

Ultra High Temperature XY System – TS1400XY

The Ultra high temperature TS1400XY stage enables the user to manipulate samples in XY direction in a gas tight sample chamber right up to 1400°C.

Features and Benefits

The ceramic tube heater completely encases the sample in a uniform temperature controlled environment enabling high accuracy control right up to 1400C within a gas sealed chamber.

Samples are mounted on a sapphire sample slide that can be moved in 6mm in XY directions to explore your sample.

Fluid inclusion geologists and material scientists interested in high speed quench cooling can add a special manipulator that enables rapid transfer from the heater to a much colder platform resulting in ultra fast cooling rates of up to 240°C per second.

The sample temperature is accurately controlled by the T95-LinkPad system controller with ergonomic LCD touch screen operation. This new controller enables the stage to heat samples at an incredible **200°C/min.** (See more information on the '[T95 System Controller](#)' on our website).

Please note that hydrogen gas cannot be used. Please see the [CCR1000 Catalyst Reactor Cell](#) for info on using hydrogen in a hotstage.

System Options

Ultra fast quench Cooling Manipulator. This special manipulator replaces the standard sample manipulator and can be used for either very rapid heating or quench cooling similar to a Vernadsky stage.

The sample can still be manipulated in XY directions so that the exact area of interest can be found and then heated to 1400°C at a rates up to 200°C/min. When at the desired temperature, the sample is quickly withdrawn from the heater. The heater can now be programmed down to the desired temperature and the sample can be reinserted into the heater to view changes in the sample resulting from the quench.



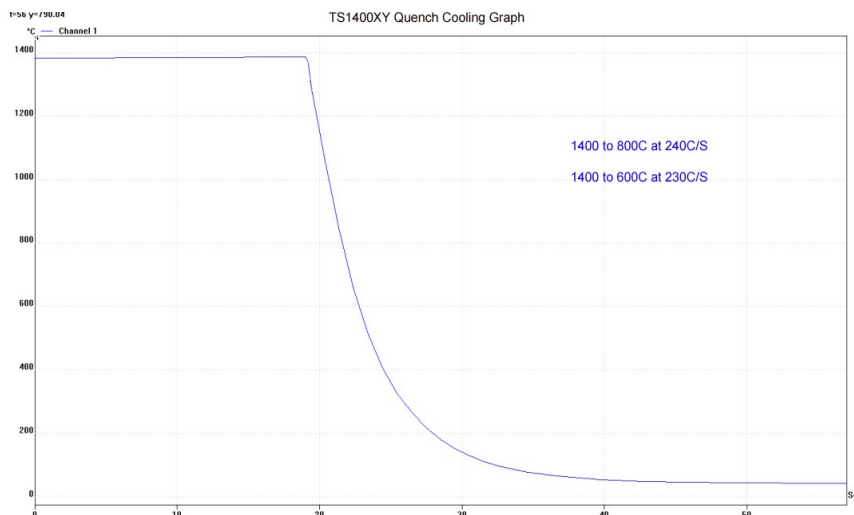
The TS1400 XY heating stage

Temperature Range ambient to 1400°C



High Temperature System with T95-LinkPad controller

The graph shows the cooling curve when a fine wire thermocouple was bonded to the sapphire sample window and withdrawn from the heater at 1400°C. Cooling from 1400 to 800°C was in excess of 240°C/s.



Optical Specifications

The high temperature stages are designed to be used with an upright microscope, where the objective lens is above the sample. (Vertical mounting for X-Ray is also possible).

When working with heating stages, it is necessary to use long working distance objective lenses. If viewing the sample using transmitted light you also require a long working distance condenser lens.

The objective lens is isolated from the sample by the stage lid window which is a fixed distance from the heating/cooling element. This distance is dependent on which size element you have selected. A cross section of the element of the TS1400XY shown here demonstrates how this distance is measured.

We recommend that you use an objective lens with at least 6mm working distance and a light filter or polarizer due to the light radiated from heating element at temperatures above 800°C.

The condenser lens is isolated from the sample by the stage base plate window and the thickness of the heating/cooling element. In the TS1400XY this distance is 12.5mm.

Linkam make condenser extension lenses for many types of condenser, please select the '[Condenser Extension Lenses](#)' from the '[Optical Accessories](#)' section of our website.

Attaching TS1400XY to Microscope

Upright microscopes whether standard optical, or part of a Raman or IR system, usually have an XY table or circular POL table to move the sample relative to the objective lens. These tables are mounted to the microscope substage and need to be removed when using the hotstage.

Linkam manufactures different stage clamps to attach the TS1400XY stage to many different brands of microscope. The stage clamps are required to adjust the position of the hotstage relative to the light path of the objective lens.

Select the stage clamps you require from the '[Stage Clamps](#)' section on our website.

