EMS-5000

ELECTRONIC MUSCLE STIMULATOR
OPERATING MANUAL
ELECTRONIC MUSCLE STIMULATION (EMS)

EMS is the process of using very weak electrical impulses to contract and relax muscles. It produces "passive" exercise by sending electrical impulses or signals to the selected muscle or muscle groups to contract and relax them. In "active" exercise the signals are sent by the brain. It is not new; it has been used for hundreds of years. However, modern scientific developments in such specialized EMS medical research centers as the Rehabilitation Engineering Section of Rancho Los Amigos Hospital near Los Angeles have produced improved wave forms (the technical shape and cycles of the electrical impulses), increased controls of rise time, duration of contractions, fall time, and rest time, comfortable tolerance of higher intensity by improving types of electrodes, and versatility in the designing of a therapy program to meet the individual needs and select the specific muscles of each patient.

EMS is known by other names. "Neuromuscular Stimulation" (NMS) is a term becoming popular in some circles of the United States. "Electronic Muscle Exercise" (EME) is widely used outside of the United States. Many other terms in EMS are fading from use because of misuse or obsolescence, such as "faradic" and "galvanic". They are still used, but primarily by manufacturers of devices for the European market, and some older models of EME devices which are not legally allowed into the United States for distribution.
INDICATORS AND CONTROLS

Channel 1
Output Indicator Light
Output Receptacle
Channel 1 On/Off and Amplitude Control

Channel 2
Output Indicator Light
Output Receptacle
Channel 2 On/Off and Amplitude Control

CONTRACTION FREQUENCY (Hz) RELAXATION TIME (S)
5 30 100
1 30
RAMP (S)
45
9V — 6F22

PREPARATION FOR USE

1. Check Battery. Insure that you are using a fresh battery.

2. Prepare Skin. Before applying electrodes, be sure to confirm correct electrode placement as recommended by your physician or therapist. Each location should be washed, rinsed and thoroughly dried.

3. Prepare Electrodes. Apply gel in a thin even layer (about the thickness of a match book cover) to the bottom of the electrode. Avoid using too much gel.

Note: If you are using reusable electrode, please disregard the procedure.
4. Attached Electrodes. Be sure that all sides are well taped and that the reusable electrodes is held firmly against the skin.

5. Electrode Lead Wires. Output Plug: (plugs into output receptacle) Pin Connectors: (Plug into electrodes)

INSTRUCTIONS FOR USE

6. Insert Pin into Electrode Socket. Insert pin connector into electrode as shown. (When inserting or removing pin connector, hold connector-not cord-to protect cord.) For some electrode locations, it may be preferable to insert the pin connector prior to taping the electrode to the skin.

7. Adjusting the Controls. Ensure that amplitude controls for both Channels 1 and 2 are turned to the "OFF" position.
8. Connect Leads to EMS unit. Insert receptacle end of lead wire into the channel output receptacle to be used (1 and/or 2), Pushing plug all the way in.

9. Adjust Contraction. Turn the Contraction control to the setting recommended by your medical professional.

10. Adjust Relaxation. Turn the Relaxation control to the setting recommended by your medical professional.

11. Adjust Frequency
- 3 section frequency
- 5,30,100 selector recommended by your medical professional

12. Adjust Ramp
- 3 section ramp
- 1, 3, 5 selector recommended by your medical professional
13. Adjust Output. Turn Amplitude control knob for Channel 1 or 2 clockwise. The indicator will light up while the unit is in operation. Slowly turn the channel control in a clockwise direction until you reach the setting recommended by your medical professional. Repeat for the other channel, if both channels are to be used.

14. Turning Unit Off. Turn both channel controls to Off. Then unplug the electrode lead wires, grasping them by the plug, not the cord.

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CARE AND MAINTENANCE

15. Portability. Your EMS is portable and may be clipped to a belt, shirt pocket, bra or other clothing.

16. Front Cover. A removable panel covers the controls for Contraction, Relaxation, and battery compartment. Your medical professional may wish to set these controls for you and request that you leave the cover in place.
17. Battery. Dimming of the indicator lights signifies that the battery should be replaced with a new one as soon as possible. However, the stimulator will continue to operate for several more hours. To replace battery, remove front cover (see above), and extract battery. Replace with 9 volt alkaline or similar rechargeable battery, taking care that the battery is inserted correctly. (See diagram inside battery compartment.) This EMS unit is designed to be used with batteries only, and can not be operated from a line-powered battery charger.

18. Care of Electrode Cords. Clean the electrode cords by wiping with a damp cloth. Coating them lightly with talcum powder will reduce tangling and prolong life.

APPLICATIONS

Relaxation of muscle spasms: The EMS unit can relax a "tense", "tight", or spasmodic muscle. Common candidates for EMS include those in high stress situations who experience muscle tension in the upper back and neck areas, and those who suffer from chronic tension headaches.

- Increasing range of motion: The EMS unit is especially useful for those suffering from simple arthritic symptoms or "stiffness" in joints, muscle groups, or back areas.

