

THERMAL STAGES FOR MICROSCOPES



TS-4MP Thermal Stage and Controller

With our TS-4SMP/ER Thermal Stage, a specimen on a microscope slide or culture dish can be maintained at any temperature between -20°C and $+100^{\circ}\text{C}$. Set-up is easy, takes little time, and the controller will regulate the stage temperature to within $\pm 0.1^{\circ}\text{C}$.

TS-4MP is a thermoelectric (Peltier) device and has no moving parts. No CO_2 or liquid nitrogen is used for cooling. Only the AC current and a trickle of water are needed for operation. Two versions are available:

Range: TS-4MP -20° to $+60^{\circ}\text{C}$
TS-4MP/ER -20° to $+100^{\circ}\text{C}$

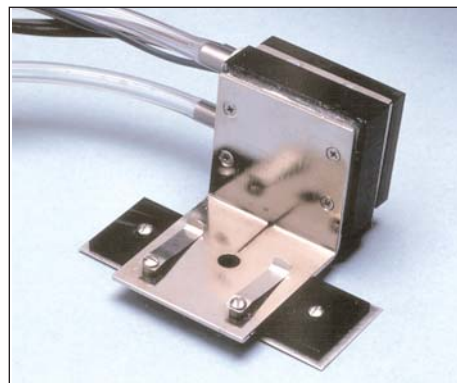
The TS-4MP consists of a **stage**, a **controller** and an **optional pump unit**:

The **Stage** is nickel-plated copper, with a thermoelectric module mounted on one side (see diagram on page 20). The plastic base is the same size and thickness as a glass slide and fits onto the mechanical stage of the microscope in the same manner as a slide. The thermal stage can therefore be moved relative to the optics by the normal mechanical stage controls. A hole in the metal plate permits the use of transmitted light.

Water is required for removal of excess heat generated by Peltier cooling from the stage. The two water tubes have self-sealing connections to prevent spills. Running water from a tap can be used. If tap water is not easily accessible, our pump and tank unit, the PTU-3 (see page 21), is compact and convenient.

Sensors mounted in the stage provide temperature monitoring for control purposes and for safety. The safety sensors prevent overheating in case of failure of cooling water supply or other malfunction.

The **Controller** produces a maximum of 10 Amps at approximately 5 volts DC for the thermoelectric modules in the stage.



TS-4MP Standard stage

- > Holds specimen at any temperature, -20° to $+100^{\circ}\text{C}$
- > Digital display of set-up and operating temperatures
- > Control to within 0.1°C
- > Fits most microscopes
- > Built-in digital thermometer & probe

Output polarity is automatically reversed when the stage requires a change from heating to cooling, or vice versa. During adjustment of the desired temperature, the digital display indicates the control temperature being selected while the set button is depressed. The actual stage temperature is displayed at all other times.

The **Thermometer** circuitry in the TS-4MP can also be used as an independent thermometer, either with the microprobe supplied or with any other Type T thermocouple sensor. A switch on the front panel allows easy selection of the external sensor. Range of the thermocouple is -100° to $+200^{\circ}\text{C}$. A separate thermocouple microprobe is supplied with the TS-4MP.

The optional pump and tank unit (PTU-3, see page 21) is connected to an auxiliary AC output on the back of the controller. The tank provides sufficient circulation to keep the stage cooled. All water connections are self-sealing.

Using the TS-4

The standard TS-4MP thermal stage fits easily onto most microscopes and is adjusted with the mechanical stage controls. There are spring clips on the surface which can

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be used to hold a glass slide in position on the Thermal Stage.

The controller has two display settings. In the "set" position, the control temperature can be adjusted by a rotary control on the front panel. Temperature selection is indicated on the digital display. In the "run" position the actual temperature of the stage is displayed (Automatic regulation of the stage temperature is continuous and independent of the switch setting).

