

# **HTC-1200 Recirculating Heater**

NESLAB Manual P/N 013966  
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## **Operation and Maintenance Manual**

# HTC-1200 Recirculating Heater Operation and Maintenance Manual

## Table of Contents

<b>PREFACE</b>	
	Compliance ..... 2
	Unpacking ..... 2
	Warranty ..... 2
	After-sale Support ..... 2
<b>SECTION I</b>	
<b>Safety</b>	
	Warnings ..... 3
<b>SECTION II</b>	
<b>General Information</b>	
	Description ..... 4
	Specifications ..... 4
<b>SECTION III</b>	
<b>Installation</b>	
	Site ..... 5
	Electrical Requirements ..... 5
	Plumbing Requirements ..... 5
	Fluids ..... 6
	Filling Requirements ..... 6
	Auto Refill (Optional) ..... 6
	Water Quality Recommendations ..... 7
<b>SECTION IV</b>	
<b>Operation</b>	
	Start Up ..... 8
	Temperature Adjustment ..... 8
	Fault Interlock Contact ..... 8
	Low Fluid Level Monitor ..... 9
	High Temperature Monitor ..... 9
	Flow Control ..... 9
<b>SECTION V</b>	
<b>Maintenance</b>	
	Service Contracts ..... 10
	Pressure Relief Valve ..... 10
	Cleaning ..... 10
	Algae ..... 10
<b>SECTION VII</b>	
<b>Service</b>	
	Configuration ..... 11
	Pump Strainer ..... 11
	Pump Motor Lubrication ..... 12
<b>SECTION VIII</b>	
<b>Warranty</b>	..... 13

# Preface

## Compliance

Products tested and found to be in compliance with the requirements defined in the EMC standards defined by 89/336/EEC as well as Low Voltage Directive (LVD) 73/23/EEC can be identified by the CE label on the rear of the unit. The testing has demonstrated compliance with the following directives:

LVD, 73/23/EEC	Complies with UL 3101-1:93
EMC, 89/336/EEC	EN 55011, Class A Verification EN50082-1:1992 IEC 1000-4-2:1995 IEC 1000-4-3:1994 IEC 1000-4-4:1995

For any additional information refer to the Letter of Compliance that shipped with the unit (Declaration of Conformity).

## 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 regulations, this is your responsibility.

## Warranty

Units have a one year warranty against defective parts and workmanship starting from the date of shipment. See back page for more details.

## After-sale Support

NESLAB is committed to customer service both during and after the sale. If you have questions concerning the operation of your unit, contact our Sales Department. If your unit fails to operate properly, or if you have questions concerning spare parts or Service Contracts, contact our Service Department. Before calling, please copy the following information off the serial tag on the rear of the unit.

Unit Serial Number \_\_\_\_\_

Unit BOM Number \_\_\_\_\_

## Section I Safety

### Warnings

Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit. If you have any ..... questions concerning the operation of your unit or the information in this ..... manual, contact our Sales Department (see After-sale Support).

**Performance of installation, operation, or maintenance procedures other than those described in this manual may result in hazardous situations and may void the manufacturer's warranty**

**Observe all warning labels.**

**Never remove warning labels.**

**Never operate damaged or leaking equipment.**

**Never operate the unit without fluid in the reservoir.**

**Always turn off the unit and disconnect the line cord from the power source before performing any service or maintenance procedures, or before moving the unit.**

**Always empty the reservoir before moving the unit.**

**Always turn off the unit and disconnect the line cord from the power source before moving the unit.**

**Never operate equipment with damaged line cords.**

**Refer service and repairs to a qualified technician.**

In addition to the safety warnings listed above, warnings are posted throughout the manual. The warnings are designated by an exclamation point inside an equilateral triangle with text highlighted in bold print. Read and follow these important instructions. Failure to observe these instructions can result in permanent damage to the unit, significant property damage, or personal injury or death.

## Section II General Information

### Description

The HTC-1200 Recirculating Heater is designed to provide a continuous flow of heated fluid at a constant flow rate and temperature.

The unit consists of a stainless steel reservoir, a pump, a heater with a high temperature limit device, and a digital temperature controller.

