



## ***Finetech-Brindley (VOCARE™)***

### ***Bladder System***

# **USERS MANUAL**

Humanitarian Device. Authorized by Federal law for use in providing urination on demand with low residual volumes of urine to complete spinal cord injured individuals. Secondary use is to aid in bowel evacuation. The effectiveness of this device for these uses has not been demonstrated.

#### **Caution**

**Federal Law restricts this device to sale by or on the order of a physician (or properly licensed practitioner).**

***This manual was adapted from "Sacral Anterior Root Stimulator Implant: Notes for Patients" by GS Brindley, MD, Honorary Director, MRC Neurological Prostheses Unit, London.***

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# 1 INTRODUCTION

This manual is intended to provide information for the safe use of the *VOCARE Bladder System* for you, your family, your caregivers, and your doctor.

The purpose of this manual is to help you understand the *VOCARE Bladder System*:

- what the *VOCARE Bladder System* is intended to be used for,
- who the *VOCARE Bladder System* is intended to be used by,
- where the *VOCARE Bladder System* is implanted,
- how to operate the *VOCARE Bladder System*, and finally,
- the general procedures you must go through in order to have the *VOCARE Bladder System* work successfully and reliably, including a procedure known as a rhizotomy

In general, you should be in reasonably good health and be able to understand how to operate the *VOCARE Bladder System*. Your doctor will train you to use the information in this manual. Call Dr. \_\_\_\_\_ at \_\_\_\_\_ if you, your attendant, or a family member need help in understanding how to use your *VOCARE Bladder System* or if you have an emergency. You can also get help by contacting Finetech Medical.

## 1.1 WHAT IS THE *VOCARE BLADDER SYSTEM* INTENDED TO BE USED FOR?

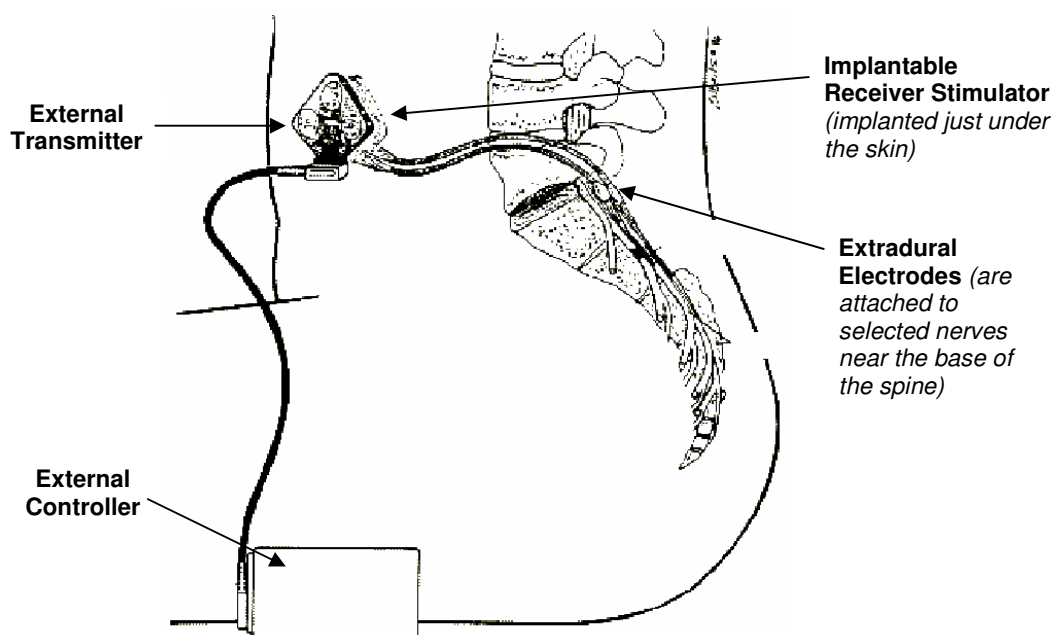
The *VOCARE Bladder System* is an implanted sacral anterior root stimulator that will allow individuals with complete spinal cord injury to urinate on demand leaving only a small amount of urine in the bladder. Secondary use of the device is to aid in bowel evacuation.

## 1.2 WHO CAN USE THE *VOCARE BLADDER SYSTEM*?

The *VOCARE Bladder System* is intended to be used by skeletally mature individuals (those who have stopped growing) who have complete spinal cord injuries and are neurologically stable. Patients must also have a bladder that will contract when it is filled (bladder reflexes).

## 1.3 HOW IS THE *VOCARE BLADDER SYSTEM* IMPLANTED?

Some of the *VOCARE Bladder System* components are implanted internally while other components are used externally. The Implantable Receiver Stimulator is implanted just below the skin (similar to a pacemaker). The Extradural Electrodes are implanted internally at the base of your spine where the nerves exit the spinal cord. The remaining components are used externally. Each component will be described in greater detail later in this manual. Figure 1 below shows where the *VOCARE Bladder System* is implanted in your body.



**Figure 1**

During the surgery to implant the *VOCARE Bladder System*, you will typically undergo a surgical procedure called a rhizotomy in which the nerves carrying sensation impulses from the bladder, anus, and penis are cut. This procedure is performed to eliminate reflex incontinence and autonomic dysreflexia. However, it also has some disadvantages including loss of erectile function and ejaculation in men who had these responses before surgery. The rhizotomy procedure is described in more detail later in this manual.

## **2 IMPORTANT INFORMATION**

**INDICATIONS:** The Finetech-Brindley *VOCARE Bladder System* is indicated for the treatment of patients who have clinically complete spinal cord lesions (ASIA Classification) with intact parasympathetic innervation of the bladder and are skeletally mature and neurologically stable, to provide urination on demand and to reduce post-void residual volumes of urine. Secondary intended use is to aid in bowel evacuation.

**CONTRAINDICATIONS (*Patients in whom the VOCARE Bladder System should not be used*):** Patients who have one or more of the following characteristics are not candidates for the *VOCARE Bladder System*:

- Poor or inadequate bladder reflexes
- Active or frequent pressure ulcers
- Active infection
- Implanted cardiac pacemaker

**WARNINGS:** The *VOCARE Bladder System* is a prescription device and is safe only when used under your doctor's supervision. You should use the *VOCARE Bladder System* only after you have received special training and counseling by your doctor.