Specifications

- Temperature Range ambient to 1400 °C
- Heating rates from 1 to 200°C/min
- Temperature stability 1°C
- Type S Pt-10% Rh/Pt thermocouple
- Sample sizes: 5x5mm, 0.5mm thick
- Objective lens minimum working distance: 6mm
- Condenser minimum working distance: 12.5mm
- Light aperture: 1.7mm for accurate sample temperature
- Suitable for transmitted and reflected light
- Gas tight chamber for atmospheric control
- Clamps directly to microscope substage
- Water cooling connections for stage lid and body
- Low mass for fast response in both heating and cooling
- Selection of different window materials and thicknesses available

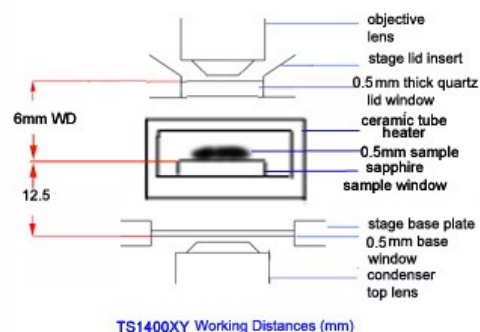
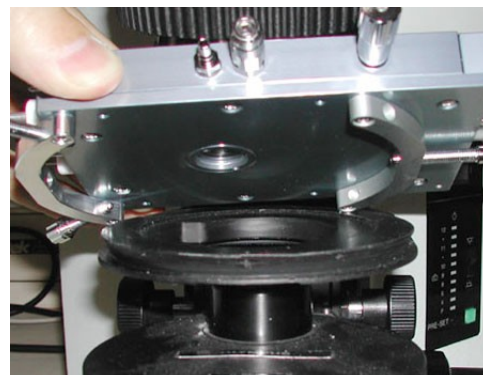


Diagram of objective lens and condenser lens working distances.



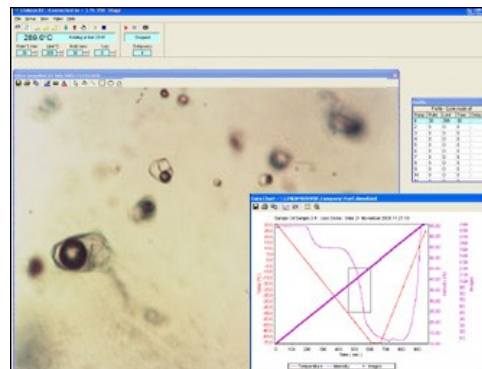
TS1400XY stage with stage clamps being attached to circular dovetail substage.

Increase Capability Options

There are several options to increase the capability of the high temperature systems.

Linksys 32X-DV (Digital Image Capture) and Digital Camera

Add system control with digital capture software and one of the range of Q-Imaging digital cameras to enable multiple ramp temperature profiles with time lapse image and data capture. All T95 controller data is saved with the image. Quickly find single or groups of images by dragging a box around an area of the time/temperature graph or scrolling through the gallery. Create movies of experiments and add scale bar, annotations and measurements. (See '[Software and Image Capture](#)' on our website for more information).



Linksys 32X-DV software.

QImaging Cameras

Linkam supports the entire range of Q-Imaging CCD firewire cameras.

The QICAM fast 1394 shown here is designed for high resolution brightfield scientific and industrial applications. A progressive scan interline CCD sensor gives a resolution of 1.92 million pixels in 12-bit digital output.



Imaging Station

Free up time on your research microscope by attaching your high temperature stage to the Linkam Imaging Station instead. The imaging station has been designed specifically for temperature controlled microscopy. Standard microscope lens can be loaded into the quick lock mounting jaws which can be easily swung back out of the way of the stage to allow greater sample access to the stage.

A long working distance condenser is built into the base with polarizer and diaphragm. A 100W halogen light source and C-mount for a camera is also supplied. (See '[Imaging Station](#)' on our website for more information).



Linkam Imaging Station. Optics are tilted back to allow easy access to sample

Linkam Complete Temperature Control Solution

Once you have selected the system. Add the options below to complete the total turnkey solution.

Add Condenser Lens if using transmitted light

See website '[Condenser Extension Lenses](#)' for more information.

Add Stage Clamp to mount to microscope substage

See website '[Stage Clamps](#)'.

Add System Control Software

Linksys 32X, see website '[Linksys 32](#)'

Add System Control software including the Digital Video Capture Option

Linksys 32X-DV (captures digital images as well as data via PC).

Add Q-Imaging Camera

Required to work with Linksys 32-DV, many camera options in the range. See website '[Q-Imaging Cameras](#)'

Add Linkam Imaging Station

Alternative to be used in place of your existing microscope for temperature controlled microscopy.

See website '[Imaging Station](#)'