



Recirculating Heater Manual

Model: CRH Series

CRH-30L, CRH-50L



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Safety Precautions and Explanations

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, thoroughly trained, and Instructed on the best safety practices. Most industry 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 to become trained operators. All personnel operating, inspecting, servicing, or cleaning this equipment must be properly trained in the operation and machine safety. **BEFORE** operating this equipment, read the operating instructions in this 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.

Symbols and Warnings

Below are examples of commonly used symbols and what they mean. Understand them and their potential consequences.



High Voltage or Electrical Hazard



Explosive Hazard



Not User Serviceable



Flammable Hazard



Hot Surface or Steam Hazard

Section 1 | Important Information

1.1 Safety Notices

ONLY USE SILICONE OIL or a DISTILLED WATER + GLYCOL BLEND.

(See section 4.1)

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 section 1.3)

Fluid lines should be unobstructed without any hard bends in the run.

Install gasket inside fittings before use. (See section 4.1)

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 liquid pump dry, allow plenty of time to prime the pump.

Do not unplug the unit while it is running.

Install the equipment in a climate-controlled facility ONLY.

Never use a generator to power this equipment.

Do not change the length of the power cable.

Repairs must be made by USA Lab or by instruction from USA Lab.

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

Contact us immediately.

USA Lab, Inc.

Main / Sales: (734) 855-4890

Tech / Dan: (734) 469-2313

Dave: (734) 564-5952

1.2 Features

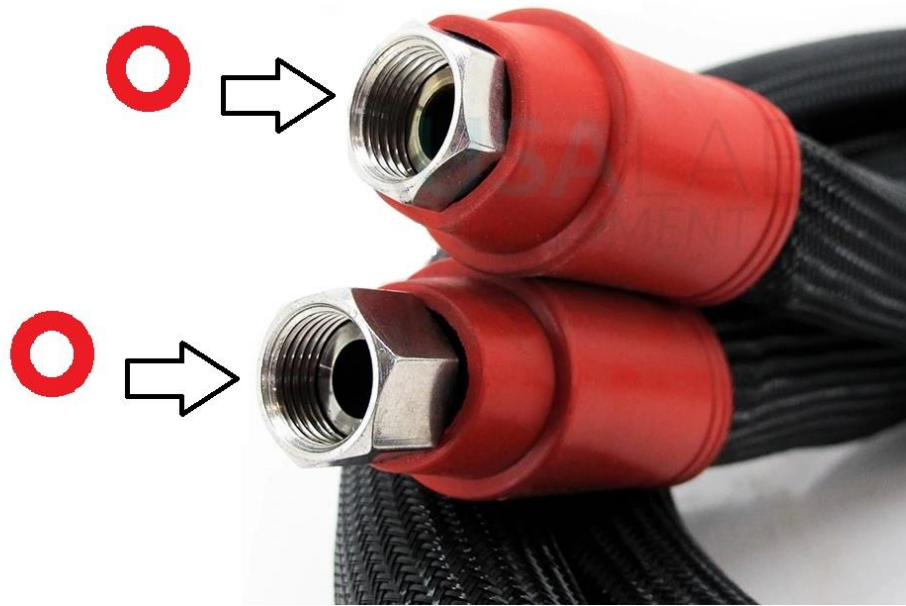
- The CRH Series of high-performance closed loop recirculating heaters, use high wattage durable heating elements.
- The magnetic drive pump can move your transfer fluid quickly and safely.
- Casters aid in the portability of the heaters.
- The PID controller can quickly and accurately bring your equipment to high temperatures.
- The included insulated metal hoses remain strong at high temperatures.
- Clear and easy to read display.
- The built-in cooling coil loop can turn your standard chiller into a heater chiller or allow you to use silicone oil with your equipment while keeping your glycol chiller.
- Easy to use low position drain valve for convenient emptying.