**PRECAUTIONS :**

- X-rays and ultrasound have not been reported to affect the function of the Implantable Receiver-Stimulator or Extradural Electrodes. However, your doctor's ability to see the tissue behind the implants may be blocked.
- **MRI:** Testing of the VOCARE Bladder System in a 1.5 Tesla scanner with a maximum spatial gradient of 450 gauss/cm or less, exposed to an average Specific Absorption Rate (SAR) of 1.1 W/kg, for a 30 minute duration resulted in localized temperature rises **up to 5.5°C** in a gel phantom (without blood flow) and translational force less than that of a 12 gram mass and torque of 0.47 N-cm (less than that produced by the weight of the device). A patient with a VOCARE Bladder System may undergo an MRI procedure using a shielded or unshielded MR system with a static magnetic field of 1.5 Tesla only and a maximum spatial gradient of 450 gauss/cm or less. The implantable components may obscure the view of other nearby anatomic structures. Artifact size is dependent on variety of factors including the type of pulse sequence used for imaging (e.g. larger for gradient echo pulse sequences and smaller for spin echo and fast spin echo pulse sequences), the direction of the frequency encoding, and the size of the field of view used for imaging. The use of non-standard scanning modes to minimize image artifact or improve visibility should be applied with caution and with the Specific Absorption Rate (SAR) not to exceed an average of 1.1 W/kg and gradient magnetic fields no greater than 20 Tesla/sec. The use of Transmit Coils other than the scanner's Body Coil or a Head Coil is prohibited. Testing of the function of each electrode should be conducted prior to MRI scanning to ensure no leads are broken. Do not expose patients to MRI if any lead is broken or if integrity cannot be established as excessive heating may result in a broken lead. Patients should be advised to empty their bladder or bowel prior to MRI scanning as a precaution. The external components of the VOCARE Bladder System must be removed prior to MRI scanning. Patients must be continuously observed during the MRI procedure and instructed to report any unusual sensations (eg. warming, burning, or neuromuscular stimulation). Scanning must be discontinued immediately if any unusual sensation occurs. Contact Finetech Medical for additional information.
- Therapeutic ultrasound (physical therapy) should not be performed over the area of the Implantable Receiver-Stimulator or Extradural Electrodes since it may damage the *VOCARE Bladder System*.
- Therapeutic diathermy (physical therapy) should not be performed over the area of the Implantable Receiver-Stimulator or Extradural Electrodes since it may damage the *VOCARE Bladder System*.

- Microwave therapy should not be performed over the area of the Implantable Receiver-Stimulator or Extradural Electrodes since it may damage the *VOCARE Bladder System*.
- The Implantable Components of the *VOCARE Bladder System* should not be touched with electrocautery instruments (instruments used during surgery to cut tissue or to stop bleeding). Electrocautery should not be used within 1 cm of the metal electrode contacts. Prior to any subsequent surgeries, you should notify your surgeon that the *VOCARE Bladder System* has been implanted.
- You should notify and talk to your doctor **before** you have dental, ENT (ear, nose, and throat) or other “high risk” medical procedures. You may need to take antibiotics to prevent infection that could spread to your implanted *VOCARE Bladder System*.
- Certain medications like anticholinergics (such as Ditropan or Oxybutynin which help control spasms of the bladder) may cause the strength of bladder contractions to be decreased using the *VOCARE Bladder System*. Your doctor will tell you to stop these medications before surgery so that the bladder reflexes and effect of the electrical stimulation can be evaluated. Patients who continue to take these anticholinergic medications may have a decreased response to the stimulation.
- Bladder surgery such as bladder neck surgery or bladder augmentation may affect your candidacy for the *VOCARE Bladder System* or the performance of the System for you. Your doctor will evaluate you and tell you if you have conditions that may affect the performance of your *VOCARE Bladder System*.
- Some leakage of urine (postoperative incontinence) can occur after implantation of the *VOCARE Bladder System*. Part of the surgery involves the cutting of nerves that cause the bladder to leak urine when it is filled (reflex incontinence). While this procedure generally stops this reflex, some patients continue to experience some leaking during exertion, coughing, etc. (stress incontinence). Your doctor will evaluate your bladder and tell you about any factors that increase the risk of this stress incontinence.
- It is important to understand that implantation of the *VOCARE Bladder System* may affect your bowel routine. The movement of stools through your body (known as bowel motility) may be different after your surgery. Your body’s response to suppositories and digital stimulation may be less effective because of the rhizotomy surgery. However, use of the *VOCARE Bladder System* may improve the rate of movement of stool through the colon to the rectum.

- The rhizotomy procedure typically performed in conjunction with the implantation of the *VOCARE Bladder System* may cause loss of erectile function and ejaculation in men who had these responses before surgery.
- The surgery to implant your *VOCARE Bladder System* involves partial removal of a portion of one or more bones in your back. After surgery, your spine may become unstable, causing abnormal or excessive movement of some portion of the spine (usually near the level of the injury) due to the loss of this bone. This instability is usually related to the initial injury of your spinal cord, but could become worse following surgery. Your doctor will evaluate you for risk factors that may contribute to this problem prior to implanting your *VOCARE Bladder System*.
- It is important to understand that the *VOCARE Bladder System* has not been tested in pregnant women.
- Check your skin daily for any signs of redness, swelling, or sores especially in the areas where the *VOCARE Bladder System* Receiver-Stimulator or Electrodes are located. Call your doctor immediately if you notice any change in your skin condition.
- It is important to stay healthy and to notify your doctor immediately if you become sick, get an infection, experience any unusual sensations or muscle contractions, or notice any change in how your bladder or bowel stimulation works.
- It is important to notify your doctor if you experience **unintended** stimulation when the *VOCARE Bladder System* is **not** in use. While there have been no reports of *VOCARE Bladder System* activation or malfunction due to electromagnetic interference (such as from retail anti-theft detectors, airport metal detectors, or other electronic devices), testing has not been conducted to rule out the possibility of this occurring. If possible, note when and where the stimulation occurred when reporting this information to your doctor.
- It is essential that you or your caregiver be familiar with an alternative method of emptying your bladder (such as catheterization). If you have any problems with your *VOCARE Bladder System*, you should be prepared to use this alternative method.
- It is important to turn off the *VOCARE Bladder System* when you are not using it. If it is left “on” for long periods of time, the External Transmitter could become hot.



- If you turn “on” the *VOCARE Bladder System* while in an electric wheelchair, your wheelchair may move unpredictably. You or your attendant should always turn “off” your electric wheelchair before you use the *VOCARE Bladder System*.
- The effect of external defibrillation (devices which deliver an electrical shock to the heart when it has stopped beating regularly) on the *VOCARE Bladder System* is unknown.
- Avoid getting the external components, cables, and attachments of the *VOCARE Bladder System* wet because this may cause damage to the device. Call your doctor if you get the *VOCARE Bladder System* wet.
- While recharging the batteries for your *VOCARE Bladder System*, you will be **unable** to use the device to empty your bladder. If you need to empty your bladder during the charging period, you may stop the recharging process and use the *VOCARE Bladder System*. You may continue to charge the *VOCARE Bladder System* after you are finished. If you find that you need to use your *VOCARE Bladder System* when your batteries are “dead” (completely discharged), recharging the batteries for approximately 30 minutes should enable you to use the *VOCARE Bladder System* for one use.
- You need to take good care of your *VOCARE Bladder System*. Your doctor will review the procedures with you. You should inspect the *VOCARE Bladder System* cables and connections for any visible signs of frayed wires or damage daily and call your doctor to report any damage.

