

### DESCRIPTION

The **TSA12Gi** Thermoelectric (Peltier) based stage is specifically designed for inverted optical microscopes and is particularly ideal for applications such as Cell culture and biology. It features gastight sample chamber, a wide adjustable viewing window, and customizable base plate. The TSA12Gi can accommodate both petri dishes and microscope slides with its optional cover lids. Thermoelectric heating and cooling modules located on the left and right of the sample heat and cool without the need for LN2.



### KEY FEATURES

#### Dual TEC modules

Thermoelectric modules on both sides of the sample area heat and cool the sample with better speed and temperature uniformity than a single module.

#### Cooling Below Ambient without LN2

Cool down to  $-20^{\circ}\text{C}$  with standard the included C100W water circulator, or upgrade to  $-25^{\circ}\text{C}$  with a [CW5000 Chiller](#). The sealed sample chamber supports a light positive pressure gas purge to help prevent condensation on the sample when cooling below ambient temperatures.



#### Chamber Lid Options

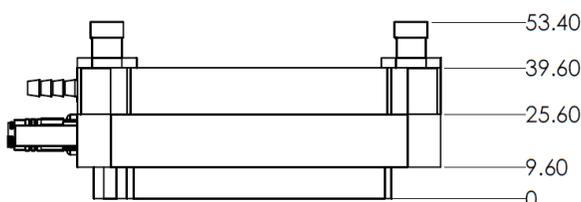
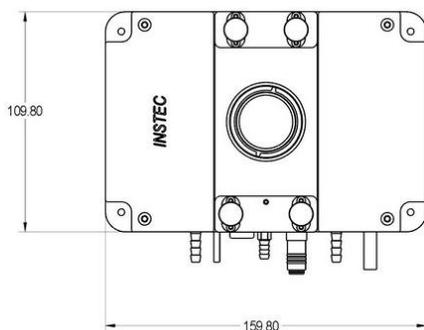
Specialized sample chamber lid options accommodate standard 25mm x 75mm microscope slides, petri dishes, capillary tubes & more.

#### 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 the sample temperature possible. Additional sensor options and alternative sensor types, such as a thermistors, are available upon request

#### Additional Features

- Includes standalone [mK2000](#) temperature controller and C100W benchtop water circulator
- 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

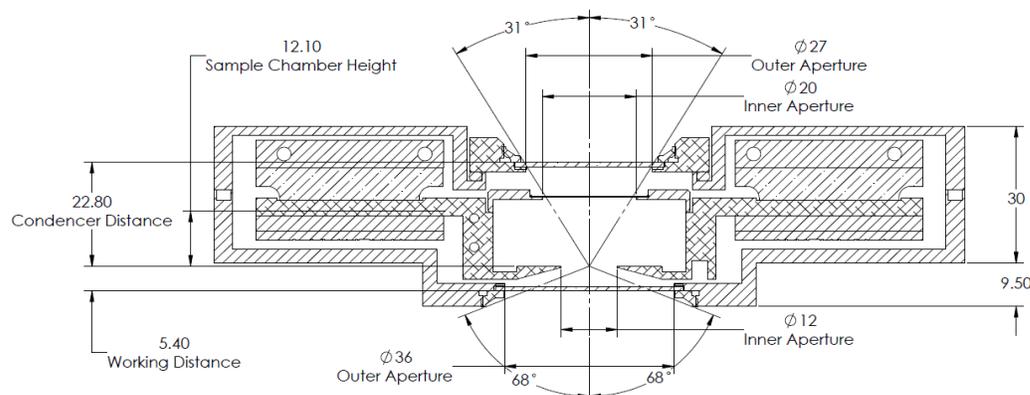
Temperature Control	<b>mK2000</b> with bidirectional LVDC output
Thermal Block	Black anodized aluminum
Sample Thermal Cover	Removable inner cover with additional window
Minimum Temperature	-20°C w/ <b>C100W</b> -25°C w/ <b>CW5000 Chiller</b>
Maximum Temperature	90°C (optional upgrade for 120°C available)
Temperature Sensor	100 Ω Platinum RTD
Maximum Heating Rate	+12°C per minute at 37°C
Maximum Cooling Rate	-6°C per minute at 37°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 – 150W max (not including water cooling accessories)
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
Minimum Condenser Working Distance	22.8 mm
Top Window	Ø27mm aperture (Ø 31.75mm x 1mm glass)
Top Viewing Angle	31° from normal
Inner Lid Viewing Aperture	Ø20mm aperture (Ø 25mm x 0.2mm glass)
Transmission Aperture	Ø12 mm (Ø5 mm aperture for better temperature uniformity available)
Top Viewing Angle	±31° from normal
Bottom Window	Ø38.5mm aperture (Ø 40mm x 1mm glass)
Bottom Viewing Angle	±68° from normal
Window Defrost	Integrated top and inner window defroster

