

DESCRIPTION

The **TP102G** compact optical stage is a versatile and convenient solution for applications requiring precision temperature and environmental control. The TP102G uses thermoelectric heating/ cooling to provide precision temperature control from -40 °C to 120°C over a 40mm x 40mm sample area. The sealed chamber creates a closed environment to prevent condensation, aid in humidity studies, or conserve expensive reacting gases. Vacuum compatible version **TP102V** supports chamber evacuation down to 9.9×10^{-3} mBar or below. Additionally, up to 4 optional feedthrough leads are available for additional sensors or electrical sample connections.

KEY FEATURES

Compact Design

Suited for use on upright microscopes, optical benches, and other instruments with limited space. Perfect for Raman or FTIR.

Wide Temperature Range

-40°C to 120°C (Cooling to -40°C may require optional chiller upgrade).

Rapid Heating Rates

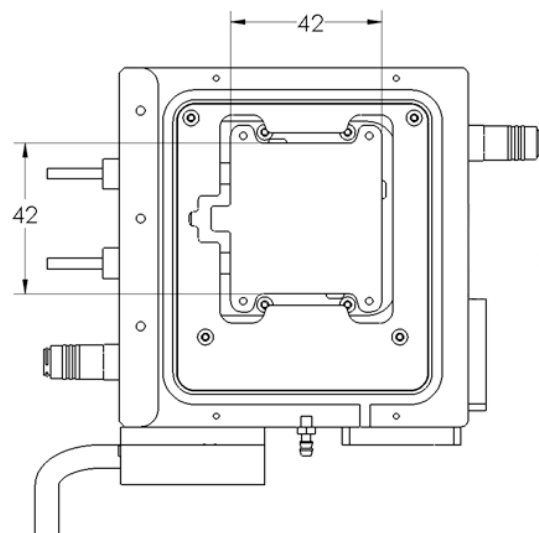
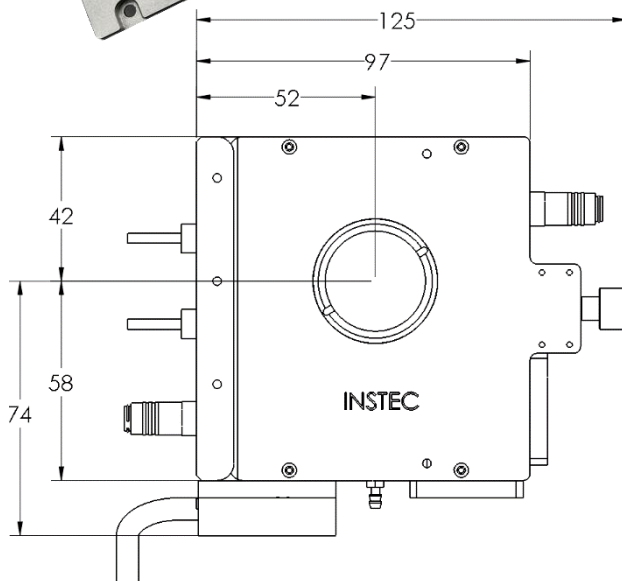
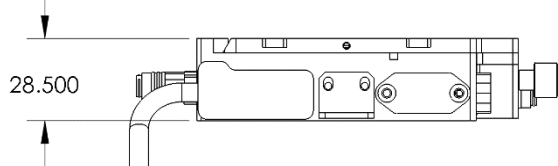
+50°C per minute max heating rate.

Gas Tight/ Vacuum tight Chamber

Air-tight seal allows for gas purge to prevent icing, condensation and oxidation. Also allows for a controlled atmosphere around sample. Standard configuration features quick connect and release gas ports; optional kf-16/ Swagelok ports available for vacuum pressures down to 9.9×10^{-3} mBar.

Accuracy and Stability

A pt100 platinum RTD sensor is embedded into the sample area to guarantee high temperature accuracy and stability. The RTD sensor is calibrated to measure the temperature of the surface of the sample heating block – giving the closest and most accurate reading of sample possible. Additional sensor options are 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

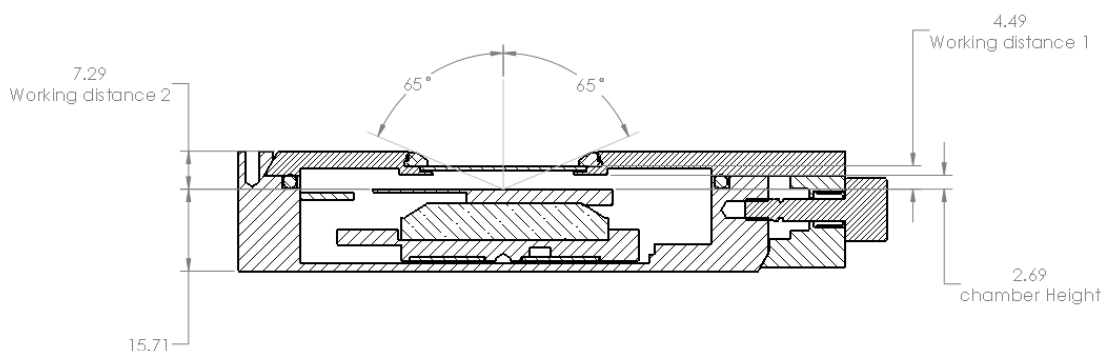
Temperature Control	mK2000 with programmable precision switching PID method
Thermal Block	Aluminum
Sample Thermal Cover	Removable Inner sample cover with additional window
Temperature Minimum	10°C without chiller, -30°C with C100W chiller, -40°C with upgraded CW500
Temperature Maximum	120°C
Temperature Sensor	100 Ω Platinum RTD
Maximum Heating Rate	+50°C per minute at 37°C
Maximum Cooling Rate	-20°C per minute at 37°C
Minimum Heating and Cooling Rate	$\pm 0.01^\circ\text{C}$ per minute
Temperature Resolution	0.01°C
Temperature Stability	$\pm 0.05^\circ\text{C}$
Power supply	Universal power input
Software	Windows 10/11 software to record and export temperature vs. time data

