



Rotary Evaporators

User Manual

Models: RE-1005, RE-1020, RE-1050
Automatic 5L – Automatic 50L



Original instructions

Read this manual before using the equipment

Retain this manual for future use

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Purpose of manual

This manual enables safe and efficient use of the Rotary Evaporators. This manual is part of the equipment and must be stored where it is accessible to operating personnel at all times.

The operating personnel must carefully read and understand this manual prior to beginning any work. The basic prerequisite for safe work is compliance with all safety instructions and operating instructions in this manual.

The local occupational safety regulations and general safety regulations for the area of application of the equipment also apply.

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1 Safety information

This section provides an overview of all safety aspects for the protection of people as well as safe and uninterrupted operation. Other task-related safety instructions are included in the specific sections.

1.1 Safety notes and warnings

ONLY USE DISTILLED WATER IN THE WATER BATH. Any elements, sensors or switches damaged due to not using distilled water, WILL NOT BE COVERED UNDER WARRANTY.



Surfaces can be extremely hot or cold to the touch. Use caution when touching any surface.



All gaskets must be greased and cleaned regularly. Failure to do so will result in leaks and loss of performance.



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



Follow all state, local and municipal laws, codes, and ordinances. This is not an explosion proof evaporator. This evaporator is not suitable for use in Class I, II or III locations, as defined by the national electrical code NFPA 70.



NEVER LEAVE YOUR EVAPORATOR UNATTENDED WHILE OPERATING.



Please make sure the power connection is correct and well-grounded. (see *Technical specifications* on page 67 for details).



Cooling water line and vacuum line should be unobstructed without any hard bends.



Rotate and push forward onto barb to install water and vacuum lines.









If flammable or organic solvent is used. Please make sure to clean any solvent immediately and take all fire safety precautions.



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



DO NOT try to heat any explosive or combustible materials inside your evaporator.

	Inspect all glassware prior to use. Please do not use any glassware that is cracked, chipped, or damaged.
	All glassware should be cleaned prior to use. Never clean your glassware or evaporator with flammable cleaners.
	Keep your evaporator away from any flammable materials, fire, or corrosive gases.
	Do not unplug your evaporator while in use. This can be very dangerous to the operator and the equipment itself.
	Make sure unit is properly grounded and in the correct power source (110V or 220V). Please never modify the cord your evaporator comes with, unless directed by USA Lab.
	We recommend a separate circuit for the evaporator to prevent any overloading from other items on the same circuit.

1.2 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.

1.3 Intended use

A rotary evaporator is a laboratory device used to efficiently and safely remove solvents from a mixture. It works by rotating a sample container while applying heat, allowing for quick and controlled evaporation. This process helps to purify the sample and remove impurities, making it useful in various scientific applications.

**WARNING****Danger due to misuse!**

Misuse of the device can result in hazardous situations.

- Only operate the device if it is in an undamaged and working condition.
- Never deviate from the prescribed maintenance intervals.
- Only use parts that are specified in the technical data and approved for this device.
- Never modify the device without consulting the manufacturer.
- Never allow untrained personnel to operate the device.
- Never operate the device in potentially explosive atmospheres.

1.4 General safety warnings

**WARNING****Risk of serious injury or death!**

Only use this equipment for its intended purpose.

Do not leave the equipment running unattended.

Do not wear loose clothing, jewelry, hair, or any other articles that can be trapped by moving parts.

Do not operate equipment if you are fatigued, emotionally stressed, or under the influence of drugs or alcohol.

**WARNING****Risk of electrical shock!**

All power sources must be turned off when the equipment is not being used.

Ensure you use the correct power source for the equipment. Refer to the electrical specifications for the equipment being used.

**WARNING****Risk of injury from trips or falls!**

There is a risk of tripping on cables or pipe connections.

Ensure that cables or pipework are routed safely and that they are not trapped or pinched during use.

**WARNING****Risk of injury from lifting heavy objects!**

Use proper lifting and transportation devices when moving equipment.

**WARNING****Automatically moving mechanical parts**

Take care when in the vicinity of equipment with moving mechanical parts that may start automatically and unexpectedly.

**Read the manual!**

You must read this manual before starting work and operating this equipment.

Where required, you must use appropriate PPE when using this equipment.

**Wear ear protection!**

You must wear ear protection.

**Wear eye protection!**

You must wear eye protection.

**Wear safe footwear!**

You must wear safe and sturdy footwear.

**Wear gloves!**

You must wear appropriate gloves or hand protection.

**Wear safe and protective clothing!**

You must wear appropriate safe clothing.

Before using the equipment, locate the nearest of these facilities and resources:

**Fire extinguisher!**

Before using this equipment, locate your nearest fire extinguisher and fire prevention resources.

**First Aid!**

Before operating this equipment, locate your nearest first aid station.

1.5 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.

1.6 Safety warning

- Never leave the equipment running unattended. Ensure that all power sources are turned off when the machine is not in use. This encompasses electrical and pneumatic power.
- Use this equipment only for its intended purpose.
- 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.

1.7 Safe operating area

A safe operating area around the equipment and work area should be maintained at all times. Non-operators and other persons should not approach the equipment or work area.

USA Lab recommends a safe area of at least 36" (910 mm) around the equipment.



Caution

Risk of damage to the equipment!

Do not obstruct the ventilation on the side of the equipment. This can cause poor performance or part failure. Always keep the operating area clean and organized to prevent injury or damage.

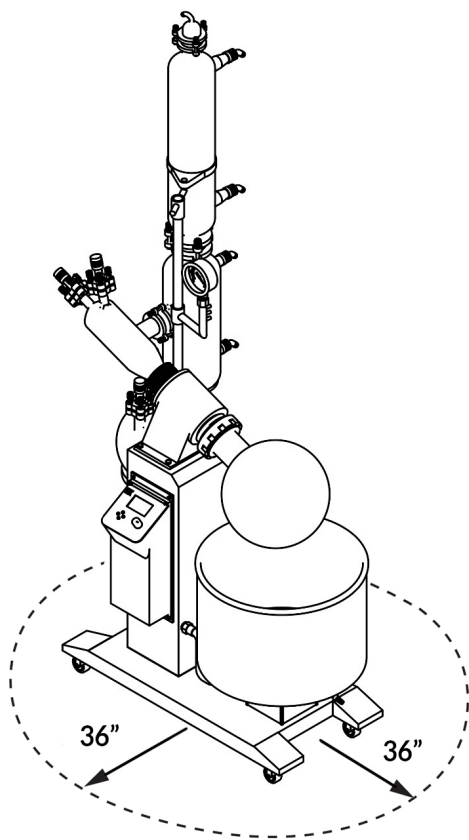









Figure 1 - Safe operating area around the evaporator unit

1.8 Illustrated safety symbols

To draw attention to special hazards, this manual uses the following symbols.

Symbol	Meaning
	Important note, please pay attention.
	Hot surface, take caution.
	High voltage, take caution.
	Rotating objects, take caution.
	Dangerous situation that may result in serious injury or death.
	Protective earth connection.
	Wear personal protective equipment and gear.

1.9 Owner responsibilities

The equipment is used for commercial purposes. The owner of the equipment is therefore subject to the legal responsibilities for occupational safety.

In addition to the safety instructions in this manual, the applicable safety regulations as well as occupational safety and environmental regulations must be implemented for the area of application of the equipment.

This applies to the following:

- The owner must be informed of the applicable occupational safety regulations and conduct a risk assessment to identify any additional risks that may arise due to the special working conditions at the equipment location.
- This information must be implemented in the form of operating instructions for the operation of the equipment .
- During the entire period of equipment use, the owner must ensure that the operating instructions created reflect the current state of policy and adjust them if necessary.

