

# CS6102

## Patient Instruction Manual



## High Voltage Galvanic Stimulator

Document Number: 007145

Revision: A



Medical Systems

## Warranty

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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 CS6102 High Voltage Galvanic 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 setup, connect and successfully use the CS6102 High Voltage Galvanic Stimulator.

### Scope

This manual describes the CS6102 High Voltage Galvanic Stimulator and its layout, buttons, menu items and usage. It also provides general care and maintenance as well as basic troubleshooting tips.

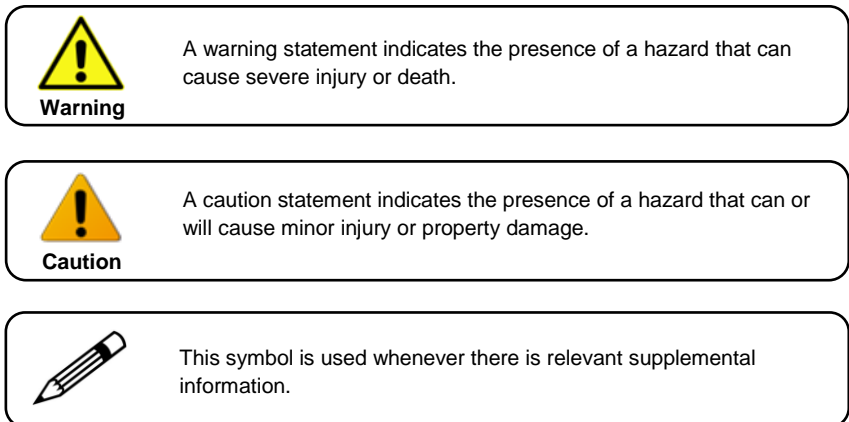
### Revision Summary

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 statements. Refer to Figure 1 for sample icons and statements.



**Figure 1 - Precaution Blocks**

## Terms

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

Abbreviation – Acronym	Definition
AC	Alternating Current
CFR	Code of Federal Regulations
CSLLC	Control Solutions Limited Liability Company
DC	Direct Current
ECG	Electrocardiogram
ESD	Electrostatic Discharge
HVGS	High-Voltage Galvanic Stimulation
Hz	Hertz
IEC	International Electrotechnical Commission
LCD	Liquid Crystal Display
LED	Light Emitting Diode
PPS	Pulse Pairs per Second

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

## Definitions

None

## References

None

## Related Products

Below are supported accessories:

- CS1211 AC wall adapter
- CS1304A Electrodes
- CS2112 Replacement Touch Proof<sup>®</sup> electrode wire leads

## Audience

This document was prepared for Patients use. It is intended to provide the information necessary to understand and safely use the CS6102 High Voltage Galvanic Stimulator.



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## High Voltage Galvanic Stimulation

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This section describes how High Voltage Galvanic Stimulations (HVGS) works, how it feels and benefits of therapy.

### How it Works

High Voltage Galvanic Stimulation uses a direct current at a high voltage to create a natural breakdown in the skin's resistance allowing current to pass freely to and around the treatment area. As compared with other modalities HVG stimulation operates with negligible thermal and electro-chemical effects on the skin by decreasing the pulse width and increasing the voltage.

The direct current HVG stimulation changes blood flow by creating a polarized field around the treatment site. Circulation of blood is reduced around the positive (+) electrodes, having a similar effect as applying an ice pack, thereby having the benefit of reduced swelling. Circulation of blood is increased around the negative (-) electrodes, acting like applied heat, thereby having the benefit of speeding the healing process.

Polarity of the output may be inverted (either positive or negative) as directed by swapping the output jacks to achieve the desired effect as mentioned. Polarity of preset modes should be set up as shown in **Setup and Treatment** on page 22, or as directed by your health care professional.

Three electrodes are used, two active and one dispersive, powered simultaneously or alternating. Power is supplied to one or two active electrodes with a pulsed galvanic waveform, as monophasic exponentially decaying spikes, delivered in pairs with a fixed interpulse interval of 100 microseconds. The pulsed galvanic waveform can be output at a variable frequency of 1-150 Pulse Pairs per Second (PPS).

