# CS6101

**Patient Instruction Manual**


## Interferential Stimulator

Document Number: 007143
Revision: A

Medical Systems

## Warranty

For warranty information please refer to the following website: http://www.controls.com/index.php/support/warranty

## Disclaimer

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# Introduction

Before using the CS6101 Interferential Stimulator please read this entire manual carefully to become familiar with the features, benefits and operation.

## Purpose

This manual is intended to provide the Patient with information required to set-up, connect and successfully use the CS6101 Interferential Stimulator.

## Scope

This manual describes the CS6101 Interferential Stimulator and its layout, buttons, and usage. It also provides general care and maintenance as well as basic troubleshooting tips.

## Revision Summary

| Revision | Update |
|---|---|
| **A** | This is the initial release of this document. |

## Precautions

This document contains hazard statements for your safety. Hazard statements are provided where safety consequences to personnel, equipment, and operation may exist. Failure to follow these statements may result in serious consequences.

A standard set of icons are used to draw your attention to the appropriate type of statement. Refer to Figure 1 for sample icons and statements.

**Warning**

A warning statement indicates the presence of a hazard that can cause severe injury or death.

**Caution**

A caution statement indicates the presence of a hazard that can or will cause minor injury or property damage.

This symbol is used whenever there is relevant supplemental information.

**Figure 1** - *Precaution Blocks*

## Terms

Table 1 defines the abbreviations and acronyms used in this document.

| Abbreviation – Acronym | Definition |
|---|---|
| **AC** | Alternating Current |
| **CSLLC** | Control Solutions Limited Liability Company |
| **DC** | Direct Current |
| **ECG** | Electrocardiogram |
| **HVGS** | High-Voltage Galvanic Stimulation |
| **Hz** | Hertz |
| **IF** | Interferential Stimulation |
| **LCD** | Liquid Crystal Display |
| **NiMH** | Nickel-Metal Hydride |
| **NMS** | Neuromuscular Stimulation |
| **TENS** | Transcutaneous Electrical Nerve Stimulation |

**Table 1** - *Abbreviations and Acronyms*

## Definitions

None

## References

None

## Related Products

Below are supported accessories:

- CS1210A AC wall adapter
- CS1304 Electrodes
- CS2110B (1) pair of Touch Proof® electrode wire leads
- CS4101 (6) AA, 7.2 V NiMH battery pack
- 000617A Neoprene Pouch

## Audience

This document was prepared for Patients use. It is intended to provide the necessary information to safely use the CS6101 Interferential Stimulator.

# Interferential Stimulation

This section describes how Interferential Stimulations works, how it feels and benefits of therapy.

## How it Works

Interferential Stimulation uses two medium frequency currents which are applied to the patient simultaneously using two pairs of electrodes. The electrodes are placed on the patient diagonally around the area to be treated. One pair of electrodes is at a fixed frequency of 4000Hz while the other pair of electrodes is variable, between 4001Hz and 4150Hz. At the point where the two currents cross a beat, or interference frequency results which is the difference of the two currents (1-150Hz). Since medium frequencies encounter little skin resistance they penetrate deep into the soft tissue and bone to the affected area. This causes the body to secrete endorphins and other natural pain killers to help relieve pain. This type of therapy may be used to provide symptomatic relief and management of chronic pain, and/or as an adjunctive treatment for the management of post-surgical and post-traumatic pain. Interferential Stimulation should not be confused with other forms of neuro-stimulators such as Transcutaneous Electrical Nerve Stimulation (TENS), Neuromuscular Stimulation (NMS), or High-Voltage Galvanic Stimulation (HVGS).

## How it Feels

Most patients find Interferential Therapy to be extremely beneficial and describe the treatment as a faint "pins and needles" sensation.

## Benefits

Interferential Therapy provides:

- Symptomatic relief and management of chronic pain and/or
- An adjunctive treatment for the management of post-surgical and post-traumatic pain

# Neuromuscular Stimulation

This section describes how Neuromuscular Stimulations works, how it feels and benefits of therapy.

## How it Works

Neuromuscular Stimulation uses two medium frequency currents which are applied to the patient simultaneously using two pairs of electrodes. The electrodes are placed on the patient diagonally around the area to be treated. One pair of electrodes is at a fixed frequency of 4000Hz. The other pair of electrodes is at a fixed frequency of 4048Hz. At the point where the two currents cross a beat, or interference frequency results at 48Hz. A sweep of amplitude then causes the treated muscle to contract and relax during the course of treatment.

