OPERATING INSTRUCTIONS – ENGLISH

BEFORE USING THE STIMULATOR

PATIENT INFORMATION

PROFESSIONAL INFORMATION

ADDITIONAL INFORMATION

APPENDIX

1. INTRODUCTION

CEFAR Medical AB has been a medical supplier of electrotherapy products for more than 30 years. The company was established in Sweden in 1975 and is today one of Europe's leading companies in electrotherapy. The Cefar stimulators are widely used by public and private health care professionals around the world.

Electrical nerve and muscle stimulation is effective, has no side effects and is economical. Through clinical research, areas of application for TENS (Transcutaneous Electrical Nerve Stimulation) and NMES (NeuroMuscular Electrical Stimulation) are rapidly expanding. Cefar is working actively to further develop the method towards a natural treatment alternative for both health care professionals and consumers.

More information about TENS, NMES and our products can be found on our web site: www.cefar.se

CEFAR REHAB X2 is a dual channel nerve stimulator intended for both muscle rehabilitation (NMES) and pain relief (TENS). The stimulator features 27 preset programs and 3 custom programs. The channels are simultaneous, which means that a selected program applies for both channels. By using CEFAR EASY TOUCH™ the stimulation is automatically set to the correct intensity for each person.

2. MEDICAL BACKGROUND

NMES

NMES (NeuroMuscular Electrical Stimulation) is used successfully both in medical rehabilitation and as a complement to athletic training on all levels.

The goal of electrical muscle stimulation is to achieve contractions or vibrations in the muscles. Normal muscular activity is controlled by the central and peripheral nervous systems, which transmit electrical signals to the muscles. NMES works similarly but uses an external source (the stimulator) with electrodes attached to the skin for transmitting electrical impulses into the body. The impulses stimulate the nerves to send signals to a specifically targeted muscle, which reacts by contracting, just as it does with normal muscular activity.

Electrical muscle stimulation is suitable for all the muscles in the body. It can be used to strengthen muscles weakened by surgery, a fracture, etc., and improve mobility. It is also an excellent tool for stroke rehabilitation, helping patients in handgrip and gait training.

Electrical muscle stimulation for rehabilitation purposes should be tried out individually by a physiotherapist or other caregiver for the best results.

TENS

TENS (Transcutaneous Electrical Nerve Stimulation) gives good results in acute and chronic pain conditions of many kinds. It is clinically proven and used daily by physiotherapists, other caregivers and top athletes around the world.

High-frequency TENS activates the pain-inhibiting mechanisms of the nervous system. Electrical impulses from electrodes, placed on the skin over or near the painful area, stimulate the nerves to block the pain signals to the brain, and the pain is not perceived. Low-frequency TENS stimulates the release of endorphins, the body's natural painkillers.

TENS is a safe treatment method and has, in contrast to drugs and other pain relief methods, no side effects. It may be sufficient as the only treatment form, but it is also a valuable complement to other pharmacological and/or physical treatments. TENS does not always treat the cause of pain. Consult your doctor if pain persists.

3. PRECAUTIONARY MEASURES

- Inspect the equipment prior to use.
- Use the stimulator only as stated in the operating instructions.
- Only Cefar accessories should be used with the stimulator

WARNING!

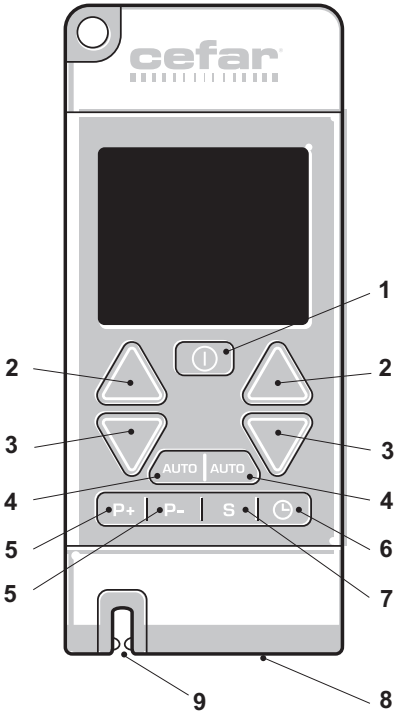
- People with implanted electronic equipment, such as pacemakers and intracardiac defibrillators, must not be treated with CEFAR REHAB X2.
- Pregnant women should not be treated with CEFAR REHAB X2 during the first trimester (12 weeks).
- Due to the location of the carotid arteries and the carotid bodies, do not stimulate the front or sides of the neck, since a drop in blood pressure can occur.
- Stimulation should not take place while the user is connected to high-frequency surgical equipment. It may cause burn injuries on the skin under the electrodes, as well as problems with the stimulator.
- Do not use the stimulator in the vicinity of shortwave or microwave therapy equipment, since this may affect the output power of the stimulator.
- Keep the stimulator out of reach of children.

CAUTION

- Stimulate with precaution while treating angina pectoris and the thoracic region on patients with cardiac arrhythmia.
- The electrodes are only to be placed on healthy skin. Avoid skin irritation by ensuring that good contact is achieved between electrodes and skin.
- Do not place electrodes directly over the uterus or connect pairs of electrodes across the abdomen if you are pregnant. The reason is that, theoretically, the current could affect the foetus's heart (although there are no reports of it being harmful).
- If skin irritation should occur, treatment should be temporarily discontinued. If problems continue, contact your health care provider. Hypersensitivity to tape and gel can occur in isolated cases. The problem usually disappears when the tape or gel is changed to another type.
- Do not use electrodes with a surface < 16 cm^2, as there will be a risk of suffering a burn injury. Caution should always be exercised with current densities > 2 mA/cm^2.
- Observe caution when using electrotherapy at the same time as the patient is connected to monitoring equipment with body worn electrodes. The stimulation might interfere with the signals to the monitoring equipment.
- Never open the battery cover during stimulation in order to avoid electrical shock.
- Turn off the stimulation before removing the electrodes from the skin. If an electrode comes off, turn off the stimulation before picking it up. Getting electrical stimulation through the fingers is unpleasant but not harmful.
- Observe caution when stimulating in the immediate vicinity of cellular phones that are switched on, since this may affect the output power of the stimulator.
- Observe caution if you use the stimulator while driving. Unintentional stimulation changes might extract focus from the driving and create a hazardous situation.

4. OVERVIEW

CONTROL BUTTONS



1. ON/OFF

- Turns the stimulator on and off.
- Turns the stimulator off even when the key lock is activated.
- Can be used for terminating the stimulation at all times.

2. INCREASE (left and right channel)

- Increases the amplitude (intensity of stimulation). Press and hold the button to increase the amplitude continuously.
  Note! Always increase the amplitude cautiously.
- Terminates AUTO stimulation mode.
- Increases the number of minutes when setting the timer (right button).
- Used when turning the program lock on and off (left button)*.
- Scrolls through choices in programming mode*.

3. DECREASE (left and right channel)

- Decreases the amplitude (intensity of stimulation). Press and hold the button to decrease the amplitude continuously.
- Deactivates the key lock.
- Terminates AUTO stimulation mode.
- Decreases the number of minutes when setting the timer (right button).
- Used when turning the program lock on and off (left button)*.
- Scrolls through choices in programming mode*.

4. AUTO (left and right channel)

- Starts the AUTO test mode.
- Confirms the selected amplitude level in AUTO test mode.

5. PROGRAM

- Selects a program (P1–P30).
  Use P+ to step forward through the programs and P– to step backward.
- Pauses an ongoing program.
- Used when activating/deactivating the program lock (P+)*.

6. TIMER

- Initiates the timer setting.

7. PROGRAMMING/CONFIRMATION (S=SET)

- Turns the stimulator into programming mode for custom programs P28–P30 when pressed for 2 seconds.
- Confirms settings in programming mode.

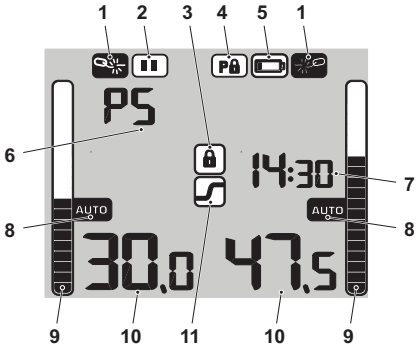
8. HAND SWITCH CONNECTION

- By using the hand switch, the contractions in programs with intermittent stimulation can be manually controlled.

