

Programmable ramping chambers, also known as freeze/thaw chambers, are capable of controlled ramping of setpoints between low and high temperatures and humidities. The standard chamber has a temperature range of 2 to 70°C., with –20°C and lower capability available upon special request. The primary function of a ramping chamber is automatic setpoint change sequences which does not require manual user control or moving of product from one chamber to another. A chain of setpoints can be programmed and automatically run for days and weeks without stop.

The entire series of setpoint changes is called a "profile", and each setpoint change is called a "step". Each profile allows up to 99 steps with each step having up to 99 recycles back to a previous step for a virtually unlimited number of profile steps. To maintain a setpoint for a specified period of time is to "soak", and to change from one point to another is to "ramp".

The CCS-3000 touchscreen controller provides the following features:

**Profile Status view:** Provides the user with all current data related to the Profile that is currently running. The Profile Status View screen also displays the name of the current Profile running as well as the current active segment function (Ramp, Soak, Auto Start, etc.).

**Profile Entry screen:** Allows the user to enter step data for each Profile. Hundreds of Profiles can be stored in memory storage. The Edit menu provides Copy, Paste, Insert and Delete functions to simplify Profile entry.

**Profile Run menu:** Allows the user to manually run, hold or stop a profile or advance to the next or previous step.

**Profile Recycle:** Allows the Profile to jump between different steps within the profile. It can also be referred to as profile "looping". This is useful for repeating the same sequence of steps over and over again without having to enter them into a profile multiple times. It is valuable for life cycle testing of product in which the same temperature (and/or humidity) Profile steps need to be repeated multiple times in order to determine longevity of a product.

**Guaranteed Soak Limits:** Allows the operator to set a "global" band for temperature and humidity during ramp and soak steps. Ramp steps are steps where the current step setpoint is different from the previous step setpoint. Soak steps are steps where the current step setpoint is the same as the previous step setpoint. This provides a guarantee that a ramp or soak step maintains the set temperature/humidity for the specified period of time. This function is used when process changes are expected due to chamber doors opening which might drop the chamber temperature (and the product under test in the chamber) below the desired setpoint for a period of time. During the Ramp or Soak period, if the temperature or humidity falls outside of the band set in the Guaranteed Soak Limits, the Profile timer will be put on hold until the process values fall back within the band limits set. This provides a guarantee that a ramp or soak step maintains the set temperature/humidity for the specified period of time.

**Profile Plot:** Plots a trend of the current Profile.

**Profile Auto Start:** Allows the user to select the month, day, hour and minute at which a Profile loaded into the CCS-3000 control module will automatically start.

Environmental Specialties pre-programs each chamber to customer setpoint requirements and can be of assistance when entering new profiles. The CCS-3000 provides on screen Help for instructions. Each chamber comes with a detailed Operation Manual which features detailed information on the functions of the CCS-3000. ES will be glad to assist in any questions about ramping chambers by contacting our Sales Department at (800) 688-5859.