# PE-1 TEMPERATURE CONTROL SYSTEM
# INSTRUCTION AND OPERATING MANUAL

## SECTION I
## GENERAL INFORMATION

### 1.1 UNPACKING

Retain all cartons and packing material until the unit is operated and found to be in good condition. If the unit shows external or internal damage, or does not operate properly, contact the transportation company and file a damage claim. Under ICC regulation this is your responsiblity.

The PE-1 units are packed with plastic water connectors and a removable power cord. Care should be taken not to discard these parts when unpacking the unit.

### 1.2 DESCRIPTION

NESLAB's PE-1 Temperature Control System is designed to recirculate a continuous source of temperature controlled fluid to the Perkin-Elmer Omni Etch Plasma Etching System. The PE-1 is equipped with an air cooled fin and tube heat exchanger, sealable reservoir, temperature controller and recirculating pump.

Temperature control of the reciruclating fluid is maintained by cycling an electric heater when the temperature starts to fall and a fan when cooling is required. The operating range of the PE-1 is approximately 10°C above ambient up to 65°C.

### 1.3 SPECIFICATIONS

PE-1 TEMPERATURE CONTROL SYSTEM

| | |
|---|---|
| Temperature Range: | 10°C above ambient up to 65°C |
| Temperature Stability: | ±2.0°C |
| Pumping Capacity: | 1.5 GPM at 20 PSI |
| Maximum Cooling Capacity: | 550 watts at 40°C in a maximum ambient of 25°C. Derate 17% for 50 Hz |
| Reservoir Volume: | 0.5 liters |
| Power Requirements: | 200/240 volt, 50/60 Hz, 4.2 amps., single phase |
| Heater Wattage: | 700 watts |

## SECTION II
## INSTALLATION AND OPERATION

### 2.1 SITE

The NESLAB PE-1 is designed for indoor operation in a laboratory or clean industrial environment. Since the ultimate cooling capacity is determined by

the ambient temperature it is suggested that the PE-1 be located in an area where the temperature is below 85°F.

The PE-1 is air cooled. Air intake is at the front of the unit and warm air discharge is at the rear. It is important that the unit is placed in an area where air intake and discharge are not impeded. A minimum 12 inches of clear airspace is recommended.

## 2.2 ELECTRICAL REQUIREMENTS

The PE-1 is supplied with a removable power cord. Insert the proper end of the power cable into the jack located on the rear of the PE-1. The plug should be placed in a properly grounded 200/240 volt, 50/60 Hz, 1 phase power source.

## 2.3 RECIRCULATING SYSTEM

### 2.3.1 Tubing and Hose Connections

The PE-1 Supply/Return connections are located on the rear of the unit. The standard connections are 1/2" FPT and plastic water connectors are provided to accept either 3/8" I.D. or 1/2" I.D. flexible tubing. The supply of the PE-1 should be connected to the inlet of the Omni Etch. The outlet of the Omni Etch should be connected to the return of the PE-1.

All hose connections should be securely clamped. Avoid running lines over other heat producing equipment, hot water pipes, etc.

It is important to keep the distance between the PE-1 and the Omni Etch as short as possible. NESLAB does not recommend plumbing the PE-1 with tubing smaller than 3/8" I.D. All plumbing lines should be straight and without bends that could increase back pressure and reduce flow.

### 2.3.2 Pump

The PE-1 is equipped with a turbine type pump capable of delivering a flow rate of 1.5 GPM at 20 PSI. A built in factory set bypass is installed to limit the maximum discharge pressure to approximately 35 PSI. The bypass line will divert flow directly back to the reservoir when the preset pressure is reached.

### 2.3.3 Fluids

A 50/50 mixture (by volume) of Prestone II Automobile Antifreeze (Union Carbide Corp.) and single distilled water is recommended as the circulating fluid.

### 2.3.4 Filling Reservoir

Remove the access panel on the top of the PE-1 by unscrewing the thumb screws and locate the reservoir plug (square nut). Fill the reservoir to the bottom of the fill hole flange. Since the reservoir capacity is small compared to the volume of the cooling loop and the Omni Etch, have extra fluid available to keep the system topped off when external circulation is started.

