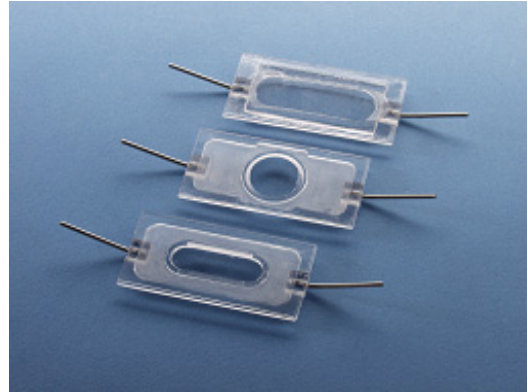


The Warner PHC Heater/Cooler Jackets are designed to bring heating and cooling to our classic Series 20 Imaging and Recording Chambers. Accurate temperature control from 5° to 50°C can be achieved using the PHC jackets in concert with the SC-20 Dual In-line Solution Heater/Cooler. Heated or chilled water flows from the SC-20 into the PHC jacket in direct thermal contact with the chamber bottom coverslip.



The PHC-1 is used for upright microscopes and provides a complete thermal barrier between the chamber-forming coverslip and the local environment. The PHC-2 and PHC-3 are designed for inverted microscopes and provide either rectangular or round openings. (See ordering information for chamber jacket compatibility.)

Heater/Cooler Jackets are provided with a mounting platform, which replaces the standard platforms used with Series 20 chambers. The platform functions as a base for the jacket /chamber sandwich and provides the clamping pressure to make a tight seal. Mounting platforms are machined from black Delrin and are compatible with all Series 20 stage adapters.

## ASSEMBLY

The PHC Heater/Cooler Jacket is designed to act as the base of your Series 20 chamber. The general procedure for assembling PHC Heater/Cooler Jacket is to first mount a coverslip onto the base of your Series 20 Chamber, then seal the chamber onto top of the PHC Jacket. Finally, the completed assembly is mounted into the provided platform. This is followed by making flow connections with jacket and chamber, respectively.

Begin by assembling a clean coverslip onto your Series 20 perfusion chamber following the instruction that came with that chamber. Next, apply a thin layer of vacuum grease to the top of the PHC Jacket. Complete the first step by gently pressing the assembled Series 20 chamber into the greased top of the PHC Jacket. Finally, place the chamber/jacket assembly into the provided platform. Slide the platform side clamps into place and tighten the assembly together using the 4 Phillips-head screws.

## Mounting onto the microscope

The assembled Series 20 chamber/platform can be mounted directly onto a microscope stage if the stage is both flat and has a cutout smaller than the platform. In most cases, however, the stage cutout is larger than the platform necessitating the use of a stage adapter. In addition, a stage adapter is

highly recommended if the platform is to be heated since it provides insulation between the platform and microscope stage.

Warner Instruments stocks stage adapters for most popular microscopes and we will custom manufacture adapters for special applications. Contact our Sales Department for details.

## **PERFUSION**

Fluid flow connections are first made between the PHC jacket and its water supply, followed by connections to the Series 20 chamber. Since the flow path within the PHC Jacket is closed, either port can be used for fluid input. Temperature control of the chamber is maintained by controlling the temperature of the fluid flowing through the Jacket. This is most directly achieved by using one channel of Warner's **SC-20** Inline Solution Heater/Cooler.

Make perfusion connections to your chamber as described in that chamber's User's Manual. Temperature control for the perfusion solution is recommended to reduce the amount of work required by the Jacket to maintain a working temperature. This task can be directly achieved by using the other channel of Warner's **SC-20** Inline Solution Heater/Cooler for the purpose as both flowing solutions will be maintained at the same working temperature.

Insertion of perfusion tubing to the various ports can be greatly simplified by cutting the end of the tube on a bias rather than with a square face. We recommend pre-filling tubing with buffer before insertion as this will reduce the occurrence of bubbles in the flow path.

## **Suction/Level control**

Removal of solution from Series 20 chambers is usually performed by aspiration. We recommend the use of a vacuum trap to avoid introduction of aspirant into your house vacuum lines. In general, suction tubing is installed in a slot in the suction reservoir wall allowing adjustment of the fluid level in the main body of the chamber. An additional benefit associated with the platform supplied with the PHC Jacket is the attached suction tube. This tube can be used to provide secondary aspiration or can be used to replace the aspirator in your Series 20 chamber. An Allen wrench is supplied for making adjustments. In any case, adjust the vacuum until the suction rate is equal to the flow rate into the chamber.

## **MAINTENANCE**

Cleaning of polycarbonate chambers should be performed using a dilute detergent solution. Alternatively, Warner instruments has developed a trisodium phosphate (TSP) wash protocol which gives very good results. Contact our Technical Support staff or download the protocol in PDF format from our website. (<http://www.warneronline.com/techref.html>)

**NOTE:** Do not use alcohol, ether or other solvents on plastic parts. Solvents may be used on the anodized surfaces of the platforms. All chamber parts may be autoclaved.