- The owner must clearly regulate and define the responsibilities for operation, troubleshooting, maintenance and cleaning.
- The owner must ensure that all persons who work with the equipment have read and understood this manual.
- The owner must also train and inform personnel of hazards at regular intervals.
- The owner must provide personnel with the required protective equipment and must ensure that personnel wear the required protective equipment.
- The owner must ensure adequate ventilation of the installation site around the equipment and work area.
- The owner is also responsible for ensuring that the equipment is always in good working order. The following therefore applies:
 - The owner must ensure that the maintenance intervals described in this manual are observed.
 - The owner must ensure that the required fire protection measures are always compliant and functional.

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2 Hardware description

Before operating the equipment, you should be familiar with the location and names of all parts of the equipment. This will help you understand the operating procedures and assist with troubleshooting, if required.

2.1 Overview

Our RE-series large rotary evaporators are mainly used in the small-scale test and production of biological, pharmaceutical, chemical, food, and other extractions. This process is most often used to separate solvents at lower boiling points, such as ethanol, n-hexane or even water. These compounds are typically solids or liquids at room temperature and then are heated up to allow separation from other solids, liquids, or products by evaporation if the products don't have similar evaporating points. When it is placed in a rotating boiling flask, it allows the solution to spread. This action causes the solution to evaporate rapidly and evenly. PTFE and Viton rubber dual spin seals are included to ensure the highest vacuum pressure.

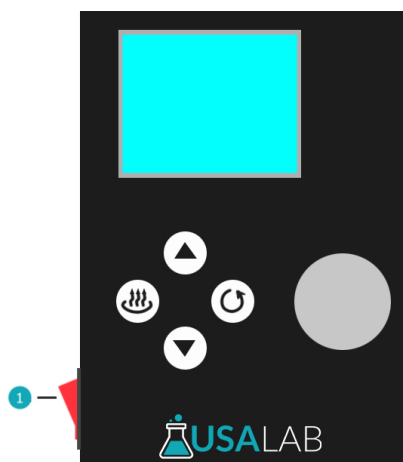
2.1.1 Features

- Timed shut down
- High quality corrosion resistant paint
- Continuous running
- Over-temperature safety dial
- Dry-run protection
- ETL Certification (UL and CSA standards)

2.2 Diagrams

2.2.1 Power switch

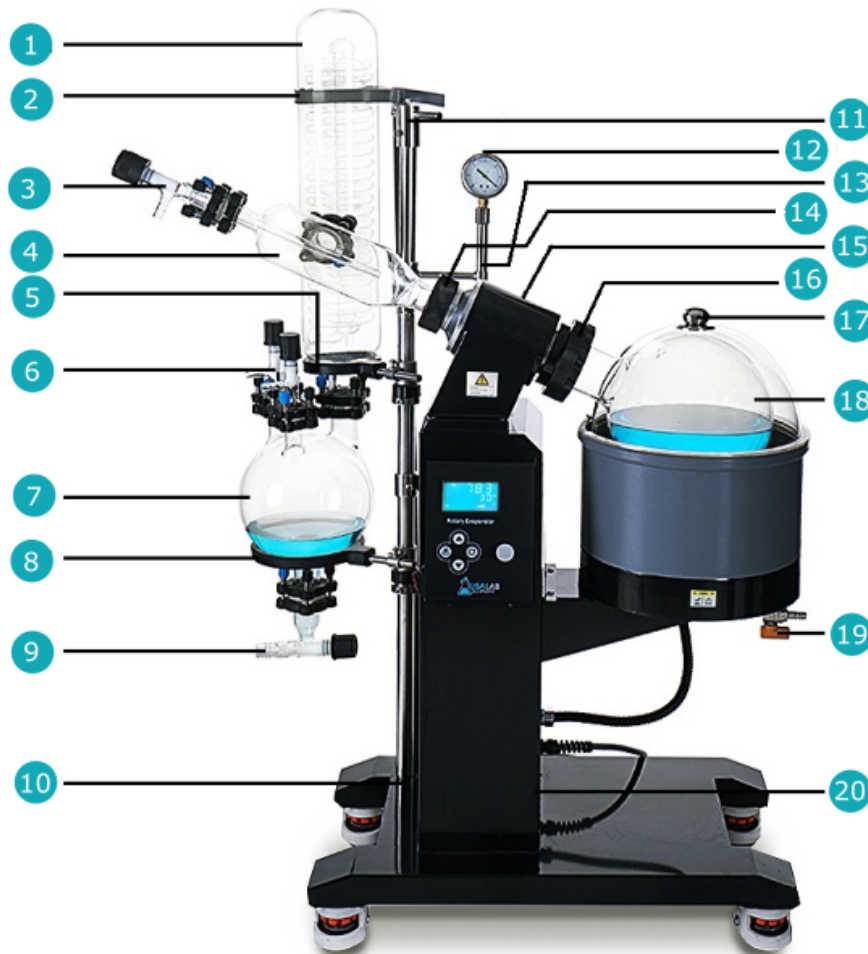
The power switch is located on the front of the evaporator.



1 Power switch

Figure 2 - Power switch

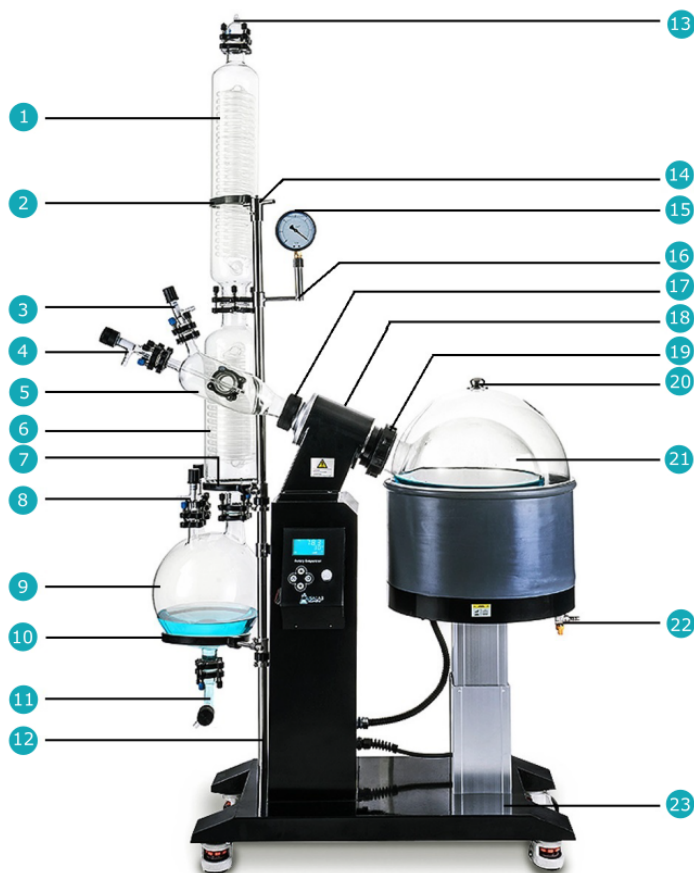
2.2.2 RE-1005



1	Main Condenser	11	Condenser Stand with Hardware
2	Condenser Retaining Strap	12	Vacuum Gauge and Manifold
3	Feed Tube	13	Vacuum Gauge Bracket
4	Bump Trap	14	Condenser Screw
5	Condenser Pallet Mount	15	Rotating Motor
6	Vacuum and Air Relief Valves	16	Boiling Screw
7	Receiving Flask	17	Dome Cover
8	Receiving Flask Pallet Mount	18	Boiling Flask
9	Solvent Drain Valve	19	Bath Drain Valve
10	Receiving Flask Stand and Hardware	20	Rotary Evaporator Main Assembly