9. CABLE HOLDER

*Professional use

DISPLAY SYMBOLS



1. **BROKEN CIRCUIT (left and right channel)**

   Broken circuit. The reason for a broken circuit may be too high resistance or cable breakage. See chapter *TROUBLESHOOTING*.

2. **PAUSE**

   Paused program.

3. **KEY LOCK**

   Activated key lock. The key lock is automatically activated if no key is pressed for 20 seconds. Deactivate the key lock by pressing the left or right **DECREASE** button.

4. **PROGRAM LOCK**

   Activated program lock.

5. **BATTERY STATUS**

   Empty batteries. This symbol is only shown when the batteries are almost empty.

6. **PROGRAM NUMBER**

   Selected program number.

7. **REMAINING TIME**

   Remaining program time in minutes and seconds. Time is flashing during timer setting.

8. **AUTO STIMULATION MODE/CEFAR EASY TOUCH™ (left and right channel)**

   Activated automatic amplitude setting. “AUTO” is flashing during test mode and steady during stimulation.

9. **AMPLITUDE BARGRAPH (left and right channel)**

   Selected amplitude as a bargraph.

10. **AMPLITUDE LEVEL (left and right channel)**

    Current of selected amplitude in mA (not shown in AUTO stimulation mode).

11. **WORK/REST (intermittent stimulation)**

    Work/rest indication for programs with intermittent stimulation. The upper part of the symbol is flashing during work time and the bottom part during rest time.

11. **HIGH/LOW FREQUENCY (mixed frequency stimulation)**

    High/low frequency indication for mixed frequency programs. The upper part of the symbol is flashing during high frequency and the bottom part during low frequency.

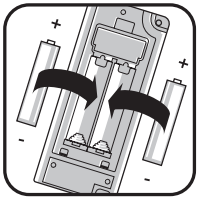
5. OPERATION

STEP-BY-STEP USE

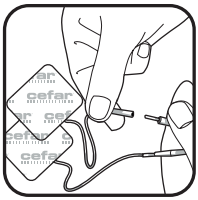
CEFAR REHAB X2 can be used for both TENS and NMES treatment. Use only those treatment programs that your health care provider has determined are the most effective for your needs. The stimulator has two simultaneous channels, which means that both channels stimulate with the same program. A hand switch is provided to make it easy to manually control muscle contractions in NMES programs.

1. INSERT THE BATTERIES

Insert the batteries (see chapter *REPLACEMENT OF BATTERIES*).

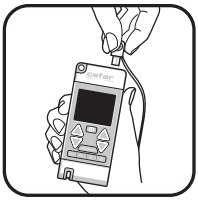


2. ATTACH THE ELECTRODES



A. Connect the electrodes to the cable.

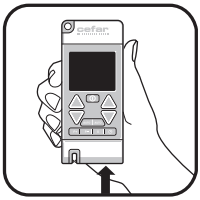
B. Attach the electrodes to your body.



C. Connect the cable to the CEFAR REHAB X2.

3. CONNECT THE HAND SWITCH

Note! This is only applicable for programs P9–P16 and P19–P23.



4. SWITCH THE STIMULATOR ON

Press the **ON/OFF** button, ⏻ . This button can be used for terminating the stimulation at all times, even when the key lock is activated.

Always switch the stimulation off before removing electrodes from the skin.

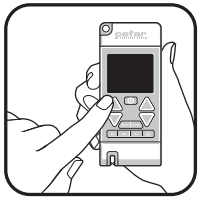
5. SELECT A PROGRAM (P1–P30)

Press the **PROGRAM** button P+ | or P– to step forward or backward until the program of your choice is shown on the display.

Note! When selecting a program the amplitude must be set to 00.0 mA for both channels.

For further information on the programs, see chapter *PROGRAMS*.

6. START THE STIMULATION



TENS

Press the **INCREASE** button △ for each channel until you reach a comfortable level of stimulation. Press and hold the button to increase the amplitude continuously.

NMES

Press the **INCREASE** button △ for each channel until you get visible muscle contractions. Press and hold the button to increase the amplitude continuously.

Note! Both channels must be used for programs P5 and P17–P18.

Note! Always increase the amplitude cautiously!

See section SPECIAL INSTRUCTIONS for the following cases:

- Mixed frequency stimulation
- Intermittent stimulation + hand switch
- Intermittent stimulation with Active Rest

An automatically activated key lock prevents unintentional changes during treatment. The key lock is activated if no button is pressed for 20 seconds. Press any of the **DECREASE** buttons ▽ to deactivate the key lock.

The treatment time is preset, but can be changed by using the timer function, see section TIMER.

7. STOP THE STIMULATION

You can stop the stimulation before the program time has elapsed by pressing the **DECREASE** button ▽ until the amplitudes are 00.0 mA or by pressing the **ON/OFF** button ⏻.

When the program is finished, remaining time “00:00” is flashing on the display.

The last used program is saved when the stimulator is turned off and then pre-selected the next time the stimulator is turned on.

The stimulator turns off after 5 minutes of inactivity to spare batteries.

CEFAR EASY TOUCH™ – AUTO STIMULATION MODE

To provide a pain relieving effect, the level of stimulation should be perceived as a little bit stronger than the pain intensity. Since the body initially adapts to the set level of stimulation, it is often required to adjust the amplitude a couple of times to reach the optimal level of stimulation. By using CEFAR EASY TOUCH™ the amplitude is automatically adjusted, and the optimal level is reached after a few minutes of stimulation.

For NMES the primary aim is to cause a strong but not painful muscular contraction. With CEFAR EASY TOUCH™ it is easy to reach the correct stimulation level. By using the patient's individual sensory-motor threshold CEFAR REHAB X2 applies a coefficient to reach the optimal intensity of stimulation.

To use CEFAR EASY TOUCH™:
Follow steps 1–5 in the section *STEP-BY-STEP USE.*

6. START THE AUTO TEST

Press the **AUTO** button 

for the left or right channel. "AUTO" starts flashing on the display, and the amplitude increases gradually.

7. FINISH THE AUTO TEST

TENS programs: Press the **AUTO** button 

again when the stimulation level feels comfortable.

NMES programs: Press the **AUTO** button 

again at the first visible muscle response.

If you press **AUTO** too late, or want to start again for any reason, press the **AUTO** button again to start over.

8. REPEAT THE AUTO TEST FOR THE OTHER CHANNEL

Repeat steps 6–7 for the other channel.

9. THE STIMULATION STARTS

The program starts after a few seconds, and the amplitude is automatically adjusted to an optimal level of stimulation.

If the hand switch is connected, you can start using it now.

Even if you are in AUTO stimulation mode, you can increase or decrease the amplitude at any time by pressing the **INCREASE** or **DECREASE** buttons   until the stimulation feels pleasant. If doing so, the automatic amplitude setting is lost.

SPECIAL INSTRUCTIONS

Mixed frequency stimulation (P4)

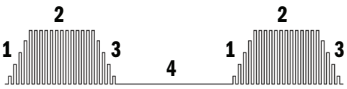
Mixed frequency stimulation is a combination of high (80 Hz) and low (2 Hz) frequency stimulation with separate amplitude settings.

1. First set the amplitude for 80 Hz stimulation when the upper part of the high/low frequency symbol is flashing
2. When the bottom part of the symbol flashes for the first time, the amplitude for 2 Hz stimulation will start at the same level as is set for 80 Hz. Adjust the amplitude until you get visible muscle contractions.

The period between the frequency changes is preset to 3 seconds.

See chapter *FREQUENTLY ASKED QUESTIONS* for further information on mixed frequency stimulation.

Intermittent stimulation + hand switch (P9–P23)



1. Ramp-up time
2. Work time
3. Ramp-down time
4. Rest time

Programs 9–23 are intermittent stimulation programs with rest time between the muscle contractions (work time), see figure. The contraction gradually increases during ramp-up time and reaches maximum contraction during work time. During ramp-down time, the stimulation gradually decreases until the rest time starts. The rest time can be without or with stimulation (Active Rest). In intermittent stimulation programs the work/rest symbol is shown on the display. The upper part of the symbol is flashing during work time and the bottom part during rest time.

