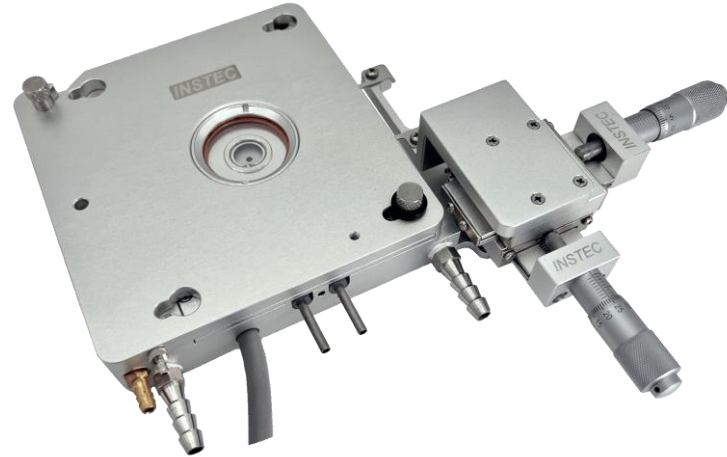


DESCRIPTION

The HCS302/HCS302XY heating and cooling stage offers a temperature-controlled environment that is an ideal choice for optical thermal microscopy and other applications requiring optical access to the sample. Top and bottom dual pane windows are removable and exchangeable to meet a range of spectroscopic needs. The stage can be mounted vertically, allowing horizontal beam access to the sample chamber. Additionally, the HCS302/HCS302XY is large enough to accommodate a variety of samples, including electro-optic devices and standard 25mm x 75mm microscope slides. An inner thermal cover is also included for applications requiring ultra-high temperature stability and uniformity



KEY FEATURES

Large Chamber

Suited to fit standard 25mm x 75mm microscope slides, [liquid crystal cell holders](#), and electro-optical devices

Sample Access

Quick sample access with spring-loaded pivoting top cover, and side-loading sample holder

Rapid Heating Rates

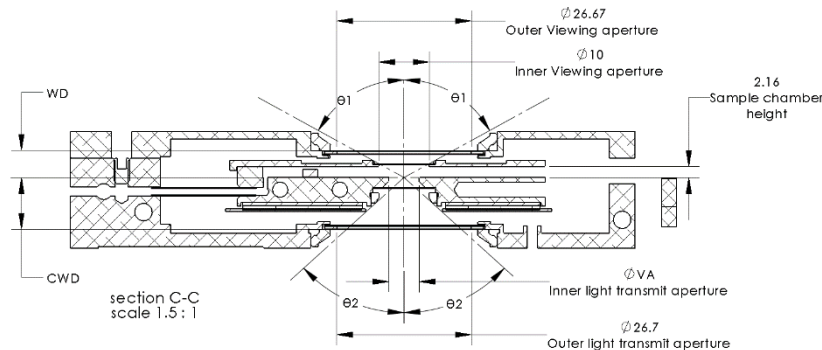
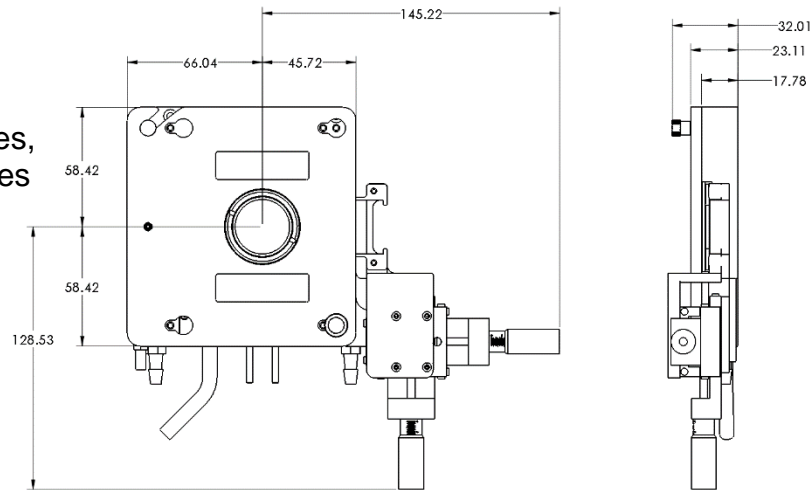
+80°C per minute max rate

XY Positioning

Position sample with ease without having to remove the top cover via the optional XY positioner. Offering greater flexibility, sample area accessibility and precision control, this option is highly recommended for use with a rotational stage on a polarizing microscope due to the directional nature of polarization

Accuracy and Stability

A pt100 platinum RTD sensor is embedded into the thermal block to guarantee high temperature accuracy and stability. The RTD sensor is calibrated to measure the temperature of the surface of the sample area – giving the closest and most accurate reading of sample possible. Additional monitoring sensors and alternative sensor such as thermistors are also available.



