



Economical temperature control system for materials analysis

- turn key temperature control system
- modular design
- extensible with Novocontrol Dielectric/Impedance Spectrometers
- dedicated sample cell for dielectric and impedance spectroscopy included
- designed for easy, safe and fully automatic operation
- wide temperature range: -100°C to $+250^{\circ}\text{C}$
- 0.1°C stability
- includes Novocool PID controller with non-linear extensions, stabilized power supplies, cryostat with gas-heating element, liquid nitrogen evaporator, 100 l Dewar vessel

novocool Technologies

Novocontrol Technologies
GmbH & Co. KG
Obererbacher Strasse 9
56414 Hundsangen
Germany
Phone: +49 6435 - 96230
Fax: +49 6435 - 962333
e-mail novo@novocool.com
www <http://www.novocool.com>

novocool Technologies

Novocool Cryosystem

Novocool Cryosystem

The Novocool Cryosystem is a high quality **turn key** temperature control system for applications in materials research. A **sample cell** particularly suited for **dielectric and impedance spectroscopy** is included. The system has been developed to set or change the temperature of the sample under test with **high accuracy and reproducibility**. The system is **modular** and may be combined with any Novocontrol dielectric or impedance analyzer.

The Novocool Cryosystem provides **easy, safe and fully automatic operation**, enabling computer-controlled long time experiments over several days without supervision.

Applications

Temperature control extends the versatility of dielectric and impedance spectroscopy and increases the significance of the obtained results.

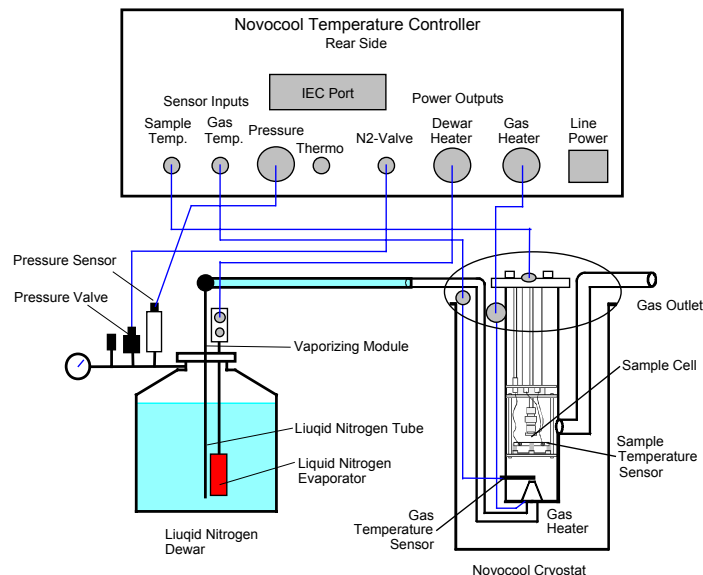
Various key materials properties, e.g., molecular relaxations, conductivity, phase separation, phase transitions, activation energy, glass temperature, rate of blending, purity, ageing, curing, either show marked temperature dependence or are only accessible through temperature-dependent measurements.

A temperature control system is, therefore, an essential part of any fully equipped system for the electrical characterisation of materials.

Features

- temperate range: -100 °C to 250 °C
- temperature ramps from 0.1 °C/min to 20 °C/min
- 0.1 °C temperature stability
- low temperature overshooting after set point step
- rapid temperature stabilization
- low nitrogen consumption due to automatic pressure - temperature adaptation
- four-channel microprocessor controller with 24 bit ADC and IEC communication port
- fully supported by Novocontrol **WinDETA** impedance control and evaluation software suite

Novocool System



Principle of operation: Liquid nitrogen is transferred from a Dewar vessel into the Novocool cryostat by a flexible cryogenic transfer hose. The evaporation takes place in the Novocool cryostat by an electrical heating element, which accurately controls the temperature of the cold gas. The gas flows directly to the sample cell which is inserted into the cryostat top flange. The temperature is measured at the sample cell lower electrode. In order to optimize temperature control and establish safe operation under all conditions, the temperature of the cold gas is measured by an additional gas temperature sensor. The Novocool cryostat is super isolated and therefore no vacuum is required. The flow of liquid nitrogen is determined by the pressure inside the Dewar vessel. For optimized operation, the dewar pressure is adjusted by the Novocool microprocessor control unit. For this purpose, a second PID control loop is used consisting of a pressure sensor and the Dewar heater (to create pressure).