Programs P9–P16 and P19–P23 can be used together with the hand switch to manually control the duration of the work time and rest time. Press the hand switch button during rest time for ramp-up time and contraction. The duration of the work time is preset but can be shortened by pressing the hand switch button. The rest time lasts until the hand switch button is pressed again.

See chapter *FREQUENTLY ASKED QUESTIONS* for further information on using the hand switch.

Intermittent stimulation with Active Rest (P19–P20)

In programs with Active Rest, the stimulation is active also during the rest time, which means that you have to perform two amplitude settings for each channel.

Amplitude setting for contractions (work time): When the upper part of the work/rest symbol is flashing, increase the amplitude gradually until you get muscle contractions without pain.

Amplitude setting for Active Rest: When the bottom part of the work/rest symbol is flashing, increase the amplitude gradually until you get muscle vibrations.

See chapter *FREQUENTLY ASKED QUESTIONS* for further information on Active Rest.

TIMER

The treatment time is preset, but the timer function allows you to set the treatment time yourself. You have the option to change the timing from "- -" to 99 minutes. If you choose to stay on "- -", the stimulation will go on until you stop the stimulation manually.

To set the timer:

1. Select a program and start the stimulation, see section STEP-BY-STEP USE.
2. Press the **TIMER** button (◷) to initiate the timer function.
3. Increase the time by pressing the right **INCREASE** button △ . The time is increased by 1 minute each time you press the button. Decrease the time by pressing the right **DECREASE** button ▽ . The time is decreased by 1 minute each time you press the button. The time is flashing on the display, while setting the timer.
4. Press the **TIMER** button (◷) to confirm the timer setting.

PROGRAM PAUSE

You can pause the programs up to five minutes.

To pause a program:

1. If key lock is on, press any of the **DECREASE** buttons ▽ to deactivate it.
2. Press any of the **PROGRAM** buttons (P+) or (P–) to pause the program.

Start stimulation again by pressing any of the **PROGRAM** buttons (P+) or (P–).

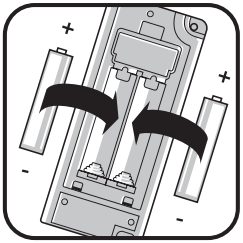
If stimulation is paused for more than five minutes, the stimulator turns off automatically to spare batteries.

6. REPLACEMENT OF BATTERIES

A battery symbol is shown on the display when the batteries are almost empty . As long as the stimulator is working normally you can continue the treatment. When stimulation feels weaker than usual or the stimulator turns off, it is time to replace the batteries.

If the stimulator is not used for some time (approximately 3 months), the batteries should be removed from the stimulator.

The stimulator operates on either two non-rechargeable 1.5 V AA batteries or two rechargeable 1.2 V AA batteries, recharged in a separate charger.



REPLACING THE BATTERIES

1. Turn off the stimulator.
2. Locate the battery compartment on the back of the stimulator.
3. Remove the battery cover by pressing the mark at the top firmly and sliding the cover downwards.
4. Remove the batteries.
5. Insert the new batteries correctly according to the polarity markings (+ and –) inside the battery compartment, see picture.
6. Replace the battery cover.
7. Dispose of the exhausted batteries in accordance with local and national regulations.

NOTE! Non-rechargeable batteries may not be charged due to the risk of explosion.

7. PROGRAMS

PRESET PROGRAMS – TENS

CEFAR REHAB X2 has six preset TENS programs for pain relief. The program overview below shows the stimulation mode and parameter settings for each program. For information on treating various pain conditions with TENS, see the clinical guide last in this manual. For further information on programs P4–P5, see chapter *FREQUENTLY ASKED QUESTIONS*.

P1 – CONVENTIONAL TENS

High-frequency stimulation that causes a tingling sensation. This is often the first choice for both acute and long-term pain.

Frequency	80 Hz
Pulse duration	180 µs
Total program time	– – min.

P2 – BURST TENS

Low-frequency stimulation that produces visible muscle contractions. The pain relief sets in slower but lasts longer than conventional TENS.

Frequency	2 Hz
Pulse duration	180 µs
Total program time	– – min.

P3 – MODULATED PULSE DURATION TENS

A type of high-frequency stimulation where the pulse duration varies continuously. This can cause an undulating sensation, which may be more pleasant than constant pulse duration.

Frequency	80 Hz
Pulse duration 1	70 µs
Pulse duration 2	180 µs
Modulation time	2 sec.
Total program time	– – min.

P4 – MIXED FREQUENCY TENS

A combination of high- and low-frequency stimulation, which can lead to a more effective pain relief treatment.

Frequency 1	80 Hz
Frequency 2 (burst)	2 Hz
Pulse duration	180 µs
Modulation time	3/3 sec.
Total program time	– – min.

P5 – FLOW TENS

An alternating stimulation causing a massaging and pumping effect that can be used for pain relief and increased circulation in the stimulated area. Always use 2 channels and 4 electrodes.

Frequency	80 Hz
Pulse duration 1	70 µs
Pulse duration 2	180 µs
Modulation time	2 sec.
Total program time	– – min.

P6 – GUIDE TO INTRAMUSCULAR INJECTIONS

A program used to increase the precision of intramuscular botox (botulinum toxin) injections. These injections are used for spasticity, dystonia, facial hemispasm and bruxism.

Frequency	1 Hz
Pulse duration	50 µs
Total program time	– – min.

PRESET PROGRAMS – NMES

CEFAR REHAB X2 has 21 preset NMES programs, covering warm up, rehabilitation, strengthening, recovery and massage. In the clinical guide, last in this manual, is a list of indications with suggested treatment programs and electrode placements for each indication. P9–P16 and P19–P23 can be used together with the hand switch, which makes it easy to manually control muscle contractions.

P7 – WARM UP, SHORT

Frequency 1	2 Hz
Frequency 2	8 Hz
Pulse duration	300 µs
Modulation time	10 sec.
Total program time	– – min.

P8 – WARM UP, LONG

Frequency 1	2 Hz
Frequency 2	8 Hz
Pulse duration	300 µs
Modulation time	10 sec.
Total program time	– – min.

P9 – INTERMITTENT STIMULATION

Smaller muscle groups

Frequency	50 Hz
Pulse duration	200 µs
Work time	4 sec.
Rest time	4 sec.
Ramp-up time	2 sec.
Ramp-down time	2 sec.
Total program time	– – min.

P10 – INTERMITTENT STIMULATION

Larger muscle groups

Frequency	50 Hz
Pulse duration	400 µs
Work time	4 sec.
Rest time	4 sec.
Ramp-up time	2 sec.
Ramp-down time	2 sec.
Total program time	– – min.

P11 – INTERMITTENT STIMULATION

Smaller muscle groups

Frequency	65 Hz
Pulse duration	200 µs
Work time	6 sec.
Rest time	8 sec.
Ramp-up time	2 sec.
Ramp-down time	2 sec.
Total program time	– – min.

P12 – INTERMITTENT STIMULATION

Larger muscle groups

Frequency	65 Hz
Pulse duration	400 µs
Work time	6 sec.
Rest time	8 sec.
Ramp-up time	2 sec.
Ramp-down time	2 sec.
Total program time	– – min.

P13 – INTERMITTENT STIMULATION

Smaller muscle groups

Frequency	50 Hz
Pulse duration	200 µs
Work time	10 sec.
Rest time	10 sec.
Ramp-up time	1 sec.
Ramp-down time	2 sec.
Total program time	– – min.

P14 – INTERMITTENT STIMULATION

Larger muscle groups

Frequency	50 Hz
Pulse duration	400 µs
Work time	10 sec.
Rest time	10 sec.
Ramp-up time	1 sec.
Ramp-down time	2 sec.
Total program time	– – min.

P15 – INTERMITTENT STIMULATION

Neurology, smaller muscle groups

Frequency	40 Hz
Pulse duration	200 µs
Work time	5 sec.
Rest time	15 sec.
Ramp-up time	4 sec.
Ramp-down time	2 sec.
Total program time	– – min.

