LTS420 Systems

The LTS stages are easy-to-use heating and cooling systems, with fast heating rates up to 50°C/min, and excellent thermal stability from –196°C to 420°C . With a heated sample area of 53mm x 43mm , and swing-out lid it is ideal for larger samples, and can be used with samples mounted on standard microscope slides.

Features and Benefits

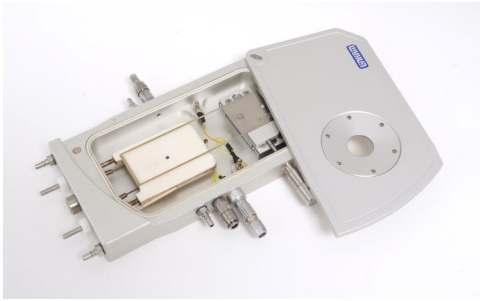
- Swing-out lid for easy sample exchange
- Larger Samples including microscope slides
- Ideal for reflected and transmitted light studies
- 15mm sample translation in X and Y
- Can be supplied with a range of different windows for Raman, FTIR, UV and x-ray work.

The LTS420 consists of a large area heating element, manufactured from pure silver, which enables higher heating and cooling rates, with quicker response times, than in previous LTS type instruments. A platinum sensor embedded close to the surface of the heating block means that accuracy is optimised.

The LTS420 heating and freezing stage. Temperature Range –196°C to +420°C

The LTS420 sample chamber is gas tight and features gas valves to enable purging with inert gas or flow of humidified air.

Samples can be quickly characterized by heating to within a few degrees of the required temperature at a rate of up to 50°C/min with no overshoot, then slowed down to a few tenths of a degrees per minute to closely examine sample changes. The entire experiment can be saved as an online plot or exported to a spreadsheet application (when using Linksys 32 software).



LTS420 stage with lid open showing the large area heating block and holder for a standard (76mm x 26mm) microscope slide

System Options

Heating Stage

The LTS420 is available as the standard LTS420 ,or the LTS420E, an instrument configured to enable electrical measurements on the sample during heating/cooling cycles. The LTS420E is supplied with two internal electrical connector posts and a Lemo feed-through for connection to external electrical devices.

Controller: T95-LinkPad or T95-Linksys

The T95 LinkPad has an LCD touchscreen data input display and can be used as a standalone system controller.

The T95-LinkSys is a PC computer interface controller and requires Linksys 32 control software (supplied) to input a temperature profile. It cannot be used standalone.

Cooling

For fast controlled cooling between +100°C to a minimum –196 °C choose the LNP95 liquid nitrogen cooling system. The LNP95 cooling pump communicates with the T95 system controller and varies the pump speeds to give a precise flow of liquid nitrogen from the 2L Dewar (supplied), to enable cooling speeds from 0.01 to 50°C/min. (All fittings and Dewar are supplied with the pump).

LTS420 System with LNP95 cooling system

Optical Specifications

The LTS420 is designed to be used with an upright microscope, where the objective lens is above the sample.

When working with heating and freezing 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. In the LTS420 this distance is 6mm, as seen in the diagram opposite. We recommend that you use an objective lens with at least 6mm working distance.

The condenser lens is isolated from the sample by the stage base plate window and the thickness of the heating/cooling element. In the LTS420 this distance is 13.2mm.

Linkam make condenser extension lenses for many types of condenser, please check with Linkam which lens you may need.

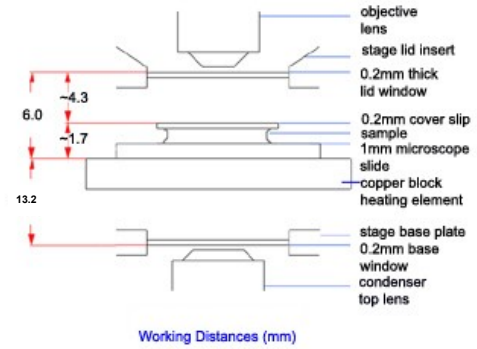


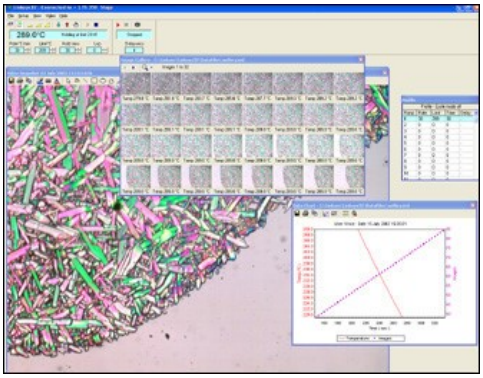
Diagram of objective lens and condenser lens working distances.

Attaching LTS420 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.

Linkam manufactures different stage clamps to attach the LTS420 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 'Selecting Stage Clamps' section on page 4 of this brochure.



Linksys 32DV System Controller Software

Increase Capability Options

Linksys 32DV (Digital Image Capture) and Digital Camera
Add digital capture to the Linksys 32 system controller software and one of the range of Q-Imaging digital cameras to enable time lapse image capture including all T95 data 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' page on our website for more information).

Imaging Station
Free up time on your research microscope by attaching your LTS420 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 LTS420 stage.

A long working distance condenser is built into the base with polarizer and diaphragm. A specially designed LED 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

Specifications

- Temperature Range -196°C to 420°C
- Sample area of 53.5 x 43mm
- 32 Ramp temperature profile programming
- 15mm XY manipulation as standard
- Sample holder for standard 76 x 26mm microscope slides
- Gas tight chamber for atmospheric control
- Swing out lid for easy sample loading
- Can be used with transmitted or reflected light
- Mounts directly to microscope table or substage
- Stage body size: 166x90x24mm
- 100 Ohm platinum sensor
- Temperature stability <0.1°C
- Inner lid to increase temperature stability
- Direct injection of coolant into block
- Highly conductive metal for improved heat transfer
- Minimum Heating Rate 0.01°C/min
- Maximum heating rate of 50°C/min (dependent on LTS stage type)
- Response time of <1 second at 5°C/min at 50°C
- Objective lens minimum working distance: 6mm
- Condenser lens minimum working distance: 13.2mm