Recirculating Heater Chiller Manual

Model: HC Series

5/10

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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

- Never leave the equipment running unattended and use this equipment only for its intended purpose.
- Ensure that all power sources are turned off when the machine is not in use. This encompasses 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.
- Know how the equipment functions and understand the operating and halting processes.
- Wear the appropriate personal protective equipment for the task.
- When working on or around all equipment, avoid wearing loose clothing, jewelry, unrestrained long hair, 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 input voltage and compare with the equipment voltage rating. DO NOT supply the incorrect power to any equipment for any reason whatsoever. Electrical specifications for your machine are printed on the machine tag. A properly grounded receptacle is required for safe operation regardless of voltage requirements.
- Keep the equipment 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 the 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 DISTILLED WATER IN THE GLYCOL MIXTURE. Any elements, sensors or switches damaged due to using tap 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)

Cooling water lines should be unobstructed without any hard bends in the run. Rotate and push forward to install water lines.

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

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

Do not run the pump dry or without priming.

The compressor requires 5 minutes to rest before operating after being shutdown.

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

We do not recommend the use of alcohol. If it is used, DO NOT set the temperature higher than 10°C.

Acceptable Transfer Fluids:
Non-toxic: Propylene Glycol 99.9% USP Kosher mixed with distilled water. Not more than 50% Glycol.
Toxic: Ethylene Glycol 99.9% mixed with distilled water. Not more than 50% Glycol.
Potassium Formate: Dynalene HC-10, HC-20, HC-30, HC-40 or HC-50.

1.2 Purposes and features

The HC / DFY Series of high-performance recirculating heater chillers use internationally recognized phase change compressors. High quality 304 stainless steel construction and a nickel-plated heat exchanger helps to inhibit corrosion. Bright, clear and simple digital interface. The 30L/min pump can move your transfer fluid quickly. Casters aid in the portability of the chillers. When connected to a short path, the DFY can maintain a consistent temperature to achieve as consistent fraction as possible.

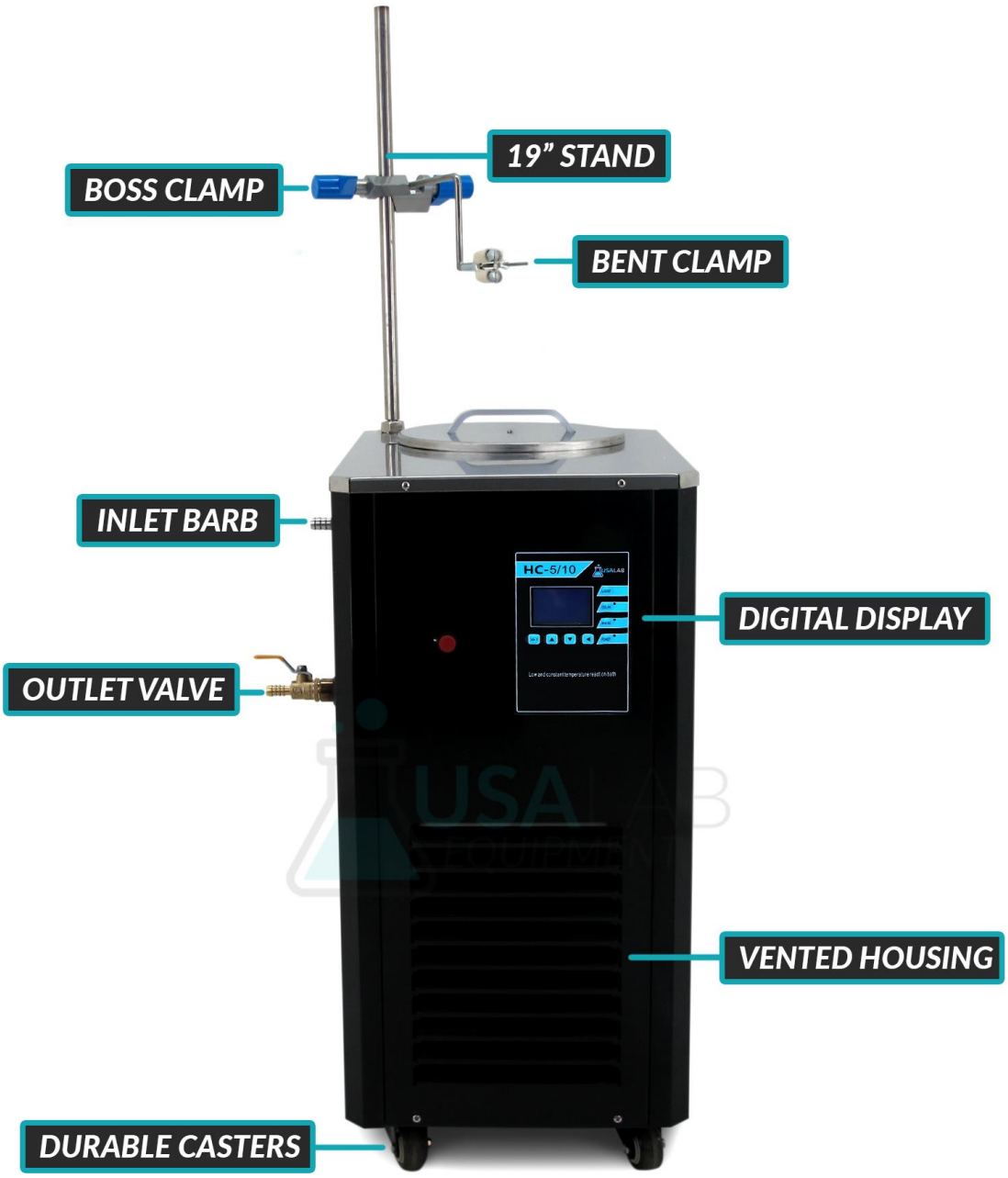
HC / DFY model number breakdown:

HC / DFY-XX/XX = Liter Capacity / Lowest Rated Set Point

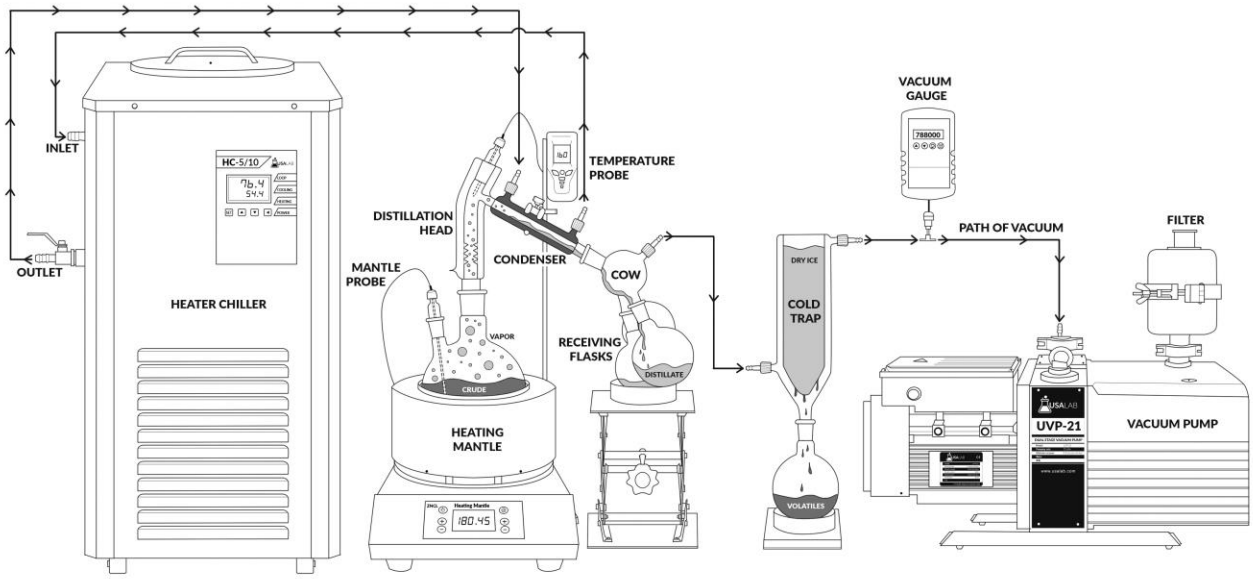
1.3 Technical Parameters

Model	HC-5/10
Reservoir Capacity (L)	5L
Reservoir Dimensions (In)	8" x 8"
Temperature Range (°C)	99°C to -10°C
Power Requirements (Phase / V / A)	Single / 110V / 22A
Plug Type	NEMA L5-30P
Compressor BTU Capacity (@20°C / @Min°C)	4,387 BTU / 1,000 BTU
Pump Wattage (W)	100W
Pump Flow Rate of Water (L/min)	30 L/min
Pump Pressure (bar)	0.4 bar
Port Connection Size	1/2" Barb
Refrigerant Type (R***A) / Charge (oz)	R404A / 63.49oz
Overall Dimensions (In)	19" x 14" x 29"
Weight (lbs.)	100 lbs.