**You should not open the *VOCARE Bladder System* External Controller to expose the internal circuits. Do not open the Battery Charger.**

### **3 HOW DOES THE VOCARE BLADDER SYSTEM WORK?**

**Functional Electrical Stimulation (FES)** is a method used to provide function to otherwise paralyzed muscles. The *VOCARE Bladder System* uses FES to stimulate the nerves which connect the spinal cord to the bladder and bowel. The *VOCARE Bladder System* is designed to be used by people with complete spinal cord injuries to allow them to urinate when they decide to (“on demand”) leaving only a small amount of urine in the bladder. The *VOCARE Bladder System* can also be used to aid in bowel evacuation.

In order to achieve control of the bladder and bowel, electrical signals normally travel from the brain down the spinal cord to the nerves that control these systems. In the case of spinal cord injury, this path is broken. The brain still sends the signals, but they do not reach the bladder or bowel. (see Figure 2 below)

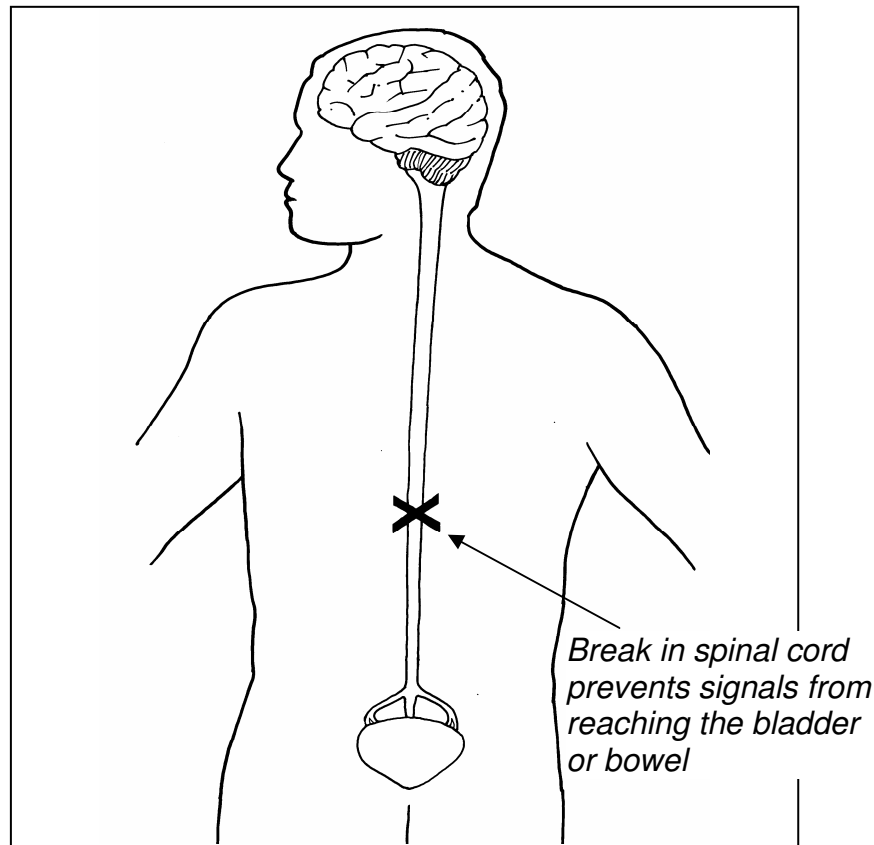


Figure 2

Using **FES**, the *VOCARE Bladder System* sends low levels of electrical energy directly to the nerves below the spinal cord injury that control the bladder and bowel. If these nerves are healthy, the electrical signals will cause the muscle of the bladder and bowel to contract.

### 3.1 WHAT ARE THE SACRAL NERVES?

The nerves that connect the spinal cord to the bladder and bowel are located at the lower end of the spine in an area called the “sacrum”. The nerves that exit the spinal cord through the sacrum are called **sacral nerves**.

### 3.2 HOW IS THE VOCARE BLADDER SYSTEM USED TO EMPTY THE BLADDER?

Two things must happen for a person to empty their bladder. First, the pressure inside the bladder must increase. Second, the valve at the bottom of the bladder must open to allow the urine to flow out. This valve is known as the **external urethral sphincter**. In most situations, stimulation of the sacral nerves causes the bladder to be squeezed and increases the pressure inside it. But, during stimulation, the external urethral sphincter stays closed. To open the sphincter, the stimulation must be turned off.

The *VOCARE Bladder System* is designed to send the electrical signals (stimulation) in bursts, with gaps of no stimulation between them. In the gaps between the bursts of stimulation, the bladder is still squeezed but the external urethral sphincter has relaxed.

Urine empties out of the bladder in spurts during these gaps. An illustration of the bladder and sphincter is provided in Figure 3 below.

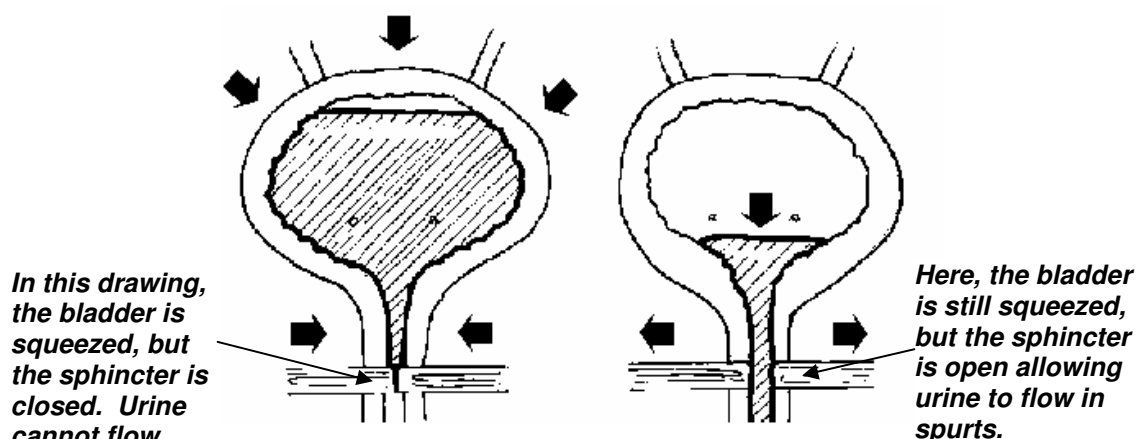


Figure 3

### 3.3 WHAT IS A RHIZOTOMY?

A **rhizotomy** is a surgical procedure in which some nerves are permanently cut. For use of the *VOCARE Bladder System*, some of the nerves that carry sensation impulses *from* the bladder and bowel *to* the spinal cord may be cut.