### STRUCTURAL SPECIFICATIONS

Sample Area	Ø40.5mm to accommodate Ø35mm petri dishes, Option for 25mm x 75mm glass slides
Environmental control	Sealed chamber for positive pressure gas purge up to 0.5Bar, very rough vacuum down to 1mBar
Chamber Height	12 mm with removable inner cover, 20mm without removable inner cover
Frame/ TEC cooling	Integrated TEC cooling with included C100W water-cooler. Optional chiller upgrade for increased temperature range
Mounting	Base model includes tapped holes on frame. Horizontal mounting adaptors for specific instruments are available by request
Frame Dimensions	160mm x 110mm x 40 mm
Weight	1000 g



### OPTIONS



#### Upgraded Chiller

Achieve lower minimum temperature with an upgraded water-cooler. The [CW5000](#) has an internal refrigeration unit which cools down to 5°C, lowering the minimum temperature reachable by TEC systems. Chiller upgrade also requires FVC11 valve box for flow control.



#### 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](#)).

*Note: the TSA12Gi is primarily intended for use with Inverted microscope, and may only be used with the TPM-CX40 in a limited capacity*



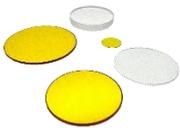
#### Microscope Camera with Temperature Overlay

Integrate digital image acquisition with sample temperature overlay. Includes software (WinDV2 via InsteApp), 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.



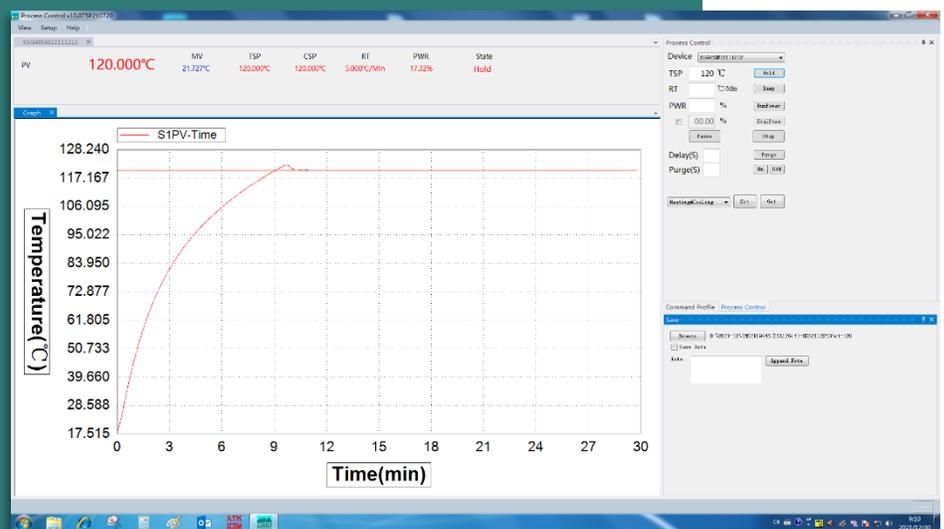
#### Windows

Additional or alternate windows are available, such as Sapphire, BaF2, CaF2, ZnSe

## InsteApp Software

Every TSA12Gi comes with the InsteApp client software for Windows 10/11.

InsteApp grants full control over the mK2000B, but also adds data logging capabilities and temperature vs. time plotting, as well as access to advanced controller parameters such as PID tuning



### SIMILAR PRODUCTS

	TS102S	TS102Si	CLM77Ki	HCS321Gi
				
<b>Temperature Range</b>	-25°C to 120°C	-30°C to 120°C	-190°C to 150°C	-190°C to 250°C
<b>Atmospheric Control</b>				✓
<b>Sample Area</b>	45mm x 45mm	Ø35mm/ 25mm x 75mm	3x3 EM Grid	23mm x 28mm
<b>Sample Cooling</b>	TEC	TEC	LN2	LN2
<b>Thermal Block</b>	Aluminum	Aluminum	Aluminum	Aluminum
<b>Objective working distance</b>	0mm	3mm	5mm	5.3 mm

### Other products to consider....



**HCS621GXY** heating and cooling stage with 28mm x 28mm sample area. Temperature range -190°C to 600°C. Gas-tight chamber with gas purge capabilities. Includes XY positioning and option to add electrical feedthroughs. Offers increased temperature range versus TSA12Gi, and also supports atmospheric control. Unlike TSA12Gi, requires LN2 for sample cooling, and is not designed for inverted microscopes.



**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. Optimized for IR applications, and offers larger temperature range than TSA12Gi, but requires LN2. Not designed for inverted microscopes.



**TP102G-PM** heating and cooling plate with integrated electrical probers. 40mm x 40mm sample area. Temperature range -30°C to 120°C. Gas-tight chamber with gas purge capabilities. Perform optical analysis with simultaneous precision temperature control and electrical probing. Not designed for inverted microscopes.

CONTACT A REPRESENTATIVE 