip so you can attach it discreetly to your belt or clothes. Some TENS have one channel, using just two electrodes, but most TENS have two channels, allowing for the option of four electrodes. The amplitude of each pair of electrodes can be adjusted independently.

The majority of TENS have two knobs or two settings. These settings are PULSE (sometimes called RATE), measured in pulses per second, and WIDTH (sometimes called DURATION), measured on your dial or screen in microseconds. It is important that these two settings be set opposite each other. For example, hi rate, low width, or low rate, hi width. Adjusting both low or high will be very uncomfortable when you turn up the amplitude. Pulse usually goes from somewhere between 2 and 200hz, and rate can go from 40 to around 300 microseconds.

The amplitude knobs are the knobs on the top of the unit that control the strength of each individual channel, or each set of electrodes. For digital users, the amplitude is usually those up and down arrow buttons that make the current stronger or weaker. Amplitude is measured in milliamps. All TENS start at zero and can go anywhere from 50 to 100 milliamps, depending on the model. Milliamps will be labeled on the knobs or displayed on the screen.

Many TENS will also have the option of different MODES. There are many modes out there, but there are three that are the most common. These modes are labeled as Normal (or Continuous), Burst and Modulate.

Normal: This is sometimes called "Continuous" and is marked by an N or a C. This is a straightforward TENS mode and the one used by most people. Sends a steady rate and width as adjusted by the user.

Burst: Usually marked with a B. This mode sends X pulses per burst, and every burst is X number of seconds. The X factor varies from one unit to the next. On some digital TENS, the X is user definable.

Modulate: Usually marked with an M. Pulse and rate modulate up and down conversely to each other. Sometimes feels like a massage.

Some of the fancier models have other modes, such as SD (Strength Duration), SMP (Simple Modulated Pulse), MRW (Modulated Rate/Width), Bi-Pulse Mode, the list goes on.

Lead Wires:

Lead wires are the wires that connect the TENS to the electrodes. Usually lead wires have a single connector on one end and then separate at some point to two connectors on the other end. The single connector plugs into the TENS and the two wires on the other end go to the electrodes. Wires are usually 36 or 40 inches long. One wire is used for each channel of the TENS. It is not necessary to have both channels running on a dual channel TENS unit.

Electrodes:

Electrodes attach to the body to provide the current from the TENS. There are three kinds of electrodes. There is the rubber kind, which requires conductive gel and tape to be applied, there is the more "permanent" type, this can stay on the body for several days and can be worn in the shower (after removing the TENS and lead wires, of course).

Most people prefer the reusable self adhesive electrodes, which can be put on and taken off a number of times before wearing out. These electrodes come in all shapes and sizes and prices. These kinds of electrodes can have longer life by placing them in the refrigerator when not in use, and by using TAC GEL when the adhesive has worn off.

How to Use:

Now let's put all of this together. Get your TENS, make sure it has good batteries, gather electrodes and lead wires.

Make sure the TENS is off and amplitude is set to zero. Attach electrodes to the lead wires and then place electrodes on or near the pain. (If you are unsure, there are many places on the net that give appropriate electrode placement for different situations, or you can ask your physician.) Attach the lead wires to the TENS and turn on the TENS, making adjustments as seen below.

Settings:

This is what you came for, so let's get right to it.

Normal or Continuous Mode:

There are two types of settings in TENS. Low frequency and high frequency. Most people tend to use high frequency so we will start with that.

High Frequency:

High Frequency TENS works by creating a "gate" between your nerves and your brain. The high frequency of the TENS effectively blocks the pain from reaching your brain, so you don't feel it.

Begin by setting the TENS to the normal or continuous mode.

Frequency, of course, refers to the pulse or rate setting of the TENS. Remember that if the rate is high, the width must be low. So a typical setting here would be:

Pulse or Rate = 80

Width or Duration = 60

Or something very close to that. This will provide a comforting "buzz" feeling that will block the pain signals from reaching the brain. Usually the TENS must be worn continuously in this mode as the pain returns shortly after the TENS is turned off.

For some, the pain may be held off for a while after a session of 30 to 60 minutes. If this is the case, you may repeat after 90 minutes to increase the effect of the TENS.

For more severe pain, the settings can be altered to this:

Pulse/Rate = 80

Width/Duration = 150

See which works best for you.

Low Frequency:

Low frequency works differently. The massage of the TENS releases your own natural endorphins at the site of the pain to help manage.

An example of settings here would be as follows:

Pulse/Rate = 2

Width/Duration = 200

This will produce a completely different feeling from the electrodes, more of a "massage" feeling than the high frequency above.

Because the low frequency releases endorphins, the pain free effect could well last from minutes to hours after you turn off the TENS. It is not always necessary to keep a TENS on constantly with this mode. (This mode becomes less effective at releasing endorphins if the pulse/rate is set above 4.)

Here, the timers come in handy. It has been established that in order to be effective, low frequency TENS must be on for at least 30 minutes. So setting the timer for 45 or 60 minutes will get good results. When the pain returns, repeat the process for another 30 to 60 minutes.

Note that in some people, the TENS must be worn continuously even in low frequency mode. The higher frequency mode may be better for these people.

Burst and Modulate Modes:

Settings for these two modes (if your TENS has them) are different, but easy.

A good place to start here is to set the parameters like this:

Pulse or Rate = 100

Width or Duration = 100

Some have found that using these settings in the Modulate mode produces the most calming effect.

You can also experiment in using these modes with the "High Frequency" settings mentioned above. Using these modes with the "Low Frequency" settings will not yield desired results.

Amplitude Settings:

Amplitude refers to those little knobs on top of the unit that set how strong the current is. Make sure that the TENS is off and the amplitude is set to ZERO on all amplitude knobs.

Once you have made one of the settings above, very slowly increase the amplitude from ZERO up to where you feel the current, but it is not uncomfortable. Remember that eventually your body will acclimate and you will no longer feel the current as strongly. To get the maximum benefit from TENS, you must occasionally ramp up the amplitude so you are always feeling the effects.

The Burst and Modulate modes were designed to help prevent the acclimation. It does help some, slows it down in others, and some acclimate to it just as easily as Normal or Continuous mode.

Conclusion:

Feel free to play with the parameters of any of the settings. If you find a combination that works well for you, I would be interested to try it myself.

I know this is only a very basic look at TENS. If you have any further questions (or if you would like to comment on this article) please feel free to [click here](#) and e-mail me.

Happy TENSing,
Thomas