1.3 Technical Parameters

Model	CRH-30L	CRH-50L
Reservoir Capacity (L)	21L	35L
Reservoir Dimensions (In)	15.3" X 7.5" X 11.4"	16.1" X 9.4" X 14.2"
Temperature Range (°C)	Ambient to 250°C	
Power Requirements (Phase / V / A)	Single Phase / 220-240V / 20A	Single Phase / 220-240V / 30A
Plug Type	6-20p	L6-30p
Heater Wattage (W)	3kW	6kW
Pump Wattage (W)	250W	
Pump Flow Rate of Water (L/min)	35L/min	
Pump Lift (ft) * Maximum tubing height *	82ft	
Port Connection Size	1/2" MNPT	3/4" MNPT
Overall Dimensions (In)	25.2" X 18.1" X 37.0"	28.0" X 19.7" X 43.3"
Weight (lbs.)	116.8 Lbs.	154.3 Lbs.

Section 2 | Diagrams

2.1 Hose gaskets



2.2 Sight Glass



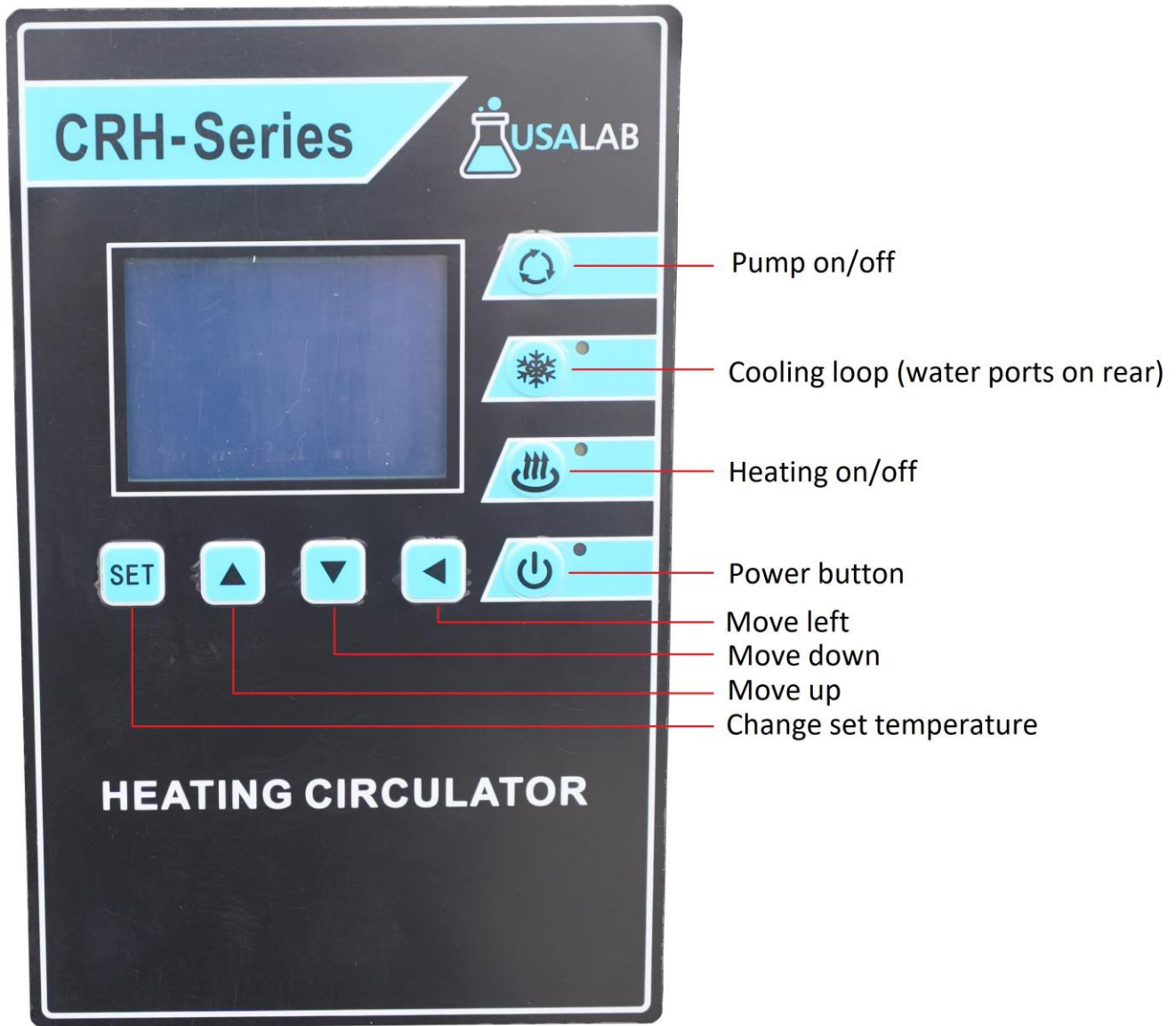
2.3 Back Panel

Only use water or water/glycol in the cooling loop
Install the valve on the heater outlet