Optional Stages

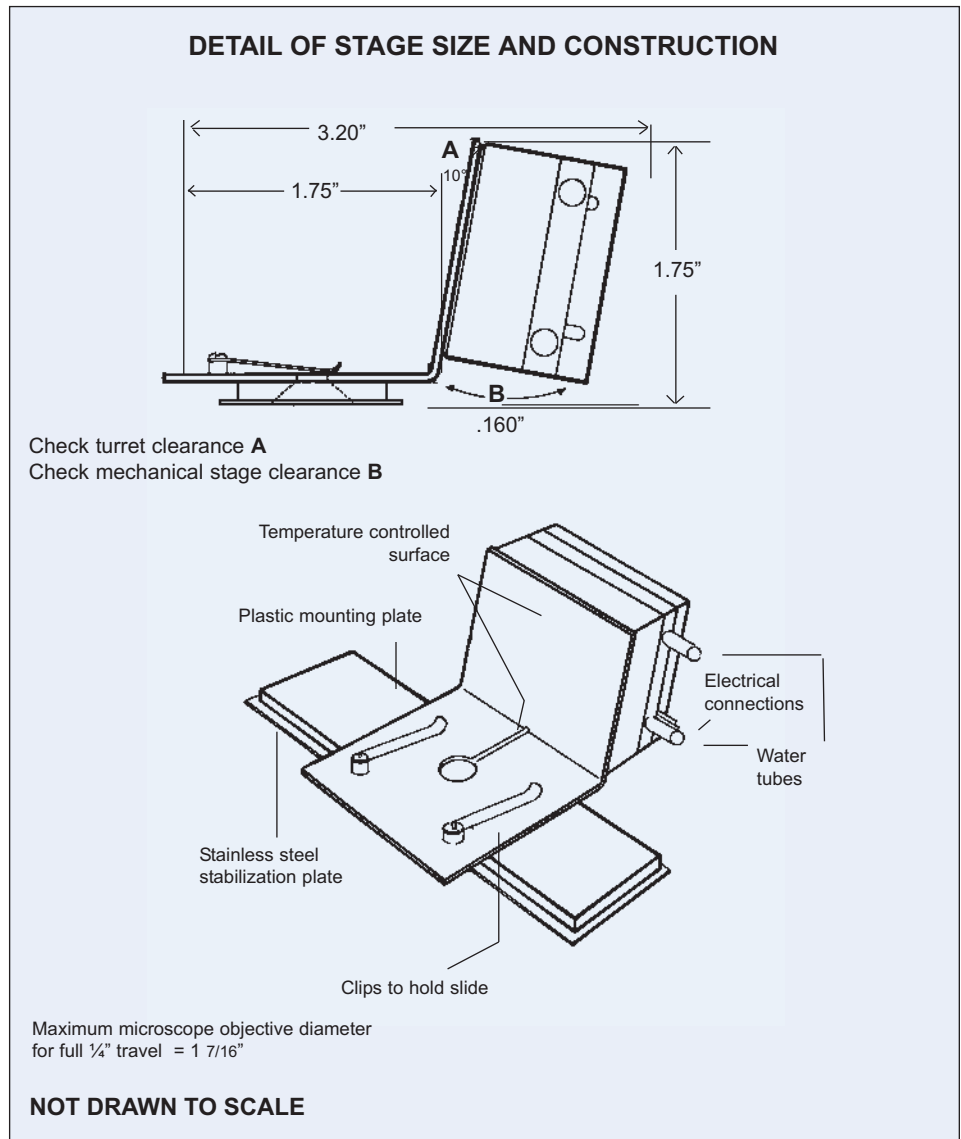


TS-4SMP, 35mm Culture Dish Stage

Physitemp offers two optional petri dish stage designs in addition to the standard TS-4 slide holder.

The TS-4SMP (above) culture dish thermal stage will maintain petri dish and specimen temperature on the microscope stage between -10° and $+60^{\circ}\text{C}$ (extended range TS-4SMPER -10° to $+100^{\circ}\text{C}$). The collar on the stage is designed to accommodate a 35mm 'Nunc' petri dish. The collar may also be removed for use with slides.

The TS-4LMP (right) petri dish thermal stage is designed to accommodate either a 'Nunc' 60 mm or 100 mm petri dish. The TS-4LMP thermal stage will maintain temperature on the microscope stage between -5° and $+60^{\circ}$. These petri dish stages will fit most upright and inverted microscopes.



TS-4/LMP, 100mm Petri Dish Stage

When placing an order please specify model of Thermal Stage (ex. TS-4SMP/PTU Standard Thermal Stage with Pump and Tank Unit). Please be sure to include the make and model of the Microscope with which it will be used so that we can confirm that the stage chosen will fit the given microscope. Modifications may be made to the stage to accommodate a microscope.

For ordering information please see page 34.

THERMAL STAGE FOR MICROSCOPES

Custom Stages

If our stage does not fit easily on your instrument, we may be able to modify it. We make many custom stages for special applications and/or specific microscopes. These devices can maintain stage and specimen temperature anywhere between -20°C and +100°C (depending on model). The custom stages are made to the user's specifications and can be a simple modification of the standard TS-4 stage or a completely new configuration. Both upright and inverted microscopes can be accommodated. Please contact our Engineering Department to discuss your particular application.

Specifications

STAGE

Temp. Range:	TS-4MP	-20°C to +60°C
	TS-4MP/ER	-20°C to +100°C
Temp. Controlled		
Surface Area:	1.25" x 1.5"	
Weight:	16 oz., including lead	
Lead Length:	40 inches	
Material:	Copper, nickel plated	
Mounting:	Plastic. Fits slide holder	

CONTROLLER

Temperature Range:	TS-4MP	-20°C to +60°C
	TS-4MP/ER	-20°C to +100°C
Resolution:	0.1°C	
Power Supply:	115V or 230V AC	
Power Consumption:	approximately 100 Watts	
Dimensions:	8" x 7" x 17"	
Weight:	28 lbs.	

THERMOMETER

Temperature Range:	-100°C to +200°C
Resolution:	0.1°C
Sensor:	Type T thermocouple

PUMP AND TANK UNIT PTU-3 (optional)

Dimensions:	15.75"D x 9.5"W x 21"H
Weight:	18 lbs. (when empty)
Power Supply:	110V or 220V. Must be specified
Power Consumption:	150 Watts
Water Connections:	Self-sealing

Water Pump and Tank Unit

Model PTU-3 - Pump and Tank Unit was designed for use with Physitemp's range of thermoelectric cooling and heating stages. It provides a convenient reservoir of cooling water when a stage is operated in the cooling mode for an extended period of time in a location which has no source of tap water nearby to cool the hot side of the thermoelectric heat pump. The reservoir tank holds seven gallons of water, which is adequate to run the smaller stages like the TS-4MP series Thermal Microscope Stage or the BFSMP series 3 or 5 Freezing Stages for up to eight hours and a larger stage like the BFS-40MPA for up to four hours.



PTU-3, Pump and Tank Unit

Water is circulated using a quiet 1/25 horsepower single phase motor and magnetically driven pump - so there are no rotating seals to leak or replace. Self sealing connectors are used on the inlet and outlet water connections to prevent spillage. Ice cubes may be added to the tank in order to extend the operating time or reduce the lowest temperature to which a thermoelectric stage can cool. A switched accessory outlet on the rear of all thermoelectric controllers and power supplies is used to power the pump so water starts flowing immediately when the controller is turned on.