A rhizotomy is usually performed during the same operation in which your *VOCARE Bladder System* is implanted. Combining the *VOCARE Bladder System* with a rhizotomy can have the following benefits:

- Removes the reflexes from the bladder and bowel which can cause a dangerous rise in blood pressure (a condition known as **autonomic dysreflexia**)
- Removes the reflex contractions of your bladder (which may cause **reflex incontinence**) and movement of urine from the bladder into the kidneys, decreasing the risk of kidney damage
- Improves the ability of the bladder to contain urine (known as **bladder capacity**)
- Improves the flow of urine.

#### **Disadvantages of the rhizotomy procedure are:**

- Loss of reflex erections (those from physical touch) in men who have these types of erection
- Loss of reflex ejaculation (from physical touch) in men who have this type of response
- Loss of sensation or “feeling” (if present) in the regions controlled by the sacral nerves (such as the anus and buttocks). Because the *VOCARE Bladder System* is intended for patients with complete spinal cord injuries, this sensation has already been lost.
- A decrease in movement of stool through your body (known as bowel motility)

### 3.4 HOW DOES THE VOCARE BLADDER SYSTEM AFFECT LEAKAGE OF URINE?

Leakage of urine, known as **incontinence**, can be caused in several ways. A common problem in spinal cord injury is large unpredictable leaks. This results from a reflex that causes the bladder to contract when there is urine in your bladder, called **reflex incontinence**. Small leaks, resulting from bending forward or coughing, may also occur and are known as **stress incontinence**.

The Finetech-Brindley *VOCARE Bladder System* may improve continence because it empties the bladder more completely. Combining the implantation of your *VOCARE Bladder System* with a procedure known as a rhizotomy, described above, can further improve continence. The rhizotomy can improve continence because it removes reflex contractions of your bladder.

### 3.5 HOW DOES THE VOCARE BLADDER SYSTEM AID IN BOWEL EMPTYING?

As with the bladder, appropriate stimulation of the sacral nerves causes a rise in pressure in the rectum and some parts of the colon. For bowel emptying, it is typical to stimulate the sacral nerves for periods of 10 seconds, separated by pauses (gaps) of 20 seconds.

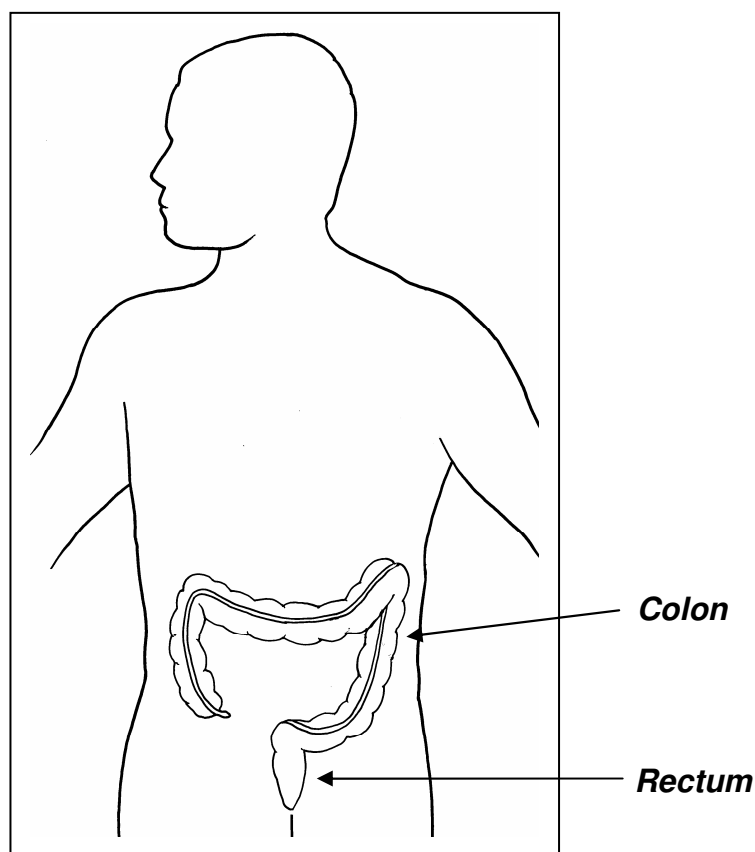


Figure 4

Typically, less than five minutes of stimulation is enough to empty the rectum. In some cases, this process will not empty the rectum but does move the feces from the colon into the rectum, and makes manual evacuation easier. Figure 4 illustrates the colon and the rectum.

## 4 PARTS OF THE VOCARE BLADDER SYSTEM

Your *VOCARE Bladder System* is made up of **implanted** and **external** components.

### 4.1 IMPLANTED COMPONENTS

The implanted components include the **Implantable Receiver-Stimulator** and two **Electrodes**. Figure 5 below shows the Implantable Receiver-Stimulator along with one (of the two) Electrodes.

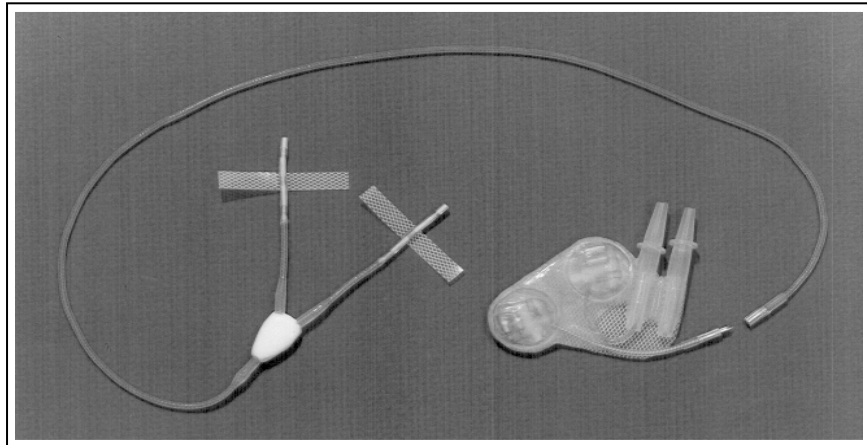


Figure 5

#### 4.1.1 Implantable Receiver-Stimulator

The Implantable Receiver-Stimulator is implanted under the skin of your abdomen by your surgeon. It receives signals from the external components (see discussion below) and sends an electrical signal to the nerves, which control the bladder and bowel. Figure 6 gives a closer view of the Implantable Receiver-Stimulator.