Section 3 | Control Panel Operation

3.1 LCD Display Operation



SV = Set temperature | PV = Current temperature

To operate the heater
Press the power button
Press set and change the set value to your desired temperature
Press the pump button
Press the heating button

Disclaimer – Parameters are not allowed to be modified by end users. This is to protect the equipment from accidental damage. Modifying parameters for any reason, without our knowledge and permission will constitute a void of the warranty.

Section 4 | Preparing for installation

4.1 Thermal Transfer Fluids

Recommended: High performance silicone oil (Ambient – 300°C)

Alternative: Propylene Glycol + Distilled Water | Ratio PG 10% : DW 90% (Ambient – 110°C)

Alternative 2: Distilled Water

Do Not Use Automotive Anti-freeze, it contains additives that have been known to corrode heat exchangers and remove the nickel plating.

Do Not Use Tap, De-Ionized, or Reverse Osmosis Water, as it can cause rusting of internal metal parts.

4.2 Tubing Connections



Diagram from Section 2.1

Install the ball valve onto the outlet port of the heater. Then connect the MNPT x MNPT fitting onto the end of the ball valve. Ensure the outlet port has PTFE thread tape on the threads no less than 4 wraps. (ball valve, gaskets, and fitting included in the manual pouch)



Diagram from Section 2.2

Add the red fiber gaskets to the ends of the tubing before securing to the MNPT X MNPT fitting.

4.3 Electrical Connection

Each unit has its own power requirements, please understand their differences. This unit must be operated on its own circuit Installed by a licensed professional.

Plugs:

RH-30L | NEMA 6-20p (some early units shipped with L6-30p)

RH-50L | NEMA L6-30p



NEMA 6-20P



NEMA L6-30P



Quick Disconnect Panel

4.5 Operating Instructions and Notes

Only operate the unit in a climate-controlled facility.

Units returned that have signs of outside use. Will automatically be determined to be improperly used and cared for.

When filling the unit:

- Power on the unit.
- Fill the tank to the #8 line on the sight glass.
- Open the ball valve and turn on the fluid pump.
- Continue to fill the tank watching the level. Do not allow level to drop below the #2 line.
- When the system is full and the tank reaches the #6 point, stop filling.
- Close the lid and follow the priming instructions.

Priming instructions:

- Power on the unit.
- Open the ball valve.
- Run the pump.
- Wait for 30 minutes to allow the air bubbles to empty from the pump.
- Then shut off the pump and close the ball valve.

Operating notes:

When using the unit always enable the pump first. Then enable the heating function.

When not operating the unit, close the ball valve and shut off the power.

Operating steps:

- Power on the unit.
- Open the ball valve.
- Run the pump.
- Set the target temperature.
- Enable heating.
- Run until the process is complete.
- Shut off the heating and pump then close the ball valve.

(Failure to close the valve will cause the tank to overflow)

If you have any questions on how to operate the unit further, contact the technical department.

5 | 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.

5.1 Periodic Maintenance

Fluid:

If using Silicone Oil, degradation is not much of a concern. Keep an eye on the tank level.

Propylene Glycol will degrade over time, it is recommended to purchase glycol test strips.

Unit:

Check the unit over monthly for leaks, broken glass, melting, burning, or any other damages.

Please bring any concerns to our attention immediately.

5.2 Long Term Storage

Empty the unit of fluid.

Cap the inlet and outlet.

Clean the condenser.

Clean the body of the unit.

