



Recirculating Heater Manual  
**Model: RH Series**  
RH-5L, RH-30L, RH-50L



## Index

1. Safety Instructions and Features
  - 1.1 Safety Instructions
  - 1.2 Purposes and features
  - 1.3 Technical parameters
2. Diagrams
3. Control panel operation
4. Preparing for installation
5. Instructions for installation
6. Notes
  - 6.1 Operating
  - 6.2 Storage
7. Maintenance
8. After-sales service



At USA Lab, safety is our number one priority. The following information provides guidelines for safety when using USA Lab equipment.

Any piece of machinery can become dangerous to personnel when improperly operated or poorly maintained.

All employees operating and maintaining USA Lab equipment should be familiar with its operation and should be thoroughly trained and instructed on safety.

Most accidents are preventable through safety awareness.

## Training

It is the responsibility of the customer to ensure that all personnel who will be expected to operate or maintain the equipment participate in training and instruction sessions and become trained operators. All personnel operating, inspecting, servicing or cleaning this equipment must be properly trained in operation and machine safety. BEFORE operating this equipment, read the operating instructions in the equipment manual. Become thoroughly familiar with the machinery and its controls.

# Safety

- Ensure that all power sources are turned off when the machine is not in use. This includes electrical and pneumatic power.
- Read the manual for any special operational instructions for each piece of equipment. All USA Lab authored manuals are typically included with each device as well as posted online at: <https://www.usalab.com/resources>
- Know how the equipment functions and understand the operating processes.
- Know how to shut down the equipment.
- Wear the appropriate personal protective equipment for the job to be performed (EX: eye protection, gloves, safety shoes). Ensure that nothing you are wearing could get caught in the machinery.
- When working on or around all equipment, avoid wearing loose clothing, jewelry, unrestrained long hair, or any loose ties, belts, scarves or articles that may be caught in moving parts. Keep all extremities away from moving parts. Entanglement can cause death or severe injury.
- For new equipment, check plant voltage with the voltage specified on the machine. Electrical specifications for your machine are printed on the machine tag. A properly grounded electrical receptacle is required for safe operation regardless of voltage requirements.
- Use this equipment only for its intended purpose.
- Keep the operating zone free of obstacles that could cause a person to trip or fall toward an operating machine. Keep fingers, hands or any part of the body out of the machine and away from moving parts when the machine is operating.
- Any machine with moving parts and/or electrical components can be potentially dangerous no matter how many safety features it contains. Stay alert and think clearly while operating or servicing the equipment. Be aware of operations and personnel in your surroundings. Be attentive to indicator lights, warning lights and/or operator interface screens displayed on the machine and know how to respond.
- Do not operate machinery if you are fatigued, emotionally distressed or under the influence of drugs or alcohol.
- Know where the FIRST AID SAFETY STATION is located.
- Know where FIRE EXTINGUISHING EQUIPMENT is located.
- Never sit or stand on the machine or on anything that might cause you to fall against the machine.
- Rotating and moving parts are dangerous. Keep clear of the operating area. Never put any foreign object into the operating area.
- Use proper lifting and transporting devices for heavy equipment. Some types of equipment can be extremely heavy. An appropriate lifting device should be used.
- Use caution when moving portable equipment. In some cases the machinery can be heavy and/or may be top heavy. Portable equipment can gain momentum during transporting and must always be controlled.

## **1 Safety Instructions and Features**

### **1.1 Safety Instructions**

**ONLY USE SILICONE OIL in the Bath. Elements, sensors, switches, or the pump damaged due to using water, WILL NOT BE COVERED UNDER WARRANTY.**

The use of Personal Protection Equipment (PPE) is REQUIRED.

Follow all federal, state, and municipal laws, codes, and ordinances.

Please make sure the power connection is correct and well-grounded. (see the technical parameters for details)

Tubing lines should be unobstructed without any hard bends in the run. Install gasket in the end of the lines before using.

Apply a rag to wipe the parts clean after washing away stains; do not use hard objects / abrasives.