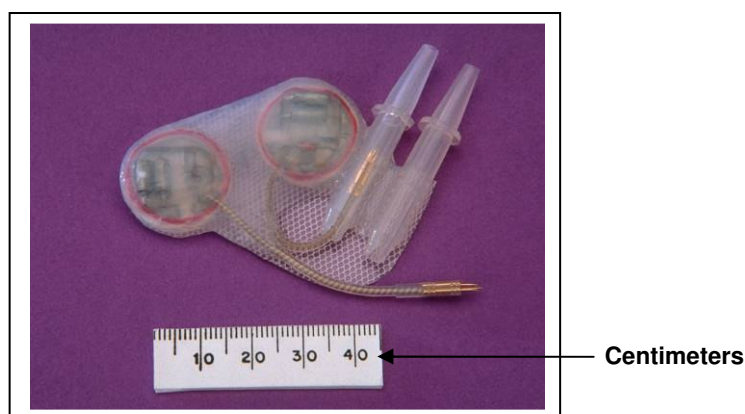


Figure 6

#### 4.1.2 Electrodes and Leads

One **Electrode** and its **Lead** are pictured below in Figure 7. The electrical signals produced by the Receiver-Stimulator are carried along the leads to the electrodes. The electrodes are attached to the sacral nerves.

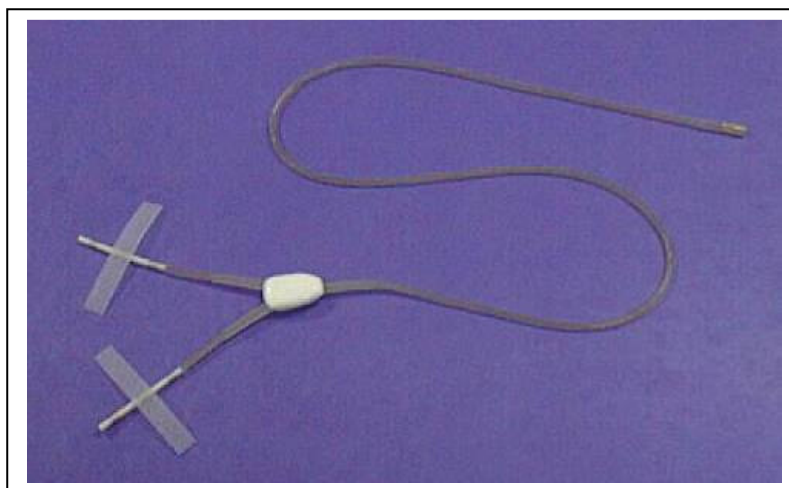


Figure 7

## 4.2 EXTERNAL COMPONENTS

The external components allow you to operate and control the *VOCARE Bladder System*. The external components consist of the **External Transmitter**, the **External Controller** and its **Cable**, the **Battery Charger and Power Cord**, and a small **Transmitter Tester**, which can be used to test whether or not the External Transmitter is working correctly. Figure 8 below shows the External Transmitter, External Controller, the External Cable, and Transmitter Tester. Figure 11 shows the Battery Charger and Power Cord.

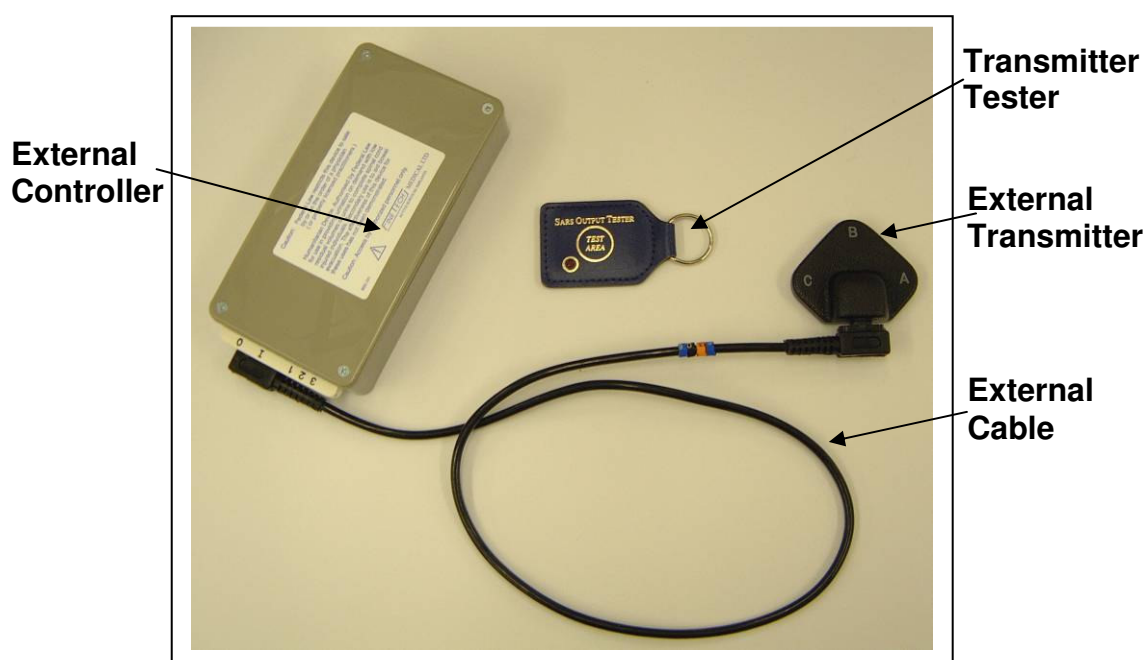


Figure 8

### 4.2.1 External Controller

The External Controller allows you to turn your *VOCARE Bladder System* on and off and to choose between bladder and bowel mode. It is adjusted by your doctor specifically for your bladder and bowel management needs. There are two switches on the top of the External Controller. One switch is used to turn the *VOCARE Bladder*



System OFF (marked as O) and ON (marked as I). The second switch enables you to select between three modes of operation, marked as 1, 2, and 3. In most cases Position 1 is set for your bladder routine and Position 2 is set for your bowel routine . Your doctor may provide alternate settings using Position 3. Figure 9 gives you a close up view of these switches.