### Specifications

#### Temperature Range<sup>1,2</sup>

Ambient to +90°C

#### Pumping Capacity<sup>3</sup>

3 gpm, 60 psi

#### Unit Dimensions<sup>4</sup>

(H x W x D)

*Inches*

19 x 23 1/8 x 18 5/8

*Centimeters*

48.3 x 58.7 x 47.3

#### Reservoir Volume

*Gallons*

5.5

*Liters*

20.8

#### Weight

*Pounds*

85

*Kilograms*

38.5

1. High temperature ranges are available up to +130°C. Contact us for details.
2. Using water as recirculating fluid, 60°C setpoint, 21°C ambient. Specification will be affected by temperature, ambient or fluid.
3. PD-2 pump, 60Hz unit. 2.5 gpm, 60 psi for 50Hz units. Optional pumps are available.
4. For units with other than PD-2 pumps, dimensions are 35¾" x 23¼" x 18¾" (H x W x D).

## Section III Installation

### Site

The unit should be located in a laboratory or clean industrial environment where ambient temperatures are inside the range of +55°F to +95°F (+13°C to +35°C).



**Never place the unit in a location where excessive heat, moisture, or corrosive materials are present.**

### Electrical Requirements



**The unit construction provides extra protection against the risk of electrical shock by grounding appropriate metal parts. The extra protection may not function unless the power cord is connected to a properly grounded outlet. It is your responsibility to assure a proper ground protection is provided.**

Refer to the serial number on the rear of the unit for the specific electrical requirements of your unit.

Ensure the voltage of the power source meets the specified voltage,  $\pm 10\%$ .

### Plumbing Requirements

Before installing the unit to an instrument that previously used tap water as a circulating fluid, flush the instrument several times to remove any rust or scale that has built up. The manufacturer of the instrument should be able to recommend a cleaning fluid for their equipment.

The plumbing connections are located on the right side of the unit and are labelled SUPPLY and RETURN. These connections are ½ inch MPT.

Connect the SUPPLY fitting to the inlet of the instrument being heated.  
Connect the RETURN fitting to the outlet of the instrument being heated.

Flexible tubing, if used, should be of heavy wall or reinforced construction. All tubing should be rated to withstand 80 psi at the highest operating temperature. Make sure all tubing connections are securely clamped. Avoid running tubing near radiators, hot water pipes, etc. If substantial lengths of tubing are necessary, insulation may be required to prevent heat loss.

Tubing and insulation are available from NESLAB. Contact our Sales Department for more information (see Preface, After-sale Support).

It is important to keep the distance between the unit and the instrument being heated as short as possible, and to use the largest diameter tubing practical. Tubing should be straight and without bends. If diameter reductions

must be made, they should be made at the inlet and outlet of the instrument being heated, not at the unit.

If substantial lengths of lines are required, they should be pre-filled with circulating fluid before connecting them to the unit.

## Fluids

The selected circulating fluid must have a viscosity of 50 centistokes or less at the lowest operating temperature.



**Never use flammable or corrosive fluids with this unit.**



**Do not use automobile anti-freeze. Commercial anti-freeze contains silicates that can damage the pump seals. Use of automobile anti-freeze will void the manufacturer's warranty.**

Filtered tap water is the recommended fluid for operation from +8°C to +80°C. See Water Quality Recommendations on the next page.

Above +80°C, you are responsible for fluids used.

## Filling Requirements

The reservoir access panel is located at the left rear of the top cover. To remove the access panel, slide the latch back (towards the rear of the unit) and lift.

The reservoir cover is located below the access panel. Loosen the thumb screws and remove the reservoir cover.

Fill the reservoir with cooling fluid to within 1 inch of the top.

Keep extra fluid on hand until the entire system (HTC-1200, the instrument being heated and the tubing that connects them) is filled.

Replace the reservoir cover and the access panel.

## Auto Refill (Optional)

Auto refill maintains the correct fluid level in the reservoir. The device consists of a reservoir float switch, a solenoid valve and a plumbing connection.

The plumbing connection is labelled AUTO REFILL. The connection is a  $\frac{3}{8}$  inch OD barbed fitting. Connect this fitting to a make-up fluid source.

Make sure all connections are securely clamped.