- Reduction or prevention of muscle atrophy: The EMS unit will increase motion, range, and response of muscles restricted from disuse or from atrophy from another cause. It is helpful following activity restrictions, such as after surgery or being in a cast.

- Re-education of muscles: Muscle fibers lose their ability to contract if they are not adequately used. The EMS unit repeats contractions of designated muscles re-educating muscle fibers. This is particularly beneficial to orthopedic patients recovering from being in a cast or a splint, or bed-ridden patients who are not able to maintain their muscles (disuse atrophy).

- Increasing local blood circulation: (Self explanatory).

The EMS unit can be used in the clinic or at home in comfort and privacy with complete safety following the prescription and proper instruction from a physician/therapist.
SKIN CARE AND CONDUCTIVITY

For proper muscle contraction there must be conduction of the electrical impulses back and forth between the electrodes through the tissue. The conductivity of the skin is important, as well as the amount of adipose tissue that must be penetrated. Obesity inhibits conductivity, requires higher amplitude levels for complete contraction. Certain chemicals, greasy materials, and some metal electrodes are poor conductors. Heat and light perspiration increase conductivity. There are re-usable, disposable, self-adhesive electrodes on the market. The MS-100 type hypoallergenic reusable electrodes are perhaps the best on the market. They do not require the use of straps. They can be moved from one position to another. They can be trimmed to any size or shape to conform to small muscles. Because they probably are the most scientifically advanced on the market, distributors of the EMS unit also distribute the MS-100 EMS electrodes. They can be re-used about 25-35 times if handled gently. Reminders: Return amplitude knobs (#4) to ‘0’ before changing placement of the electrodes. Be sure electrodes fit snugly during stimulation to avoid tingling discomforts caused by loose contact between electrode and skin. Also, cramps are common when exercising muscles weak from disuse. Resting then re-using moderate EMS repeatedly for 5-15 minutes usually eliminates the cramps.

NOTES

• You may place both pairs of electrodes over various muscle groups at one time.
• It is best to place the two electrodes of a single outlet lead on the same side of the body.
• Even during high amplitude levels of contraction, most persons can sleep or rest once they have become accustomed to EMS.
• Each pair of electrodes may be set at a different level of intensity. Different muscles require varying degrees of EMS to reach a full contraction.
• It is important to understand that the off time, when the muscles rest between contractions, is critical. Sufficient time between contractions in order for the muscles to relax totally reduces the possibility of muscle fatigue. After a modest amount of use of EMS, an individual does adjust to the contractions so well that less and less time is necessary for the muscle to relax.
• As in any exercise, EMS exercise may cause soreness in muscles. If this occurs, resting the muscle, even for up to a day or two, should eliminate the soreness. As the person becomes accustomed to the exercise, soreness should no longer occur. Should it reoccur, the physician or therapist should evaluate the program and factors of use to ascertain corrective measures.
PRECAUTIONS

- Do not use EMS while operating power equipment or machinery, or while driving an auto.
- Physicians should use caution in recommending EMS during pregnancy; its safety during pregnancy has not been conclusively determined.
- Effectiveness is dependent upon patient selection.

CONTRAINDICATIONS

- EMS should not be prescribed for persons using demand-type cardiac pacemakers, or with patients known to have myocardial diseases or arrhythmias or with cardiac patients in general.
- EMS electrodes should not be placed over the carotid glands, or over the pharyngeal or laryngeal muscles.
- EMS electrodes should not be placed over healing fractures in such a manner as possibly to cause stress in the fracture area.
- Any electrode placement that causes current to flow transcerebrally (through the head) is not allowed.

TROUBLESHOOTING

If your EMS unit does not seem to be operating correctly, refer to the chart below to determine what may be wrong. Should none of these measures correct the problem, the unit will need servicing.

<table>
<thead>
<tr>
<th>Problem Description</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>The power indicator lights up but unit does not function properly.</td>
<td>Check all control settings. Replace battery with a new one.</td>
</tr>
<tr>
<td>&quot;On&quot; and &quot;Battery Light&quot; are dim.</td>
<td>Replace battery with a new one.</td>
</tr>
<tr>
<td>None of the indicators light up.</td>
<td>Replace battery with a new one.</td>
</tr>
</tbody>
</table>

Check all control settings.
Are they set to values prescribed by your medical professional?
Are electrodes in proper position?
Check lead wires. Be sure all connectors are firmly seated.
Replace cord set with another to check for broken wires.

To obtain service, contact your supplier.
TECHNICAL SPECIFICATION

Channels: dual, isolated between channels
Wave Form: Modified square wave with zero net direct current (DC) component
Pulse Amplitude: Constant current 0 to 80mA each channel, adjustable (500 ohm load)
Pulse Frequency: 5, 30, 100 Hz
Pulse Ramp: 1, 3, 5 seconds
Contraction: Variable control (1-30 Sec.)
Relaxation: Variable control (1-45 Sec.)
Power Source: 9V alkaline battery or similar rechargeable cell
Size: 24 × 64 × 95mm
Weight: 130 grams (including battery)

All values have 10% ± tolerance