P16 – INTERMITTENT STIMULATION

Neurology, larger muscle groups

Frequency	40 Hz
Pulse duration	400 µs
Work time	5 sec.
Rest time	15 sec.
Ramp-up time	4 sec.
Ramp-down time	2 sec.
Total program time	– – min.

P17 – ALTERNATING STIMULATION

Smaller muscle groups

Frequency	50 Hz
Pulse duration	200 µs
Work time	4 sec.
Rest time	6 sec.
Ramp-up time	1 sec.
Ramp-down time	1 sec.
Total program time	– – min.

P18 – ALTERNATING STIMULATION

Larger muscle groups

Frequency	50 Hz
Pulse duration	400 µs
Work time	4 sec.
Rest time	6 sec.
Ramp-up time	1 sec.
Ramp-down time	1 sec.
Total program time	– – min.

P19 – STIMULATION WITH ACTIVE REST

Smaller muscle groups

Frequency – work	50 Hz
Frequency – rest	8 Hz
Pulse duration	200 µs
Work time	10 sec.
Rest time	10 sec.
Ramp-up time – work	2 sec.
Ramp-down time – work	2 sec.
Ramp-up time – rest	1 sec.
Ramp-down time – rest	1 sec.
Total program time	– – min.

P20 – STIMULATION WITH ACTIVE REST

Larger muscle groups

Frequency – work	50 Hz
Frequency – rest	8 Hz
Pulse duration	400 µs
Work time	10 sec.
Rest time	10 sec.
Ramp-up time – work	2 sec.
Ramp-down time – work	2 sec.
Ramp-up time – rest	1 sec.
Ramp-down time – rest	1 sec.
Total program time	– – min.

P21 – STRENGTHENING
Upper extremities

Frequency 1	25 Hz
Frequency 2	45 Hz
Pulse duration	200 µs
Work time	5 sec.
Rest time	8 sec.
Ramp-up time	2 sec.
Ramp-down time	1 sec.
Total program time	– – min.

P22 – STRENGTHENING
Lower extremities

Frequency 1	45 Hz
Frequency 2	65 Hz
Pulse duration	400 µs
Work time	5 sec.
Rest time	8 sec.
Ramp-up time	2 sec.
Ramp-down time	1 sec.
Total program time	– – min.

P23 – STRENGTHENING
Back and trunk

Frequency 1	30 Hz
Frequency 2	50 Hz
Pulse duration	300 µs
Work time	5 sec.
Rest time	8 sec.
Ramp-up time	2 sec.
Ramp-down time	1 sec.
Total program time	– – min.

P24 – RECOVERY
Smaller muscle groups

Frequency	4 Hz
Pulse duration	200 µs
Total program time	– – min.

P25 – RECOVERY
Larger muscle groups

Frequency	4 Hz
Pulse duration	400 µs
Total program time	– – min.

P26 – MASSAGE
Smaller muscle groups

Frequency 1	5 Hz
Frequency 2	15 Hz
Pulse duration	200 µs
Modulation time	5 sec.
Total program time	– – min.

P27 – MASSAGE
Larger muscle groups

Frequency 1	5 Hz
Frequency 2	15 Hz
Pulse duration	400 µs
Modulation time	5 sec.
Total program time	– – min.

CUSTOM PROGRAMS

With the CEFAR REHAB X2 it is possible to create and store three custom programs (P28–P30) for patient-specific treatment. To create a custom program, follow the programming procedure below. To use a custom program, follow the instructions in the section STEP-BY-STEP USE.

Programming

1. Press the **ON/OFF** button ⏻ to turn the stimulator on.
2. Press the **PROGRAM** button P+ or P– to step forward or backward until Program 28, 29 or 30 is shown on the display. Select one of these programs.
3. Press the **PROGRAMMING/CONFIRMATION** button S for 2 seconds to enter the programming mode. (See the programming chart for the following steps.)
4. **Level 1** (shown in the upper right corner of the display):
   The first step in the programming procedure is to choose between:
   - Continuous (**C**) stimulation
   - Intermittent (**I**) stimulation

   Press the **INCREASE** (or **DECREASE**) button ▽ △ to toggle between **C** and **I**. Confirm your choice by pressing the **PROGRAMMING/CONFIRMATION** button S .

   You are moved to the next stage in the programming procedure.
5. **Level 2**
   For Continuous stimulation there are no choices at Level 2. You are moved directly to Level 3.

   If you chose Intermittent stimulation on Level 1, you now have two choices:
   - Simultaneous (**SI**) stimulation
   - Alternating (**Alt**) stimulation

   Press the **INCREASE** (or **DECREASE**) button ▽ △ to toggle between **SI** and **Alt**. Confirm your choice by pressing the **PROGRAMMING/CONFIRMATION** button S .

   You are moved to the next stage in the programming procedure.
6. **Level 3**
   The available stimulation types on this level depend on your previous choices.

   Press the **INCREASE** (or **DECREASE)** button ▽ △ to see the different stimulation types alternate on the display. The programming chart shows the parameter setting possibilities for each stimulation type.

   Continuous stimulation types:
   - Conventional (**C**)
   - Burst (**B**)
   - Pulse width/duration modulation (**PWM**)
   - Frequency modulation (**FM**)

   Intermittent/Simultaneous stimulation types:
   - Conventional (**C**)
   - Frequency modulation (**FM**)

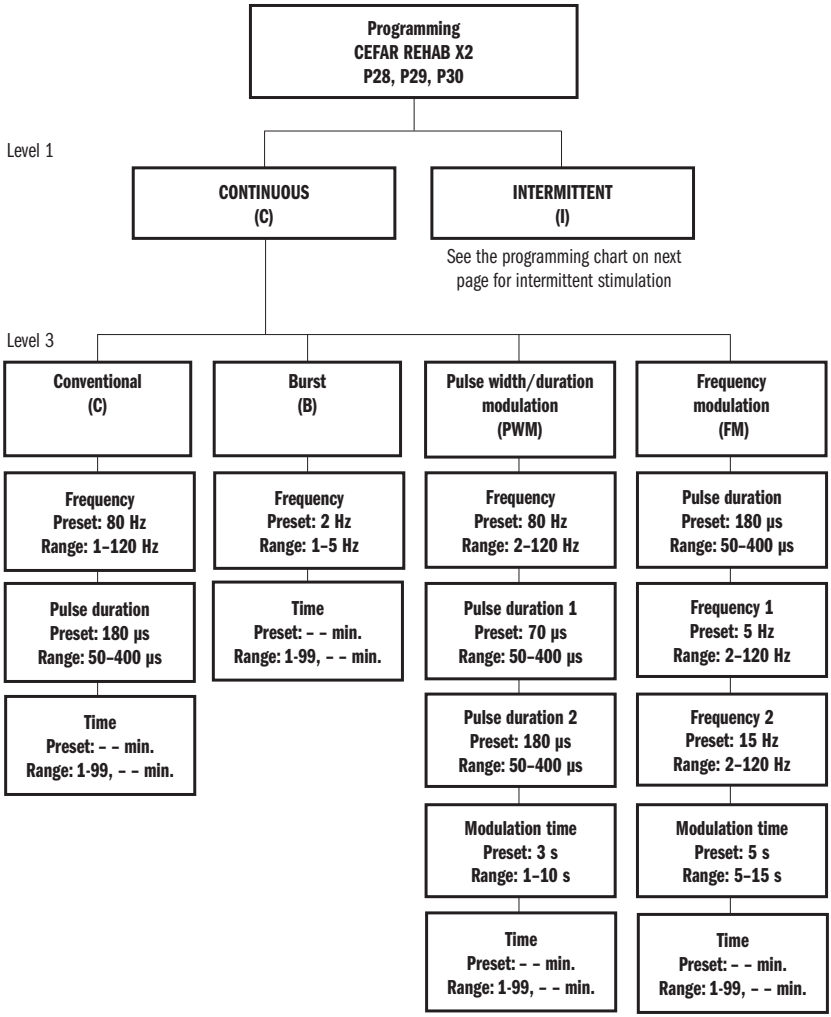
For Intermittent/Alternating stimulation your only choice is Conventional stimulation, which is not shown on the display. You are moved directly to the next stage in the programming procedure (see step 7).