## Water Quality Recommendations

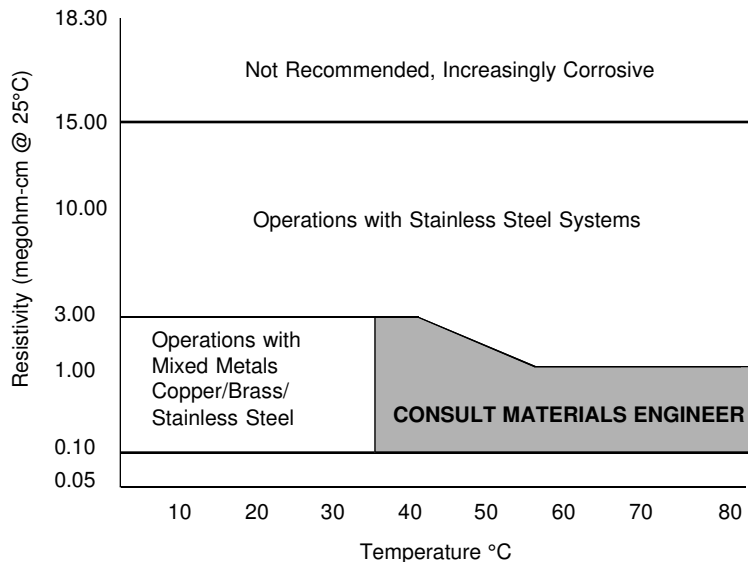
**Unfavorably** high total ionized solids (TIS) can accelerate the rate of galvanic corrosion. These contaminants can function as electrolytes which increase the potential for galvanic cell corrosion and lead to localized corrosion such as pitting which can be observed at the studs and on the outside surface of cooling coils. Eventually, the pitting will become so extensive that the coil will leak refrigerant into the water reservoir.

As an example, raw water in the United States averages 171 ppm (as NaCl). The recommended level for use in a water system is between 0.5 to 5.0 ppm (as NaCl).

Recommendation: Initially fill the tank with distilled/deionized water. Do not use untreated tap water as the total ionized solids level may be too high.

Maintain this water quality at a resistivity of between 1 to 10 megohm-cm (compensated at 25°C) by using a purification system. Although the initial fill may be as high as 10 megohm-cm (compensated at 25°C), the desired level for long time usage is 1 to 3 megohm-cm (compensated at 25°C).

The above two recommendations will reduce the electrolytic potential of the water and prevent or reduce the galvanic corrosion observed.



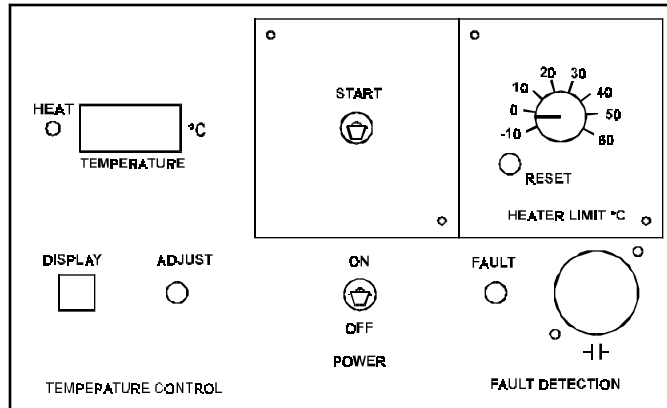


## Section IV Operation

### Start Up

Before starting the unit, double check all electrical and plumbing connections and make sure the circulating system (the HTC-1200, the instrument being heated, and the tubing that connects them) has been properly filled with circulating fluid.

To start the unit, place the POWER ON/OFF switch in the ON position and momentarily press the START switch upward. The circulation pump will start and the TEMPERATURE LED will indicate the fluid temperature.



Digital Temperature Controller

### Temperature Adjustment

To display the temperature setpoint, press and hold the DISPLAY button. To adjust the temperature setpoint, press and hold the DISPLAY button and turn the ADJUST dial until the desired temperature setpoint is indicated on the TEMPERATURE LED display.

**NOTE:** Inadvertent movement of the ADJUST dial, regardless of the position of the DISPLAY button, will result in a change in the setpoint. This change will not be immediately reflected on the digital display, unless the DISPLAY button is pressed. The display will eventually change as the unit responds to the new setpoint.

The HEAT LED on the front of the control box indicate the status of the heater. The LED indicates power is supplied to the heater.

### Fault Interlock Contact

A set of contacts are connected to a receptacle on the front of the control box. The contacts are rated 15A, 125V. This is not a power inlet or outlet. The receptacle is isolated from the circuitry. Its ground pin is connected to the chassis. The contacts are closed during normal operation and open when the unit is turned off or when a fault occurs.