### How it Feels

Most patients find HVG Therapy to be extremely beneficial and describe the treatment as a sensation of deep, sufficiently strong but pleasant vibrations at rhythmical frequencies with a pleasant tingling sensation.

### Benefits

High Voltage Galvanic Therapy benefits:

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

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## Safety Precautions and Warnings

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

**Important**

The CS6102 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 CS6102 HVG Stimulator 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.

### Contraindications

Cancer patients or anyone with a demand-type cardiac pacemaker should not use the CS6102.

### Warnings

Below are warnings that should be observed before beginning High Voltage Galvanic 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 CS6102 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 CS6102 should not be applied transcranially (across the brain).

- Long term effects of chronic electrical stimulation have not yet been established.
- Simultaneous connection of a patient to h.f. surgical equipment may result in burns at the site of the CS6102 electrodes and possible damage to the CS6102.
- Operation in close proximity (e.g. 1 m) to shortwave or microwave therapy equipment may produce instability in the CS6102 output.

**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 CS6102 should be kept out of the reach of children.
- The CS6102 should be used only with the leads and electrodes recommended for use by the manufacturer.
- The CS6102 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

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This section of the document provides an overview of the CS6102 High Voltage Galvanic Stimulator and supported features and specifications.



**Warning**

Keep out of the reach of children at all times.

### Overview

The CS6102 High Voltage Galvanic (HVG) Stimulator was designed with the latest innovations in technology and user-friendly ergonomic design. The HVG's treatment voltage amplitude may be set from 0 to 300 Volts peak ( $\pm 10\%$ ), and various preset or customized protocols may be selected for different types of treatment. The CS6102 utilizes a Touch Proof<sup>®</sup> output designed to ensure patient safety. Frequency and amplitude settings are controlled by a microcontroller. An intuitive keypad and alpha numeric/graphic LCD provides user input/output. The unit has three memory modes, used to provide storage for custom therapist protocols. Power is provided by a non-rechargeable 9 volt alkaline battery, or optionally by use of an AC power adapter.



**Figure 2** - CS6102 High Voltage Galvanic Stimulator

## Features

The High Voltage Galvanic Stimulator provides:

- Four preset modes of operation (Daytime, Nighttime, Full Sweep, Muscle Pump)
- Three programmable clinician-set modes which can use one of six functions (The custom modes are stored in one of three available memory locations)
- Two-line, 16 character LCD display
- Touch Proof<sup>®</sup> output safety connectors
- Count-down treatment timer display
- Easy to use menu interface
- Pause/resume treatment for maximum flexibility
- Built-in belt clip for hands free operation
- Automatic shutoff, electrode lead detection, audible alert
- Compliance meter
- Customizable front panel membrane graphics with your company name and logo (private labeling available)

## Specifications

Table 2 lists the CS6102 High Voltage Galvanic Stimulator product specifications.

Specification	Value
<b>Channels</b>	One active (red) and one dispersive (black) or two active (red) and one dispersive (black)
<b>Waveform</b>	Asymmetrical monophasic exponentially decaying spikes, delivered in pairs with a fixed interpulse interval of 100 µsec
<b>Output Voltage</b>	0-300 volts peak ±10%
<b>Pulse Rate</b>	1-150 pulse pairs per second (PPS), adjustable
<b>Pulse Width</b>	Fixed at 20 µsec at 500 ohms
<b>Max Charge per Cycle</b>	5.81 µcoulombs
<b>Power Source</b>	Non-rechargeable 9V alkaline battery, or CS1211 UL approved AC power adapter
<b>Compliance Meter</b>	1 minute to 255 hours in 1 minute increments
<b>Dimensions</b>	2.6" x 4.4" x 1.1"
<b>Unit Weight (with battery)</b>	6.0 ounces (170 grams)
<b>Regulatory Class</b>	Class II (per IEC 60601-2-10, and 21 CFR 890.5850)

Specifications are subject to change without notice.


**Table 2 - CS6102 Product Specifications**

### Kit Content


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

Quantity	Item
1	CS6102 High Voltage Galvanic Stimulator Unit
1	CS2112 Touch Proof <sup>®</sup> electrode wire lead set
1	Patient Instruction Manual
1	Custom cut foam-lined carrying case
1	9V Battery
1	CS1211 AC wall adapter
1	CS1304A Electrodes (Each package contains four 2" x 2" electrode patches and one 4" x 7" electrode patch)

**Table 3 - Kit Contents**



**Warning** Only use the supplied 9 volt alkaline battery or CS1211 AC wall adapter to power the CS6102. Using any other source may damage the CS6102.