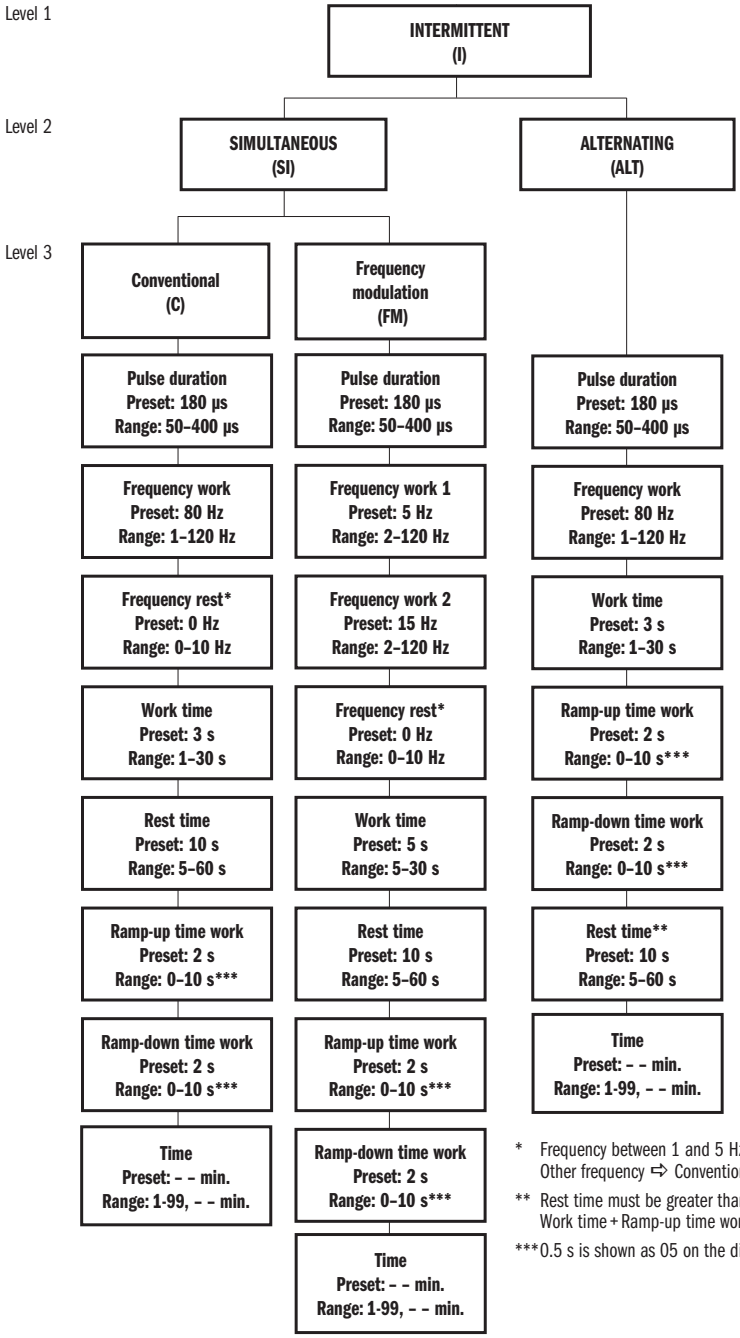
Press the **PROGRAMMING/CONFIRMATION** button S to confirm your choice of stimulation type and you are moved to the next stage in the programming procedure. In the following steps you will set the parameters for the selected stimulation type.

7. A preset parameter value is shown on the screen, but you can change this value by pressing the **INCREASE** (or **DECREASE**) button  . The valid range for the parameter is shown in the programming chart.
8. Press the **PROGRAMMING/CONFIRMATION** button S to confirm your setting. You are now moved to the next stage (if any) in the programming procedure.
9. Repeat step 7 and 8 until the parameter value in the last stage is set.
10. The programming procedure is finished and you will automatically exit the programming mode. The new program is now selected and ready for use. The program is also stored in the stimulator for future use.

A custom program can be changed by redoing the programming.

Programming chart





* Frequency between 1 and 5 Hz ⇨ Burst stimulation
Other frequency ⇨ Conventional stimulation

** Rest time must be greater than
Work time + Ramp-up time work + Ramp-down time work

***0.5 s is shown as 05 on the display.

PROGRAM LOCK

The stimulator can be locked to prevent changing of programs.

To activate/deactivate the program lock:

1. Select the program you want to lock/unlock, see section *STEP-BY-STEP USE.*
2. Press the **PROGRAM** button [P+] and the left **DECREASE** button ▽ simultaneously for 2 seconds.
3. Press the left **INCREASE** or **DECREASE** button ▽ △. "ON" is shown on the left side of the display when activating the program lock and "OFF" when deactivating it. (The button toggles between ON and OFF).
4. Press the **PROGRAM** button [P+] to finish the program lock setting.

DISABLE THE AUTO FUNCTION

The stimulator can be locked to disable the AUTO function.

To enable/disable the auto function:

1. Press the **PROGRAM** button [P+] and the left **INCREASE** button △ simultaneously for 2 seconds.
2. Press the left **INCREASE** or **DECREASE** button ▽ △. "ON" is shown on the left side of the display when the auto function is enabled and "OFF" when the function is disabled. (The button toggles between ON and OFF).
3. Press the **PROGRAM** button [P+] to finish the setting.

COMPLIANCE

Compliance gives you the possibility to monitor the use of the stimulator:

1. Turn the stimulator ON.
2. Press the **TIMER** button [◷] and the right **DECREASE** button ▽ simultaneously for 2 seconds.
3. The left side of the display shows the usage time in hours and the right side in minutes. To reset the usage time, press the right **DECREASE** button ▽ for 2 seconds.
4. Wait for 5 seconds or press the **TIMER** button [◷].
5. The left side of the display shows the total usage time in hours and the right side in weeks. The total usage time cannot be reset.
6. Wait for 5 seconds or press the **TIMER** button [◷] to exit compliance mode.

8. ACCESSORIES

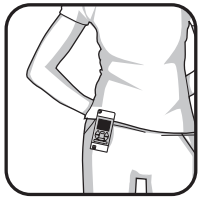
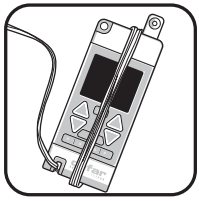
CEFAR REHAB X2 comes with a neck strap and a belt clip, allowing you to wear the stimulator around your neck or on your belt and have your hands free during treatment.

The electrodes will eventually wear out and have to be replaced. It is recommended to replace the electrodes after approximately 20–40 times of usage.

The hand switch included can be used in some NMES programs for full manual control of the time of contractions.

The cables are best preserved if left attached to the stimulator between sessions.

For purchase information, contact your Cefar dealer or visit www.cefar.se.

9. CARE INSTRUCTIONS

Taking care of and cleaning the Cefar equipment is simple with the following instructions:

- Keep stimulator and accessories in the original case when they are not in use. It may, however, be practical to allow the electrodes to remain on the body between treatments. Carbon rubber electrodes can generally remain for 2–3 hours without the electrode gel drying out (does not apply to adhesive gel). They must then be taken off, washed, and dried before being applied again. This is especially important for persons with sensitive skin. In connection with stimulation, make sure that the electrodes are firmly in place.
- When using carbon rubber electrodes, use plenty of electrode gel and avoid drying out by applying tape around all the edges of the electrodes. Rinse the carbon rubber electrodes and the skin with water after use. Do not use detergent for the electrodes.
- Self-adhesive multi-use electrodes are re-moistened if necessary with a few drops of water and kept air-tight (in a plastic bag) on protective paper when they are not in use.
- Never expose the stimulator to water. Wipe it off with a damp cloth if necessary.
- Do not jerk cables or connections.
- The cables are best preserved if left attached to the stimulator between sessions.

10. TROUBLESHOOTING

THE STIMULATION DOES NOT FEEL THE SAME AS USUAL

- Check that all settings are correct (see section STEP-BY-STEP-USE) and make sure that the electrodes are correctly placed.
- Slightly change the position of the electrodes.