OPTICAL SPECIFICATIONS

Optical access	Reflection capability only (see TS102GXY/ TS102VXY for transmission capability)
Optical windows	Removable and exchangeable windows permit full-spectrum transparency
Minimum Objective Working Distance	4.8 mm
Top Window	$\varnothing 27\text{mm}$ aperture, 31.75mm glass
Top Viewing Angle	$\pm 60.0^\circ$ from normal
Window Defrost	External window defrost fixture. Option for integrated window defrost port.

STRUCTURAL SPECIFICATIONS

Sample Area	40 mm x 40mm
Chamber Height	2.5 mm without inner cover, 1.2mm with inner cover
Atmosphere Control	Gastight configuration includes 2x quick-connect ports to easily control gas flow in and out of the chamber. Positive pressure up to +0.5 Bar. Vacuum-compatible version supports both evacuation to $9.9 \times 10^{-3}\text{mBar}$ and +0.5 Bar Gas purging capability. Includes 1x SS bellows + 1x machinable vacuum blank by default. Secondary SS bellows for external vacuum gauge or vacuum feedthrough available by request.
Frame Cooling	Integrated frame cooling (includes recirculating water-cooling system)
Mounting	Horizontal or Vertical mounting capability
Frame Dimensions	146 mm x 111 mm x 20.4 mm
Weight	700 g (Gas tight)/ 800 g (Vacuum tight)



OPTIONS



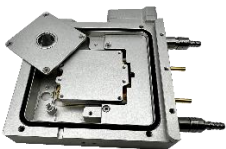
Frame Cooling

The TEC based TP102G works by electrically creating a temperature gradient between the sample area and the frame of the plate. Frame cooling is used to keep the frame temperature as low as possible during sample cooling to maximize the cooling power of the plate. Room temperature water is enough to reach -30°C, but a chiller with sub-ambient refrigeration capabilities is required to reach -40°C.



Sample Fixing Clamps

Secure samples with metal, spring-loaded clamps. Useful in cases where the heating and cooling stage is mounted vertically.



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 in design to allow for just enough space for intended samples (slides, slipcovers, wafer pieces, etc.). By closing the distance, vertical temperature gradients are significantly reduced, making the inner lid ideal for high-precision experiments.



Electrical Feedthroughs

Add up to 4 electrical feedthroughs for applying an electric field to sample.



Microscope

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



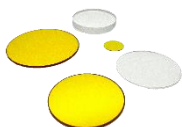
Digital Microscope Camera

Integrate digital image acquisition with sample temperature overlay. Includes software (WinDV2 via InstecApp), USB 3.0 connection, 20-megapixel resolution, and standard C-mount microscope connection. (see [MITO2](#))



Mounting Adapter

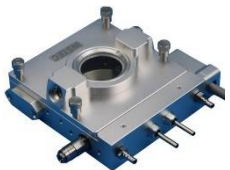
Various mounting adapters are available for most microscope models and/or instruments. Custom mounting adapter may also be made to fit each and every application.



Windows

Additional or alternate available windows are Sapphire, BaF2, CaF2, ZnSe (Ask your INTEC salesperson about customizing the TP102G for IR applications).

SIMILAR PRODUCTS

	TP102G	HCP621G	HCP421V	HP1200G	HCP621G-ELP
					
Temperature Range	-40°C to 120°C	-190°C to 600°C	-190°C to 400°C	RT to 1200°C	-190°C to 600°C
Atmospheric Control	✓	✓	✓	✓	✓
Sample Area	40mm x 40mm	Ø30mm	Ø30mm	16 x 16mm	Ø30mm
Sample Cooling	Thermoelectric	LN2	LN2	- *	LN2
Thermal Block	Anodized Aluminum	Silver	Silver	Silicon Carbide	Silver
Electrical Feedthroughs	Up to 4	Up to 4	Up to 4	-	Up to 4
Transmission Option Available	✓	✓	✓	✓	

*Heating only, no sample cooling available

Other products to consider....



TS102GXY heating and cooling TEC stage with 40mm x 40mm sample area. Temperature range -40°C to 120°C. Gas tight chamber with gas purge capabilities. Includes XY positioning for positioning sample over transmission aperture. Supports up to 4 electrical feedthroughs.



HCS601G-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.



HCP600G-CAP heating and cooling plate for capillary tube applications. 28mm x 30mm sample area. Temperature range -190°C to 600°C. Gas tight chamber with gas purge capabilities. Manipulate capillary tube while maintaining chamber atmosphere.