

# FURNACE CONTROLLER & SOFTWARE

3117-301/302

## SPECIMEN TEMPERATURE CONTROL

Historically there have been two major approaches to controlling furnace temperature. While in the past the most common of these was to control the furnace temperature by measuring the temperature at each heating zone, this is no longer the case. If you want to ensure the temperature set point that you are demanding is achieved on your test specimen, you will need a furnace controller architecture that offers specimen temperature control sometimes known as 'Cascade Control'. Instron's solution supports both specimen temperature and a traditional zone control from when specimen thermocouples cannot be used. Changing between these modes is as simple as the click of a button.



## EXCELLENT PERFORMANCE WITH NO EXPERT TUNING

Temperature control is often overlooked as being more straightforward than it really is. Many technicians would recognize the importance of tuning a machine's control loop to optimize its performance but might assume that temperature does not require the same optimization. In fact, optimizing the performance of a temperature control loop can be a very time consuming and complicated task.

Instron no longer relies on the internal tuning parameters of hardware temperature control devices and instead uses advanced software algorithms to deliver the performance you need at the touch of a button. With this new temperature control software, all users can feel confident to set up a test from 100°C to 1050°C (at specimen) without having any prior knowledge.

## TRACEABILITY AND VISUALIZATION OF DATA

A high percentage of high temperature, low cycle fatigue testing is done on safety-critical materials. The results data is likely to be used in critical component design in aerospace and power generation applications. Traceability of data should be a critical consideration for any of these customers and Instron has put visibility and traceability of temperature data at the heart of our new software-based temperature controller. Plot all of your temperature against time and look at historical data as well as current values. Large numerical and visual displays make it easy for users to check the specimen status. All of this data is logged to a file even before you start a test and after it is completed. You have a digital record of everything that happens to the specimen while it is inside the furnace.

## INTELLIGENT TEMPERATURE CONTROL

Control at high and low temperatures without manual tuning. Change performance from 'Automatic Overshoot Minimisation Specimen Temperature Control' to fast heat at the touch of a button. Intelligent control offers you the performance you expect across the whole range of temperatures your furnace can test to and not just in one small sweet spot.



### TWO SIMPLE INPUT PARAMETERS

The only two inputs you need to provide are the temperature set point and the heating rate. You can enter these directly during test preparation or they can be driven directly from your test software like WaveMatrix™ and BlueHill®.



### VISUALISATION OF DATA

Large graphical display of time history data for temperature data. Easily toggle channels to include up to 8 thermocouple readings as well as internal working parameters like the temperature setpoint.



### LOAD AND SAVE TEST PROFILES

Load and save test configurations to a file to allow quick setup of previously run test configurations. Reconfigure the whole system in seconds from a simple change of control mode through to a whole setup for a dedicated specimen configuration.



### SPECIMEN TEMPERATURE

A large visual display shows the critical specimen temperature data. Easily view specimen thermocouple readings and the gradient between the two thermocouples.\*



### SYSTEM STATUS INDICATOR

A clear and human-readable display of system status in the software which can be checked at a glance. Specific faults are displayed, such as over temperature alarm or as a "cooling water interlock" which can be connected to a flow sensor which checks the flow of cooling water to the loadstring.



### NUMERICAL DISPLAYS

Large, clear numerical displays of current variables are located at the top of the program and can be viewed simultaneously without configuring a menu or changing between display variables.

\* Three thermocouple control is available but performance may vary



## FLEXIBLE HARDWARE PLATFORM

With Instron's new furnace controller you really do have a single hardware platform for all of your temperature needs. Unlike in the past where you had to choose the way you wanted to use your furnace hardware – now you can change the architecture at the touch of a button in your software.

### Smart Temperature Control

No buttons or setup needed at the hardware box. We have a power cable, a USB module and an ON/OFF switch. Everything else is managed from the software by you with the help of our smart tuning algorithms.

### 3-Zone Thermocouples

Type K thermocouples for Zone Control

### Flexible Software Control

Test With or Without Specimen Thermocouples

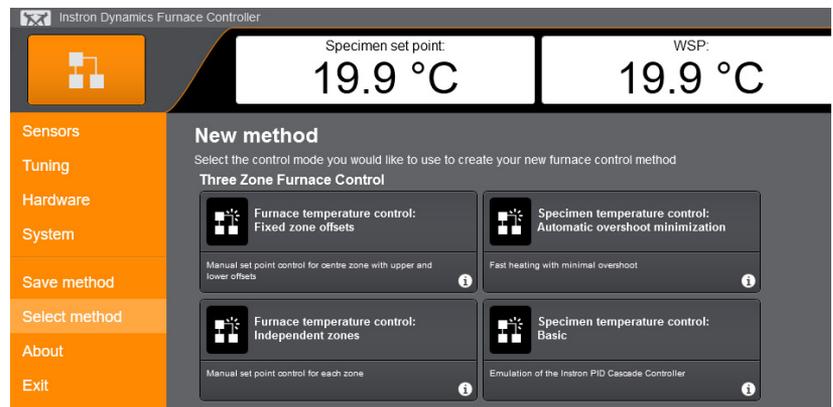
### Up to 8 Specimen Thermocouples

Supports Type K, N, S, and R  
Quick Change thermocouple panel

## FLEXIBLE SOFTWARE CONTROL

As mentioned, this hardware can allow you to test with or without specimen thermocouples. While the preference for modern testing is to use a specimen thermocouple, there are still practical examples where this is not possible.

Perhaps your specimens are very short or made of a material which cannot be easily spot welded. In these cases, you have the flexibility to run with a traditional Fixed Zone Offsets configuration with a non-contacting temperature measurement device. One hardware platform to meet all of your needs through flexible software control.



## THERMOCOUPLE CALIBRATION

Thermocouple calibration is an essential feature for ensuring your temperature data is of the highest accuracy. If you are already using calibrated thermocouples then you can input the compensation profile directly into our software and match that specific thermocouple to an input channel. This will ensure you are recording calibrated/compensated temperature data on up to 8 inputs.

## CHANGING THERMOCOUPLES

Instron offers a support for a range of specimen thermocouple types which are mounted to a panel which can easily be changed without the support of a service engineer. The change takes 10-20 minutes to physically change and just seconds to reconfigure in the software.

## PERFORMANCE

*Typical System Performance	
Maximum temperature	1050 °C on specimen 1200 °C on furnace elements
Minimum temperature	100 °C on specimen
Supported temperature ramp rate**	> 5 °C/min heating > 3 °C/min cooling
Temperature stability	< ± 1 °C or < ± 0.5 % set point in °C
Temperature uniformity	100 to 400 °C < 2 °C 400 to 1050 °C < 0.5 % set point in °C Maximum point-to-point difference on 25 mm parallel length
Overshoot on heating	Zero***
Interlocks and warnings	Water flow switch, overtemperature, and disconnected thermocouple
Results and data	Excel CSV files up to 20,000 hours data recording
Automatic tuning modes	Fast heat and Automatic Overshoot Minimisation Control

\* Typical system used: SF1770 Furnace with Instron Hydraulic Pullords 3117-501. For any other Furnace or loadstring, please consult Instron for performance specifications.

\*\* Heating rate is non-linear and heat up times will vary depending on heating mode, furnace, loadstring, and specimen.

\*\*\* At end of ramp the specimen temperature will not exceed the stability tolerance when Automatic Minimisation function enabled.

Note: All specifications are based on 2 Specimen Thermocouples. For 3 Specimen Thermocouple Temperature Control, performance may vary.

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