The recommended electrodes to use with the CS6102 High Voltage Galvanic Stimulator are CS1304A.

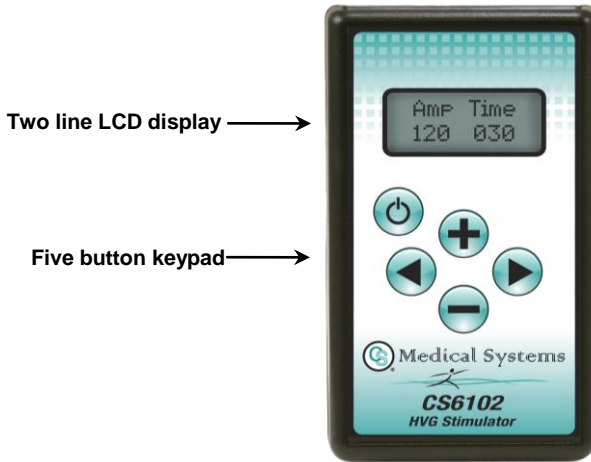


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## Unit Layout

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The stimulator contains a Liquid Crystal Display (LCD) and five button keypad on the front of the unit. The top of the unit contains the positive (+) and negative (-) electrode jacks. The right side of the unit contains the DC-IN jack. See Figure 3 and Figure 4.








**Figure 3 - High Voltage Galvanic Stimulator Front**

### Display

Information is output to the user through the 8 character x 2 line LCD display located on the front of the unit. The display provides menu options, parameters, and patient treatment timer.

## Input and Navigation

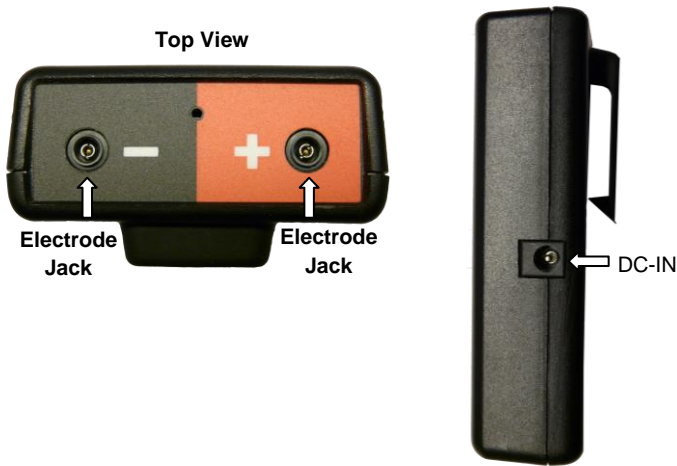
The user can review and configure the stimulator by navigating through a series of menus and options. Navigation is performed using the keypad buttons on the front of the unit. Table 4 describes the function of each keypad button.

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, pressing this button will pause treatment. When paused, if this button is pressed, the unit will power off. To conserve power, the unit will turn off if paused for five minutes.
	This button is used to select the previous parameter on the display. Pressing this button will resume treatment when treatment is paused. Pressing this button when receiving treatment and operating in the <b>Run Menu</b> , will allow the user to change the <b>Amp</b> and/or <b>Mod</b> settings.
	*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 - High Voltage Galvanic Stimulator Navigation**

### Electrodes, Audible Alert and DC-IN Jacks

The electrode jacks and Audible Alert are located on the top of the unit, while the DC-IN jack is located on the right side of the unit. See Figure 4.



**Figure 4 - High Voltage Galvanic Stimulator Top and Right Side**

Table 5 provides a description of the external jacks and audible alert.

