THMS600PS Pressure System

By pressurizing the sample chamber up to 14bar the THMS600-PS pressure stage can be used to investigate the effects of pressure on the sample during heating and cooling experiments. This stage has been used in applications where minimizing sample evaporation and sublimation are required.

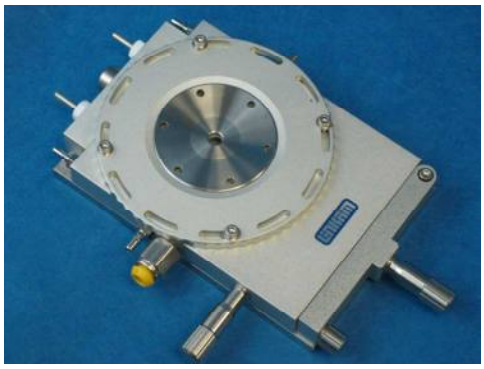
Features and Benefits

Samples are loaded onto a 0.17mm thick cover slip or a quartz crucible placed on a highly polished pure silver heating element to ensure excellent heat transfer and extremely sensitive temperature measurement. A platinum sensor, accurate to 0.01°C provides far more accurate and stable temperature signal that can be achieved with a thermocouple.

Even under pressure, sample positions can be precisely controlled 16mm in XY directions via the precision ground gas sealed manipulators.

Pressure up to 14 bar is applied directly to the THMS600PS by using simple push-to-fit nylon pressure tubing. A reusable safety pressure valve releases gas pressure above 14bar.

Samples can be quickly characterized by heating to within a few degrees of the required temperature at a rate of up to 150°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.



The THMS600PS Pressure Stage

Temperature Range -196°C to 500°C with 14 bar pressure

System Options

There are two different system controller options:

T95 LinkPad

This system includes the excellent new standalone T95-LinkPad system controller with ergonomic LCD touch screen control and data sampling of 20 times per second. The controller has both USB and RS232 connectivity to add Linksys 32X system control software. See the T95 system controller Product Brochure for more details.

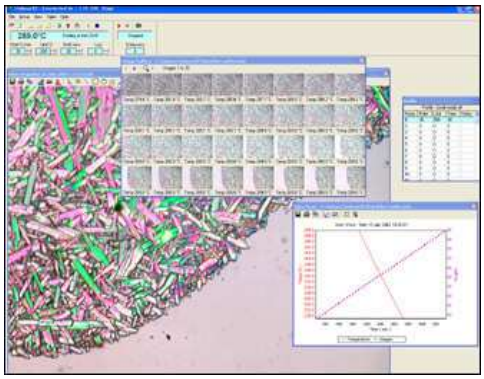
T95 LinkSys

This system includes the new T95-Linksys system controller including new Linksys 32X system control software, enabling PC control of temperature, data acquisition and export as well as multiple ramp programming. (Requires PC, cannot be used as standalone controller).

Cooling

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 linear cooling speeds from 0.01 to 100°C/min. The exhaust dry nitrogen is then recycled through the pumps and used to keep the tubing flexible and purge the sample chamber to eradicate condensation. (All fittings and Dewar are supplied with the pump).

THMS600-PS Pressure System with T95-LinkPad and LNP95 controller



Linksys 32X-DV System Controller Software

Optical Specifications

The THMS600-PS 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 THMS600-PS this distance is 6.6mm, as seen in the diagram opposite. We recommend that you use an objective lens with at least 6.6mm 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 THMS600-PS this distance is 14.5mm.

Linkam make condenser extension lenses for many types of condenser, please select the condenser extension lens from the optical accessories section of our website.

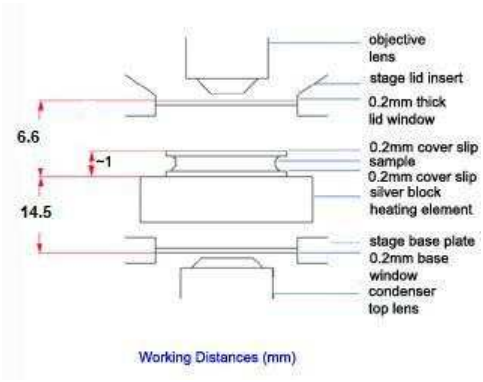


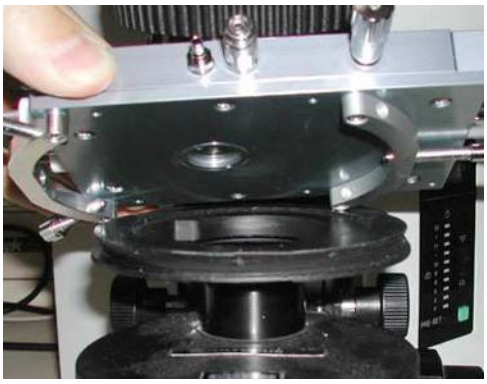
Diagram of objective lens and condenser lens working distances.