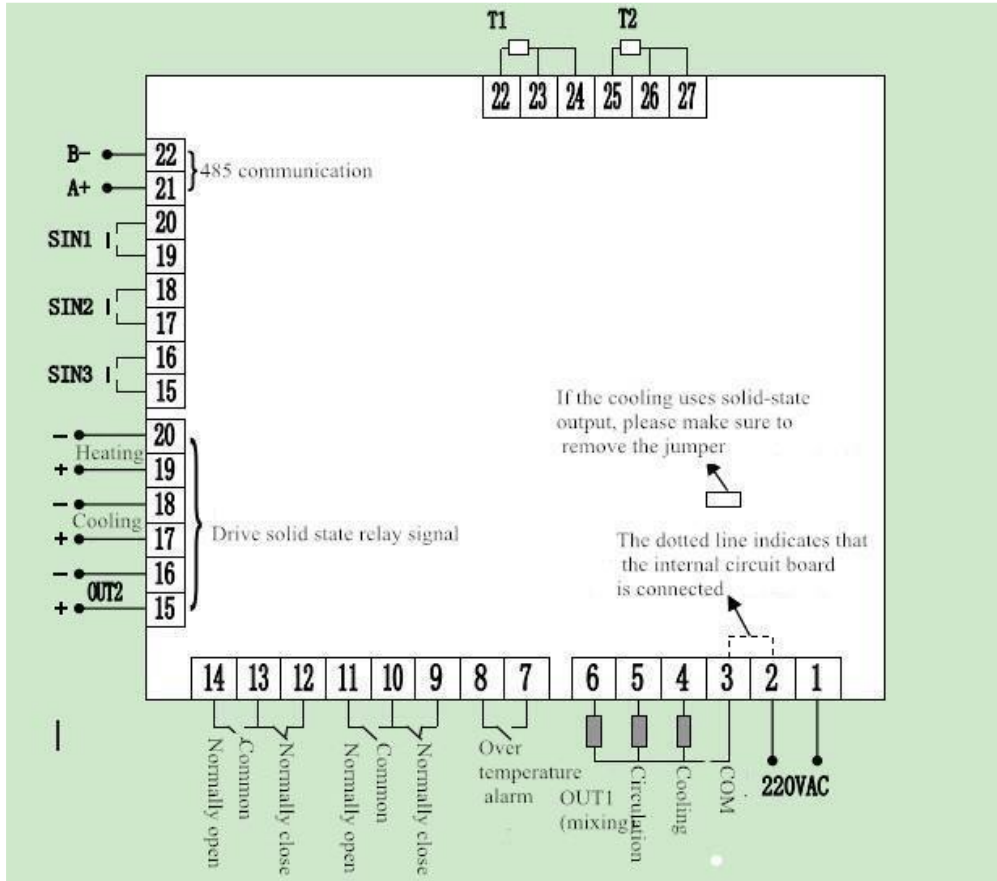
Wrap the unit with plastic.

Store in a secure level location.

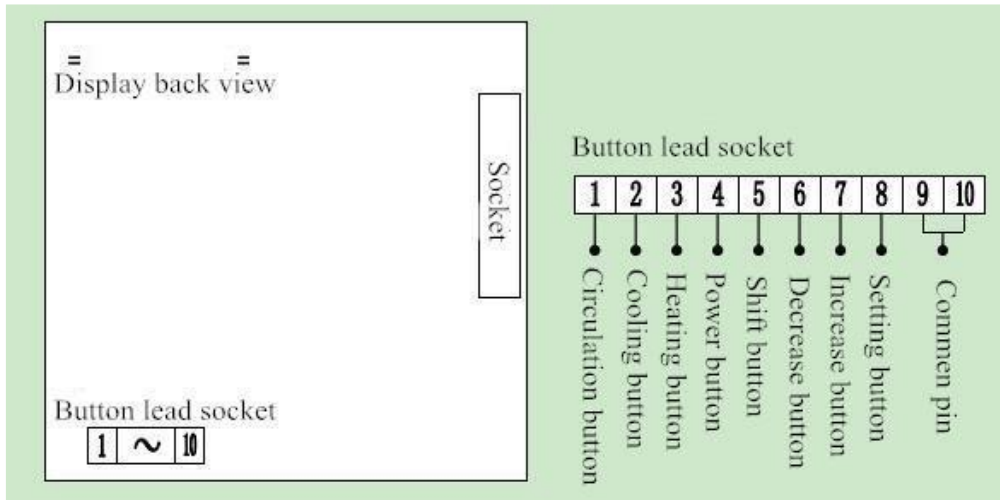
Section 6 | Technical Diagrams and Troubleshooting