Jack	Description
<b>Positive (+)</b>	*This jack is located on the top of the unit. It is the active 1 and active 2 outputs which accept the Touch Proof® plug of the red electrode wire lead (CS2112).
<b>Audible Alert</b>	This is used to aid the patient and health care professional when the unit is close to the end of treatment or when an electrode lead becomes disconnected. Alert volume can be adjusted or turned off from the Compliance Menu.
<b>Negative (-)</b>	*This jack is located on the top of the unit. It is the dispersive or reference output which accepts the Touch Proof® plug of the black electrode wire lead (CS2112).
<b>DC-IN</b>	This jack is located on the right side of the unit and is the DC input source. It accepts the male plug on the CS1211 AC Wall Adapter. The CS1211 AC Wall Adapter can be used to power the unit during treatment. If the adapter is used to power the unit during treatment the unit will automatically turn off after treatment.
* The red and black electrode wire leads can be swapped to achieve opposite polarity to the electrodes. Refer to Table 7.	

**Table 5 - High Voltage Galvanic Stimulator Jacks and Audible Alert**

## Operating Instructions

---

This section of the document describes the following:

- Preparing the electrodes,
- Attaching electrodes,
- Setup and treatment,
- Audible alert, and
- Modes of operation.

### 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.
  - If required, shaving the electrode placement site 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.

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## Attaching Electrodes

Follow the steps in Table 6 when placing the electrodes and preparing for therapy.

Step	Action
1	Review contraindications, warnings, precautions and adverse effects in <b>Safety Precautions and Warnings</b> section located on page 10 of this document.
2	Apply the electrodes to the locations designated by the health care professional. There is one active (red) lead and one dispersive (black) lead. The red lead wire contains two active electrodes; Active 1 and Active 2. The black (dispersive) wire is common to both actives.
3	The red and black electrode plugs can be swapped to achieve the opposite polarity. Refer to Table 7.

**Table 6** - *Electrode Placement*

### Setup and Treatment



**Warning**

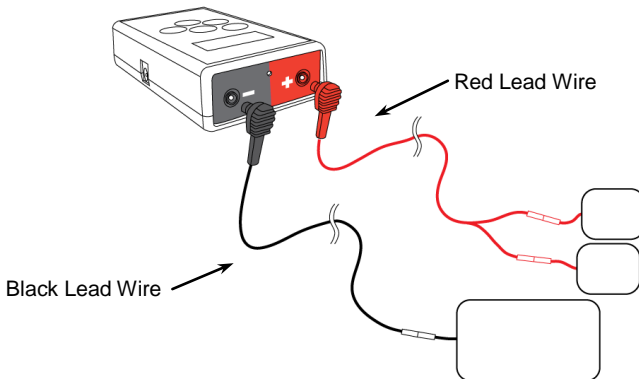
Do not use the unit while enclosed in the carrying case.

Follow the steps in Table 7 to attach the electrodes and begin treatment.

Step	Action
1	Verify the CS6102 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 as prescribed by the health care professional firmly onto the skin. In general the electrodes will be placed as either positive or negative polarity around the area to be treated.
3	Type of polarity? <ul style="list-style-type: none"> <li>• If positive, continue with step 4.</li> <li>• If negative, continue with step 5.</li> </ul>

4 For Positive Polarity (refer to Figure 5) follow the steps below:

Step	Action
1	Connect the two square pads to the <b>red</b> lead wire.
2	Connect the red lead wire to the <b>red positive output jack</b> on the CS6102.
3	Connect the rectangular shaped pad to the <b>black</b> lead wire.
4	Connect the black lead wire to the <b>black negative output jack</b> on the CS6102.



**Figure 5 - Electrode Positive Polarity**

5 For Negative Polarity (refer to Figure 6) follow the steps below:

Step	Action
1	Connect the two square pads to the <b>red</b> lead wire.
2	Connect the red lead wire to the <b>black negative output jack</b> on the CS6102.
3	Connect the rectangular shaped pad to the <b>black</b> lead wire.
4	Connect the black lead wire to the <b>red positive output jack</b> on the CS6102.