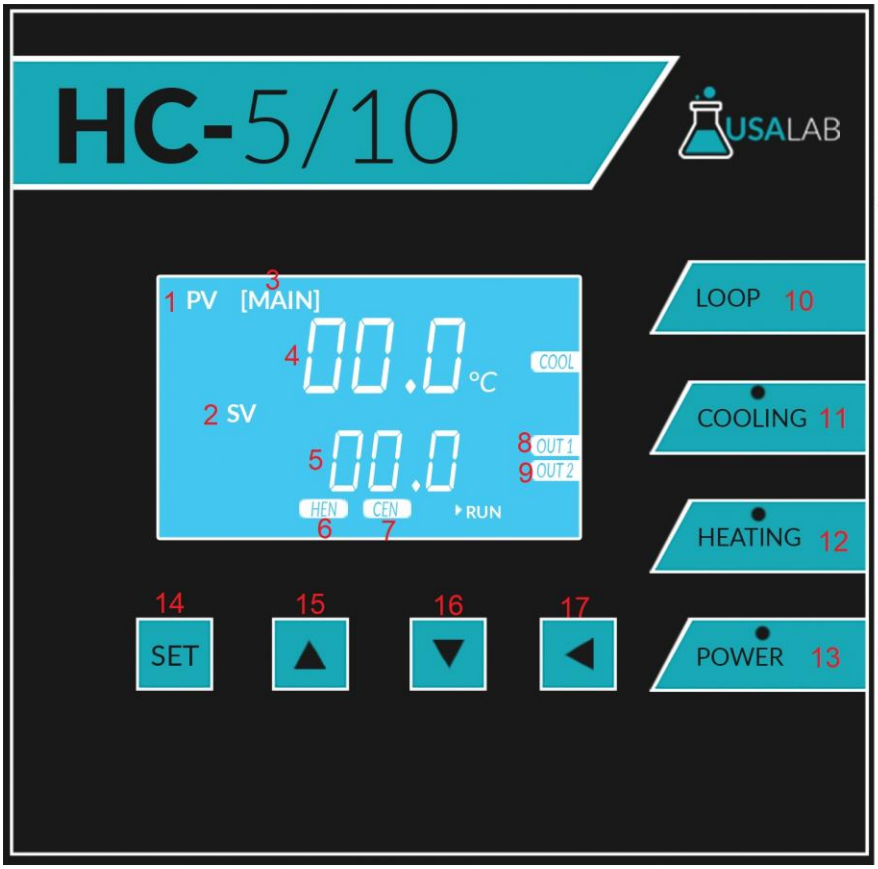
2 Diagrams



Special Note: The red knob on the front of the HC-5/10 is the stirrer control knob. We do not recommend using the stirrer function. The magnetic stir bar can spin off and get stuck inside the circulating pump.



3 Control Panel Operation



1 - Point Value (Current Fluid Temp)
2 - Set Value (Fulid Temp Setting)
3 - Program Menu Mode
4 - PV Temp Zone
5 - SV Temp Zone
6 - Heating Enabled Indicator
7 - Cooling Enabled Indicator
8 - Fluid Pump / Loop Indicator
9 - Tank Stirrer Indicator
10 - Fluid Pump On/Off Button
11 - Cooling On/Off Button
12 - Heating On/Off Button
13 - Power On/Off Button
14 - Set Temp Modification Button
15 - Setting Value Increase
16 - Setting Value Decrease
17 - Cursor Left (for large SV changes)

[Prior to running the chiller, your tank should be filled, fluid pump primed, and loop primed]
Press Set (14) to enter the temperature set menu.
Adjust the value using the Up (15) or Down (16).
Then Press Set (14) again to save the desired value (5).
Next press Loop (10), then Cooling (11) and Heating (12).
This turns on the fluid pump, heating, and cooling.