Do not use flammable, corrosive, or explosive substances on, in or near the equipment.

Do not run the pump dry or without priming.

If there is a problem, do not continue to use the heater. Call us immediately.

#### **Acceptable Transfer Fluids:**

**-50°C – 200°C:** Caldera 7 Silicone Oil.

**NOTICE:** Heating silicone oil to 200°C in an open bath (RH Series) can cause polymerization of the oil.

### **1.2 Purposes and features**

The RH Series is intended to be used as a heater and circulator for the JR / JRE series of reactors. It can heat a reactor up to 200°C. Closed loop functionality provides greater temperature stability. PID temperature calibration increases accuracy. Controller display is bright and easy to see from any angle. The heavy duty pump can keep the flow going strong.

### 1.3 Technical Parameters

RH Series Specifications	RH-5L	RH-30L	RH-50L
Reservoir Capacity (L)	5L	30L	50L
Reservoir Dimensions (In)	11" x 11" x 10"	19" x 19" x 12"	20" x 22" x 14"
Temperature Range (°C)	70°C - 275°C		
Power Requirements (Phase / V / A)	Single / 220V / 15A	Single / 220V / 30A	Single / 220V / 40A
Plug Type	NEMA 6-15P	NEMA L6-30P	Hardwired - 40A
Heater Output (kW / A)	2kW / 9.09A	5kW / 22.7A	7kW / 31.81A
Temperature Accuracy	+/- 0.2°C		
Pump Flow Rate of Water (L/min)	18.3 L/min (oil flow may vary)		
Pump Lift (m)	6m		
Port Connection Size	1/2" MNPT		3/4" MNPT
Overall Dimensions (In)	12" x 14" x 16.5"	19" x 19" x 24"	20" x 23.5" x 25.5"
Weight (lbs.)	31lbs	68lbs	87lbs

## 2 Diagrams

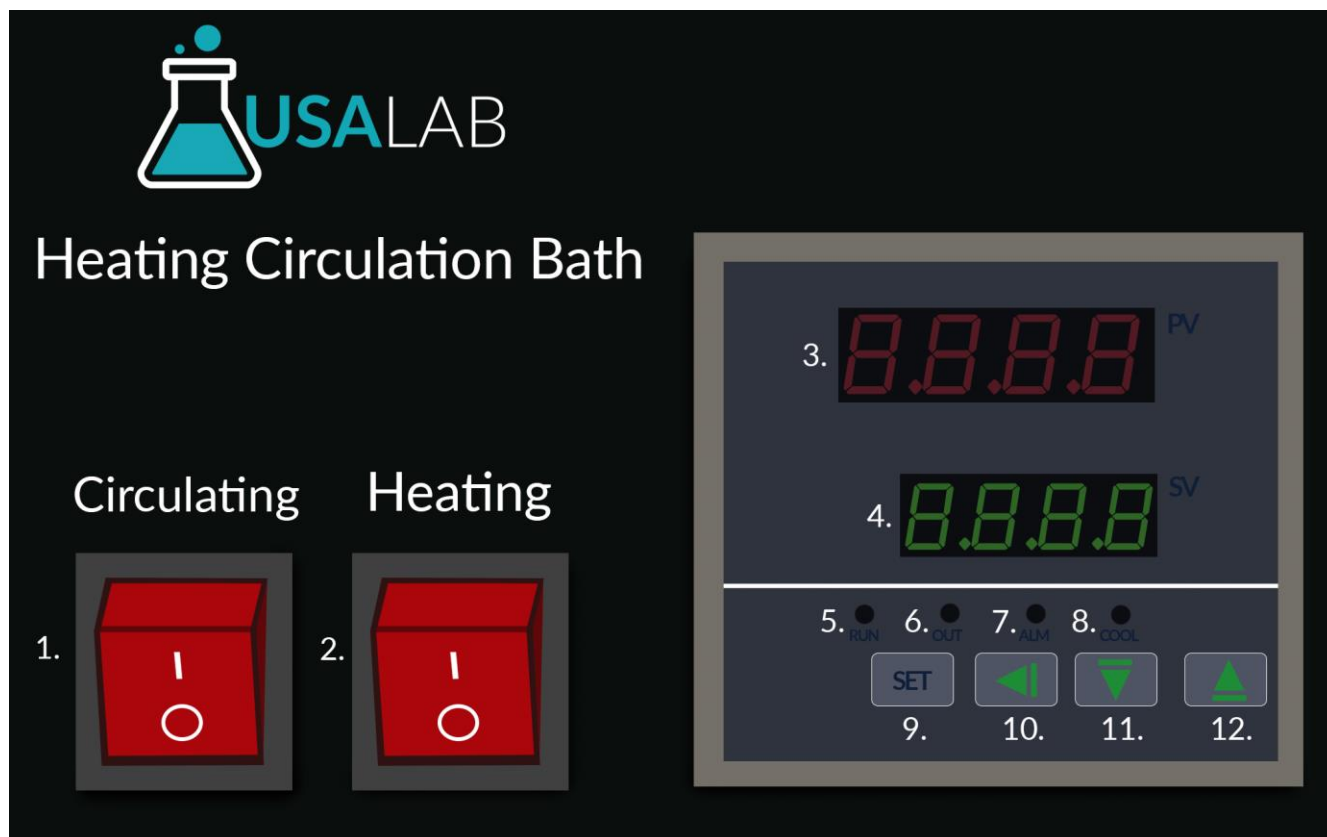
RH-5L:



RH-30L & RH-50L:



### 3 Control Panel Operation



1. Pump / Circulator Power Switch
2. Heater and Controller Power Switch
3. Current Temperature Display
4. Target Temperature Display
5. Power Indicator
6. Heater Status
7. Overtemperature Indicator
8. Not Used
9. Set Button (used to change the target temperature)
10. Left Button (used to move the modifying space left)
11. Down Button (used to change the value down)
12. Up Button (used to change the value up)

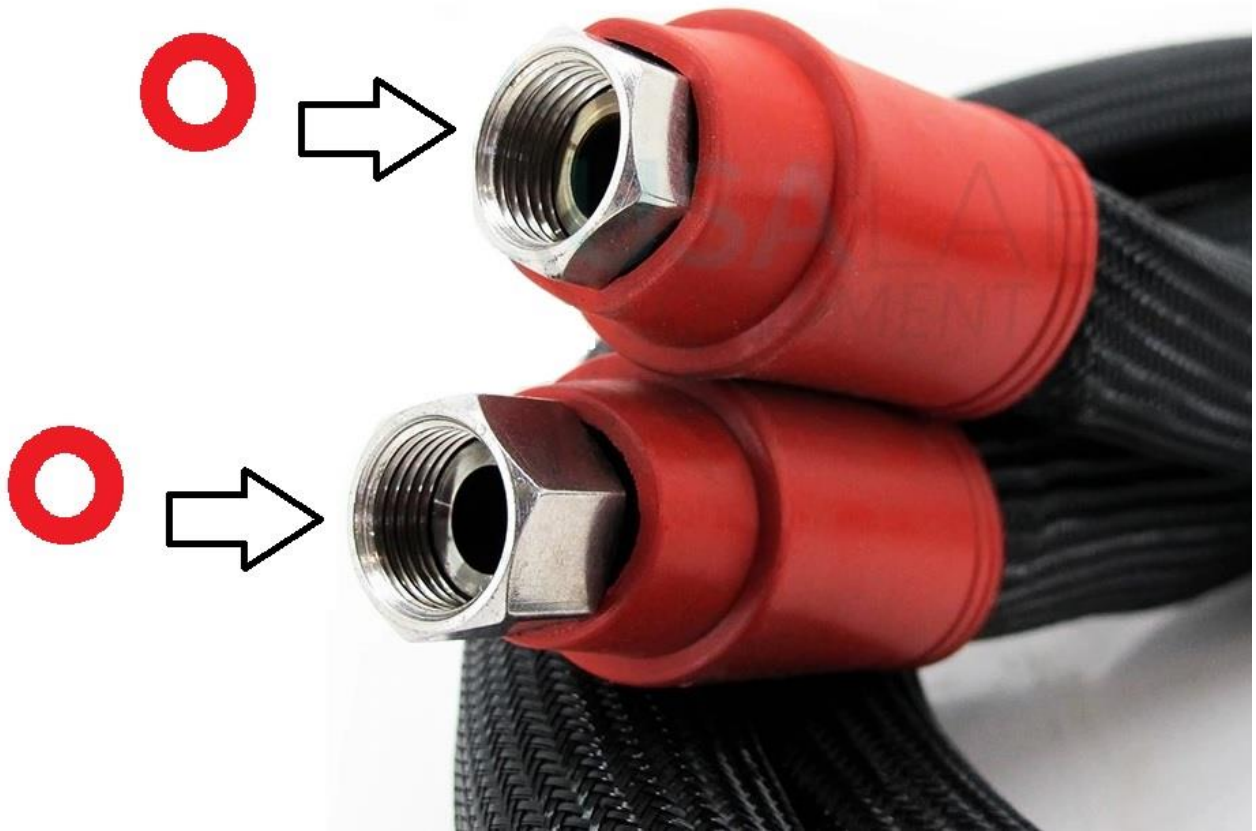
#### Notes:

The controller sets higher than 275°C, do not use the heater above this temperature. It will break the thermocouple (probe).

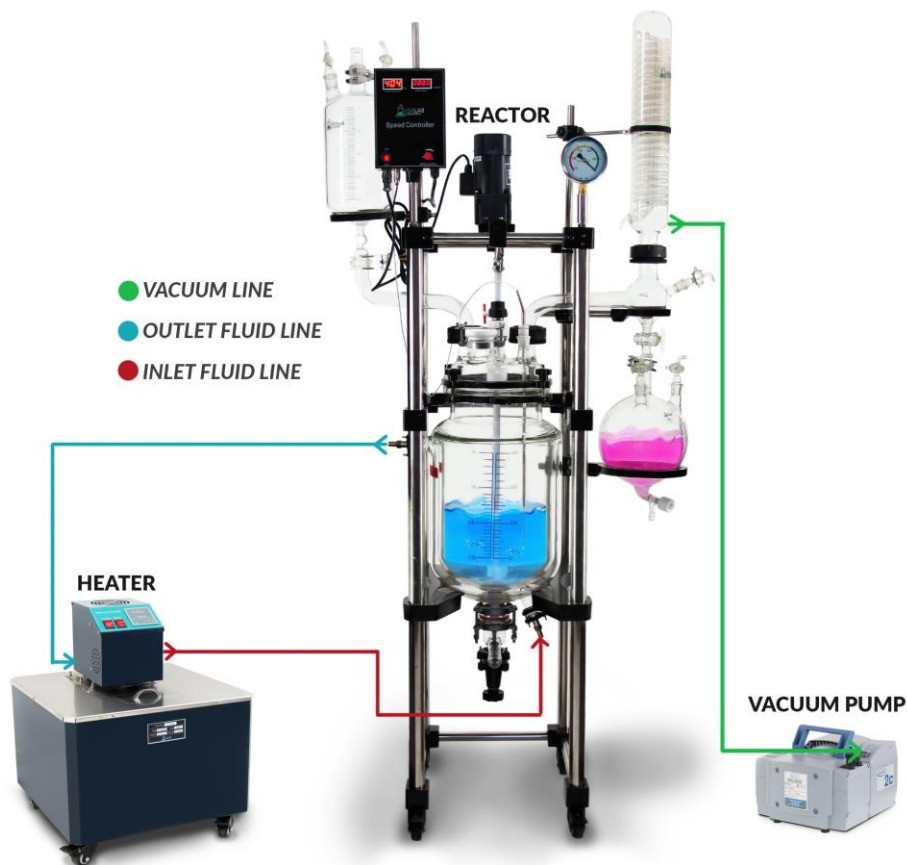


#### **4 Preparing for Installation**

Before filling or priming your heater circulator. Be sure to add the gaskets to the ends of the tubing. The gaskets are included in the manual pouch. Leaking will occur if this is not followed.