THE STIMULATION FEELS UNPLEASANT

- The skin is irritated. For advice on skin care, see chapter PRECAUTIONARY MEASURE.
- The electrodes begin to lose their stickiness and do not stick properly to the skin. Moisten the adhesive surface with a few drops of water before placing on the skin.
- The electrodes are worn out and need to be replaced.
- There is insufficient electrode gel on the carbon rubber electrodes.
- Slightly change the position of the electrodes.

THE STIMULATION FEELS WEAK OR NOT AT ALL

- Check if the batteries need to be replaced, see chapter REPLACEMENT OF BATTERIES.
- Electrodes are too old and need replacement.

THE BROKEN CIRCUIT SYMBOL IS SHOWN ON THE DISPLAY SYMBOL

The broken circuit symbol indicates that the resistance is too high, or that a cable is broken.

- A too high resistance can be caused by a bad connection between the electrodes and your skin, or that the electrodes need to be replaced.
- A cable breakage can be checked by pressing the cable's pins against one another while increasing the amplitude for the corresponding channel to 11 mA. If the amplitude now drops to 0.0 mA and  starts flashing, the cable needs to be replaced.

Note! Never increase the amplitude above 20 mA when you check for cable breaks, since this can damage the stimulator.

THE STIMULATOR IS NOT WORKING

If the error symbol appears on the display when you start the stimulator, it means that the stimulator is broken and needs to be replaced.

Note! Do not use the stimulator – contact your Cefar dealer.

Cefar will only be responsible for service and repairs performed by Cefar or a distributor appointed by Cefar.

11. FREQUENTLY ASKED QUESTIONS (FAQ)

CAN ANYONE USE ELECTRICAL STIMULATION?

People with implanted electrical equipment, for example a pacemaker or an intracardiac defibrillator, must not be treated with electrical stimulation. Pregnant women should not use electrical stimulation during the first 12 weeks of the pregnancy. Read the safety precautions in this manual (PRECAUTIONARY MEASURES).

WHEN SHOULD I USE MIXED-FREQUENCY STIMULATION?

With mixed-frequency stimulation both muscle nerves (2 Hz) and sensory nerves (80 Hz) are stimulated. The stimulator switches between these two frequencies every three seconds, providing the benefits of both high-frequency stimulation (fast pain relief) and low-frequency stimulation (longer lasting but slower pain relief). This stimulation type can lead to more effective treatment of long-term pain conditions.

WHAT KIND OF PROGRAM IS P5 (FLOW TENS)?

Cefar Flow TENS is a new comfortable way of stimulation requiring four electrodes. Use it on large areas to obtain pain relief together with a massage/muscle relaxation. The alternating stimulation gives a pumping effect that increases the circulation in the area.

WHAT IS THE ADVANTAGE OF USING THE HAND SWITCH?

It helps you to get an effective and individual stimulation by allowing you to manually control the time of contractions in intermittent stimulation programs. By pressing the hand switch button during contraction, the stimulation gradually decreases until the rest time starts. If you do not stop the stimulation manually during contraction, it will continue the whole preset work time. With the hand switch connected, the rest time will last until you press the hand switch button. Without hand switch the rest time is preset and depending on the program you use.
Note! The preset work time can be shortened but not extended. It is therefore preferable to use a program with a longer work time when using the hand switch.
Note! When using CEFAR EASY TOUCH™ the AUTO stimulation mode must have started before you press the hand switch button.
Note! The hand switch does not work during alternating stimulation (P17–18).

WHAT DOES ACTIVE REST MEAN?

It means that low frequency stimulation is active during rest time, causing muscle vibrations to maintain circulation. The Active Rest stimulation helps eliminate lactic acid and waste products, thereby reducing muscle soreness afterwards and keeping the muscle prepared for the next contraction.
Note! The amplitude level must be set for both contractions and Active Rest.

HOW LONG WILL THE ELECTRODES LAST?

The self-adhesive electrodes last for approximately 20 to 40 occasions. The durability depends on how good the care and maintenance instructions are followed.

WHICH DISTANCE SHOULD I HAVE BETWEEN THE ELECTRODES?

It is recommended to have a distance of 3 to 30 cm between the electrodes.

HOW DO I FIND THE OPTIMAL POSITION OF THE ELECTRODES FOR NMES?

Use carbon rubber electrodes and gel. Slide the electrodes slowly over the muscle while stimulating at 2 Hz. The optimal position for the electrodes is where the strongest motor response occur.

FOR HOW LONG CAN I STIMULATE?

TENS (80 Hz): Can be used without an upper limit, but at least 30 min at each occasion.

TENS (2 Hz): Can cause sore muscles but normally 20–45 min three times a day is recommended.

NMES: Depending on the muscle's status and where the patient is in the rehabilitation process, treatment can last from 5 to 60 minutes and be repeated from three times a week to twice a day. Remember that the patient may develop sore muscles after NMES treatment.

12. TECHNICAL DATA

CEFAR REHAB X2 is a dual channel stimulator intended for both muscle rehabilitation (NMES) and pain relief (TENS). The stimulator features 27 preset programs and 3 custom programs.

Treatment with electrical stimulation requires the stimulation current to penetrate the resistance of the skin and the electrode, about 1000 ohms. CEFAR REHAB X2 can penetrate this resistance and maintain a current of up to 99.5 mA. With a change in load from 100 to 1000 ohms, the stimulation current changes less than 10% from the set value.

The stimulator operates on either two non-rechargeable 1.5 V AA batteries or two rechargeable 1.2 V AA batteries, recharged in a separate charger.

CEFAR REHAB X2

Number of channels	2 (non-independent)
Constant current	Up to a resistance of 1000 ohm
Stimulation current/channel	0–99,5 mA
Waveform	Symmetrical biphasic pulse, 100% compensated
Number of preset programs	27
Number of custom programs	3
Stimulation forms	Conventional
	Burst
	Modulated frequency/pulse duration
	Mixed frequency
	Alternated modulated pulse duration (CEFAR Flow TENS)
	Intermittent
Max pulse duration	400 µs
Max frequency	120 Hz
Timer	1 to 99 min./Off
Environment for	
storage, use and shipping	Temperature 10° C–40° C
	Air humidity 30%–75%
	Air pressure 700 hPa–1060 hPa
Power source	2 x 1.5 V AA non-rechargeable or
	2 x 1.2 V AA rechargeable batteries
Current consumption for	
one channel, 80 Hz, 30 mA	150 mA
I r.m.s. max/channel	31 mA
Size	120 x 50 x 30 mm
Weight	ca. 180 g

KEY TO THE SYMBOLS

Read the operating instructions before to use.

Patient part type – Body Floating.

Dispose of the worn-out stimulator in accordance with local and national regulations.

One or more of the following markings may appear on your device:

CE
0413

Complies with the European Medical Device Directive (93/42/EEC). Notified body Intertek ETL Semko (0413).

Complies with CSA C22.2 No. 69050-1. Certification mark issued by SGS.

INFORMATION RELATED TO ELECTROMAGNETIC COMPATIBILITY (EMC).

CEFAR REHAB X2 is designed to be used in typical domestic or clinical environments and is approved according to the EMC safety standard of EN 60601-1-2.

CEFAR REHAB X2 emits very low levels in the radio frequency (RF) interval. Therefore it is not likely to cause any interference in nearby electronic equipment (radios, computers, telephones etc.).

CEFAR REHAB X2 is designed to withstand foreseeable disturbances originating from electrostatic discharges, mains supply magnetic fields and radio frequency transmitters (such as mobile telephones).

CLINICAL GUIDE

INTRODUCTION

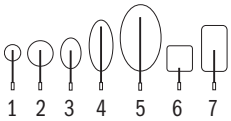
This clinical guide gives tips and practical advice on how to use the CEFAR REHAB X2 to treat common orthopedic and neurological indications.

The guide is organized by indication area. For each indication, the guide gives the goal of treatment and suggestions for where to place the electrodes. NMES is an active training method, and the pictures show how NMES can be integrated with training. For each indication, appropriate programs are suggested, but custom programs can also be created for patient-specific treatment.