## Low Fluid Level Monitor

The low fluid level monitor is connected to a float switch in the reservoir. A low liquid level fault occurs when the fluid in the reservoir drops below the operating level.

In the event of a low fluid fault, the unit will shut down immediately and the FAULT LED will light. The fault must be identified and corrected before the unit can be restarted.

## High Temperature Monitor

The high temperature monitor is connected to a sensor that monitors the fluid temperature as it exits the heat exchanger. The monitor protects the system from exposure to excessively hot fluid. A temperature fault occurs when the circulating fluid temperature exceeds the set temperature limit.

In the event of a high temperature fault, the unit will shut down immediately and the FAULT LED will light. The fault must be identified and corrected before the unit can be restarted.

**NOTE:** Another adjustable heater limit is located under the bonnet. To set the limit, first turn the dial fully clockwise and press the red RESET button. On units without a reset button recycle the POWER switch OFF then back ON. Next, turn the dial on the front of the control box until the reference line points to the desired temperature. The temperatures surrounding the adjustment dial are in degrees Celsius

## Flow Control

The flow control handle is connected to a valve that controls the flow of fluid to the instrument being heated. The handle is located on the right side of the unit, next to the plumbing connections.

When the handle is turned fully counterclockwise, the valve is open and all fluid is supplied to the instrument being heated. When the handle is turned fully clockwise, the valve is closed and no fluid is supplied to the instrument being heated. When the handle is between these two positions, the flow rate of the fluid is between full flow and no flow. Use a flow meter on the SUPPLY line to adjust the desired flow rate.

Make sure the flow control valve is closed position before starting the unit. Once the unit is running, use the handle to slowly open the valve until the desired flow rate is adjusted. Never start the unit with the valve in the open position and never “crank” the valve wide open from the closed position.

## Section V Maintenance

### Service Contracts

NESLAB offers on-site Service Contracts that are designed to provide extended life and minimal down-time for your unit. For more information, contact our Customer Service Department (see Preface, After-sale Support).

### Pressure Relief Valve

On units with PD-2 pumps an adjustable pressure relief valve establishes the maximum operating pressure of the unit. If the pressure of the fluid leaving the pump exceeds the valve setting, the relief valve will bypass the fluid within the unit to relieve the pressure. The relief valve does not determine the actual operating pressure; the operating pressure of the system is determined by the back pressure of the connected equipment and the setting of the flow control.

If adjustment is necessary, consult our Service Department for assistance.

For applications requiring a maximum pressure less than 55 psi, an External Pressure Reducer (EPR) is available. An EPR allows an adjustable operating pressure of 10 to 50 psi. Contact our Sales Department for more information (see Preface, After-sale Support). Before calling, please obtain the following information:

*BOM number*  
*Serial number*

### Cleaning

Periodically inspect the reservoir. If cleaning is necessary, flush the reservoir with a cleaning fluid compatible with the circulating system and the fluid.

### Algae

To restrict the growth of algae in the reservoir, we recommend the reservoir cover be kept in place and that all circulation lines be opaque. This will eliminate the entrance of light which is required for the growth of most common algae.

NESLAB recommends the use of Chloramine-T, 1 gram per 3.5 liters.

## Section VI Service



For personal safety and equipment reliability, the following procedure should only be performed by a qualified technician. Contact our Service Department for assistance (see Preface, After-sale Support).

### Configuration

The unit has a hinged top cover to allow service access. The top cover is secured to the unit base by a hinge between the top cover and base (along the rear of the unit), and by two spring clips located at the front corners. To gain access to the pump or the reservoir area, lift the top cover and tilt it back. A support brace, located on the right side of the inner base, will stop and support the top cover.

### Pump Strainer

If debris is in the system, the strainer will prevent the material from being drawn into the pump and damaging the pump vanes.

After initial installation, the strainer will most probably become clogged with debris and scale within the first week. Therefore, the strainer must be cleaned after the first week of installation. After this first cleaning, a monthly visual inspection is recommended. After several months, the frequency of cleaning will be established.

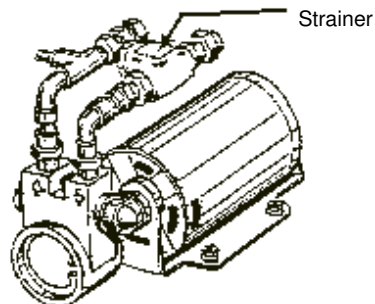
Before cleaning the strainer, disconnect the line cord from the power source and drain the reservoir.