Figure 3 - RE-1005 diagram

2.2.3 RE-1020 and RE-1050



1	Main condenser	13	Vacuum Port
2	Condenser Retaining Strap	14	Condenser Stand with Hardware
3	Vacuum Relief Valve	15	Vacuum Gauge and Manifold
4	Feed Tube	16	Vacuum Gauge Bracket
5	Bump Trap	17	Condenser Screw
6	Auxiliary Condenser	18	Rotating Motor
7	Condenser Pallet Mount	19	Boiling Screw
8	Vacuum and Air Relief Valves	20	Dome Cover
9	Receiving Flask	21	Boiling Flask
10	Receiving Flask Pallet Mount	22	Bath Drain Valve
11	Solvent Drain Valve	23	Rotary Evaporator Main Assembly
12	Receiving Flask Stand and Hardware		

Figure 4 - RE-1020 and RE-1050 diagram

2.2.4 System diagrams

2.2.4.1 System diagram of RE-1005

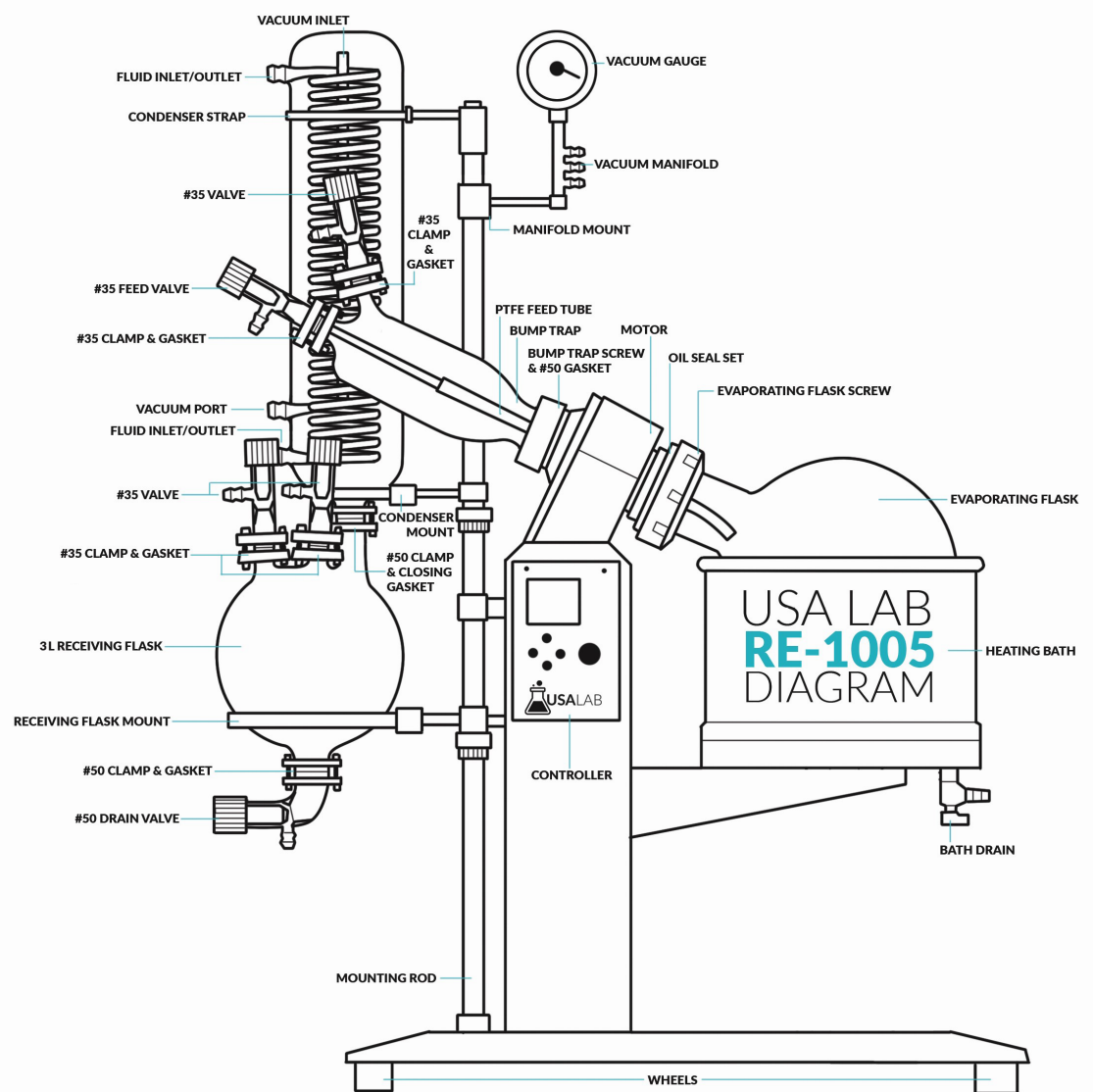


Figure 5 - System diagram of RE-1005

2.2.4.2 System diagram of RE-1020

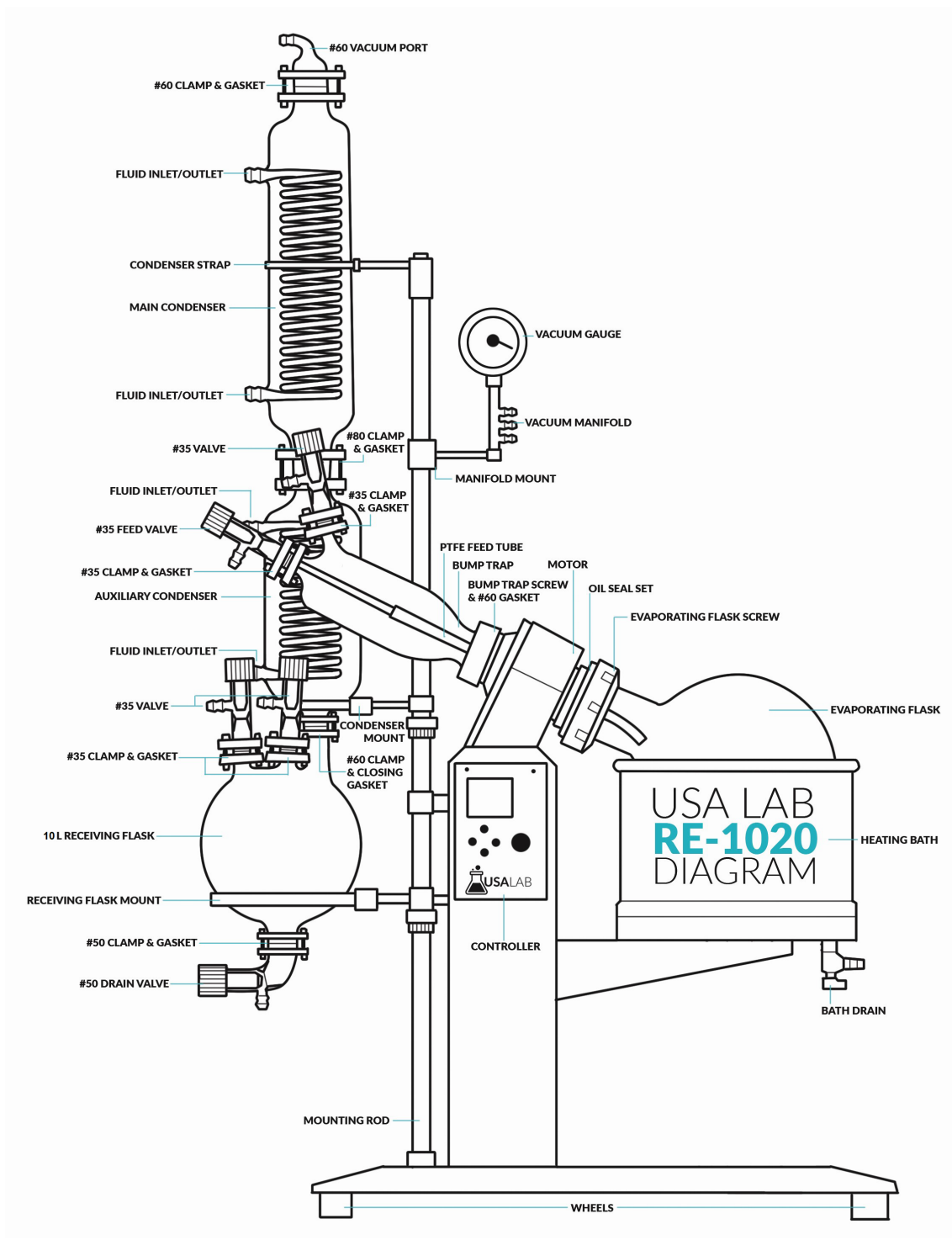


Figure 6 - System diagram of RE-1020

2.2.4.3 System diagram of RE-1050