## How it Feels

Most patients find Neuromuscular Stimulation to be extremely beneficial and describe the treatment as a faint "pins and needles" sensation with the added sensation of muscle contraction and relaxation.

## Benefits

Neuromuscular Stimulation:

- Re-educates muscle
- Promotes muscle tone (prevents disuse atrophy)
- Maintains or increases range of motion
- Relaxes muscle spasms
- Increases local blood circulation
- Provides immediate post-surgical stimulation of calf muscles to prevent venous thrombosis

# Safety Precautions and Warnings

This section of the document lists very important safety precautions and warnings that must be observed when using the Interferential Stimulator.

## Interferential Stimulation

**Important**

The CS6101 should only be used under the medical supervision of a qualified practitioner for adjunctive therapy for the treatment of medical diseases and conditions.

### Indications

The CS6101 Interferential Stimulator may be used, with a physician's prescription, for a variety of reasons including:

- Symptomatic relief and management of chronic pain and/or
- An adjunctive treatment for the management of post-surgical and post-traumatic pain

The Interferential Current Therapy Modes include:

- Standard (Std),
- Sweep (Swp),
- Back,
- Continuous (Cont), and
- Memory 1 – Memory 4 (Mem1 - Mem4)
  [Ramp, Jump, Duo, Cont, 36A, 36R]

For additional explanation refer to the Patient Modes of Operation section of this document.

### Contraindications

Below are conditions where this type of therapy should be avoided.

- **Carotid Sinus - Do not stimulate over the carotid sinus nerves**, especially if an individual has a known sensitivity to the carotid sinus reflex. Severe spasm to the laryngeal and pharyngeal muscles (throat) may occur when the electrodes are positioned over the neck and mouth. These contractions may be strong enough to close the airway passage in the throat to close or cause difficulty in breathing
- Patients with a demand-type cardiac pacemaker **should not** use the CS6101
- The CS6101 should not be applied transcerebrally (across the brain)
- Interferential stimulation should not be used whenever pain syndromes are undiagnosed, until etiology is established

### Warnings

Below are warnings that should be observed before beginning Interferential Stimulation.

- The safety of electrical stimulation during pregnancy or delivery has not yet been established.
- Interferential stimulation is not effective for pain of central origin. (This includes headache.)
- Interferential devices should be used only under the continued supervision of a physician.
- Interferential devices have no curative value.
- Interferential current therapy is a symptomatic treatment and as such suppresses the sensation of pain which would otherwise serve as a protective mechanism.
- Electronic monitoring equipment (such as Electrocardiogram (ECG) monitors and ECG alarms) may not operate properly when interferential stimulation is in use.
- Stimulus delivered by this device may be sufficient to cause electrocution. Electrical current of this magnitude must not flow through the thorax because it may cause a cardiac arrhythmia.

**Caution**

Federal Law (USA) restricts this device to sale by, or on the order of, a practitioner licensed by the State in which he/she practices to use or order the use of the device.

**Warning**

Keep out of the reach of children at all times.

### Precautions

The following precautions should be observed:

- Isolated cases of skin irritation may occur at the site of electrode placement following long-term application.
- Effectiveness is highly dependent upon patient selection by a person qualified in the management of pain patients.

### Adverse Effects

Unusually high sensitivity to electrical stimulation may result in skin irritation and burns beneath the electrodes. If this occurs, discontinue use until the source has been determined and corrected.

## Neuromuscular Stimulation

This section of the document provides general information related to neuromuscular stimulation.

**Important**

The CS6101 should only be used under the medical supervision of a qualified practitioner for adjunctive therapy for the treatment of medical diseases and conditions.

### Indications

The CS6101 may be used, with a physician's prescription, for a variety of reasons including:

- Relaxation of muscle spasm
- increasing local blood circulation
- maintaining or increasing range of motion
- preventing or retarding disuse atrophy, muscle reeducation, and
- immediate post-surgical stimulation of calf muscles to prevent venous thrombosis

The Neuromuscular Stimulator Modes include:

- Muscle Stimulation (Stim), and
- Memory 1 – Memory 4 (Mem1 - Mem4) [when using Stim function]

### Contraindications

Cancer patients or anyone with a demand-type cardiac pacemaker should not use the CS6101.