4 Preparing for Installation

5/10:

DFY-5/10 PACKING LIST	
USA Lab DFY-5/10 Heater Chiller	1 pc
19" Metal Rod Stand	1 pc
Boss Clamp	1 pc
Bent 4 Prong Clamp	1 pc
1/2" Insulated Tubing	11ft
1/2" Barbed Valve	1 pc
PTFE Sealing Tape	1 pc

1. Please refer to the packing list above to check whether the components and parts are included. If there are any missing parts, please contact us immediately.
2. Remove any residue before assembly and keep all surfaces clean.
3. Tools that might be needed in the installation include: large adjustable wrench.
4. A professionally installed receptacle. Requirements listed below by model.
   DFY-5/10: 5-20 Receptacle (110V 20A)
   HC-5/10: L5-30 Receptacle (110V 30A)

5 Installation

Precautions: Wait, Fill and Prime.

Step 1: Wait 12-hours.
The compressor oil can run out of the compressor and up refrigerant lines. If you don't wait, the compressor will pump without enough oil. Causing damage.

Step 2: Use A Distilled Water Based Glycol Anti-freeze mixture. (No more than 50% Glycol)
Do Not Use Automotive Anti-freeze, it Contains Additives That Have Been Known To Corrode Heat Exchangers.
Do Not Use Tap Water, as it Can Cause Rusting of Many Internal Parts.
Dynalene HC can be used.

Step 3: Prime the Water Pump Before Use.
Use a short length of tubing (about 2 feet in length) and connect the outlet and inlet together. Let the pump run until no bubbles appear in the water line. Then shut down the pump and close the outlet valve. Now your pump is ready for operation.

How to setup the chiller:
1. Add the outlet valve.
2. Follow step 3 above to prime your pump.
3. Connect your hoses.
4. Run the pump, adding more thermal transfer fluid as the pump fills your loop.
5. Fill the tank up to the top of the fluid return once your loop is full.
6. Set the desired temperature.
7. Turn on the cooling.
8. Place the lid on the tank.

6 Notes

7.1 Purpose

HC / DFY-series is designed to be used with cold condenser short path setups. (No hotter than 38.7°C) Using the phase change cooler and heating element in conjunction. The liquid temperature can be regulated accurately.

7.2 Storage

For long periods, please disconnect the power. Empty the water bath and purge the pump. (Tilt 25° toward outlet valve to drain pump) Allow time to dry completely or flush with 99.9% Isopropyl Alcohol. Cover while in storage.

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.
- Clean condenser assembly regularly. Cooling performance will suffer if the condenser is blocked.

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

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.

Troubleshooting If help is needed, please contact us.

Problem	Cause	Solution
No power	A. Not plugged in. B. No power from outlet. C. Outlet has power, chiller doesn't. D. Fuse is broken.	A. Plug unit in. B. Reset Breaker or GFCI. Call electrician. C. Unplug unit, open the rear panel and check for damage. D. Replace fuse.
Temperature display incorrect	A. Probe wire is loose. B. Temperature probe has a short. C. Control board has failed.	A. Repair loose wire. B. Replace temperature probe. C. Replace the control board.
Temperature display not working correctly or flashing	A. Check supply voltage. B. Power board has failed.	A. Verify the power supply and requirements match. B. Replace power board.
Shock from the shell of the unit	A. System ground fault.	A. Repair fault to system ground.
Not cooling or heating	A. Cooling or heating not enabled. B. Condenser fan not spinning. C. Compressor doesn't start. D. Refrigerant leaked.	A. Press cooling button on display. B. Replace condenser fan. C. Check capacitors, relay, and power board. D. Call HVAC Technician to repair and recharge system.
Cooling slowly or warming	A. Compressor stopped running. B. Condenser fan not spinning. C. Incorrect glycol ratio. D. Capillary or refrigerant blocked. E. Liquid pump running slowly. F. Load is greater than the chiller can handle. G. Tubing lines are not insulated.	A. Wait for compressor to start again. 5-10 minutes. B. Replace condenser fan. C. Never use more than 50% glycol in your ratio. D. Call HVAC Technician to repair and recharge system. E. Purge the liquid circulation pump. F. Reduce heat load on the chiller. G. Use included line insulation to prevent thermal loss.