### 2.3.5 Start-Up and Temperature Adjustment

Once the PE-1 has been filled and the proper plumbing connections have been made the power toggle switch should be placed in the "On" position and the "Push To Start" button should be depressed. The circulation pump and temperature control system will be activated. Within a few seconds after start-up you should observe flow through the supply line. In most installa-

# WATER-TO-WATER HEAT EXCHANGERS SYSTEM III

## FEATURES

Continuous duty pump motors provide trouble-free circulation

Heat load sensing valve monitors and conserves house water requirements

Heat exchanger designed for low pressure drop

Panel mounted gauges monitor recirculating temperature and fluid pressure

Flow control valve and flow meter allow precise setting of recirculating rate

Compact size makes maximum use of floor space

Low Liquid Level/ High Temperature safety interlocks protect equipment

## APPLICATIONS

Laser Cooling

Semiconductor Equipment

Vacuum Systems

Diffusion Pumps

Deionized Recirculating Loops

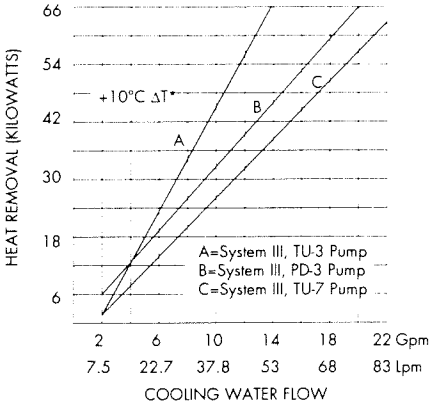
Analytical Instrument Cooling

The System III Water-to-Water Heat Exchanger is the perfect choice when you need high capacity heat removal, but your tap or building water source is too cold, unpredictable, or too dirty to rely on.

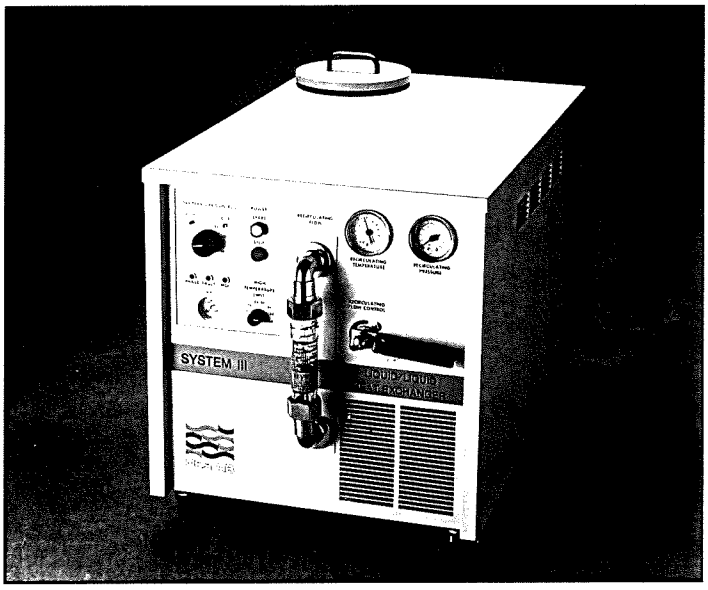
Exactly like the System I and System II, the System III utilizes your water source to cool one side of a built-in heat exchanger, while the secondary circuit pumps clean, temperature controlled coolant to your instrument.

The System III has the capability of removing a large heat load, but it utilizes a limited amount of space. A System III will occupy a footprint of only 3.2 ft² (.3 M²), still leaving you plenty of room for your other equipment.

### COOLING CAPACITY




*Heat load removal depends on the temperature of your in-house, or tap water system. We've plotted the cooling capacity based on a 10°C temperature differential (ΔT°C) between your supply water and the water at the System III outlet. Pressure differential required from house water system does not exceed 10 psi.




## SPECIFICATIONS

| | | |
|---|---|---|
| **MODEL** | SYSTEM III | |
| **COOLING CAPACITY** | 66 Kw<br>Cooling capacity contingent on temperature and flow of in-house water source. See cooling graph below. | |
| **TEMPERATURE RANGE** | +5°C to +40°C | |
| **TEMPERATURE STABILITY** | ±1.0°C | |
| **PUMP** | PD-3 Pump<br>10 Gpm, 60 psi<br>31.4 Lpm, 2.7 Bar* | TU-3 Pump<br>8 Gpm, 60 psi<br>18.0 Lpm, 1.8 Bar* |
| | TU-7 Pump<br>13 Gpm, 40 psi<br>40.8 Lpm, 1.8 Bar* | |
| **RESERVOIR VOLUME** | | |
| Gallons/Liters: | 1.25/4.7 | |
| **CASE DIMENSIONS** | | |
| (H x W x D) In. | 20 3/4 x 17 3/8 x 27 | |
| Cm. | 53.0 x 45.0 x 69.0 | |
| **POWER REQUIREMENTS** | 208/230 V, 60 Hz<br>9 Amps, 1ø** | |
| 50 Hz Models: | 220/240 V, 50 Hz<br>9 Amps, 1ø** | |
| **SHIPPING WEIGHT** | 175 Lbs/79.3 Kgs | |

*Pump specification for 50Hz units. ** System III with TU-7 pump requires 3ø power. All specifications listed for standard unit circulating water at 20°C, using pure water as a coolant on secondary loop. Performance specifications will be affected by changes in fluids. Specifications may change without notice.