### Warnings

Below are warnings that should be observed before beginning Neuromuscular Stimulation.

- **Carotid Sinus - Do not stimulate over the carotid sinus nerves**, especially if an individual has a known sensitivity to the carotid sinus reflex. Severe spasm to the laryngeal and pharyngeal muscles (throat) may occur when the electrodes are positioned over the neck and mouth. These contractions may be strong enough to close the airway passage in the throat to close or cause difficulty in breathing.
- **Skin Irritation** - The CS6101 should not be used over infected, inflamed, or swollen areas or skin eruptions, e.g., phlebitis, thrombophlebitis, varicose veins.
- **Heart Problems/Epilepsy** - Persons with suspected or diagnosed heart problems, or epilepsy, should consult their physicians before considering the use of electrical muscle stimulation. Caution should be used in the transthoracic application of electrical muscle stimulators in that the introduction of electrical current into the heart may cause arrhythmias.

- Stimulation should not be applied over, or in proximity to, cancerous lesions.
- The CS6101 should not be applied transcerebrally (across the brain).
- Long term effects of chronic electrical stimulation have not yet been established.

**Caution**

Federal Law (USA) restricts this device to sale by, or on the order of, a practitioner licensed by the State in which he/she practices to use or order the use of the device.

**Warning**

Keep out of the reach of children at all times.

### Precautions

The following precautions should be observed:

- The safety of electrical stimulation during pregnancy or delivery has not yet been established.
- Caution should be used for patients with suspected or diagnosed heart problems.
- Caution should be used for patients with suspected or diagnosed epilepsy.
- Precautions should be observed in the presence of the following:
  - When there is a tendency to hemorrhage following acute trauma or fracture.
  - Following surgical procedures when muscle contraction may disrupt the healing process.
  - Over the menstruating or pregnant uterus.
  - Where sensory nerve damage is present by a loss of normal skin sensation.
- Some patients may experience skin irritation or hypersensitivity due to the electrical stimulation or electrical conductive medium. This irritation can usually be reduced by use of an alternate conductive medium or alternate electrode placement.
- Electrode placement and stimulation settings should be based on the guidance of the prescribing practitioner.
- The CS6101 should be kept out of the reach of children.
- The CS6101 should be used only with the leads and electrodes recommended for use by the manufacturer.
- The CS6101 should not be used while driving, operating machinery, or during any activity in which involuntary muscle contractions may put the user at undue risk of injury.

### Adverse Effects

- Skin irritation and burn beneath the electrodes have been reported with the use of powered muscle stimulators.
- Unusually high sensitivity to electrical stimulation may result in skin irritation and burns beneath the electrodes. If this occurs, discontinue use until the source has been determined and corrected.

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## Product Description

This section of the document provides an overview of the CS6101 Interferential Stimulator and supported features and specifications.

**Warning**

Keep out of the reach of children at all times.

### Overview

The CS6101 Interferential Stimulator was specifically designed for the health care market with the latest innovations in technology and user-friendly ergonomic design. The unit incorporates interferential (IF) and neuromuscular stimulation (NMS) protocols and was built to provide portable user-friendly experience for the patient, while offering a myriad of possibilities for the clinician.


**Figure 2** - *CS6101 Interferential Stimulator*

## Features

The Interferential Stimulator provides:

- Two channel four lead output
- Touch Proof® output safety connectors
- Microprocessor controlled frequency and amplitude
- Two-line, 32 character LCD display
- Water proof membrane keypad and alphanumeric/graphic LCD for user friendliness and long life
- Five preset protocols including Interferential (IF) and Neuromuscular Stimulation (NMS)
- Optional custom clinician protocols
- Pause/resume treatment for maximum flexibility
- Long life quick-charge rechargeable NiMH battery technology
- Built-in battery charger
- UL approved AC wall adapter
- Easy to use menu interface
- Battery charge indicator
- Count-down treatment timer display
- Compliance meter to keep track of usage

## Specifications

Table 2 lists the CS6101 Interferential Stimulator product specifications.