## 5 Installation



### **Filling the jacket:**

Attach the hoses before trying to fill the jacket.

Use the heater circulator to fill the reactor jacket from the bottom to the top.

When filling do not let the pump run dry.

1. Fill the reservoir.
2. Open the outlet valve and turn on the circulator
3. Watch the reservoir lower until half way.
4. Shut the pump off and the close the outlet valve.
5. Repeat 1 - 4 until the jacket is full and the liquid returns into the reservoir.
6. Fill the reservoir.

Alternative method (space permitting)

1. Do not attach return line to the heater circulator
2. Close the outlet valve
3. Hold the line above the jacket.
4. Use a funnel to pour fluid into the jacket.
5. Do not fill completely.
6. Attach the return line.
7. Open the outlet valve.
8. Turn on the circulator.
9. Fill the reservoir.

## **6 Notes**

### **6.1 Operation**

When using the heater circulator with Silicone Oil. Raise the temperature slowly, in 10°C increments maximum.

When not using the circulator, close the outlet valve.

Do not use the heater without running the circulator.

### **6.2 Storage**

Empty the reservoir and clean it with 99.9% alcohol before storing the unit.

When storing the unit, cover it.

## **7 Maintenance**

- Shut off the power switch and disconnect the power cord before any maintenance.
- Use a damp soft cloth to wipe clean. Stubborn stains should be cleaned by neutral detergents.
- The maintenance of internal electrical and heating parts must be performed by professionals or trained electricians.
- Do not directly splash water over the product or use abrasive powder, diluent, oil, kerosene, acidic material, and similar substances during cleaning, or else shock or other accidents will occur.

## **8 Service**

Our company provides limited warranty for any product with failures due to manufacturing quality within 12 months after the date of delivery on the premise of normal operation by users. Reasonable repair costs will be charged for damage caused by improper use. After-sales service Tel : (734) 855-4890 or [sales@usalab.com](mailto:sales@usalab.com)

USA Lab reserves the right of ultimate interpretation of the instruction manual. Additionally, USA Lab is not responsible for damages or injuries caused by improper use; knowingly or unknowingly. Glassware is not covered under warranty. We ship all glassware products with additional care, but sometimes they arrive broken. If glassware arrives broken, please contact us within 3 days of receiving your product and we will either send you a brand new piece or send you a refund. Any glassware broken 3 days after or later will not be covered by warranty. Maintenance items such as seals and gaskets are not covered under the warranty. Thank you for understanding!

### **Return Policy:**

We offer a 30-day return policy from when your package is delivered to your shipping address. By placing an order with USA Lab, you express that you have read and agreed to the following return policies.

- We do not accept returns for customized items. When purchasing a customized item, you agree that there are no returns due to the nature of the item(s) being specific to your needs.
- By default, a 15% restocking fee is applied on all items that are in original packaging and unused with no damage. This applies to all items returned within 30 days. No exceptions. You will be responsible for the return shipment unless deemed defective by USA Lab. In that case, we will pay for return shipment and replacement shipment costs.
- The item(s) must be returned in original packaging and in undamaged condition. The item(s) must have no signs of usage or wear including stickers, scratches, dents, resins, non-standard fluids, plant matter, or any other wear not representing a new, unused item. Products deemed defective with any signs of usage or wear will result in a 25% restocking fee.
- Once the returned item is received, tested, inspected, and processed, a refund will be issued. If your item(s) are in original packaging and unused, you will be refunded the initial purchase price with the 15% restocking fee deducted. If your item(s) are deemed damaged or used, you will be refunded the initial purchase price with the 25% restocking fee deducted.
- If an item has been deemed to be severely misused, modified resulting in catastrophic failure, operated anywhere but inside of a climate-controlled facility. A minimum of 25% restocking fee will be deducted from the refund.