#### PD-2 Pumps

PD-2 pumps have a wire mesh screen (under hex nut) located in the pump suction line.

Remove the right side access panel. Unscrew the hex nut on the strainer and remove the screen. Clean the screen by rinsing it with water.

When the screen is clean, replace it in the strainer, tighten the hex nut and replace the panel. Refer to Section III, Filling Requirements for instructions on replacing the circulating fluid.



### TU Pumps

TU pumps have a wire mesh screen located in the reservoir.

Open the bonnet and remove the access panel located on top of the reservoir cover.

Cover the strainer with a plastic bag to help catch any debris which may become free.

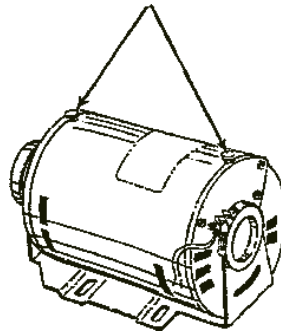
Unscrew the strainer, rinse it with water. Replace the strainer. Refer to Section III, Filling Requirements for instructions on replacing the fluid.

### Pump Motor Lubrication

PD recirculating pumps require motor lubrication. Motors used to drive the pump are manufactured by several companies. These motors use sleeve type bearings with large oil reservoirs. Oiling instructions are generally posted on each motor. In the absence of legible lubrication instructions, add approximately 30 to 35 drops of SAE 20 non-detergent oil to each bearing on the following schedule (SAE 20 = 142 CS viscosity):

Duty Cycle	Oiling Frequency
Continuous	Each year
Intermittent	Each 2 years
Occasional	Each 5 years

Fill Holes (Typical)



## WARRANTY

NESLAB Instruments, Inc. warrants for 12 months from date of shipment any NESLAB unit according to the following terms.

Any part of the unit manufactured or supplied by NESLAB and found in the reasonable judgment of NESLAB to be defective in material or workmanship will be repaired at an authorized NESLAB Repair Depot without charge for parts or labor. The unit, including any defective part must be returned to an authorized NESLAB Repair Depot within the warranty period. The expense of returning the unit to the authorized NESLAB Repair Depot for warranty service will be paid for by the buyer. NESLAB's responsibility in respect to warranty claims is limited to performing the required repairs or replacements, and no claim of breach of warranty shall be cause for cancellation or rescission of the contract of sales of any unit.

With respect to units that qualify for field service repairs, NESLAB's responsibility is limited to the component parts necessary for the repair and the labor that is required on site to perform the repair. Any travel labor or mileage charges are the financial responsibility of the buyer.

The buyer shall be responsible for any evaluation or warranty service call (including labor charges) if no defects are found with the NESLAB product.

This warranty does not cover any unit that has been subject to misuse, neglect, or accident. This warranty does not apply to any damage to the unit that is the result of improper installation or maintenance, or to any unit that has been operated or maintained in any way contrary to the operating or maintenance instructions specified in NESLAB's Instruction and Operation Manual. This warranty does not cover any unit that has been altered or modified so as to change its intended use.

In addition, this warranty does not extend to repairs made by the use of parts, accessories, or fluids which are either incompatible with the unit or adversely affect its operation, performance, or durability.

NESLAB reserves the right to change or improve the design of any unit without assuming any obligation to modify any unit previously manufactured.

THE FOREGOING EXPRESS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

NESLAB'S OBLIGATION UNDER THIS WARRANTY IS STRICTLY AND EXCLUSIVELY LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE COMPONENT PARTS AND NESLAB DOES NOT ASSUME OR AUTHORIZE ANYONE TO ASSUME FOR IT ANY OTHER OBLIGATION.

NESLAB ASSUMES NO RESPONSIBILITY FOR INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO LOSS OR DAMAGE TO PROPERTY, LOSS OF PROFITS OR REVENUE, LOSS OF THE UNIT, LOSS OF TIME, OR INCONVENIENCE.

This warranty applies to units sold in the United States. Any units sold elsewhere are warranted by the affiliated marketing company of NESLAB Instruments, Inc. This warranty and all matters arising pursuant to it shall be governed by the law of the State of New Hampshire, United States. All legal actions brought in relation hereto shall be filed in the appropriate state or federal courts in New Hampshire, unless waived by NESLAB.