A program with a short pulse duration, 200 µs, is ideal for treating smaller muscle groups, while a longer pulse duration, 350–400 µs, is better for larger muscle groups. The length of the work time and the rest time varies from program to program. For weaker muscles, we recommend programs with longer rest times, to give the muscle time to rest between contractions.

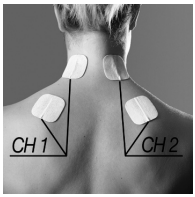
Just as with other training methods, NMES treatment should be adjusted to the patient's ability. Depending on the muscular status and where the patient is in the rehabilitation process, treatment can last from 5 to 60 minutes and be repeated from three times a week to twice a day. Remember that the patient may develop sore muscles after NMES treatment.

Suitable electrode sizes are suggested for each indication. We use the electrodes sizes shown below. The electrodes we recommend are shadowed.



1 ø 32 mm
2 ø 50 mm
3 40 x 60 mm
4 50 x 100 mm
5 80 x 130 mm
6 50 x 50 mm
7 50 x 90 mm

NECK/THORACIC SPINE – NOCICEPTIVE MUSCLE PAIN



Examples of indications

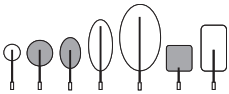
1. Tension type headache.
2. Myalgia in the trapezius.

Goal

1. Reduced headache.
2. Pain alleviation.

Placement of electrodes

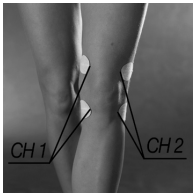
Place the electrodes over M. Trapezius.



Suggested programs

CEFAR REHAB X2: 1, 3, 4, 5

KNEE – NOCICEPTIVE JOINT PAIN



Examples of indications

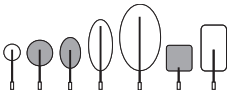
Gonarthrosis.

Goal

Alleviation of knee pain.

Placement of electrodes

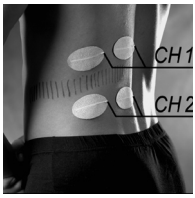
Place one pair of electrodes medially and laterally over and under the joint space of the knee.



Suggested programs

CEFAR REHAB X2: 1, 2, 3

TRUNK – NEUROGENIC PAIN



Examples of indications

Postherpetic neuralgia.

Goal

Pain alleviation.

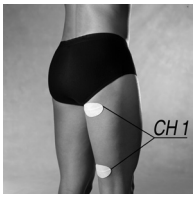
Placement of electrodes

Place one pair of electrodes bilaterally over and under the painful area.

Suggested programs

CEFAR REHAB X2: 1, 3

BACK – NEUROGENIC PAIN



Examples of indications

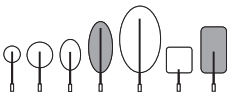
Sciatica.

Goal

Pain alleviation.

Placement of electrodes

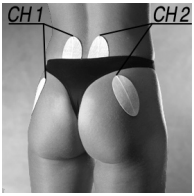
Place electrodes over a muscle in the affected area.

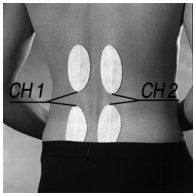


Suggested programs

CEFAR REHAB X2: 1, 2, 4

BACK – NOCICEPTIVE MUSCLE PAIN





Examples of indications

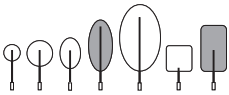
1. Lumbalgia.
2. Low back pain.

Goal

Pain alleviation.

Placement of electrodes

In the painful area, e.g. erector spinae, gluteal muscles.



Suggested programs

CEFAR REHAB X2: 1, 3, 4, 5

SHOULDER – SUBLUXATION AND REDUCED ABDUCTION

Examples of indications

1. Subluxated shoulder, for example after a stroke.
2. Reduced muscular function in the shoulder after a fracture, luxation, etc.

Goal

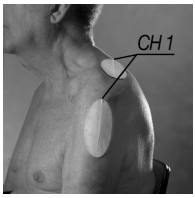
1. Increased stability/centralizing the head of the humerus.
2. Increased function/strength in the shoulder muscles.

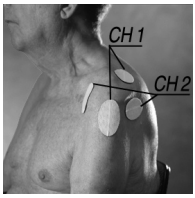
Placement of electrodes

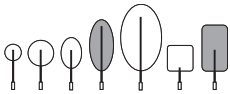
Place electrodes around the shoulder over M. Deltoid and M. Supraspinatus.

Suggested programs

CEFAR REHAB X2: 9, 11, 13, 15







SHOULDER – REDUCED STRENGTH/ HYPOTROPHY

Examples of indications

Reduced strength in external rotation of the shoulder.

Goal

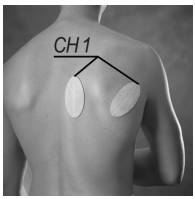
Increased strength and endurance in the infraspinatus, rhomboid muscles and teres minor muscles.

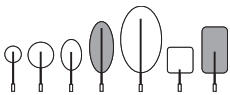
Placement of electrodes

Place one electrode over the middle of the trapezius, rhomboid muscles and one over the infraspinatus/teres minor.

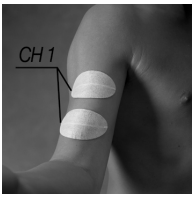
Suggested programs

CEFAR REHAB X2: 9, 11, 13





UPPER ARM – REDUCED FUNCTION IN BRACHIAL BICEPS



Examples of indications

1. Reduced function in the brachial biceps, for example after a fracture or spinal injury.
2. Reduced supination of the elbow.

Goal

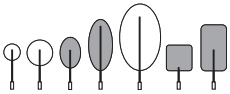
1. Increased strength and endurance in the brachial biceps.
2. Increased supination of the elbow.

Placement of electrodes

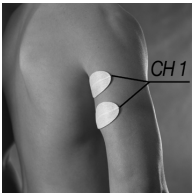
Place one pair of electrodes over the brachial biceps.

Suggested programs

CEFAR REHAB X2: 9, 11, 13, 19



UPPER ARM – REDUCED FUNCTION IN BRACHIAL TRICEPS



Examples of indications

1. Reduced function in the brachial triceps, for example after a stroke.
2. Elbow fracture.

Goal

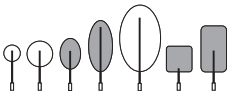
1. Increased strength in the brachial triceps and increased control of the elbow.
2. Increased strength in the brachial triceps.

Placement of electrodes

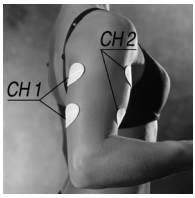
Place one pair of electrodes over the brachial triceps.

Suggested programs

CEFAR REHAB X2: 9, 11, 13, 19



UPPER ARM – ALTERNATING STIMULATION



Examples of indications

Extension/flexion defect in the elbow.

Goal

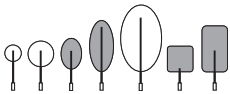
1. Increased mobility of the extension/flexion of the elbow.
2. Reduced spasticity.

Placement of electrodes

Place one pair of electrodes over the brachial triceps and one pair over the brachial biceps.

Suggested programs

CEFAR REHAB X2: 17, 18



LOWER ARM – REDUCED STRENGTH/ HYPOTROPHY IN THE HAND EXTENSORS

Examples of indications

1. Reduced wrist extension and/or flexion spasticity for example after a stroke.
2. Reduced wrist extension after fracture.

Goal

1. Facilitation and reduced spasticity.
2. Increased mobility of the wrist and increased strength in the hand extensor muscles.

Placement of electrodes

Place one pair of electrodes over the hand extensor muscles.

Suggested programs

CEFAR REHAB X2: 9, 11, 13, 15

LOWER ARM – ALTERNATING STIMULATION

Examples of indications

Reduced extension and flexion of the wrist.

Goal

1. Increased extension and flexion of the wrist.
2. Reduced spasticity

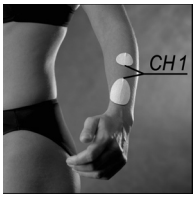
Placement of electrodes

Place one pair of electrodes over the hand extensor muscles and one over the hand flexor muscles.

