# Tennant Biomodulator® Technology

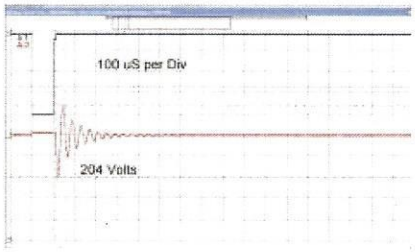
Tennant Biomodulator® technology is a state-of-the-art microcurrent, neuro-modulation stimulator powered by proprietary software and high-performance microchip processors, encased in easy-to-use, hand-held devices. The Tennant Biomodulator® technology offers a uniquely different clinical application for the non-pharmaceutical, effective symptomatic relief and management of chronic, intractable pain and the adjunctive treatment of post-surgical and post-traumatic pain

### How Does It Work?

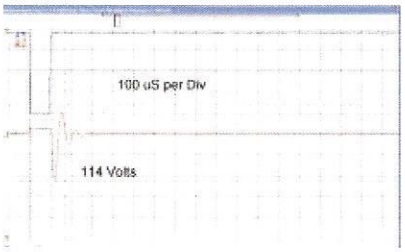
Tennant Biomodulator® devices contain unique frequency sets created by Dr. Jerry Tennant to produce micro-current electrical impulses, which are transmitted by electrodes in the device through the skin to interface with the body's internal peripheral nervous system for the purpose of therapeutic intervention.

System feedback is the system's (in this case, the body's) response to the stimulus, and the technology's ability to detect, measure, analyze and respond to the body. With each response, the electrical properties of the tissue change. The device detects the change and responds, resulting in the very next signal being modified. This is possible because of the development of modern high-speed microprocessors, which are able to establish a *cybernetic loop* between electronic instrument and living body. The body's response can be measured with respect to a signal sent out from the instrument to initiate the loop. When a signal is emitted and penetrates deep into the tissue, the impedance of the tissue (analogous to resistance in DC circuits but dynamic in nature) modulates the next waveform. The degree of modulation is based upon the changes of impedance of skin as signals are applied. This sets up a constantly changing interactive bio-loop possessing non-repeating signals. Eventually the change in impedance diminishes in significance until a plateau occurs.

**The three charts show Tennant Biomodulator® waveforms of tissue when (1) first being treated, (2) midway through treatment, (3) when tissue impedance diminishes and treatment stops.**

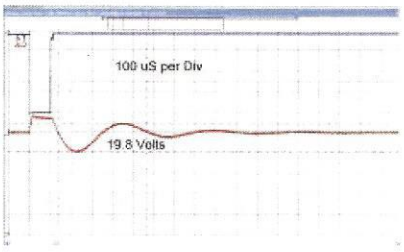



**In air, there is no conductivity between the electrodes. The output signal waveform appears as shown.**




**The device immediately detects when the electrodes are placed on reactive tissue as shown.**

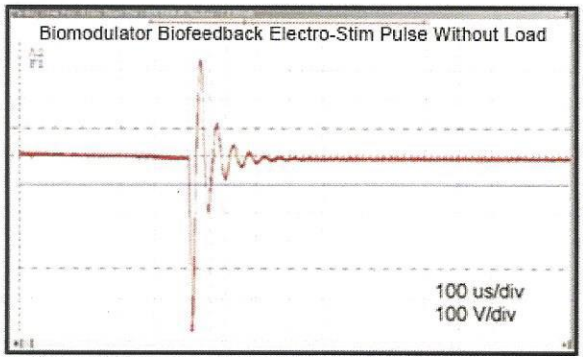
**The passing of the pulsed sinusoidal waveforms causes the electrical properties of the tissue to change resulting in changes in the next applied signal. Hence biofeedback.**

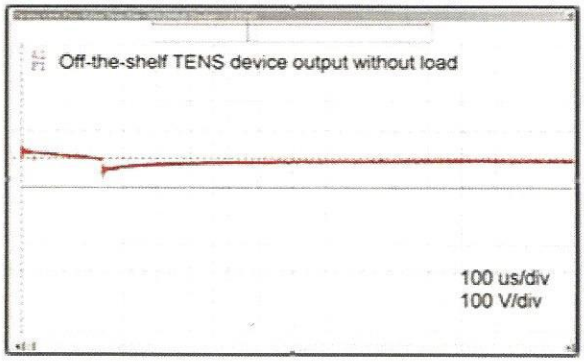



**In Assess mode, the device will 'Ring' when it detects the optimum characteristics.**

**Tennant Biomodulator® technology measures this signal 24 million times per second to recognize this condition.**

Tennant Biomodulator® devices actually seek decreased impedance on skin by *sticking* (dramatic increase in friction) to acupuncture or electron deficient sump points when gliding the instrument over the skin. The area may comprise injured or diseased tissue or may be associated with an organ or corresponding structure with that anatomical segment. Electrons supplied by a Tennant Biomodulator® device placed at the correct location on the skin are channeled by the integrated system of connective tissue within the body to the lowest electron