Additional Features

- Includes standalone *mK2000* temperature controller
- Includes 'InstecApp' Windows compatible software for optional operation via PC
- Comes standard with optical glass windows that can be easily replaced with IR or UV transparent glass.

THERMAL SPECIFICATIONS

| | |
|----------------------------------|---|
| Temperature Control | <i>mK2000</i> with precision switching PID output |
| Thermal Block | Clear anodized aluminum |
| Sample Thermal Cover | Optional removable Inner sample cover with additional window |
| Minimum Temperature | -60°C (requires optional liquid N2 cooling; lower limit of -190°C available*) *frost and condensation will occur at temperatures below -60°C |
| Maximum Temperature | 400°C |
| Temperature Sensor | 100 Ω Platinum RTD |
| Maximum Heating Rate | +80°C per minute at 100°C |
| Maximum Cooling Rate | -40°C per minute at 100°C |
| Minimum Heating and Cooling Rate | ±0.01°C per minute |
| Temperature Resolution | 0.01°C |
| Temperature Stability | ±0.05°C (>25°C), ±0.1°C (<25°C) |
| Power supply | Universal power input |
| Software | Windows software to record and export temperature-time data |

OPTICAL SPECIFICATIONS

| | |
|------------------------------------|---|
| Optical access | Reflection and transmission capability |
| Optical windows | Removable and exchangeable windows permit full-spectrum transparency |
| Minimum Objective Working Distance | 5.4 mm (without add-on spacers) |
| Minimum Condenser Working Distance | 10.3 mm |
| Top/ Bottom Window Aperture | Ø27 mm (Ø31.75mm Window Glass). With Inner lid, viewing aperture is Ø10mm |
| Top Viewing Angle | ±61° from normal |
| Transmission Aperture | Ø2 mm (Ø5mm and Ø8mm options available with HCS302+ model) |
| Bottom Viewing Angle | ±45° from normal |
| Window Defrost | Integrated window defrost port |

STRUCTURAL SPECIFICATIONS

| | |
|----------------------------------|--|
| Sample Area | 38 mm x 50 mm |
| Chamber Height | 3.5 mm without removable inner cover 2 mm with removable inner cover Note: Optional add-on spacers available to increase chamber height |
| Sample Loading | side loading/unloading, spring-loaded pivoting top cover |
| Sample Positioning (With XY Kit) | 10mm fine travel with Vernier XY dials for remote manipulation |
| Frame Cooling | Integrated frame cooling with optional chiller system |
| Mounting | Base model includes tapped holes on frame and removable side-mounted L-brackets. Horizontal and vertical mounting adaptors available for select instruments, or by custom design |
| Frame Dimensions | 117mm x 112 mm x 23.5 mm |
| Weight | 670 g |

OPTIONS

Controlled Cooling

Extend lower temperature limit to -190°C with our **LN2-P** cooling system; includes LN2 suction pump, tubing and Dewar (2L, 10L, or 30L). Enables active cooling with rates of up to -50°C per minute (at 100°C).

Frame Cooling

Safety always comes first – keep the frame of the HCS302/HCS302XY cool and safe to touch with an optional water circulator. (see **C100W** chiller) Frame cooling option allows thermal control of frame independent of sample thermal block and aids in preventing frost buildup when cooling sample is being cooled below freezing temperatures.