| Specification | Value |
|---|---|
| **Waveform** | Symmetrical biphasic square wave with zero net DC component |
| **Carrier Frequency** | 4000Hz |
| **Beat Frequency** | 1-150 ±1Hz Preset modes |
| **Variable Frequency** | 4001-4150 ±1Hz fixed frequency |
| **Output Current** | 0-50 milliamps @ 500 ohms, per channel |
| ***Output Voltage** | 0-25 volts peak, 0-50 volts peak-to-peak |
| **Pulse Width** | 125 µsec |
| **Sweep Time** | 6 second preset, adjustable 1 to 63 seconds |
| **Compliance Meter** | 1 minute to 255 hours in 1 minute increments |
| **Power Source** | CS4101 (6) AA, 7.2V NiMH battery pack |
| **Operating Ambient Temperature** | 0 – 40 °C |
| **Dimensions** | 3.6" x 5.75" x 1.125" |
| **Unit Weight (with batteries)** | 13 ounces (370 grams) |
| * 0.1 V increments, output voltage accurate to ± 10% of AMP setting | |

Specifications are subject to change without notice.

**Table 2** - *CS6101 Product Specifications*

## Kit Content

Table 3 provides a list of the items contained within the kit.

| Quantity | Item |
|---|---|
| **1** | CS6101 Interferential Stimulator Unit |
| **1** | CS2110B Touch Proof® electrode wire lead set |
| **1** | Patient Instruction Manual |
| **1** | Custom cut foam-lined carrying case |
| **1** | CS1210A AC wall adapter (UL approved) |
| **1** | Neoprene Pouch |
| **1** | CS1304 Electrodes<br>(Each package contains four 2" x 2" electrode patches) |

**Table 3** - *Kit Contents*

**Warning**

Only use the supplied CS1210A AC wall adapter to charge the Interferential Stimulator Unit. Using any other unit may damage the Interferential Stimulator or shorten battery life.

The recommended electrodes to use with the CS6101 Interferential Stimulator are CS1304.

## Unit Layout

The stimulator contains a Liquid Crystal Display (LCD) and five button keypad on the front of the unit. The lower left side of the unit contains the CH1 jack. The lower right side of the unit contains the CH2 jack and the DC-IN jack. See Figure 3 and Figure 4.

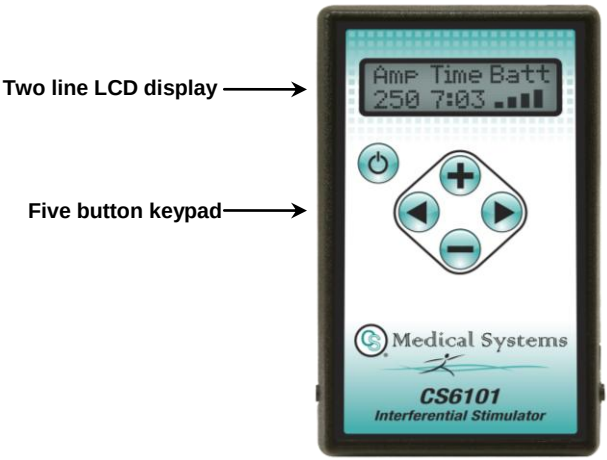



**Figure 3** - *Interferential Stimulator Front*

### Display

Information is output to the user through the 16 character x 2 line LCD display located on the front of the unit. The display provides menu options, parameters, patient treatment timer, battery level, and charging indication.

## Input and Navigation

The user can review and configure the stimulator by navigating through a series of menus and options. Navigation is performed using the keypad buttons on the front of the unit. Table 4 describes the function of each keypad button.

| Button | Meaning |
|---|---|
|  | Turns the unit on and off. This button serves as an Enter button when the unit is powered up. While treatment is being delivered this button also serves to pause treatment. |
|  | This button is used to select the previous parameter on the display. |
|  | *****This button is used to decrement the current (selected) parameter value or select the previous parameter choice. |
|  | This button is used to select the next parameter on the display. |
|  | *****This button is used to increment the current (selected) parameter value or select the next parameter choice. |
| ***** When these buttons are pressed and held down, the speed at which the selected parameters are displayed increases. | |

**Table 4** - *Interferential Stimulator Navigation*

### Electrode and DC-IN Jacks

The electrode jacks and DC-IN jack are located on the left and right sides of the unit. See Figure 4.

