

Laboratory Thermostats for Testing Electronic Components



Carsten Persner

The testing of temperature dependence in the behaviour of electronic components is frequently carried out directly in an attempterated liquid bath. The new thermostats from the Lauda Proline range offer the ideal conditions for these measurements. An example of such is their use in the development department of the Micronas GmbH in Freiburg/Breisgau, Germany.

Electronics and Temperature

Temperature has always been of major importance in industrial and automobile electronics, where a temperature range of -40 to 150 °C is the rule. Each electronic measured value displays large temperature dependence to a greater or lesser degree. The communication of this temperature dependency in the behaviour of electronic components is thus an important factor for the determination of the application specifications. It is a specification explicitly requested by the customer in new developments.

A further aspect is the permanent modification to specified properties (ageing) of defined temperatures or in conjunction with temperature changes.

Time-optimised temperature tests are of major importance to applications with changing field conditions, such as in the automobile and aviation industries.

An Example from Development

Special test conditions in the limits in the development of electronic components present a particular challenge for the test

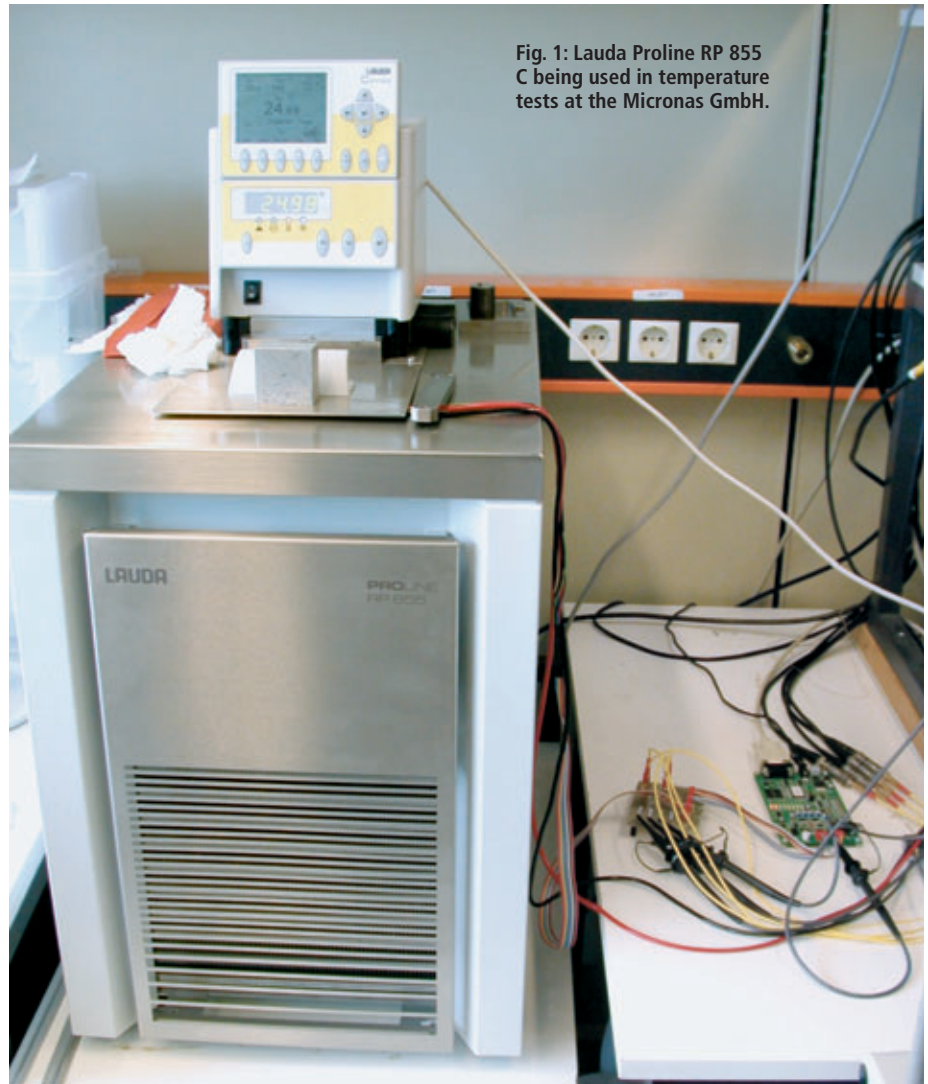


Fig. 1: Lauda Proline RP 855 C being used in temperature tests at the Micronas GmbH.

equipment used. In the development department of the Micronas GmbH in Freiburg, Germany, a Lauda Proline RP 855 C is used for testing the temperatures of sensors and other integrated circuits.

Micronas (SWX Swiss Exchange: MASN, Prime Standard Segment, TecDAX, Frankfurt: MNSN), a globally-operating semiconductor group of companies, is a leading provider of innovative IC and sensor system solutions for the field of consumer electronics and automobile electronics. The operative headquarters of the Micronas group is the Micronas GmbH with its main location in Freiburg, Germany. A large part of the development department is also located there. In addition to further parameters, the elec-

trical and functional properties of newly-developed chips are tested to define their temperature dependency.