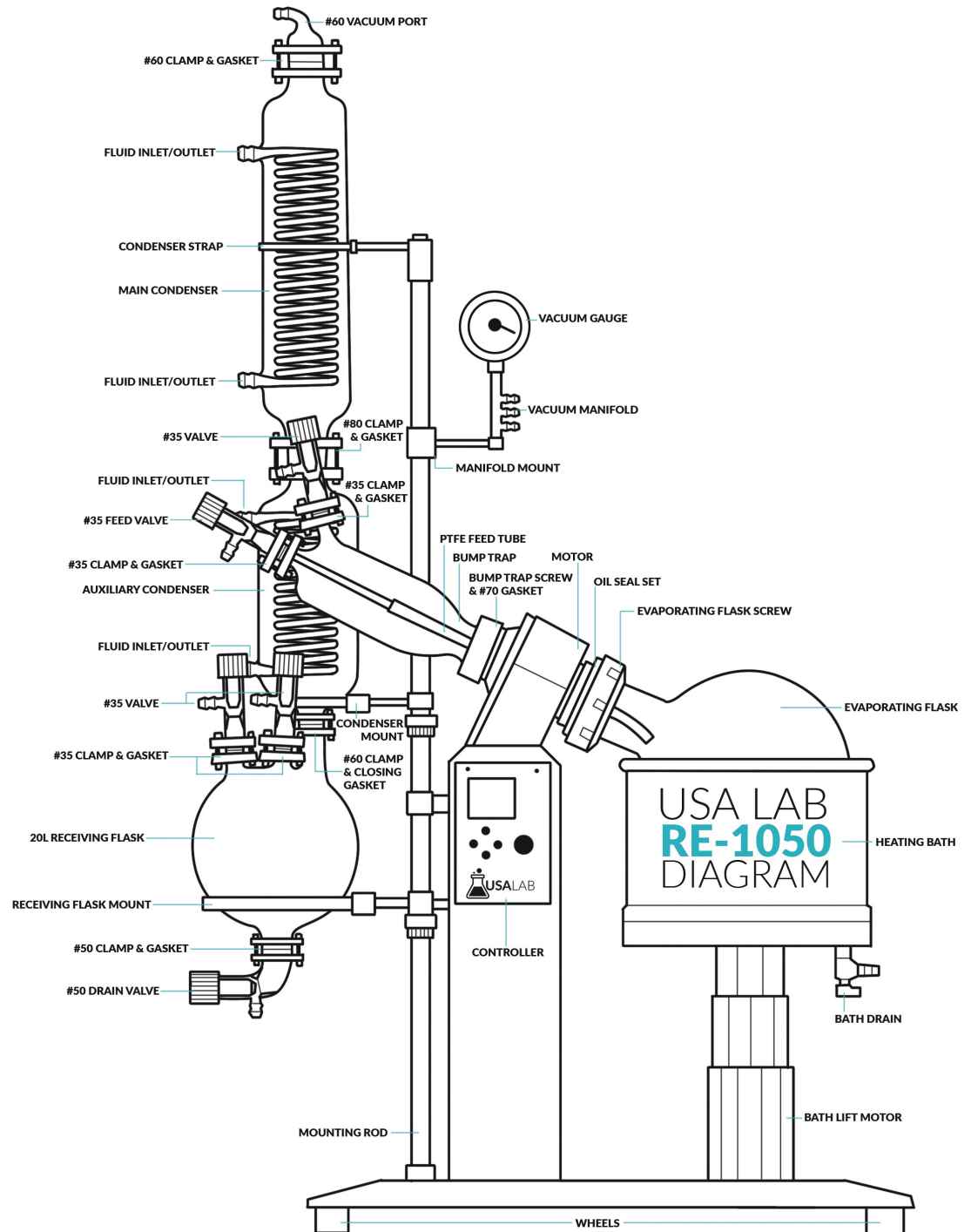


Figure 7 - System diagram of RE-1050

2.2.5 Wiring diagrams

2.2.5.1 Wiring diagram of RE-1005

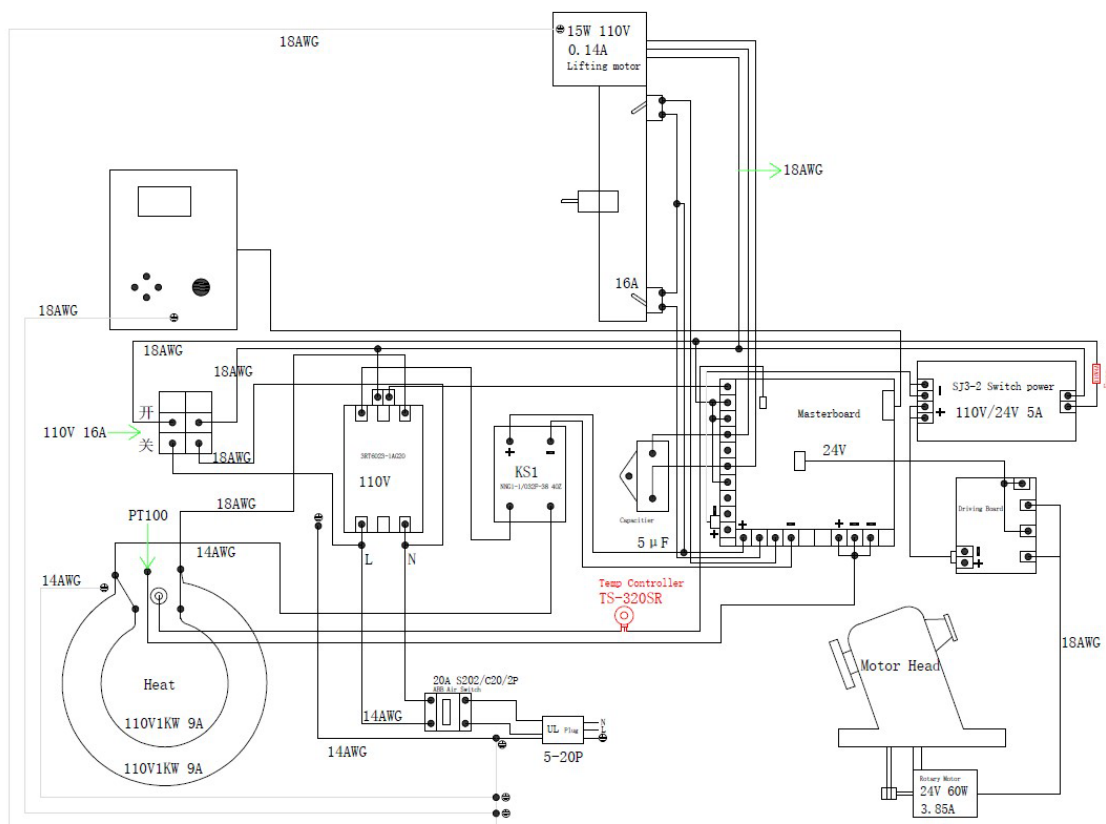


Figure 8 - Wiring diagram of RE-1005

2.2.5.2 Wiring diagram of RE-1020

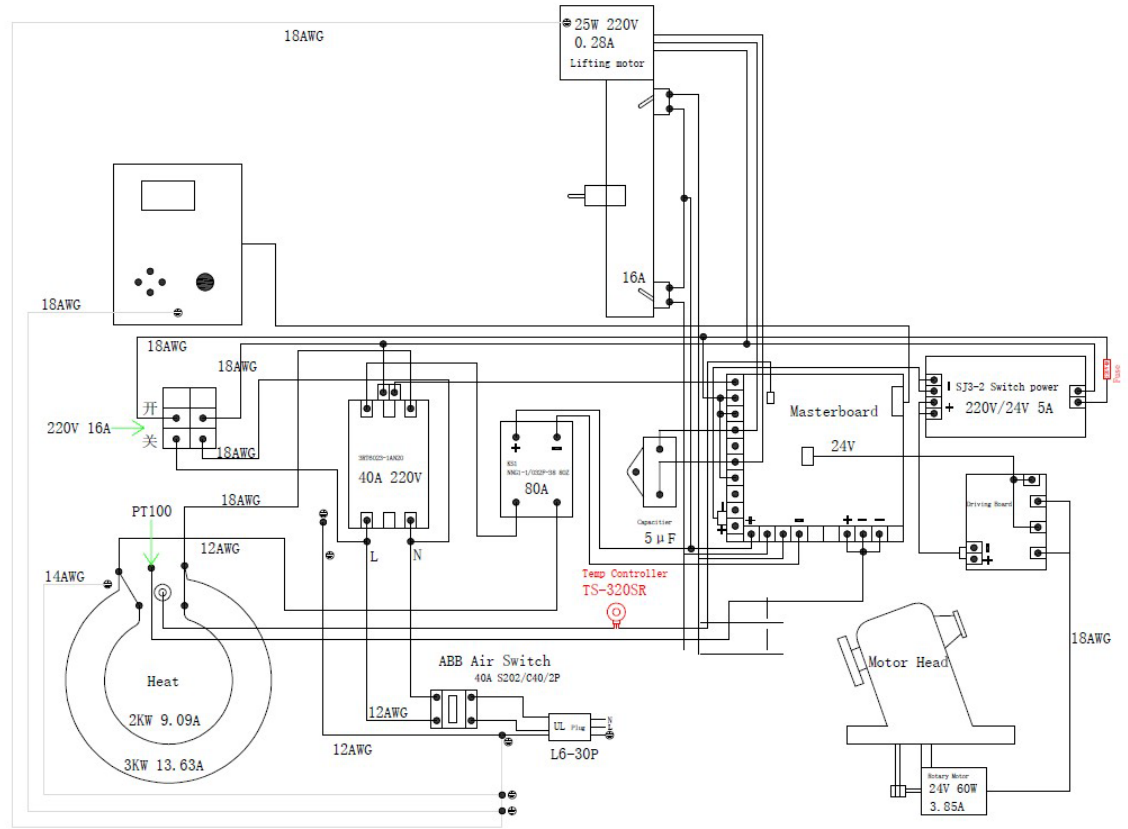


Figure 9 - Wiring diagram of RE-1020

2.2.5.3 Wiring diagram of RE-1050

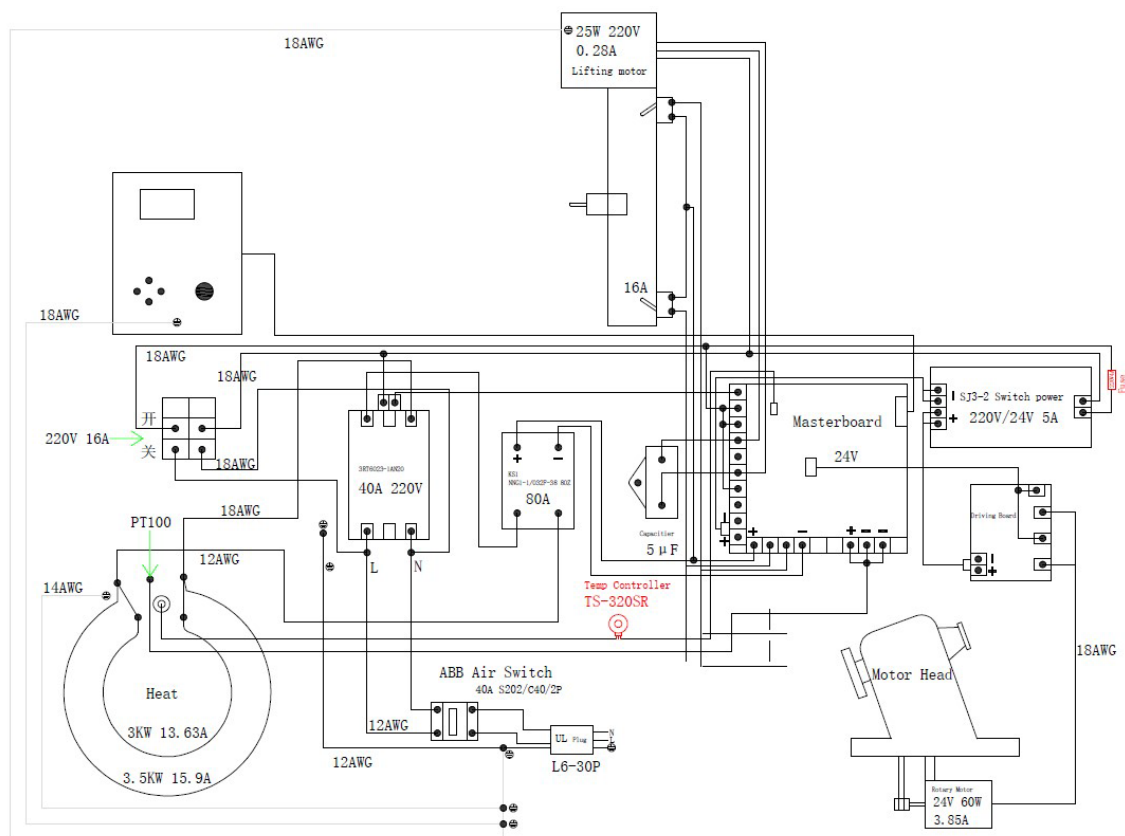
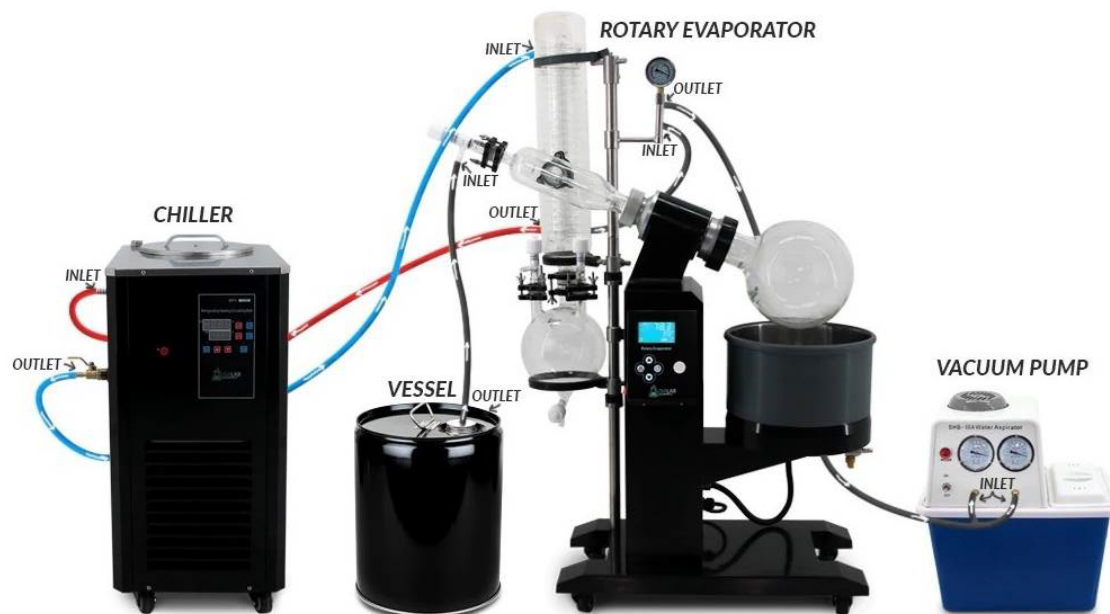


