

## Calibration of the EMST75 Lite

The EMST75 Lite is a handheld calibrated device that includes a one-way, spring-loaded valve with an adjustable external dial. The valve blocks the flow of air until enough pressure is produced. Once the targeted pressure is produced, the valve opens and air begins to flow through the device. **The dial allows adjusting the pressure amount in a range between 0 and 75 cm H<sub>2</sub>O.** The pressure-threshold load is based on the patient's maximum expiratory pressure (MEP) **which can be obtained using a pressure manometer.**

During training the pressure threshold device is adjusted incrementally to progressively increase the resistance (progressive overload). The expiratory force must be sufficient to open the spring-loaded valve and allow the air flow. The pressure released valve requires a consistent flow of air to remain open. If the expiratory force is inadequate, the valve will not open and no air will flow through the device. These mechanics may serve as a biofeedback during the use of the device. The "dose" of EMST is typically defined in terms of the number of repetitions per set, which is determined based on each individual patient's function. A frequently implemented goal is for the patient to complete 5 sets of 5 breaths 5 days per week; however, this "dose" may vary depending on patient function and diagnosis.

## Using the numbers on the dial

In the first session, users should learn the correct way to utilize the device with the threshold on the EMST 75 set to the very lowest setting. To find the lowest setting, the dial should be turned all the way to the left\*. (\* see arrows in Photo 1). Once the user demonstrates understanding of accurate device use, try to increase the threshold setting on the device. To do this, locate the small silver screw on the green device dial. Line up your thumb with that screw and turn the dial  $\frac{1}{4}$  turn to the right. To do this look just above the dial and you will see 4 vents with 4 plastic pillars. Each pillar marks  $\frac{1}{4}$  of the way around a turn of the dial. To turn the dial  $\frac{1}{4}$  of a turn, move it to the right to the point where the small silver screw lines up with the next plastic pillar.

With the EMST75, as the pressure intensifies, the spring tightens, causing larger increments in pressure per turn. From 5cmH<sub>2</sub>O to 35cmH<sub>2</sub>O a full rotation of the knob will increase the pressure by 10cmH<sub>2</sub>O. Starting from 35cmH<sub>2</sub>O, a full rotation of the knob will raise the pressure by 20cmH<sub>2</sub>O to 55cmH<sub>2</sub>O. A subsequent full turn will reach the maximum pressure of 75cmH<sub>2</sub>O. The average for a full turn from the lowest point (0 pressure) to the maximum of 75cmH<sub>2</sub>O is approximately 16cmH<sub>2</sub>O.

**WHAT THIS MEANS:**

In collaborative dialogues with clinicians and researchers utilizing this device, it has been determined that for every 1/4 turn of the device dial there is an average threshold increase of 4cmH2O. Assigning this value (4cmH2O) for each quarter turn is the most effective approach for recording patient progress, ensuring comparable outcomes. If you are conducting formal research, **Table 1** provided below serves as a useful reference.

Photo 1.

This screw is to the left of 5cmH2O. The device is at its lowest pressure at this point.



this arrow shows the direction to turn the knob to LOWER your pressure level.

Photo 2.

The device features four "pillars" placed an equal distance apart. Each pillar can serve as a visual marker for a quarter turn.



the distance between pillars is = to 1/4 turn

Table 1

Pressure (from-to)	1 full turn =	1/4 turn =
(5-35) cmH2O	10 cmH2O	2.5 cmH2O
(35-75) cmH2O	20 cmH2O	5 cmH2O