Solving Problems

One particular thermostat from the new Lauda Proline range has proved itself as the ideal solution for testing. The RP 855 C model cooling and heating thermostat with an operating temperature range of -55 to 200 °C meets all the required specifications. The decisive factors here were the ability to cover the whole temperature range with only one bath liquid and a very short length of time for a complete temperature cycle.

Tests of the electronic components are executed in a temperature range of

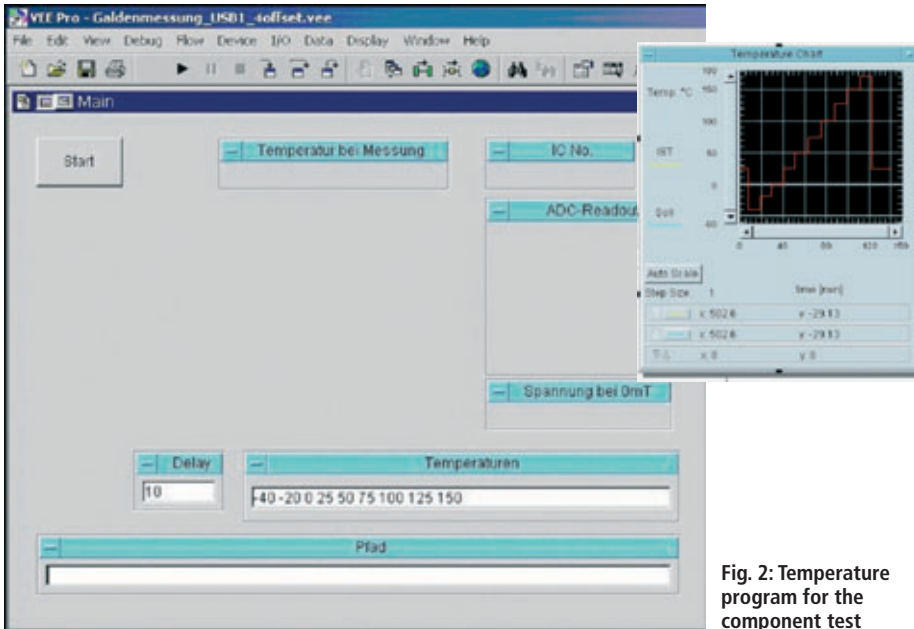


Fig. 2: Temperature program for the component test

between -40 and 170 °C. The test pieces are put directly into the thermostat bath: this ensures the uniform attemperation of the chips and the reproducibility of the test results. Specification of the temperature programs is by means of the PC via the thermostat's interface.

Simple, Flexible Operation

This is where one of the advantages of the Lauda Proline's flexible operation concept already becomes apparent. Set values – either as a single value or a complete program with various time and temperature values – can be either entered by the operator directly on the device or via a PC. With the aid of the detachable control panel of the Command control head, programming is as easy as on the monitor of a computer. Controlling the program run is just as simple. The graphic display allows the real-time monitoring of the current reference and actual temperatures at a glance. The Command console can be positioned on the user's desk up to 50 m away from the actual test installation, so that the process is under control at all times.

High Power in Compact Form

An important criterion for the use of the Proline thermostats is the fast change-over between the various testing temperatures in order to optimise the sample throughput with one single device. "Time is money" is especially applicable to the development of electronic components.

The Lauda Proline thermostats with the patented heating drive are the ideal

solution for fast heating. They provide up to 3.5 kW heating capacity without overloading the mains supply.

The cooling-down speed in the test process is just as important. The Smart-Cool System provides the cooling capacity when it is needed. In the case of the Lauda RP 855 C, this is up to 1.6 kW available cooling capacity at a bath temperature of 20 °C.

The particular advantage of the RP 855 C is its compact construction. With an area of only 40x45 cm, the device can be placed



Fig. 3: Lauda Proline cooling thermostat with removable operating unit

on the laboratory bench without the need for any special installation measures.

Wide Temperature Range

Continuous measurements within a wide temperature range are a further must for use at Micronas. All tests are executed for the entire temperature range from -40 and 170 °C without having to change the bath medium. The Lauda Kryo 20 silicone oil is used as a bath liquid.

Only the powerful varioflex pump from the Lauda Proline thermostats enables the use of this bath liquid at temperatures of -20 °C and less. In this temperature range, the viscosity of the silicone oil rises sharply so that the pumps of standard thermostats cannot guarantee adequate bath mixture and therefore temperature homogeneity. The high degree of effectiveness of the varioflex pumps also enables the required constancy required for the testing process even at low end temperatures. The power can be set at one of eight stages depending on the relevant power requirement in order to achieve an optimal bath circulation.

Summary

It is only the use of the latest technologies in the field of thermostating technology which enables the fast, efficient testing of electronic components over a wide temperature range. Thanks to the thermostats from the Lauda Proline range, these demands are met, and customers are offered various additional benefits such as can be seen with the application example of the RP 855 C model of thermostat.

Dr. Carsten Persner

Lauda Dr. R. Wobser GmbH & Co. KG
P.O. Box 1251
97912 Lauda-Königshofen, Germany
dr.persner@lauda.de
www.lauda.de