



Objective Lens Heating Mantle

Instruction Manual

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Fits on any objective lens!

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Objective Lens Heater

The thermo foil Objective lens heater pad is a resistive element that can be used with any temperature controller or power supply. The heater operates with a maximum of 12V DC.

It is recommended that you place the thermo foil on the objective lens prior to power it so the heat can dissipate to the lens.

Note: operating the heater on its own at maximum voltage (12v DC) may burn out the element.

A NOTE OF WARNING: Do not overheat your objective lens, heat can damage some lenses and/or distort focus. Check with the manufacturer to be sure your objective can be heated. Know its limits, and set up your system so as not to exceed them.

Setup:

The thermo foil heater is wrapped around the objective lens at the part of the shaft of the lens where the foil has the best surface contact with the metal of the lens. The plastic surface of the foil should contact the metal of the objective as much as possible. Use the Velcro® fastener to secure the thermo foil in the wrapped position. Try to keep the wrap as tight as possible. The wire should be run so as not to interfere with the rotation of the microscope nose piece. Secure the power wire from the heater carefully as to not get it pinched by any moving parts.



The Heater comes with a mate connector and pins to connect it to any temperature controller or power supply used. Optional cable is available to connect to npi electronics temperature controllers.

Cable Pin-Out:

Power - 2 red wires (no polarity)

Sensor - 2 white wires (no polarity). Sensor is 2225 Ω @ 25°C.

Power Supply:

The thermo foil heater can be powered by a 12V DC power supply. After setting up the thermo foil on the objective lens slowly increase the voltage output until the desired temperature is reached. In most cases no more than 6V DC will be needed.

Temperature Controller:

When using the thermo foil with a temperature controller (npi electronic), it is best to keep the controller in the DIRECT mode. The Direct Mode simply outputs a constant voltage to the thermo foil. This is done by switching the controller to the DIRECT MODE where the temperature is not selected by number, but rather the amount of energy to be sent to the thermo foil is selected. In the Direct Mode, the number on the temperature selection dial indicates a % of the total power that can be delivered to the thermo foil. For example: if the setting is 50, then 50% of the maximum voltage that the controller can output will be sent to the thermo foil. If the maximum voltage is 12 volts, then 6 volts would be sent out at a 50% setting.

One should be careful not to over power the thermo foil since it can overheat and be damaged. It is best to install the thermo foil, plug it into the temperature controller, and then start out in the direct mode at a low %. Slowly raise the power output until the objective is at the temperature you desire. One nice thing about the direct mode is that you do not need a temperature sensor—no feedback is necessary.



For active temperature control, the Objective heater comes with a built-in sensor that can be connected to your temperature controller. If using an npi temperature controller, an optional cable is available to connect the objective heater to the circular DIN connector on the front panel. Measure the temperature and adjust the controller as necessary. If you want, you can switch to the active control mode, and control the temperature of the foil automatically to a set temperature.

Oil immersion Lens:

If you are using an oil immersion lens with a small chamber and you want to use the thermo foil to heat the chamber when the lens is in contact, you have two choices: You can place a sensor in the dish with the cells, and measure the temperature there as you slowly adjust the controller in Direct mode, or when the temperature of the bath gets close to what you need, you can switch over to control mode and go from there. This is fine, so long as the system does not need so much heating that the thermo foil is driven at full power for several minutes. Another option is to use one sensor in the bath, another attached to the lens. If the one attached to the lens is in contact with the thermo foil, it can be used as the feedback sensor as the unit is run in the control mode. The thermo foil should not be damaged in this arrangement. Simply turn up the temperature on the objective lens until the desired temperature in the cell bath is seen.

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