



Calibration of the EMST150

The EMST150 is a pressure-threshold 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 24 and 150 cm H₂O.** The pressure-threshold load is based on the patient's maximum expiratory pressure (MEP) obtained through 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 set to the very lowest setting. To find the lowest setting, the dial should be turned all the way to the left. Once the user demonstrates an understanding of device use, try to increase the threshold setting. To do this, locate the small silver screw on the device dial. Line up your thumb with that screw and turn the dial ¼ turn to the right. To do this, look just above the label and you will see 4 vents with 4 plastic pillars. Each pillar marks 1/4 of the way around a turn of the dial. To turn the dial ¼ of a turn, move it to the right to the point where the small silver screw lines up with the next plastic pillar. As the pressure intensifies, the spring tightens, causing larger increments in pressure per turn. From 30cmH₂O to 60cmH₂O a full rotation of the knob will increase the pressure by 30cmH₂O. From 60cmH₂O to 120cmH₂O, a full rotation of the knob will raise the pressure by 15cmH₂O. A subsequent full turn will reach the maximum pressure of 150cmH₂O. The average for a full turn from the lowest point to the maximum 150cmH₂O is approximately 24cmH₂O.

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 6cmH2O**. Assigning this value (6cmH2O) 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.

Table 1

Pressure (from-to) cmH2O	1 full turn =	1/4 turn =
(30-60) cmH2O	30 cmH2O	7.5 cmH2O
(60-90)cmH2O	15cmH2O	3.75 cmH2O
(90-120) cmH2O	15 cmH2O	3.75 cmH2O
(120-150) cmH2O	30 cmH2O	7.5 cmH2O

Figure 1

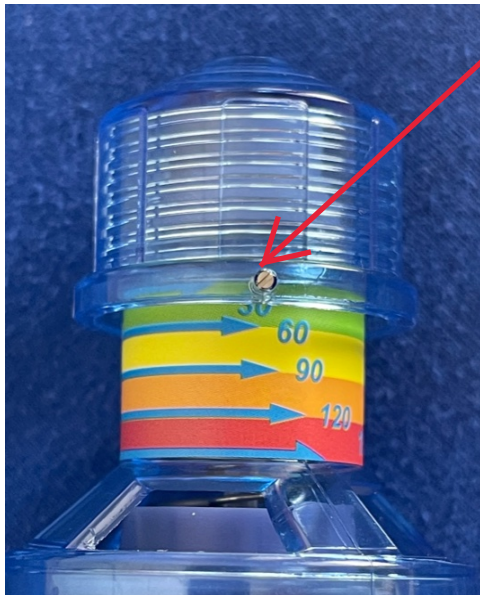


Figure 2

