

# Quatro Cryosystem



## Universal temperature control system for materials analysis

- high precision turn key temperature control system
- dedicated sample cell for dielectric and impedance spectroscopy included
- designed for easy, safe and fully automatic operation
- wide temperature range:  $-160^{\circ}\text{C}$  to  $+400^{\circ}\text{C}$
- $0.01^{\circ}\text{C}$  stability due to 4 channel Quatro controller featuring PID control algorithms with non-linear extensions
- includes 4 channel controller QUATRO, stabilized power supplies, cryostat with sample cell, gas heating, liquid nitrogen cooling system, vacuum system

**novocontrol** Technologies 

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

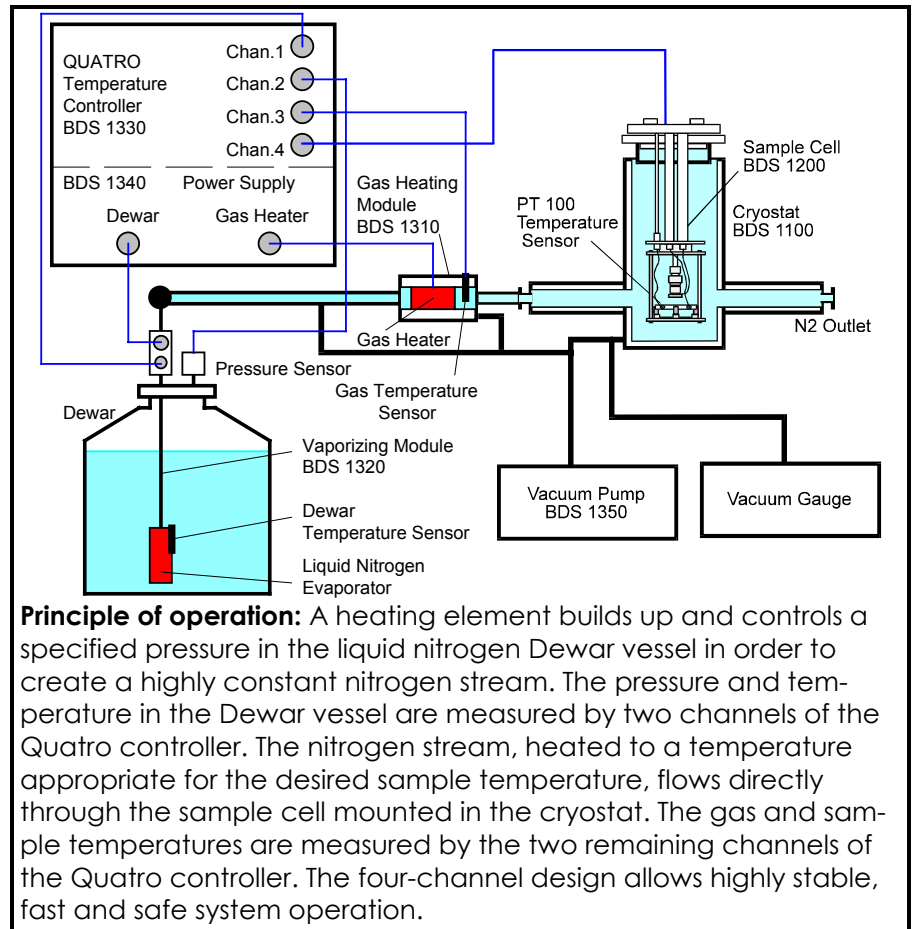
**novocontrol** Technologies 

### QUATRO Cryosystem

The Quatro 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 Quatro Cryosystem is designed to provide **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.

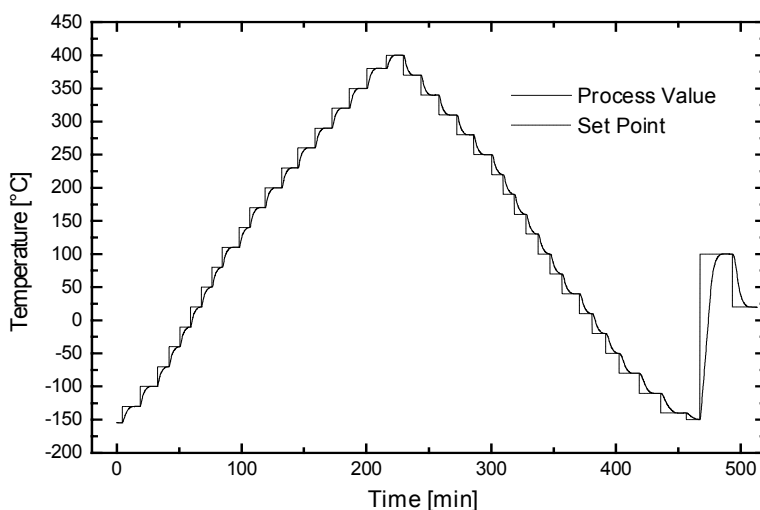
### Purge Gas Option

An economical way to operate the QUATRO system without liquid nitrogen is provided by the purge

gas option. The temperature range is limited to 25 ... 400 °C.

### Features

- high precision turn key temperature control system
- temperature range -160°C to 400°C
- temperature ramps from 0.01°C/min to 20°C/min
- 0.01°C temperature stability
- temperature overshooting after set point step typically < 0.2°C
- stabilization times typically below 8 minutes (for 0.1°C stability)
- low nitrogen consumption due to automatic pressure-temperature adaptation
- automatic adaptation of controller parameters (selftune)
- 4 channel microprocessor controller with 24 bit ADC and IEC communication port
- vacuum-isolated cryostat and nitrogen lines



Stabilization characteristics of the sample temperature (process value) in dependence of the temperature set point. Set point step after sample temperature stabilization to 0.1°C accuracy.