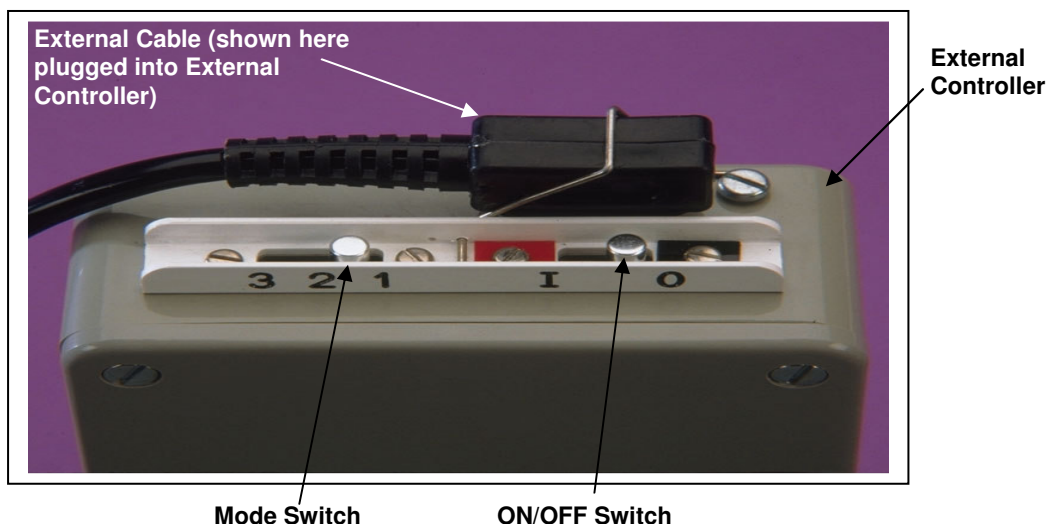


Figure 9

#### 4.2.2 External Transmitter

The External Transmitter sends a radio signal from the External Controller through your skin to the Implantable Receiver-Stimulator. The External Transmitter is held over the site of your Implantable Receiver-Stimulator whenever you want to use the *VOCARE Bladder System*. You can either hold it over by hand or use a medical adhesive product to hold it on. The External Transmitter is labeled with the letters “A”, “B”, and “C” which identify the individual stimulation “channels” (similar to channels on a radio). The letters “A” and “B” will help you identify how to place the transmitter over your skin. The implanted parts of your *VOCARE Bladder System* only have two channels (“A” and “B”). The “C” channel is not used. The “C” channel is used in other European models of the *VOCARE Bladder System*. The External Transmitter is shown in Figure 10.

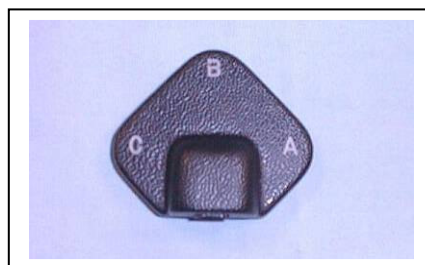


Figure 10

#### 4.2.3 Battery Charger and Power Cord

The Battery Charger and Power Cord (see Figure 11 below) are used to recharge the batteries in the External Controller. The Power Cord is used to connect the Charger to an electrical outlet. The free end of the External Cable is plugged into the Battery

Charger to charge the batteries. *The External Transmitter must be removed from the External Cable before plugging the External Cable into the charger.*

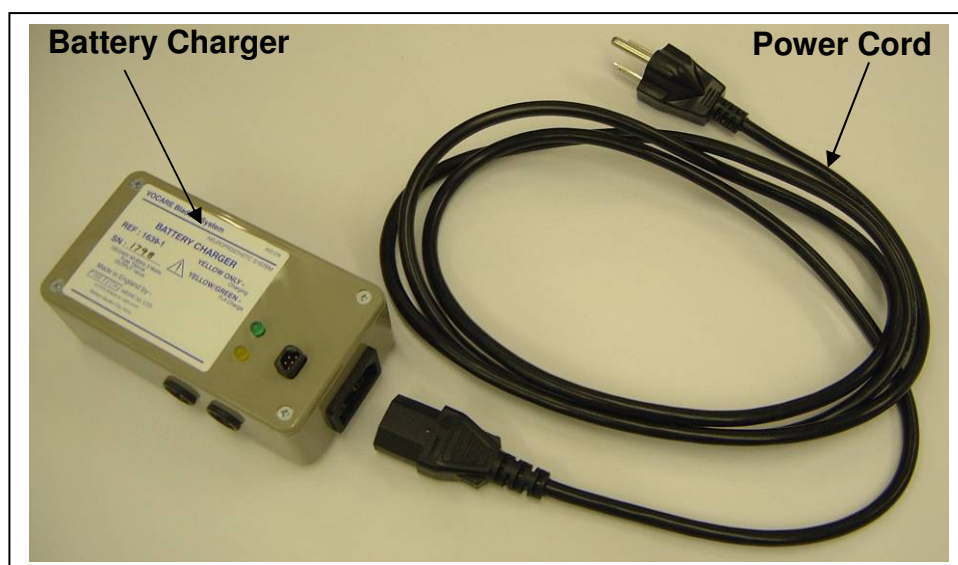


Figure 11

#### 4.2.4 Transmitter Tester

The Transmitter Tester is used to test if the External Transmitter is working correctly. The Transmitter Tester is pictured in Figure 12 below.



Figure 12

## 5 OPERATING THE VOCARE BLADDER SYSTEM

To use the *VOCARE Bladder System* effectively, you will need to have an approximate “schedule” for using the device to empty your bladder. For example, you might use the *VOCARE Bladder System* in the morning, at lunch time, in the mid afternoon, in the evening, and before you go to bed. Similarly, you will need to establish a “schedule” for your bowel routine. You and your doctor will decide on a schedule that is best for you.

*In order to operate the VOCARE Bladder System, you must first position the External Transmitter.*



## 5.1 PLACING THE EXTERNAL TRANSMITTER

- The External Transmitter must be placed on the skin so that the “A” and “B” of the External Transmitter lie over the corresponding receiver channels of the Implantable Receiver-Stimulator. (Please refer to Figure 13 below.)
- You may be able to feel the Implantable Receiver-Stimulator under the skin. Your doctor will help you learn where the receivers are and how to position the External Transmitter.
- During the first six weeks after implantation, the implant may move slightly, but after six weeks, its position is usually very stable.