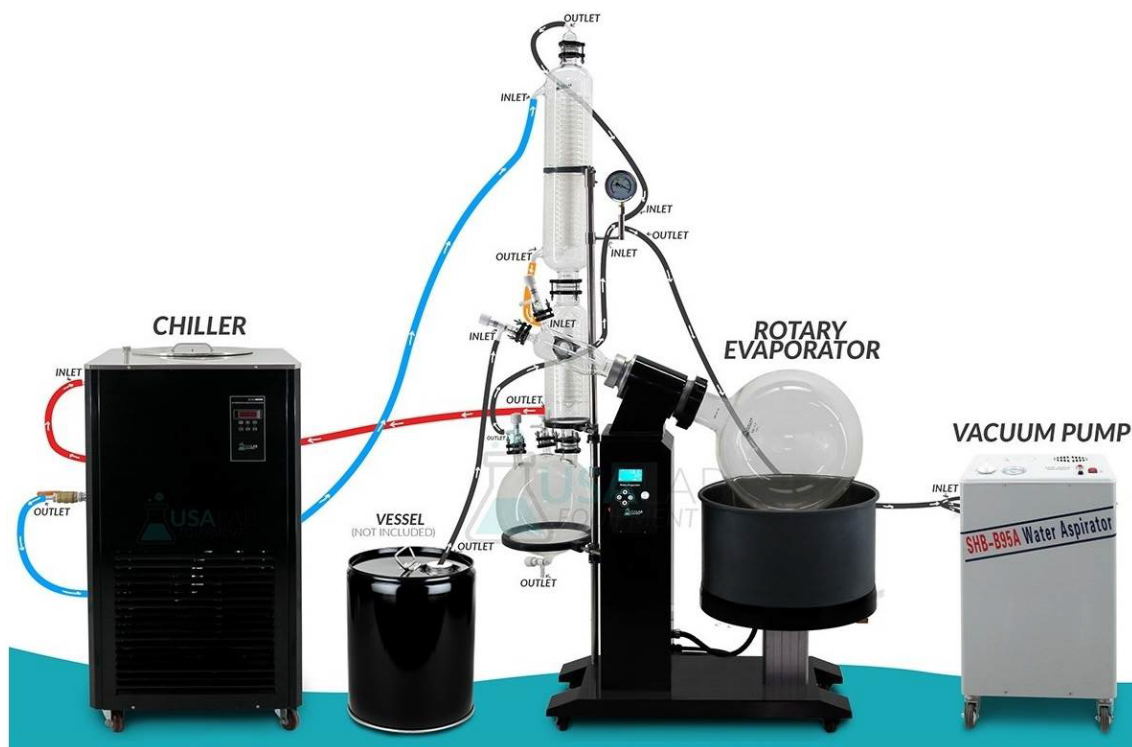
Figure 10 - Wiring diagram of RE-1050

2.3 Tubing connections

2.3.1 RE-1005



2.3.2 RE-1020 & RE-1050



3 Installation and set up

Unpack the evaporator and confirm you have all necessary items before setting up the unit.

- Please open all packages completely before attempting assembly.
- Certain parts such as the top vacuum port (RE-1020 & RE-1050 only) are within the receiving flask packaging. This part can be particularly difficult to locate.
(Contact us if you have any missing parts, need help locating parts, or identifying parts)
- All parts must be clean and dry before assembly. Vacuum grease must be applied to all mating surfaces. (Excluding clamps)
- Some units come with similar extra glass valve parts; this is normal. These are used in case of part failure.

3.1 What's in the box

The following parts are included in the package:

Table 1 - Packaging list

Part	Amount
Rotary Evaporator Base	1 set
Main Condenser	1 pc
Auxiliary Condenser (only with RE1020 & RE1050)	1 pc
Boiling Flask	1 pc
Receiving Flask	1 pc
Bump Trap	1 pc
Vapor Duct with Seal (Pre-Installed)	1 set
PTFE Vacuum Sealing Kit (Pre-Installed)	1 set
Glass Vacuum Port with PTFE Valve	4 sets
Glass Feeding Tube with PTFE Valve	2 sets
PTFE Feeding Tube Extension Hose	1 pc
Vertical Stand	1 pc
Vacuum Gauge	1 pc
Support Ring	2 pcs

Part	Amount
Rubber Strap for Condenser	1 pc
Clamp with PTFE Gasket (RE1020 & RE1050)	7 sets
Clamp with PTFE Gasket (RE1005)	5 sets
Evaporating Flask Screw Aid	1 pc
Allen Key	2 pcs
Vacuum Grease	1 pc
Vacuum Hose	10ft

3.2 Unpacking and assembly of the rotary evaporator

Unpack the evaporator and confirm you have all necessary items before setting up the unit.



Notice

If you believe any parts are missing, contact USA Lab. Keep the original packaging in case you need to return or send the unit back for repairs. USA Lab is not responsible for providing the packaging material.



Before you start assembling your rotary evaporator, make sure the following:



When removing the evaporator from your crate, please be careful and use two people. You can lift from any point on the base to remove the evaporator from the crate. Be mindful of lopsided weight. If necessary, use a third person to stabilize the unit as it is lifted and lowered.



The unit must be installed at least 3 feet away from any walls or items for easy access to the main power switch.



Please use the evaporator in a well-ventilated area.



Remove any residue on the glass parts before assembly and keep the glass flange surfaces clean; apply vacuum grease to both sides of the seal washer gasket, ground glass joints, and PTFE gaskets before the installation.



To clean the condensers, you must empty the packaging material out and then use compressed air as well as water to fully clean them.

Please refer to the packing list to verify receipt of all components and parts. If there are any missing parts, please contact us as soon as possible.