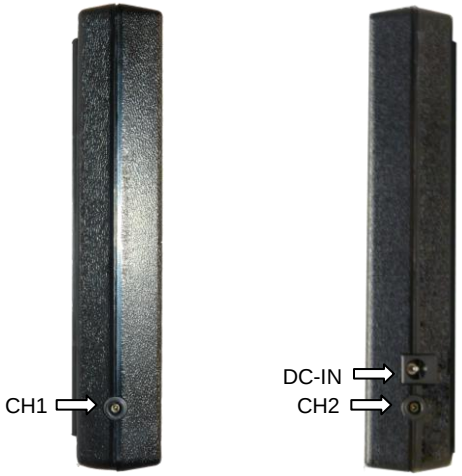



**Figure 4** - *Interferential Stimulator Left and Right Sides*

Table 5 provides a list and description of the external jacks located on the sides of the Interferential Stimulator.

| Jack | Description |
|---|---|
| **CH1** | This jack is located on the lower left side of the unit. It is the fixed frequency (4000Hz) output, which accepts the right angle Touch Proof® plug of one set of electrode wire leads (CS2110B). |
| **CH2** | This jack is located on the lower right side of the unit. It is the variable frequency (4001 - 4150Hz) output, which accepts the right angle Touch Proof® plug of one set of electrode wire leads (CS2110B). |
| **DC-IN** | This jack is located on the lower right side of the unit just above CH2 and is the DC input source. It accepts the male plug on the CS1210A AC Wall Adapter needed to charge the CS6101. The CS1210A AC Wall Adapter can be used to power the unit or to charge the unit. If the adapter is used to power the unit during treatment the unit will automatically turn off after treatment and recharge the batteries. |

**Table 5** - *Interferential Stimulator Jacks*

# Operating Instructions

The operating instructions for the Interferential Stimulator include:

- Electrode preparation,
- Attaching electrodes and treatments,
- Patient modes of operation, and
- After treatment care.

## Preparing Electrodes

Review the information below before attaching the electrodes:

- Use only the leads and electrodes provided with the unit by the manufacturer.
- Prepare the skin as required before applying the electrodes. This includes:
  - Cleaning and thoroughly drying the skin.
  - Shaving may be necessary depending upon the density of hair.

  Failure to provide for maximum current conduction efficiency could result in skin irritation related to increase current at the electrode placement site.
- Apply electrodes on clean, dry and unbroken skin only.
- Ensure the entire surface of the electrode is in contact with the skin.

Careful maintenance of the electrodes is strongly encouraged. This includes the lead wires as well as the pads. Worn cables and/or poor pads (or the wrong size pads) can have a significant impact upon treatment results.

Using reusable electrodes for longer periods of time than recommended by the electrode manufacturer could result in ineffective treatment or cause skin irritation.

## Attaching Electrodes

**Warning**

Do not use the unit while enclosed in the carrying case.

Follow the steps in Table 6 to attach the electrodes to the treatment area.

| Step | Action |
|---|---|
| 1 | Verify the CS6101 unit is off before use. This is indicated by a blank LCD display. |
| 2 | Connect the wire leads to the electrodes and place the electrodes firmly onto the skin at the site to be treated. In general the electrodes will be placed in a crisscross pattern around the treatment area. See Figure 5. |
| 3 | Insert the wire lead plugs into the CS6101 **CH1** and **CH2** jacks ensuring that they firmly snap into place. |

**Table 6** - *Attaching Electrodes*

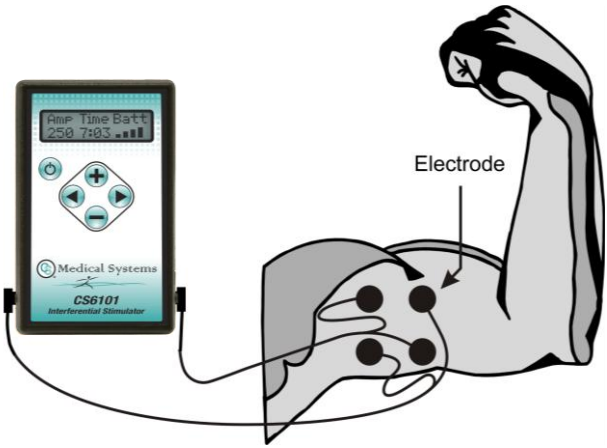



**Figure 5** - *Electrode Placement*

## Treatment Using Standard Built-In or Memory Modes

Follow the steps in Table 7 to select the correct treatment mode, amplitude and to begin treatment.