Spacer Set

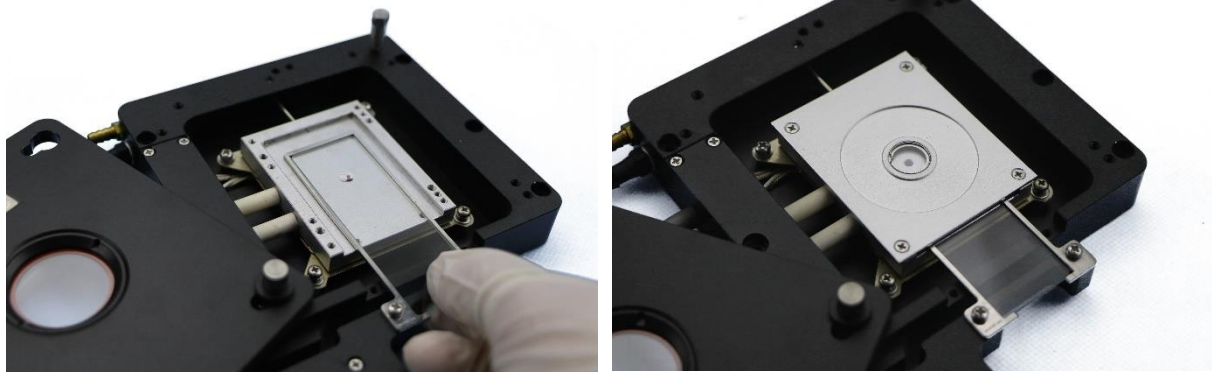
Increase chamber height with fitted [spacer kit](#) to allow fitment of taller samples, or to accommodate an [INTEC Liquid Crystal holder](#).

XY Sample Positioning

Position sample relative to transmission aperture without removing cover with the optional XY positioner kit. With greater flexibility, sample area accessibility, and precision control, this option is optimal for use with a rotational stage on a polarizing microscope.

Inner Cover

The chamber height is the distance between the top surface of the thermal block and the bottom surface of the outer cover. With an optional inner cover, the distance is minimized by design to allow for just enough space for intended samples (slides, slipcovers, wafer pieces, etc.) and to decrease the minimum objective working distance. By vertically insulating the sample with the inner cover, vertical temperature gradients are significantly reduced.



Enlarge Transmission Aperture

Standard Ø2mm viewing aperture can be increased to up to Ø8mm with upgraded HCS302+ model.

Microscope

Entry-level polarizing microscope offering superior performance for a variety of research applications with specifications to satisfy a wide range of demanding observational requirements. (see [TPM-CX40](#))

Camera






Integrate digital image acquisition with sample temperature overlay. Includes software (WinDV thru InstecApp) USB 3.0 connection, 20-megapixel resolution, and standard C-mount microscope connection. (see [MITO2](#))

Mounting Adapter

Various mounting adapters are available for most microscope models and/or instruments. Custom mounting adapters may also be made to fit each and every application.



SIMILAR PRODUCTS

| | HCS402 | HC402DGXY | HS1000GXY | TS102VXY | HCS302GXY |
|--------------------------------|---|---|--|---|---|
| |  |  |  |  |  |
| Temperature Range | -190°C to 400°C | -190°C to 400°C | RT to 1000°C | -40°C to 120°C | -190°C to 400°C |
| Atmospheric Control | | ✓ | ✓ | ✓ | ✓ |
| Sample Area | 38mm x 50mm | 38mm x 50mm | 16 x 16mm | 42mm x 42mm | 38mm x 50mm |
| Sample Cooling | LN2 | LN2 | - * | TEC | LN2 |
| Thermal Block | Anodized Aluminum (top and bottom heating) | Silver (Dual top and bottom heating/cooling) | Silicon Carbide | Anodized Aluminum | Anodized Aluminum |
| Electrical Feedthroughs | None – Open Frame | Up to 2 | Up to 2 | Up to 2 | Up to 2 |
| XY Manipulation | ✓ | ✓ | ✓ | ✓ | ✓ |

*Heating only, no sample cooling available

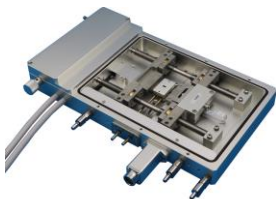
Other products to consider....



HCP621G heating and cooling plate with Ø30mm sample area. Temperature range -190°C to 600°C. Gas tight chamber with gas purge capabilities. Includes option to add electrical feedthroughs. Has a higher max temperature, but does not have a transmission aperture, and is gas-tight. Highly compatible with reflection-mode optical instruments.



HCS601GXY-IRM FTIR heating and cooling stage with 24mm x 24mm sample area. Temperature Range -190°C to 600°C. Gas tight chamber with gas purge capabilities. CWD=10.5mm WD=10.5mm, cone angle>100°C. Includes IR windows. Has a wider temperature range, sealed chamber, and integrated XY sample positioning. Optimized for IR applications.



HCS350G-TNS heating and cooling stage for tensile force measurements. 26mm x 16mm sample area. Temperature range -190°C to 350°C. Gas tight chamber with gas purge capabilities. Apply up to 200 N force. Specialized for experiments requiring applied force control with simultaneous optical access.

CONTACT A REPRESENTATIVE 