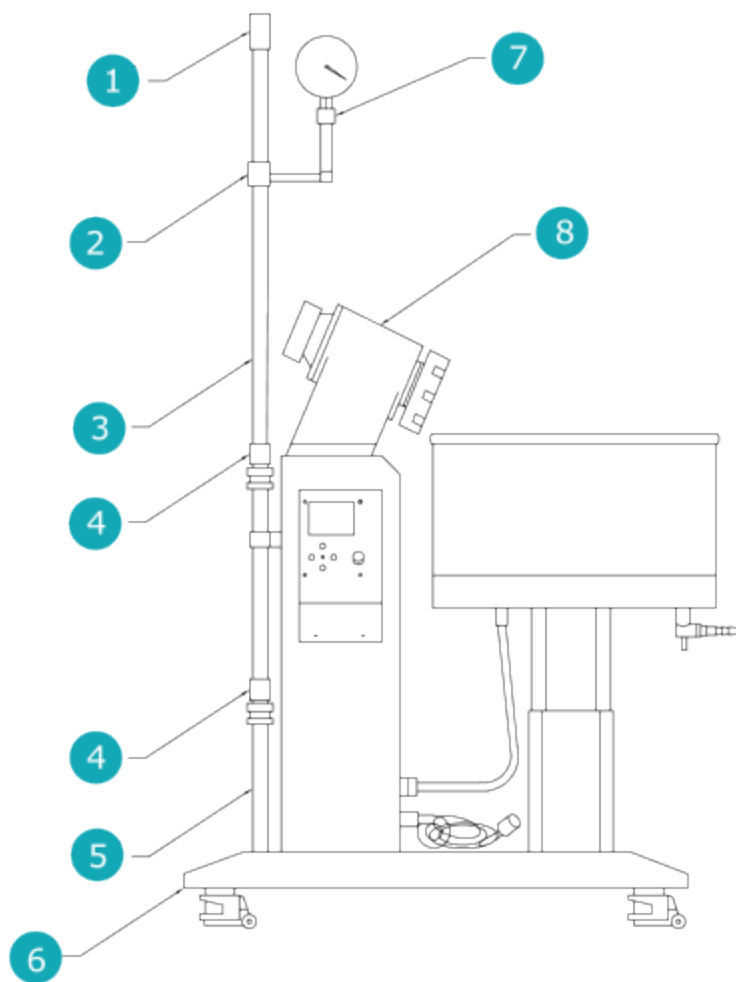
Tools that might be needed in the installation include: Metric Allen wrenches, vacuum grease, and a screwdriver. An assistant to help with assembly.

A professionally installed 110V 20A (NEMA 5-20) receptacle.
(Plug Type: RE-1005 – 110V 20A NEMA 5-20p)

A professionally installed 220V 30A (NEMA L6-30) receptacle or an AC disconnect panel.
(Plug Type: RE-1020 or RE-1050 – 220V 30A NEMA L6-30p)

3.3 Vertical stand assembly

The vertical stand is located on the bottom of the crate.



1	Condenser Strap Mount	5	Lower Vertical Stand
2	Vacuum Gauge Bracket	6	Base
3	Vertical Stand	7	Vacuum Gauge and Manifold
4	Pallet Mount Clamps	8	Rotating Motor

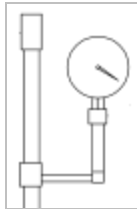
Figure 11 - Vertical stand assembly

To assemble the vertical stand, follow these steps:

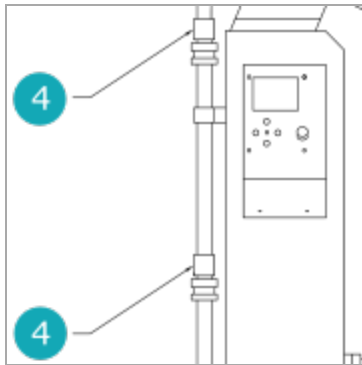
1. Unwrap and prepare the top half of the vertical stand (3).
2. Position the male thread onto the female thread.
3. Rotating in a clockwise direction, secure the two halves together.
4. Loosen the set screw holding the "L" shaped bar (1).
5. Attach the grey silicone condenser strap to the short end of the bar as shown.



6. Tighten the bar set screw.
7. Add the vacuum gauge and manifold (7) to the vacuum gauge bracket (2) as shown.



8. Place the small pallet ring in the top pallet mount, and the large ring in the lower mount (4) as shown.

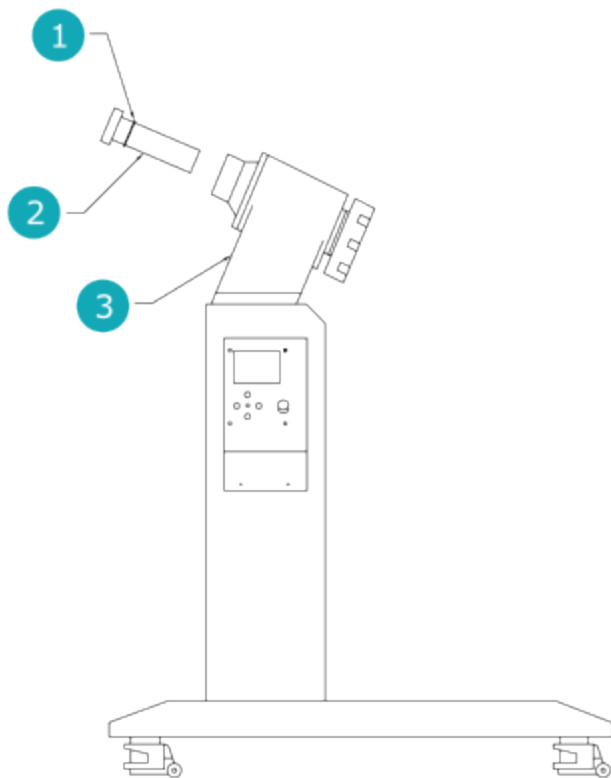


3.4 Vapor duct assembly



You should remove the condenser screw and retainer before inserting the vapor duct.

- For instructions on greasing the vapor duct, see *Service and maintenance* on page 59.



- | | |
|---|------------------|
| 1 | O-ring |
| 2 | Glass Vapor Duct |
| 3 | Rotating Motor |

Figure 12 - Vapor duct assembly

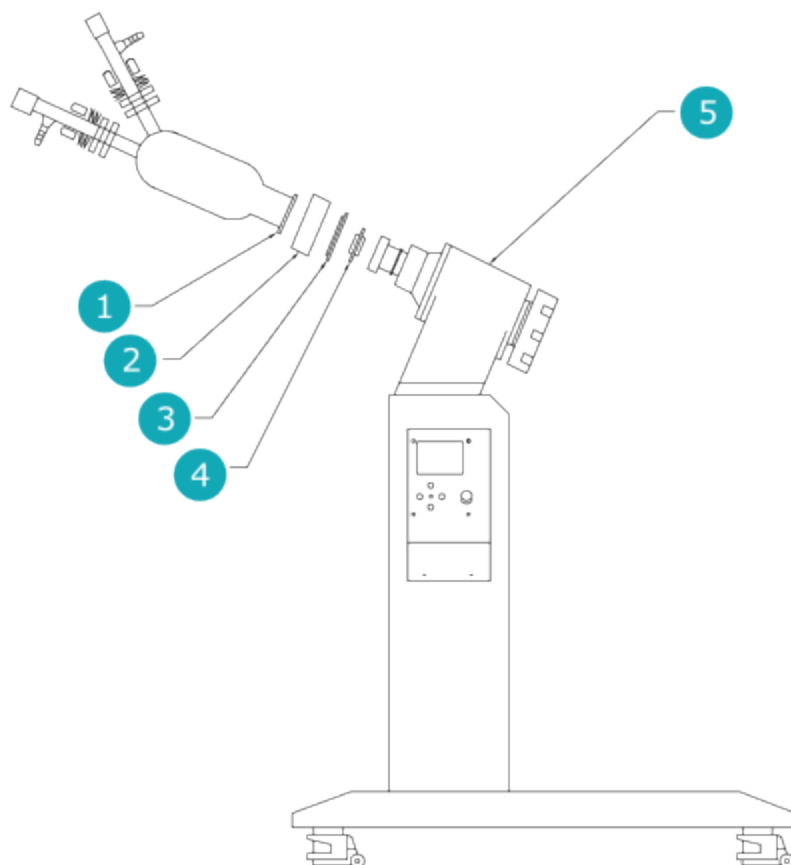
To assemble the vapor duct, follow these steps:

1. Ensure the green O-ring (1) is on the flanged end of the vapor duct (2).
2. Insert the vapor duct (2) into the center of the rotating motor (3).

3.5 Bump trap assembly



The condenser screw and retainer that has been removed while inserting the vapor duct is used here.