| Step | Action |
|---|---|
| 1 | Turn on the CS6101 by pressing the ⏻ button. After the initial "splash" screen, the LCD will display:<br>`Amp Mode`<br>`000 Std` |
| 2 | Press ▶ to select the **Mode** parameter. The selected parameter will blink. |
| 3 | Press either **+** or **–** to change to the correct **Mode.** |
| 4 | Press ◀ to select the **Amp** parameter. The selected parameter will blink. |
| 5 | Press **+** to increase the output intensity (amplitude) of the electrodes until the level prescribed by your health care professional is reached.<br>☞ The displayed numbers represent tenths of a volt e.g. 000 = 0V, 100 = 10.0V, 155 = 15.5V etc.<br>☞ As a safety precaution the **Amp** parameter is reset to zero whenever the **Mode** parameter is changed.<br>☞ If the stimulation is uncomfortable for any reason, press **–** to reduce the intensity. This may reduce the effectiveness of the muscle stimulation.<br>☞ If no stimulation is felt, please refer to the **Troubleshooting the CS6101** on page 33. No treatment will begin until the **Amp** value is set to a value greater than zero. |
| 6 | Treatment automatically begins after the **Mode** and **Amp** parameters are set.<br>☞ As a safety precaution the unit will prevent the user from changing the treatment **Mode** after 10 seconds. |
| 7 | If the stimulation is uncomfortable for any reason, press ◀ or ▶ to access the patient menu and press **–** to reduce the intensity. This may reduce the effectiveness of the muscle stimulation. |

**Table 7** - *Treatment Setup*

When the treatment begins the LCD will display amplitude (**Amp**), patient treatment timer (**Time**), and power source (**Batt** or **AC**). See Figure 6.

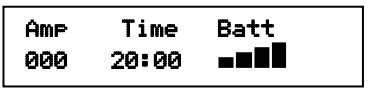



**Figure 6** - *Treatment Display*

Table 8 describes the keypad functions while receiving treatment.

| Button | Meaning |
|---|---|
|  | Pressing this button pauses the treatment. This does not affect the total time of the treatment since the treatment timer does not count down while in the pause mode. The patient can resume the treatment by pressing any of the other buttons.<br>☞ Pressing this button while in pause mode turns the unit off. To conserve power the unit will turn off if paused for five minutes. |
|  | Displays **Amp Mode** on the patient menu. When on the patient menu pressing ◀ will select the previous parameter on the display. |
|  | When on the patient menu it increases the amplitude. If the stimulation is uncomfortable for any reason, the intensity can be turned down. |
|  | Displays **Amp Mode** on the patient menu. When on the patient menu pressing ▶ will select the next parameter on the display. |
|  | When on the patient menu it decreases the amplitude. Decreasing the amplitude to zero pauses treatment. Increasing the amplitude resumes treatment. Decreasing the amplitude while using Stim mode may reduce the effectiveness of muscle stimulation. |

**Table 8** - *Treatment Button Functions*

If during treatment the Mode value is changed, the Amp value is automatically set to zero and must be increased to begin treatment. In this case the treatment time duration is based on the selected Mode value.

## Patient Modes of Operation

This section of the document lists the patient modes of operation and provides a description and what is generally accomplished by each mode.

For each mode, Table 9 lists the treatment time, default frequencies and default sweep duration.

| Mode | Treatment Time | Frequency 1 (Low Beat) Default | Frequency 2 (Highest Beat) Default | Sweep Time Default |
|---|---|---|---|---|
| **Std – Standard** | 20 min. | 1 Hz | 10 Hz | 6 sec. |
| **Swp – Sweep** | 30 min. | 1 Hz | 150 Hz | 6 sec. |
| **Back – Back** | 60 min. | 1 Hz | 10 Hz | 6 sec. |
| **Cont – Continuous** | 60 min. | 100 Hz | n/a | n/a |
| **Stim – Muscle Stimulation** | 20 min. | 48 Hz | n/a | n/a |
| **Mem1** | Programmed treatment by clinician | | | |
| **Mem2** | | | | |
| **Mem3** | | | | |
| **Mem4** | | | | |

**Table 9** - *Mode Details*

Table 10 provides a listing of the patient modes of operation and a description of each.