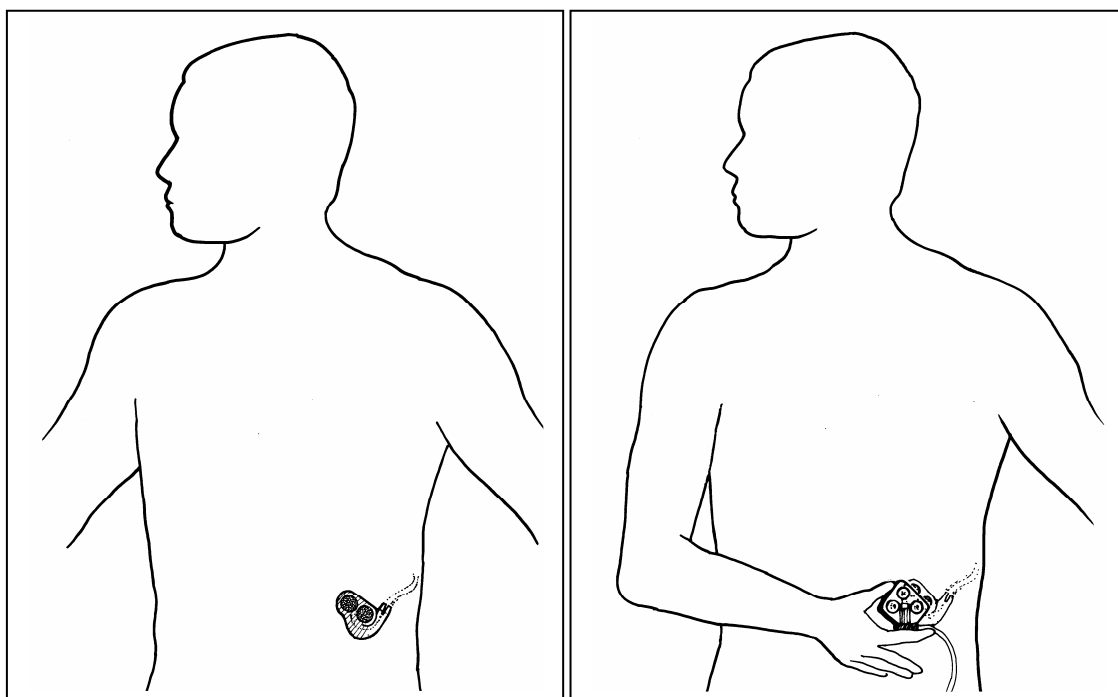


Figure 13

## 5.2 BLADDER EMPTYING

- Position yourself to begin your voiding program. *This may involve a transfer to a commode, placement of a urinal, or assistance from a personal care attendant. Refer to HELPFUL HINTS below for help in positioning.*
- You will usually select the Position “1” of the 3-position switch, move the on-off switch to the “I” (ON) position, and place the External Transmitter over the Implantable Receiver-Stimulator.
- You should expect urine to come out in spurts between the bursts of stimulation. Keep the External Transmitter in position until the spurts have stopped, or nearly stopped. *Note: You may need to turn the External Controller OFF, wait two minutes and then turn the VOCARE Bladder System back ON again. Waiting for a period of*

*two minutes will enable your bladder to rest before beginning another series of stimulation. This may help you empty your bladder completely.*

**Remember to switch off the External Controller when you are finished. If you forget, your batteries may be drained.**



**Caution**

If your urine flow pattern changes or you do not think you are emptying your bladder completely, contact your physician immediately. If you cannot contact your physician, use an alternative or back-up method (such as Intermittent Catheterization) to empty your bladder.

## **HELPFUL HINTS**

### **Using the VOCARE Bladder System in a wheelchair**

- While sitting in a wheelchair, a man can empty his bladder into a condom catheter and legbag or male urinal and a female can empty her bladder into a female urinal.

If you are a man, you may not empty your bladder completely if your wheelchair cushion is pressing against your urethra (the opening through which urine passes). You may be able to relieve this pressure if you sit further forward on the cushion, you lean to one side, or if you reduce the height of the center of the cushion.

## **5.3 BOWEL EMPTYING**

- Position yourself to begin your bowel program. *This may involve a transfer to a commode or assistance from a personal care attendant.*
- Select the bowel mode (usually position 2) of the 3-position switch, move the on-off switch to the I (ON) position, and place the External Transmitter accurately over the Implantable Receiver-Stimulator.
- Typically, up to five minutes of stimulation is needed to empty the bowel. *Some people may require repetition of this stimulation. In these cases, you should stimulate for 3 to 5 minutes, rest for two minutes, then stimulate again for 3 to 5 minutes. The entire bowel program (including time spent manually evacuating or cleaning) may take longer.*
- If stimulation does not empty the bowel effectively by itself, it may be necessary to assist stool removal manually. While learning to use the stimulator, you should continue your usual bowel medications.

**Remember to switch off the External Controller when you are finished. If you forget, your batteries may be drained.**

## 6 CARE AND MAINTENANCE

### 6.1 CHARGING THE BATTERIES IN THE EXTERNAL CONTROLLER

#### Important

Make sure the input voltage setting on the back of the Charger box is set to the correct voltage. For the USA this must be set to 115V (120V in older charger). In the UK, this must be set to 230V (240V in older charger). **Use the tip of a pen to slide this switch to the correct setting before use.**



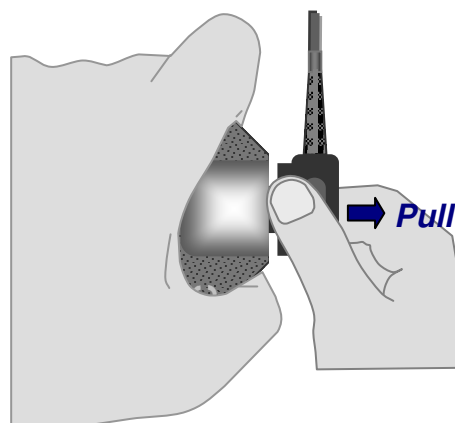
Figure 14

#### Voltage input setting switch

USA=115V or 120V  
UK = 230V or 240V

- 1) Connect the Battery Charger to the wall outlet with the Power Cord. If the charger is supplied with current from the wall outlet but the External Controller is not connected, only the **Green** light will be on.
- 2) Disconnect the Transmitter Block

To unplug the connector from the *Transmitter Block*, hold the *Transmitter Block* in one hand and pull the plug with the other hand; this will avoid damage to the cable.



- 3) Plug the cable into the Charger box. If the External Controller is connected and the batteries are being charged, only the **Yellow** (Red on older Chargers before serial number 1120) light will be on. Ensure the On/Off switch is in the Off ("0") position during charging. There is no harm if the Controller is left on during charging, but it could take longer to charge.

When the batteries are fully charged, the **Yellow** and **Green** lights should be almost equally bright. A dim Green light indicates the Controller is approaching

fully charged. Moderate overcharging will not harm the batteries. Once a week, you should recharge the batteries for the entire night (14-16 hours).

In cold weather, you will need to charge probably twice a week as the battery capacity is lower than at room temperature. In hot weather, the Green light might not get brighter as the battery voltage is lower than at room temperature when it is fully charged. To ensure fully charged, always leave it on charge for 14-16 hours; it cannot be overcharged.

Charging Conditions	Green LED	Yellow LED
Control box not connected	ON-Bright	OFF
Charging (Batteries low)	OFF	ON-Bright
Charging (Batteries nearly full)	ON-Dim	ON-Dim
Charging (Batteries fully charged)	ON-Brighter	ON-Dimmer



Figure 15

## 6.2 CLEANING

The outside cover of External Controller can be cleaned with a damp cloth. **Do not wash or submerge the External Controller for cleaning.** For heavier dirt or stains, a mild detergent such as dishwashing soap may be used for cleaning. Remove the soap with a damp cloth. Tape residue may be cleaned off the External Transmitter with rubbing alcohol. The cables should be wiped clean with mild detergent. Allow all items to air-dry completely before using.