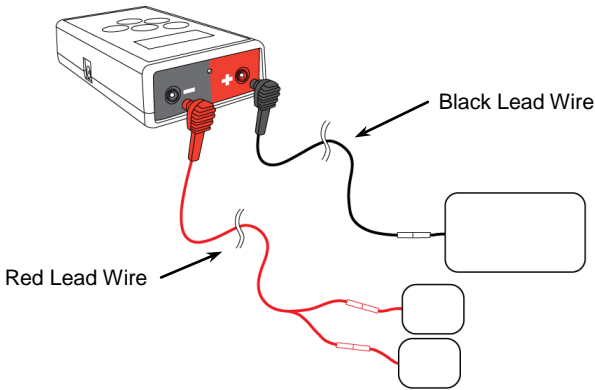

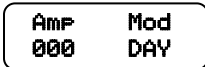



Figure 6 - Electrode Negative Polarity

6 Ensure that the lead wires snap firmly into place.

7 Turn on the CS6102 by pressing the  button. After the initial "splash" screen, the LCD will display:




The "Mod" of operation may display: DAY, NGT, FSP, MSP, M1, M2, or M3.

8 If directed by the health care professional, press  to select the **Mod** parameter. The selected parameter will blink.

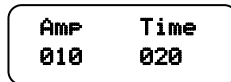
9 Press either + or - to select the correct **Mod**.

10 Press  to select the **AMP** parameter. The selected parameter will blink.

<p>11</p>	<p>Press + to increase the output intensity (amplitude) of the electrodes until the level prescribed by your health care professional is reached.</p> <ul style="list-style-type: none"> <li>☞ As a safety precaution the <b>AMP</b> parameter is reset to zero whenever the <b>Mod</b> is changed.</li> <li>☞ If the stimulation is uncomfortable for any reason, reduce the <b>AMP</b> setting by pressing ◀ or ▶ to return to the <b>settings menu</b> and press – to reduce the intensity. However, this may reduce the effectiveness of the muscle stimulation. Please discuss this situation with the treating health care professional.</li> <li>☞ If no stimulation is felt, please refer to <b>Troubleshooting the CS6102</b> on page 32.</li> </ul> <div style="border: 1px solid black; border-radius: 10px; padding: 10px; margin-top: 10px;">  <p style="margin-left: 20px;">Treatment will not begin until <b>AMP</b> is set to a value greater than zero.</p> </div>
<p>12</p>	<p>Treatment begins after the <b>AMP</b> and <b>Mod</b> setting have been made.</p> <ul style="list-style-type: none"> <li>☞ As a safety precaution the unit will prevent the user from changing the treatment mode after 10 seconds.</li> </ul>

**Table 7 - Attaching Electrodes**

When treatment begins the LCD will display amplitude (**AMP**) and the patient treatment timer (**Time**). See Figure 7.












**Figure 7 - Treatment Display**

To modify the **AMP** or **Mod** setting after the **Run Menu** is displayed, press ◀ or ▶ to return to the **Settings Menu** and proceed to make the changes.



Table 8 describes the keypad functions while operating in the **Settings Menu** or the **Run Menu**.

Button	Settings Menu	Run Menu
	<p>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 treatment is paused. The patient can resume the treatment pressing . Pressing  while treatment is paused turns the unit off. To conserve power, the unit will turn off if paused for five minutes.</p>	<p>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 treatment is paused. The patient can resume the treatment pressing . Pressing  while treatment is paused turns the unit off. To conserve power, the unit will turn off if paused for five minutes.</p>
	<p>Selects the <b>AMP</b> parameter.</p>	<p>Pressing this button will resume treatment if treatment is paused either by the user or by the unit. This button will also return the user to the <b>Settings menu</b> where the <b>AMP</b> or <b>Mod</b> settings can be modified.</p>
	<p>Decreases the amplitude or changes the mode. If the amplitude is decreased to zero, treatment will be paused. Increasing the amplitude will resume treatment. Decreasing the amplitude while using <b>MSP</b> mode (STM function) may reduce the effectiveness of muscle stimulation.</p>	<p>n/a</p>
	<p>Selects the <b>Mod</b> parameter.</p>	<p>This button will return the user to the <b>Settings menu</b> where the <b>AMP</b> or <b>Mod</b> settings can be modified.</p>
	<p>Increases the amplitude or changes the mode. Sets the intensity to the appropriate level. If the stimulation is uncomfortable for any reason, the intensity can be turned down.</p>	<p>n/a</p>

**Table 8 - Treatment Button Functions**

**Audible Alert**

The CS6102 is equipped with an audible alert speaker. When the **Vol** parameter is not set to zero the CS6102 will:

1. Beep twice when the treatment timer reaches two minutes of remaining treatment.
2. Beep once when the treatment timer reaches one minute of remaining treatment.
3. Beep seven times when treatment ends. At this point the output amplitude will be set to zero. If the unit is idle for five minutes, (the default automatic shut-off value), the unit will turn off.

