

High precision, managed thermostatic chamber

Thermostatic chambers are frequently used to examine how different device characteristics are affected by changes in temperature. This report describes the development of such a chamber using primarily locally available components. The system provides both heating and cooling for the internal space. It utilizes digital temperature sensors to ensure precise temperature control. A voltage-controlled converter was designed to regulate the power supplied to the heating and cooling elements. The entire system is managed by a Raspberry Pi single-board computer. A slow-control system, implemented in Python and based on a PID algorithm, enables rapid adjustments to the internal temperature according to the desired setpoint and maintains thermal stability over time. To improve usability, a web-based interface has been created for remote temperature monitoring and PID parameter configuration.

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