Suggested programs

CEFAR REHAB X2: 17

HAND – THUMB EXTENSION



Examples of indications

1. Reduced extension of the thumb.
2. Flexor spasticity in the thumb.

Goal

1. Increased extension of the thumb.
2. Reduced spasticity in the thumb.

Placement of electrodes

Place a small oval electrode over the extensor pollicis brevis and a small round one proximal to the oval one.

Suggested programs

CEFAR REHAB X2: 9, 11, 13, 15

HAND – REDUCED OPPOSITION/GRIP ABILITY

Examples of indications

Reduced opposition/grip ability.

Goal

Increased opposition and improved grip.

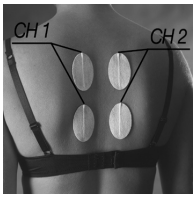
Placement of electrodes

Place a small electrode over the thenar muscles and another small one over the hypothenar muscles.

Suggested programs

CEFAR REHAB X2: 9, 11, 13, 15

TRUNK, THORACIC SPINE – HYPOMOBILITY



Examples of indications

1. Thoracic hypomobility.
2. Increased thoracic kyphosis.

Goal

1. Mobility training of the thoracic spine.
2. Improved posture.

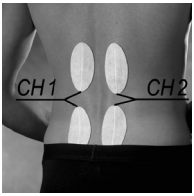
Placement of electrodes

Place two pairs of electrodes along the spinal erector muscles paravertebrally and over the rhomboid muscles at the height of the hypomobile area.

Suggested programs

CEFAR REHAB X2: 10, 12, 14

TRUNK, LOWER BACK – AWARENESS TRAINING OF BACK EXTENSORS



Examples of indications

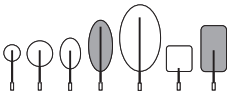
Pain/insufficiency in lower back.

Goal

1. Increased awareness of the trunk muscles.
2. Increased postural control.
3. Increased stability.

Placement of electrodes

Place two pairs of electrodes paravertebrally in the lumbar region, along the spinal erector muscles on both sides.



Suggested programs

CEFAR REHAB X2: 10, 12, 14

TRUNK, AWARENESS TRAINING OF ABDOMINAL MUSCLES

Examples of indications

Reduced function in the abdominal muscles.

Goal

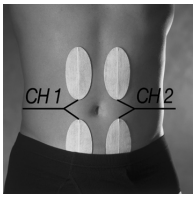
1. Increased strength in the abdominal muscles.
2. Increased awareness of the trunk muscles.
3. Increased postural control.
4. Increased stability.

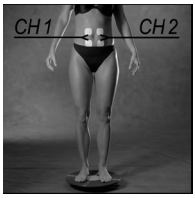
Placement of electrodes

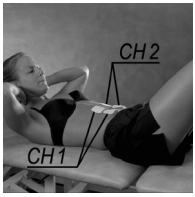
Place two pairs of electrodes over the abdominal muscles bilaterally.

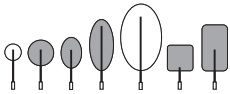
Suggested programs

CEFAR REHAB X2: 10, 12, 14









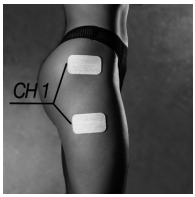
HIP – POSITIVE TRENDELENBURG

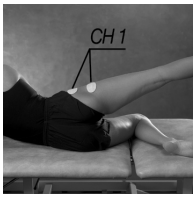
Examples of indications

1. Positive Trendelenburg/reduced function in hip abductors.
2. Post-stroke treatment

Goal

1. Increased strength in hip abductors.
2. Improved gait.



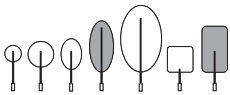


Placement of electrodes

Place one pair of electrodes over the hip abductors and tensor fasciae latae.

Suggested programs

CEFAR REHAB X2: 12, 14, 16



KNEE – INSTABILITY

Examples of indications

1. Postoperative after ACL/knee operation.
2. Extension defect.
3. Post-stroke treatment.

Goal

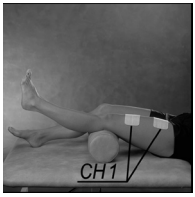
1. Increased control of the quadriceps.
2. Increased mobility and decreased pain in the knee.

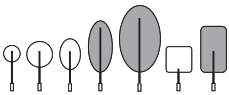
Placement of electrodes

Place one pair of electrodes over the quadriceps.

Suggested programs

CEFAR REHAB X2: 12, 14, 16





KNEE – MUSCULAR IMBALANCE

Examples of indications

Muscular imbalance in the medial vastus in relation to the lateral vastus.

Goal

Increased strength in the medial vastus.

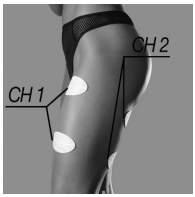
Placement of electrodes

Place one pair of electrodes over the medial vastus.

Suggested programs

CEFAR REHAB X2: 10, 12, 14

KNEE – ALTERNATING STIMULATION



Examples of indications

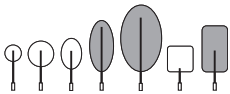
Reduced flexion and extension of the knee.

Goal

1. Increased mobility of the knee.
2. Reduced spasticity.

Placement of electrodes

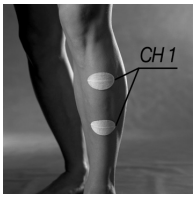
Place one pair of electrodes over the quadriceps and one pair over the hamstrings.



Suggested programs

CEFAR REHAB X2: 18

LOWER LEG – REDUCED DORSAL FLEXION AND PRONATION



Examples of indications

1. Reduced dorsal flexion after e.g. a stroke.
2. Reduced dorsal flexion after a fracture.

Goal

1. Increased strength in the anterior tibial muscle and in the peroneus longus and brevis.
2. Reduced spasticity
3. Improved walking.
4. Increased mobility of the ankle.

Placement of electrodes 1

Place one pair of electrodes over the anterior tibial muscle.

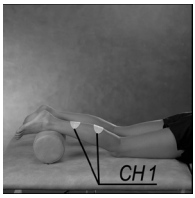
Placement of electrodes 2

Place one pair of electrodes on the peroneus longus and brevis.

Suggested programs

CEFAR REHAB X2: 9, 11, 13

LOWER LEG – ACHILLES-RELATED PROBLEMS



Examples of indications

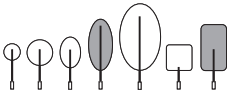
Achilles-related problems.

Goal

Concentric or eccentric increase in strength in the gastrocnemius muscle.

Placement of electrodes

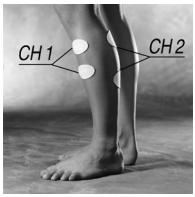
Place one pair of electrodes over the gastrocnemius.



Suggested programs

CEFAR REHAB X2: 10, 12, 14

LOWER LEG – ALTERNATING STIMULATION



Examples of indications

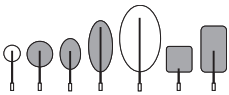
Reduced mobility of the plantar flexion and dorsal flexion of the ankle.

Goal

1. Increased plantar and dorsal mobility in the foot.
2. Reduced spasticity.

Placement of electrodes

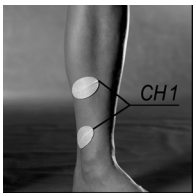
Place one pair of electrodes over the anterior tibial muscle and one pair over the gastrocnemius.



Suggested programs

CEFAR REHAB X2: 18

ANKLE – INSTABILITY



Examples of indications

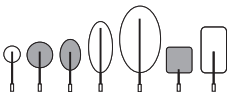
1. Ankle instability after distorsion etc.
2. Pes planus (flatfoot).

Goal

Increased stability of the ankle and increased strength in the posterior tibial muscle.

Placement of electrodes

Place one pair of electrodes over the lower part of the posterior tibial muscle.



Suggested programs

CEFAR REHAB X2: 9, 11, 13

FOOT – HALLUX VALGUS

Examples of indications

Hallux valgus.

Goal

Increased abduction of the big toe.

Placement of electrodes

Place one pair of electrodes over the abductor hallucis.

Suggested programs

CEFAR REHAB X2: 9, 11, 13

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