| Mode | Description |
|---|---|
| Standard (Std) | Provides a beat frequency of 1Hz for 6 seconds followed by a beat frequency of 10Hz for 6 seconds. This cycle repeats continuously for 10 minutes. Next a beat frequency that sweeps from 80 to 150Hz within 6 seconds occurs and continuously repeats for another 10 minutes. The unit turns off after the 20 minute treatment. |
| Sweep (Swp) | Provides a beat frequency that sweeps from 1Hz to 150Hz within 6 seconds. The treatment lasts for 30 minutes and then the unit will turn off. |
| Back (Back) | Provides a beat frequency of 1Hz for 6 seconds followed by a frequency of 10Hz for 6 seconds. The treatment lasts for 60 minutes and then the unit will turn off. |
| Continuous (Cont) | Provides a beat frequency of 100Hz for the full treatment time of 60 minutes and then the unit will turn off. |

| Mode | Description |
|---|---|
| Stimulator (Stim) | Provides a beat frequency of 48Hz for 6 seconds followed by a ramp down to 0 amplitude that lasts for 6 seconds. This phase is followed by a ramp back to the original amplitude where the cycle is repeated. The treatment lasts for 20 minutes and then the unit will turn off. |
| Memory 1 (Mem1) | The unit provides the therapy programmed into this memory location. |
| Memory 2 (Mem2) | The unit provides the therapy programmed into this memory location. |
| Memory 3 (Mem3) | The unit provides the therapy programmed into this memory location. |
| Memory 4 (Mem4) | The unit provides the therapy programmed into this memory location. |

**Table 10** - *Patient Modes of Operation Descriptions*

## After Treatment Care

Below are some guidelines to follow to get the most out of your reusable electrodes and CS6101 Interferential Stimulator.

### Reusable Electrode Care

To ensure the reusable electrodes are cared for properly:

1. After use grasp the corner of the electrode and gently remove it from the skin. Do not pull on the electrode snap or wire connection.
2. Reapply the release liner to the adhesive side of the electrode.
3. Store the electrode in a re-sealable pouch or plastic bag.

To prolong the life span of the electrodes, remoisten them by applying a few drops of water when they show signs of drying out or losing their adhesive. After repeated usage, reusable electrodes begin to lose their adhesive and therefore deliver less stimulation and shorten battery life. Replace reusable electrodes as needed.

### CS6101 Unit Care

To ensure the CS6101 is cared for properly:

1. Verify the CS6101 is turned off. The display will be blank when the unit is off.
2. Remove the wire leads from the CS6101 by firmly grasping the plug housing and pulling it straight out of the jack. **Do not pull on the wires because damage may occur.**
3. Carefully remove the electrodes from the wire leads by firmly grasping each side of the connector and pulling it straight apart. **Do not pull on the wires because damage may occur.**
4. Place the electrodes on their plastic sheet and return them to their resealable plastic bag.

5. Figure 7 displays the various battery level indicators that appear on the CS6101 LCD screen. When the units display indicates less than 20% battery capacity remaining, the unit **must** be recharged. If the Batt indicator reaches 0%, the unit will automatically shut-off to prevent discharging the battery below the battery manufacturer's recommended level.

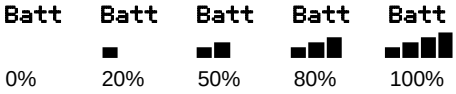
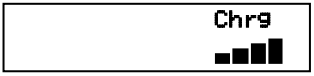



**Figure 7** - *Battery Capacity*

The CS6101 will function per specifications over the entire 0-100% battery capacity range. However, available treatment time may be limited depending on treatment timer setting, output amplitude, load, and battery capacity.

6. To charge the CS6101:
   a. Ensure the unit is off.
   b. Plug the included wall adapter into the DC-IN jack on the unit.
   c. Plug the wall adapter into an unused AC wall receptacle.

   While charging, the CS6101 LCD screen displays:




   The bar graph will sequence indicating the unit is charging properly. A completely drained battery will take approximately 2.5 hours to charge.

If any numbers are displayed under the **Chrg** symbol instead of the sequencing bar graph, unplug the wall adapter and contact Customer Service at the number listed on page 35 document.

   Though not required, charging after every use is good for the batteries and will not overcharge the batteries due to smart charging methods.

