

# OPERATING INSTRUCTIONS – ENGLISH

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# 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](http://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.

































Level 1

**INTERMITTENT  
(I)**

Level 2

**SIMULTANEOUS  
(SI)**

**ALTERNATING  
(ALT)**

Level 3

**Conventional  
(C)**

**Frequency  
modulation  
(FM)**

**Pulse duration**  
Preset: 180  $\mu$ s  
Range: 50-400  $\mu$ s

**Pulse duration**  
Preset: 180  $\mu$ s  
Range: 50-400  $\mu$ s

**Pulse duration**  
Preset: 180  $\mu$ s  
Range: 50-400  $\mu$ s

**Frequency work**  
Preset: 80 Hz  
Range: 1-120 Hz

**Frequency work 1**  
Preset: 5 Hz  
Range: 2-120 Hz

**Frequency work**  
Preset: 80 Hz  
Range: 1-120 Hz

**Frequency rest\***  
Preset: 0 Hz  
Range: 0-10 Hz

**Frequency work 2**  
Preset: 15 Hz  
Range: 2-120 Hz

**Work time**  
Preset: 3 s  
Range: 1-30 s

**Work time**  
Preset: 3 s  
Range: 1-30 s

**Frequency rest\***  
Preset: 0 Hz  
Range: 0-10 Hz

**Ramp-up time work**  
Preset: 2 s  
Range: 0-10 s\*\*\*

**Rest time**  
Preset: 10 s  
Range: 5-60 s

**Work time**  
Preset: 5 s  
Range: 5-30 s

**Ramp-down time work**  
Preset: 2 s  
Range: 0-10 s\*\*\*

**Ramp-up time work**  
Preset: 2 s  
Range: 0-10 s\*\*\*

**Rest time**  
Preset: 10 s  
Range: 5-60 s

**Rest time\*\***  
Preset: 10 s  
Range: 5-60 s

**Ramp-down time work**  
Preset: 2 s  
Range: 0-10 s\*\*\*

**Ramp-up time work**  
Preset: 2 s  
Range: 0-10 s\*\*\*

**Time**  
Preset: -- min.  
Range: 1-99, -- min.

**Time**  
Preset: -- min.  
Range: 1-99, -- min.

**Ramp-down time work**  
Preset: 2 s  
Range: 0-10 s\*\*\*

**Time**  
Preset: -- min.  
Range: 1-99, -- min.

\* Frequency between 1 and 5 Hz  $\Rightarrow$  Burst stimulation  
Other frequency  $\Rightarrow$  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.









# 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.





## 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





