## 6.3 INSPECTING CABLES

You should inspect the External Cable and the Power Cord for cracking or breaks in the insulation. If the insulation on either of your cables is cracked or broken, contact Finetech Medical Customer Service for a replacement cable.

## 6.4 SERVICE MAINTENANCE

If you find that the External Controller needs to be charged more than once per week, the internal batteries will need to be changed. The unit should be returned to Finetech Medical to ensure proper installation.

## 7 TROUBLESHOOTING

If you have any questions or concerns with the *VOCARE Bladder System* or need assistance, call your Doctor or Finetech Medical.

- **IF YOUR VOCARE BLADDER SYSTEM DOES NOT APPEAR TO FUNCTION PROPERLY**  
If you think that the External Controller or External Transmitter is not working properly, you should first make sure the External Controller has enough charge. Connect the External Controller to the Battery Charger and check the lights as described in the section on battery charging.
- If the External Controller is charged, you can test it by using the Transmitter Tester.
- Turn on the External Controller and place the Transmitter Tester opposite each of the transmitters (one at a time). If they are transmitting properly, a light on the Transmitter Tester will go on and off. Remember that it may take several seconds for the Transmitter Tester to begin flashing.
- If you cannot get a "transmitter tester" response from any of the transmitters, the External Controller is not working properly. Contact your Doctor or Finetech Medical.
- If your *VOCARE Bladder System* seems to work sometimes but not other times, check the External Cable. You may have a loose connection.
- **IF YOU CANNOT EMPTY YOUR BLADDER**  
If you think that a large amount of urine is left in your bladder after trying to empty it, you should use an alternative or back-up method to empty your bladder (such as catheterization) until the problem has been corrected. **You should also contact your doctor immediately.**
- **IF THE EXTERNAL CONTROLLER IS ACCIDENTALLY DROPPED IN WATER**  
If you have dropped your External Controller in water, contact Finetech Medical for instructions.

### OTHER PROBLEMS

If you have any other problems with your *VOCARE Bladder System*, you should contact your doctor or Finetech Medical.

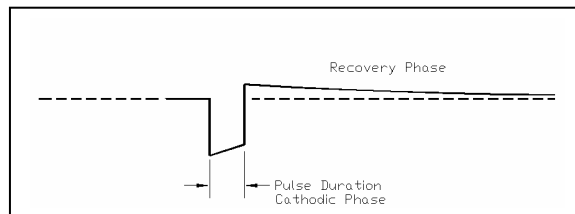
### OTHER REASONS TO CONTACT YOUR DOCTOR

**If you suspect that you have a urinary tract infection you should contact your doctor. Signs and symptoms of a urinary tract infection include one or more of the following: fever; general tiredness and weakness; foul smelling, cloudy, or bloody urine; and increased leaking of urine.**

## 8 PRODUCT SPECIFICATIONS

### IMPLANTABLE RECEIVER-STIMULATOR BSD117 (MODEL 1635-1)

Output: 2 Independent output channels  
Biphasic, capacitively coupled waveform (See waveform below)



Carrier Frequency: Channel A - 7MHZ  
Channel B - 9 MHZ

Physical Dimensions: 8 x 5 x 0.85 cm, 12g

Packaging: 1 Receiver stimulator in steam sterile double bag

### EXTRADURAL ELECTRODES BSC124B (MODEL 1640-1 for Clear Electrode, MODEL 1641-1 for White Electrode)

Stimulating Area  
(Cathodic): 35 mm<sup>2</sup> total

Return Area (Anodic): 74 mm<sup>2</sup> total

Physical Dimensions: 44 cm connector to bifurcation length  
7 cm bifurcation to distal anode length  
4g

Packaging: 2 extradural electrodes (1 white core, 1 clear core) in sterile double bag

### EXTERNAL CONTROLLER BSC154(MODEL 1637-1)

Power Source: (5) - 9 Volt rechargeable NiCd batteries

Operating Life: 8 hours (with typical stimulation settings)

Front Panel Controls: 3 Position mode selection switch On/Off toggle switch

Connections: 5 Contact receptacle

Physical Dimensions: 16 x 8 x 3 cm, 420 g

Typical Output Control: Amplitude 0-40 V  
Pulse Duration 24-720  $\mu$ s  
Pulse Frequency 8-46Hz  
Bladder Gap Duration 2-14sec  
Bladder Burst Duration 1-7sec  
Bowel Gap Duration 5-35sec  
Bowel Burst Duration 2-17sec

### **EXTERNAL CABLE BSD128 (MODEL 1638-1)**

Physical Dimensions: 75 cm length

Connectors: 5 Contact molded plugs Interchangeable ends

### **EXTERNAL TRANSMITTER BSC127 (MODEL 1636-1)**

Output: 7 MHz-Channel A  
9 MHz-Channel B

Physical Dimensions: 7.5 x 6.2 x 1.1 cm, 19 g

Connection: 5 Contact receptacle

### **TRANSMITTER TESTER MPL149 (MODEL 1642-1)**

Visual indicator of stimulus pulse output from External Transmitter

### **BATTERY CHARGER BSD152 (MODEL 1639-1) AND POWER CORD (MODEL 1670-1)**

Power Output: Full charge 14 mA, Trickle Charge 4 mA

Input: 115/230 VAC, 50 - 60 Hz

Indicators &

Connections: Amber charging indicator, Green charge complete indicator, 5 Contact connector receptacle

Physical Dimensions: 12.6 x 6.5 x 5.2 cm, 290 g

### **ENVIRONMENTAL CHARACTERISTICS FOR ALL COMPONENTS**

Transport and

Storage: Temperature -40 °C to +70 °C  
Relative Humidity 10 to 90%  
Pressure 500 to 1060 hPa

## 9 VOCARE Bladder System Glossary

**Autonomic Dysreflexia** – Reflexes from the bladder which can cause a rise in blood pressure.

**Bladder Capacity**- The amount of urine that the bladder can hold.

**External Urethral Sphincter**– A valve at the bottom of the bladder which needs to open for urine to empty out of the bladder.

**Functional Electrical Stimulation (FES)** – A method by which electrical signals provide function to otherwise paralyzed muscles.

**Incontinence** – Leakage of urine.

**Reflex Incontinence**- Large unpredictable leakage of urine resulting from a reflex that causes the bladder to contract when there is urine in it.

**Rhizotomy** –The selective cutting of nerves.

**Sacral Nerves** – Nerves which travel through a lower part of the spine called the sacrum.

**Stimulation** – electrical signals which cause the contraction of muscles.

**Stress Incontinence** – small leaks of urine from bending forward or coughing.



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