

The E3 has the ability to operate in dual modes. In the default continuous passive motion (CPM) mode the device operates at a specified speed between the programmed range of motion (ROM) extremes.

In Progressive Stretch Relaxation (PSR) mode the E3 monitors the force the device is exerting on the patient through the pronation/supination patient support. The E3 is pre-programmed to sequentially pause three times for the specified pause time at the end of every ROM cycle. The first pause occurs when the device senses 60% of the programmed force setting. The second pause occurs when the device senses 75% of the programmed force setting. The third, and final, pause occurs when the device senses 90% of the programmed force.

PSR involves incremental stretching of the joint musculature to tolerance, allowing for greater soft tissue relaxation and elongation. PSR can effectively increase the patients gain in ROM while decreasing the amount of therapy time required per session. This type of stretch has been proven to achieve results significantly faster than conventional stretches<sup>1, 2</sup>.

### Key Features and Benefits

**Programmable ROM** covers 145° to -5° for flexion and extension and 80° to 80° in pronation/supination.

**Lock Out Feature** allows a clinician to program the device and then lock the settings preventing patient tampering.

**Compliance Monitor** allows the clinician to monitor patient compliance.

**Reverse-On-Load** feature causes the device to reverse directions when it senses 100% of the programmed force has been reached.

**Warm-Up Feature** can be used in CPM mode. When selected during setup, the Warm-Up Feature increases the ROM settings from 50% of the programmed settings to the full setting over 10 cycles.

**Pause Feature** can be programmed to cause the device to pause at the end of ROM in CPM mode or at the intervals in PSR mode. The duration of the pause can be set at up to 61 minutes.

**Variable Settings** for both speed and force and the rechargeable battery pack allows the device to be used away from electrical outlets, permitting limited ambulatory use in addition to being suitable for bed and chair.

**Synchronized Motion** mode, available in CPM operating mode, can be selected during setup. This mode synchronizes the programmed ROM between the elbow and forearm, allowing the maximum programmed flexion to be synchronized with the maximum supination.

# E3

ELBOW CPM / PSR

## CPM with PSR

*The E3 Elbow CPM from OrthoRehab is the latest innovative design with a wide range of features. The E3 has not one but two operating modes for the maximum range of therapeutic treatments, allowing the choice between traditional CPM or the new Progressive Stretch Relaxation Mode.*



# E3

ELBOW CPM/PSR

## Forearm Pronation and Supination



In CPM mode, serial or synchronous pronation and supination of the forearm can be programmed to fit the patient's needs.

## Who can benefit from PSR?

PSR is indicated for patients with reduction in joint range of motion due to joint contractures and post-injury or post-surgical loss of motion. The E3, with PSR, was designed to help patients who would otherwise be candidates for static progressive splinting (SPS). Yet, PSR offers potential benefits beyond other types of stretch treatments. In PSR mode, the E3 passively moves the joint between stretches to maintain the existing range of motion, thereby keeping the joint cartilage healthy, preventing intra-articular adhesions, reducing swelling, and even reducing pain. In addition, PSR also offers a stretch to joint musculature in both directions during the same setup, instead of just the one direction available with static progressive stretch devices.

## How should PSR be utilized?

The treatment regime for PSR can be similar to static progressive stretch (SPS) protocol<sup>1,2</sup>. Patient treatment time is suggested as one or more daily 30 minute sessions, using 5 minute "stretch/relaxation" intervals. However, using the E3 and its programmable features, the therapist has full control of cycle time, force, and how the pause intervals are delivered, for example as either many short stretches, or as fewer long stretches.

This type of incremental stretching has been found to achieve significant results much faster than other conventional stretch treatments.

### References:

1. Hotz, M. et al. Joint contracture rehabilitation: static progressive stretch. Scientific exhibit, American Academy of Orthopaedic Surgeons Meeting, 1998

2. Hotz, Donatelli & Bonnutti, "Evaluation of a 30-minute protocol to restore range of motion via Stress Relaxation and Static Progressive Stretch", AAOS paper# 134, Feb 14, 02.

## Application

Continuous Passive Motion (CPM) is best applied immediately post-operative and continued, uninterrupted, for up to six weeks or as prescribed by the physician.

Progressive Stretch Relaxation (PSR) is best utilized for patients with reduction in joint range of motion due to joint contractures and post-injury or post-surgical loss of motion. It should not be utilized immediately post-operative.

## Clinical results:

Clinical studies have demonstrated the following benefits of CPM:

- Prevention of intra-articular adhesions and extra-articular contractures;
- Improved patient compliance with passive and active therapies;
- Prevention of joint stiffness and maintenance of range of motion;
- Prevention of negative effects of immobilization such as edema and pain.

## CPM Indications:

Immediate post-operative management after the following where indicated:

- Following arthrotomy and drainage of acute septic arthritis providing infection is controlled;
- Crush injuries of hand without fractures or dislocations;
- Burn injuries;
- Stable fractures;
- Flexor and extensor tendon tenolysis;
- Reconstructive surgery on bone, cartilage, tendons, and ligaments;
- Prolonged joint immobilization.

## PSR Indications:

- Loss of ROM following immobilization for fracture;
- Flexion-contraction due to repetitive trauma;
- Adhesive capsulitis;
- Adhesions following surgery.

## Contraindications:

- Untreated infections;
- Unstable fractures;
- Known or suspected DVT.

*Note: If signs of infection such as hyperthermia, irritation, swelling, bleeding, or increased or persistent pain are observed, CPM should be discontinued until infection is controlled.*

## Product Information

Controller Module	5.5" x 3.5" x 1.5", (14 cm x 9 cm x 4 cm)
Controller Module	1.4 lbs (0.6 kg)
Shipping Configuration	10" x 16.75" x 23.5"
Shipping Configuration	27 lbs (12 kg)
Operating Power Supply	Double insulated, Input supply voltage 100 to 240 VAC, 50/60 HZ, Output 12VDC, 1.25A
Rechargeable Battery Capacity	2 hours fully charged at Force 3, Speed 3

## Variable Speed Setting:

1	40°/minute
2	90°/minute
3	150°/minute
4	210°/minute
5	270°/minute

## Variable Force Setting:

### Elbow Flex/Extension:

1	±3 lbs (13 N)
2	± 5 lbs (22 N)
3	± 7 lbs (31 N)
4	± 9 lbs (40 N)
5	± 12 lbs (53 N)

### Forearm Pro/Supination:

1	± 5 in.lbs (0.5 Nm)
2	±13 in.lbs (1.5 Nm)
3	± 20 in.lbs (2.3 Nm)
4	± 28 in.lbs (3.1 Nm)
5	± 36 in.lbs (4.1 Nm)



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