Conventional TENS technology works based on the *pain gate* theory. That is, they apply sufficient electrical charge to the **A** and **B** fibers of the nervous system to saturate them and thereby blocking the communication of pain to the brain. Often, when the stimulation is removed, the pain returns in a short period of time, thus only *masking the pain*. An oscilloscope trace of a conventional TENS signal is shown above. Note the signals are monophasic-square wave in nature with voltage from 0 to 30volts. Their duty cycle is approximately 50%.

TENS was developed for the control of chronic and post-operative pain by saturating subcutaneous nerve receptors with low-intensity, electrical stimulation in order to affect a specific dermatome or anatomical segment where the main source of pain resides. TENS delivers constant voltage with fluctuating current and resistance/impedance whereas Tennant Biomodulator® devices deliver a driving signal based upon the change in microcurrent and impedance over the active pulse interval. Unlike TENS, which relies on constant and externally generated signaling principles, the Tennant Biomodulator® is based upon the development of a cybernetic feedback loop. Tennant Biomodulator® signaling is an electrical control system, external to the body, which interfaces directly with the skin and transcutaneously communicates with the internal peripheral nervous system for the purpose of therapeutic intervention.

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deficiency. The normal energetic equilibrium between various tissues and organs is restored, and the redox potential of the body is recharged.

### Why Does It Work?

The body is continually influenced by external stimuli, which it reacts to in a way that maintains internal balance, or homeostasis. Because these stimuli are infinitely variable, no two stimuli are experienced in the same way. However, if pathological signals are experienced as repetitive, the body adapts to them and fails to recognize it has a problem. Blocking the brain's ability to know that tissue is degenerating and painful is the normal mechanism-of-action of pain medications, TENS devices, implanted pain blockers and other commonly used pain therapies.

The Tennant Biomodulator® modifies the pathological signal so the brain becomes aware of it, inputting electrical impulses, to increase voltage, that are never the same and cannot be adapted to, forcing the body to respond by making new cells. Central nervous system involvement is reintroduced by neuropeptides that alter the regulatory pathway, breaking the repetitive pathological cycle and allowing cellular and organ recovery. The result is pain disappears because of healing, not because the brain doesn't know the area no longer hurts.

Consider that a patient's thumb reads normally as -25 millivolts. Suddenly the patient's thumb is hit with a hammer. The injured thumb will immediately go to -50 millivolts so it can make new cells to replace those injured by the hammer. It is red, swollen, hot, and has pulsing pain because the dilated vessels are dumping new nutrients into the area to make new cells. As it finishes replacing the damaged cells, the thumb will return to being pink and have normal voltage.

However, if the thumb area exhausted its voltage before all the new cells could be made or if it couldn't reach -50 millivolts in the first place, the patient now has chronic pain that hurts all the time. It will never heal with medications or surgery because it cannot make new cells.

Measuring it with the Tennant Biomodulator® and then using the device to insert electrons with the proper voltage and frequency allows the body to raise the voltage to -50 millivolts. It makes new cells and is thus healed and the pain is permanently gone.

## Tennant Biomodulator® Technology vs. Conventional TENS

Often mistaken for TENS technology, Tennant Biomodulator® devices are based on a completely different operating theory. The Tennant Biomodulator® is a non-invasive microcurrent system that transcutaneously communicates with the internal peripheral nervous system for the purpose of therapeutic intervention.

The Tennant Biomodulator® device communicates with the neuro-endocrine system through direct touch to the skin, sending a signal through the epidermis and dermis into underlying fascia planes and is transmitted through connective tissue to the **C** and **A** nerve fibers. Tennant Biomodulator® devices generate electrical impulses that are similar to neurological impulses in the **C** nerve fibers. These fibers are embedded in tissues and make up 85 percent of all nerves found in the body and to *fast* pain blocking **A** fibers.