## Modes of Operation

This section lists the modes of operation and describes what is generally accomplished by each mode.

Table 9 lists the recommended polarity settings for each preset mode:

- P = positive
- N = negative

The user must set polarity of the output leads before starting treatment. Refer to **Setup and Treatment** on page 22 for more information on setting the polarities.

Patient Mode	Functions	Treatment Time	Frequency #1	Frequency #2	Sweep Time	Ramp Time	On Time	Off Time	# of Treatments	Lead Polarity
(Mod)	(Fnc)	(Tim)	(Fq1)	(Fq2)	(SwT)	(RmT)	(OnT)	(OffT)	(Tmt)	--
DAY	DUO	30 min.	100 PPS	20 PPS	n/a	n/a	n/a	n/a	1	P or N
NGT	DUO	30 min.	100 PPS	20 PPS	n/a	n/a	n/a	n/a	6	N
FSP	RMP	30 min.	1 PPS	150 PPS	6 sec.	n/a	n/a	n/a	1	N
MSP	STM	20 min.	50 PPS	n/a	n/a	6	6	1	1	P or N
M1	Programmable by Health Care Professional									P or N
M2										P or N
M3										P or N

**Table 9 - Mode Details**

Table 10 provides a description for each mode of operation.

Mode	Description
Daytime (DAY)	Delivers 100 PPS continuous for 15 minutes, followed by 20 PPS continuous for 15 minutes for a total treatment of 30 minutes.
Nighttime (NGT)	Delivers 100 PPS continuous negative polarity for 15 minutes, followed by 20 PPS continuous negative polarity for 15 minutes for a total treatment of 30 minutes on. The unit is then idle for 30 minutes. This on-off cycle is repeated five more times for a total of 360 minutes (6 hours).
Full Sweep (FSP)	Sweep from 1 to 150 PPS continuous negative polarity over six seconds, and back from 150 to 1 PPS continuous negative polarity over six seconds. This cycle is repeated for a total treatment time of 30 minutes.
Muscle Pump (MSP)	Provides a smooth amplitude ramp of 50 PPS continuous positive polarity from zero amplitude to <b>AMP</b> setting over six seconds, followed by a smooth amplitude ramp from <b>AMP</b> setting to zero amplitude over ½ second. It remains at zero for one second before repeating the treatment for a total treatment time of 20 minutes.
Memory 1 (M1)	All functions and parameters that compose a mode of operation can be individually adjusted within a specific range to create a custom programmed mode. These custom modes can only be set by a licensed health care professional using a special access code, and can be used by a patient as a preset non-changeable mode. The unit provides the therapy programmed into this memory location.
Memory 2 (M2)	All functions and parameters that compose a mode of operation can be individually adjusted within a specific range to create a custom programmed mode. These custom modes can only be set by a licensed health care professional using a special access code, and can be used by a patient as a preset non-changeable mode. The unit provides the therapy programmed into this memory location.
Memory 3 (M3)	All functions and parameters that compose a mode of operation can be individually adjusted within a specific range to create a custom programmed mode. These custom modes can only be set by a licensed health care professional using a special access code, and can be used by a patient as a preset non-changeable mode. The unit provides the therapy programmed into this memory location.

**Table 10 - Modes of Operation Descriptions**

## After Treatment Care

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Below are guidelines to get the most out of your reusable electrodes and CS6102 High Voltage Galvanic Stimulator.

### Reusable Electrode Care

To ensure the reusable electrodes are cared for properly:

- 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.
- Reapply the release liner to the adhesive side of the electrode.
- Store the electrode in a resealable 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.

### CS6102 Unit Care

To ensure the CS6102 unit is cared for properly:

- Verify the CS6102 is turned off. The display will be blank when the unit is off.
- Remove the wire leads from the CS6102 by firmly grasping the plug housing and pulling it straight out of the jack. **Do not pull on the wires because damage may occur.**
- 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.**
- Place the electrodes on their plastic sheet and return them to their resealable plastic bag.