7. For additional care information, please refer to **Care and Maintenance** on page 32 of this document.

# Additional Features

This section of the document describes the auto shut-off feature.

## Auto Shut-off

To control the maximum treatment given to a patient and to extend battery life, an automatic shut-off feature is incorporated into the CS6101. Treatments can last for 20, 30, or 60 minutes or a variable time limit. After the treatment timer reaches zero, the output amplitude of both channels is reduced to zero and the unit remains in an idle state. After five minutes (default) in the idle state, the unit automatically turns off to conserve battery power and prevent inadvertent operation.

## Care and Maintenance

This unit does not contain any consumer serviceable parts.

The CS6101 is easy to maintain if cared for properly. Follow these steps to ensure long lasting performance:

- Clean the unit by wiping gently with a damp cloth moistened with water or a mild soapy solution if the unit is soiled.
  - Never use an abrasive cloth on the clear LCD window as it will reduce visibility of the LCD.
  - Never immerse or splash the unit with water or other liquid.
- Wipe the lead wires with a damp cloth if they become soiled.
- Always store the CS6101 unit in its carrying case whenever it is not being used. This will prevent inadvertent damage.
- After repeated uses of the reusable electrodes, they may lose their conductive property and the gel may begin to separate from the rest of the electrode. If this happens they should be replaced. To prolong the life of the electrodes, store them between uses on their plastic sheet and reseal them in the plastic bag from which they came.

## Troubleshooting the CS6101

Table 11 provides a list of potential problems, probable causes and possible solutions.

| Problem | Probable Cause | Possible Solution |
|---|---|---|
| Unit does not turn on while plugged in | AC adapter is not securely plugged into the unit | If the unit is receiving power from the AC adapter it will display **Chrg** along with the charging indicator. If not:<br>• Ensure that the mini-plug end of the AC adapter is firmly pushed all the way into the DC-IN jack located on the right side of the unit.<br>• Ensure the wall receptacle that the AC adapter is plugged into is providing power by plugging a lamp into the wall receptacle. |
| Unit does not turn on when running on battery | Discharged battery | Plug the AC adapter firmly into the unit and a known good wall receptacle. If the unit is receiving power from the AC adapter it will display **Chrg** along with the charging indicator. The unit should now be turn on. If it doesn't, return the unit for repair or replacement. |
| Unit turns on, but no stimulation is felt | Lead wires are not fully inserted | • Ensure lead wires are snapped firmly into CH1 and CH2 jacks.<br>• Ensure the lead wires are properly connected to the electrodes. |
| | Electrode placement | • Ensure the electrodes are arranged and placed as directed by a physician or therapist.<br>• Ensure the electrodes are firmly attached to the body. |
| | Amplitude level | Check the Amp (intensity) level:<br>• The amplitude level may be too low; increase it to the proper level.<br>• Amplitude is set to zero. Treatment will not be delivered if Amplitude is set to zero. |
| | Broken lead wire | Replace lead wire. |

| Problem | Probable Cause | Possible Solution |
|---|---|---|
| Unit is not charging | Not receiving power from AC wall adapter | If the unit is receiving power from the AC adapter it will display **Chrg** along with the charging indicator. If not:<br>• Ensure that the mini-plug end of the AC adapter is firmly pushed all the way into the DC-IN jack located on the right side of the unit (see Unit Layout on page 21 of this document.)<br>• Ensure that the wall receptacle that the AC adapter is plugged into is providing power by plugging a lamp into the wall receptacle. |
| Stimulation felt when unit is **off** | Defective unit | **Discontinue use** and return the unit to where it was obtained from for repair or replacement. |

**Table 11** - *Troubleshooting Hints*

## Error Codes

If your CS6101 unit displays an error code, access the following website to obtain troubleshooting information:

http://www.controls.com/index.php/support/troubleshoot/interferential-stimulator

The website is continuously updated and should have the latest troubleshooting information.

## Contacting Customer Service

Customer Service is a top priority at Control Solutions. We are committed to being a leader in our industries, while providing our customers with superior quality, value, and service. We are here to help you find answers to your Control Solutions LLC related questions.

**If you have any questions, experience technical problems, need any parts or service, contact Control Solutions LLC Customer Service during normal business hours (Mon-Fri, 8am-5pm Central Time) at 630.806.7062.**

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