Attaching THMS600-PS 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 THMS600 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 for more information.



THMS600PS stage with stage clamps being attached to circular dovetail substage.

Increase Capability Options

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

Add digital capture to the Linksys 32X 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 and Image Capture' on our website for more information).

Imaging Station

Free up time on your research microscope by attaching your THMS600PS 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 THMS600PS 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

Specifications

- Temperature range: -196℃ to 600 ℃ at 0bar, -125℃ to 500℃ at 14bar
- Maximum pressure 14bar
- Up to 150℃/min heating/cooling rate
- Temperature stability <0.1℃
- 16mm XY sample manipulation
- Sample area 22mm diameter
- Clamps directly to the microscope substage for stability
- 100 Ohm platinum resistor sensor
- Silver heating block for high thermal conductivity
- Direct injection of the coolant into the heating element
- Objective lens working distance: 6.6mm
- Condenser lens minimum working distance: 14.5mm
- Range of condenser extension lenses available
- Can be used with all microscope techniques
- Suitable for Confocal, Laser Raman and IR
- Stage body size: 160x80x24mm
- Weight: 1.2Kg
- Response time: <1 second at 5℃/min at 50℃
- Aperture hole size: 1.3mm in diameter
- Water cooled stage body for high temperature work (>300℃), ECP water circulator pump is needed
- Nylon pressure tubing size: 6mm OD, 3mm ID (1.5m supplied)

What do you need for a complete temperature control solution?

Select Stage: THMS600-PS Pressure Stage

Select Controller

Either T95-LinkPad standalone system controller

Or T95-Linksys PC interface and Linksys 32X system controller software

Add System Control Software if Pro system is not selected

Linksys 32X enables temperature control.

Add Condenser Lens if using transmitted light

See website ‘Condenser Extension Lenses’

Add Stage Clamp to mount to microscope substage

See website ‘Stage Clamps’

Add the Digital Video Capture Option to Linksys 32X temperature control software

Linksys 32X-DV, set up temperature control profiles, display live image, capture time lapse images with data. Requires camera

Add Q-Imaging Camera

Camera is required if Linksys 32X-DV is added to system. See website ‘Q-Imaging Camera’

Add Linkam Imaging Station

Alternative to be used in place of your existing microscope for temperature controlled microscopy. See website ‘Imaging Station’

Suggested Spares

These spares are organised into convenient kits. Purchase a spares kit to avoid downtime with your stage and eliminate future shipping costs.

The THMS600PS heating element is extremely durable if used carefully. However, it is made from pure silver which is a soft metal. It can be easily scratched, which will compromise the heat flow to the sample and reduce accuracy. The platinum temperature sensor is brittle and can be broken if cleaning is not carefully performed. We recommend a spare heating element to avoid downtime with your stage while element is being repaired.

Part No.	Part Name	Part Description
22222	**THMS Kit**	**Full Replacement Spares Kit**
	WVC	Water Valve Connector **x2**
	SSR	Silicon Rings for Lid and Base (Set of 4)
	RI17	Stainless Steel Ring Set
	THC	Tube Clip Holder (for Nitrogen de-fogging stage lid tube)
	ORTHMS	Set of O-Rings for THMS Stage Body and Lid
	THMS/Q	15mm diameter Quartz Crucible for THMS/CC **x2**
	W16G	16mm diameter Glass Sample Window (0.17mm thick) Box of 100
	THMS/CC	Crucible Carrier for THMS600
	TUBE	3x6x150mm Clear PVC Tube
	WT	Window Tool (for unlocking lid insert and base locking ring)
	TUBE	3x6x150mm Clear PVC Tube
	W22G1.0	Glass for Windows Lid and base 22x1.0mm **x4**

Suggested Spares

Part No.	Part Name	Part Description
22222	**THMS Spare Windows Kit**	**Spare windows for Lid, Base and samples**
	THMS/Q	15mm diameter Quartz Crucible for THMS/CC **x2**
	W16G	16mm diameter Glass Sample Window (0.17mm thick) Box of 100
	SRR	Silicon Rings for Lid and Base (Set of 4)
	W22G1.0	Glass for Windows Lid and base 22x1.0mm **x4**

Part No.	Part Name	Part Description
9818	**THMSPS**	**Spare Heating Element incl. Platinum Temperature Sensor**

Part No.	Part Name	Part Description
22222	**W/S**	**Precision Temperature Kit**
	G7T	Sample Carrier for 7mm diameter Tapered Edge Window
	W7S	7mm diameter Sapphire Sample Window (0.3mm thick) **x10**
	SCO	Silver Cover Lid