For additional care information, please refer to **Care and Maintenance** on page 31 of this document.

## Additional Features

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This section of the document describes; auto shut-off, audible alert, low battery indicator and the electrode lead detection features.

### 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 CS6102. Treatments can last for 20 or 30 minutes, or a variable time limit. After the treatment timer reaches zero, the output amplitude 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.

### Audible Alert

A beeper alerts the patient and health care professional when the unit is close to the end of a treatment (refer to **Setup and Treatment** on page 22 for more information), or when an output electrode becomes disconnected. Refer to **Electrode Lead Detection** on page 30 for more information.

### Low Battery Indicator

If the unit displays **Low Batt Good Bye** the unit's battery charge is low and the unit will turn off. The unit's battery should be replaced with a fresh non-rechargeable 9-volt battery or plugged into a wall receptacle with the CS1211 AC wall adapter.

### Electrode Lead Detection

To ensure the safety and effectiveness of every treatment delivered to the patient, onboard circuitry continuously monitors the output electrode leads to ensure proper connection to the patient. If any electrode is not making proper connection during a non-alternating treatment, the unit will immediately force the output amplitude to zero, pause the treatment and audibly alert the patient and health care professional of the problem. The display will cycle between **Pause < Resume** and **Attach Leads**, continuing to beep for 4 seconds after the electrodes are restored, after which the audible alert will stop and the display will only show **Pause < Resume**. The treatment may now be safely and comfortably resumed by pressing ◀.

## Care and Maintenance

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The CS6102 is easy to maintain if cared for properly. Follow these guidelines 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 liquids.
- Wipe the lead wires with a damp cloth if they become soiled.
- Always store the CS6102 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.

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## Troubleshooting the CS6102

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

Problem	Probable Cause	Possible Solution
Unit does not turn on while powered by the AC adapter	AC adapter is not securely plugged into the unit or AC wall receptacle	<ul style="list-style-type: none"> <li>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.</li> <li>Ensure the wall receptacle that the AC adapter is plugged into is providing power by plugging a lamp into the wall receptacle.</li> </ul>
Unit does not turn on when running on battery	Discharged battery	Replace the 9V battery with a new one.
Unit turns on, but no stimulation is felt	Lead wires are not fully inserted	<ul style="list-style-type: none"> <li>Ensure lead wires are snapped firmly into + and – output jacks.</li> <li>Ensure the lead wires are properly connected to the electrodes.</li> </ul>
	Electrode placement	<ul style="list-style-type: none"> <li>Ensure the electrodes are arranged and placed as directed by the health care professional.</li> <li>Ensure the electrodes are firmly attached to the body.</li> </ul>
	Amplitude level	Check the <b>Amp</b> (intensity) level: <ul style="list-style-type: none"> <li>The amplitude level may be too low; increase it to the proper level.</li> <li>Amplitude is set to zero. Treatment will not be delivered if Amplitude is set to zero.</li> </ul>
	Broken lead wire	Replace lead wire.
Stimulation felt when unit is <b>off</b>	Defective unit	<b>Discontinue use</b> and return the unit to where it was obtained from for repair or replacement.
Audible alert does not sound near end of treatment	Alert volume	Check the <b>Vol</b> setting: <ul style="list-style-type: none"> <li>The alert volume may be set too low; increase it to the appropriate level.</li> <li>Alert volume is set to zero. Alert will not sound if <b>Vol</b> is set to zero.</li> </ul>

Problem	Probable Cause	Possible Solution
Unit is displaying <b>Attach leads</b>	Output electrode(s) not connected properly	<ul style="list-style-type: none"> <li>• Re-attach output electrodes and ensure that all lead wires are fully connected to both the electrodes and CS6102 unit.</li> <li>• Ensure no output lead wires are damaged. Replace if necessary.</li> <li>• Ensure all electrodes are clean and adhering well to the patient. Replace if necessary.</li> </ul>

**Table 11** - *Troubleshooting Hints*

### **Error Codes**

If your CS6102 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 will provide the latest troubleshooting information.

## Contacting Customer Service

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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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