6.1 Circuit Board Diagrams

Main Board



Display Board



6.2 Troubleshooting

Problem	Cause	Solution
No power	<ul style="list-style-type: none"> A. Not plugged in. B. No power supplied from outlet. C. Outlet has power, unit does not. D. Breaker tripped. E. Power randomly turns off. 	<ul style="list-style-type: none"> A. Plug unit in. B. Reset breaker in the front panel or at service panel. C. Verify no power at circuit breaker in front panel. D. Reset breaker in the front panel or at service panel. E. Check screws inside of the plug, tighten if necessary.
Temperature display is incorrect	<ul style="list-style-type: none"> A. Probe wire is loose. B. Temperature probe has a short. C. Main board has failed. 	<ul style="list-style-type: none"> A. Tighten probe wires. B. Replace temperature probe. C. Replace main board.
Temperature display not working correctly or flashing	<ul style="list-style-type: none"> A. Incorrect power supply. B. Display cable loose or broken. C. Display board has failed. 	<ul style="list-style-type: none"> A. Supply the correct power to the unit. B. Re-seat or replace the display cable. C. Replace the display board.
Shock from the shell of the unit	<ul style="list-style-type: none"> A. System ground fault. B. An electrical component has failed. 	<ul style="list-style-type: none"> A. Repair fault to ground. B. Contact us for further troubleshooting.
Not heating	<ul style="list-style-type: none"> A. Heating not enabled. B. Heating won't turn on. 	<ul style="list-style-type: none"> A. Enable heating. B. Check the relay and the element for damage.
Boling / smoking	<ul style="list-style-type: none"> A. Temperature set too high (glycol only) B. Heating not increased slowly. 	<ul style="list-style-type: none"> A. Reduce temperature below 110°C or switch to silicone oil. B. Increase the temperature slowly by 5°C increments.

Section 7 | Warranty Information and Coverages

7.1 Warranty

Continental United States

USA Lab products are warranted to be free of workmanship, mechanical, and material defects for **one to two years** from date of purchase depending on product. Within this warranty period USA Lab will replace or repair components that fail due to manufacturer defect. For such repairs or parts, shipping charges will be covered in full or in part by USA Lab.

This warranty **does not cover any failures** due to alteration, repairs, misuse, accident, or abuse. This warranty also **does not cover wear items** such as glassware, heating elements, thermocouples, oil seal sets, switches, and sensors. The warranty does also not cover wrongful input voltage. The customer needs to be responsible in monitoring power rating and routine checking. If using water in a heater or chiller, the customer must only use **distilled water**. Other forms of water will **void the warranty**.

Non-continental United States

USA Lab products are warranted to be free of workmanship, mechanical, and material defects for **one to two years** from date of purchase depending on product. Within this warranty period USA Lab will replace or repair components that fail during normal daily use. Such repairs or parts will be covered in full by USA Lab and **the customer will be responsible for shipping, labor, and custom duties**.

This warranty **does not cover any failures** due to alteration, repairs, misuse, accident, or abuse. This warranty also **does not cover wear items** such as glassware, heating elements, thermocouples, oil seal sets, switches, and sensors. The warranty does also not cover wrongful input voltage. The customer needs to be responsible in monitoring power rating and routine checking. If using water in a heater or chiller, the customer must only use **distilled water**. Other forms of water will **void the warranty**.

7.2 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. ***We do not accept returns on any solvents or consumables.***
- ***Pre-orders:*** There will be a ***10% non-refundable fee*** associated with pre-orders that are canceled. This covers the banking fees and the hold fee.
- 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. Unused and undamaged products not in original packaging will be subject to a restocking fee equal to 25% of the purchase price.

Products deemed defective with any signs of usage or wear whatsoever of damage or usage (including but not limited to the presence of botanical material, resins, cleaning agents, stickers or decals, or any damage, wear, or tear) will not be accepted for return.

- 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 not be refunded.***

7.3 Notes

Keep all original packaging in the event you need to return the unit or to send it in for to us for repair. We are not responsible for providing packaging material.

This manual and its contents are subject to change without notice.

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.

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