- | | |
|---|--------------------------|
| 1 | Bump trap |
| 2 | Condenser screw |
| 3 | Condenser screw retainer |
| 4 | Seal washer |
| 5 | Rotating motor |

Figure 13 - Bump trap assembly

To assemble the bump trap, follow these steps:

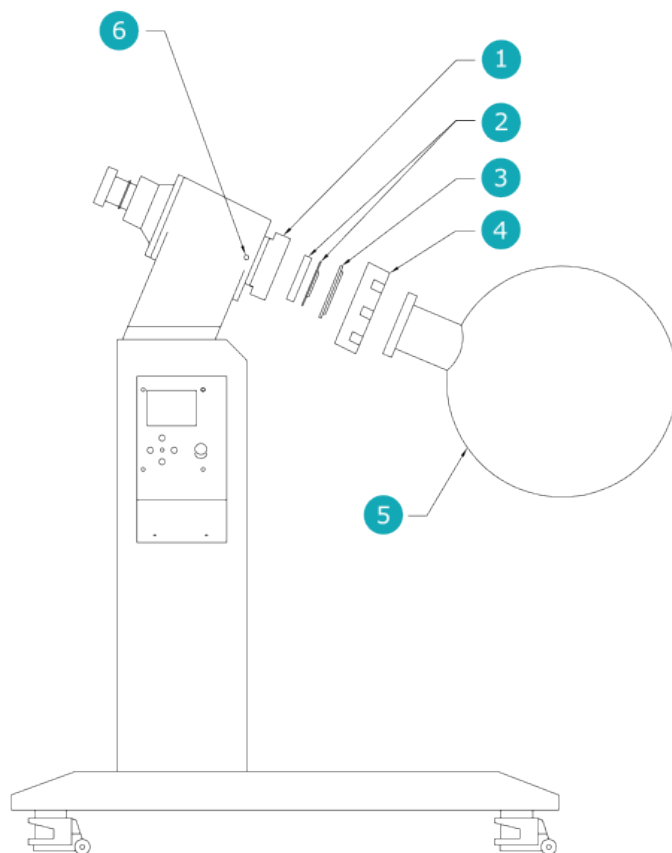
1. Place metal condenser screw (2) over the narrow end of the bump trap (1).
2. Find the split in the condenser screw retainer (3).
3. Slide one end of the retainer between the bump trap flange and the condenser screw (2).
4. Push the remainder of the condenser screw retainer (3) down into the condenser screw (2).
5. The condenser screw (2) should now be attached to the bump trap (1).
6. Grease the seal washer (4) on both sides and insert onto the end of the vapor duct inside the rotating motor (5).
7. Place the assembled end of the bump trap (1) onto the seal washer (4) and tighten the condenser screw (2) keeping it slightly loose for the following step.
8. Rotate the bump trap (1) so that the side port flange points away from the operator.

3.6 Boiling flask assembly



You should remove the boiling screw and retainer before inserting the oil seal set.

- For instructions on greasing the oil seal set, see *Service and maintenance* on page 59.



- | | |
|---|------------------------|
| 1 | Motor coupler |
| 2 | Oil seal set |
| 3 | Boiling screw retainer |
| 4 | Boiling screw |
| 5 | Boiling flask |
| 6 | Motor lock port |

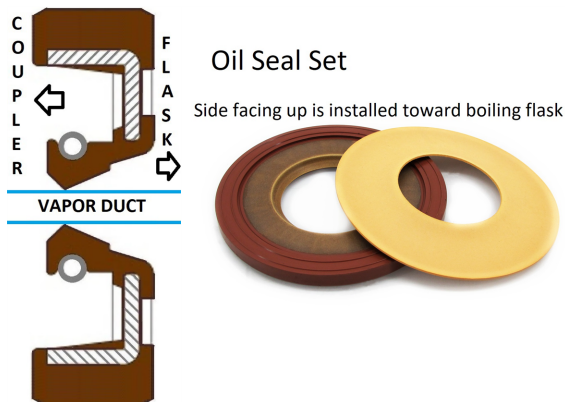
Figure 14 - Boiling flask assembly

To assemble the boiling flask, follow these steps:

1. Place the greased thick oil seal gasket (2) into the motor coupler (1) with the smooth face pointing to the outside.



The thick gasket is directional. Ensure that you set it correctly. Vacuum loss will occur if you do not set it correctly.

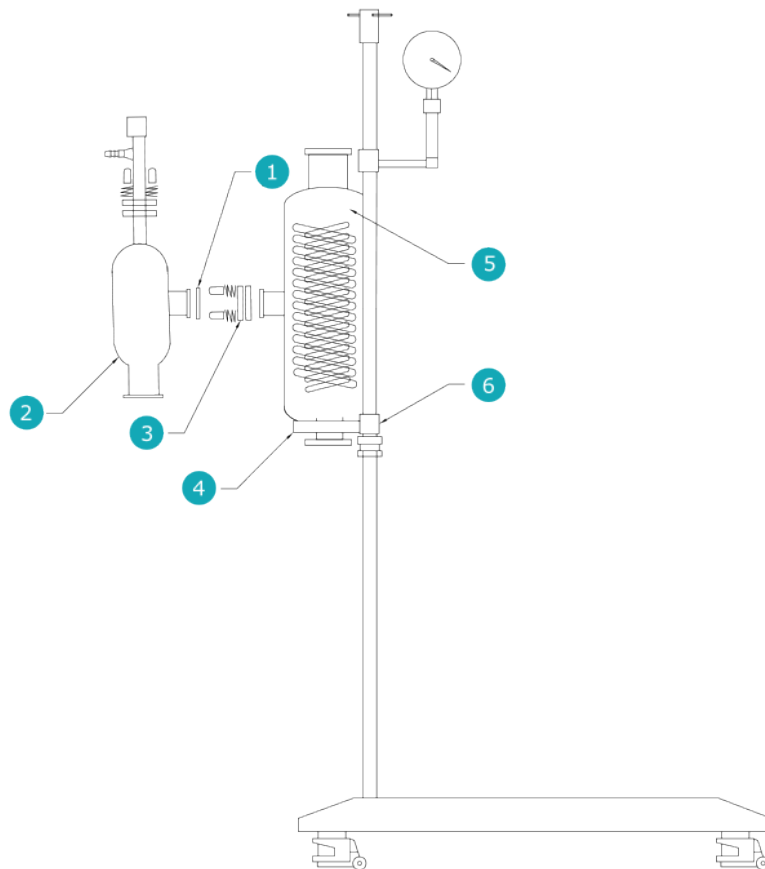


2. Ensure the gasket slides around the greased end of the vapor duct as displayed in *Service and maintenance* on page 59.
3. Press the greased thin oil seal gasket (2) in the same manner placing the concave side toward the thick gasket.
4. Using an assistant or a flask carrier to hold the boiling flask (5) upright and place the boiling screw (4) onto the flange.
5. Slide one end of the boiling flask retainer (3) between the boiling flask (5) flange and the boiling screw (2).
6. Push the remainder of the boiling screw retainer (3) down into the boiling screw (4).
7. The boiling screw (4) should now be attached to the boiling flask (5).
8. Place an Allen wrench into the motor lock port (6), and press as you turn the motor coupler (1). The Allen wrench should slide into the corresponding shaft port, locking the motor coupler (1) into place.
9. Using an assistant, place the assembled end of the boiling flask (5) onto the motor coupler (1) and tighten the boiling screw (4) keeping it balanced and aligned.

3.7 Auxiliary condenser assembly (Main for RE-1005)



You should ensure that the bump trap and condenser pallet ring mount are installed prior to condenser assembly.



- | | |
|---|---|
| 1 | Seal washer |
| 2 | Bump trap (assembled) |
| 3 | Quick clamp |
| 4 | Pallet mount |
| 5 | Auxiliary condenser (Main condenser on RE-1005) |
| 6 | Pallet mount clamp |

Figure 15 - Auxiliary condenser assembly

To assemble the auxiliary condenser, follow these steps:

1. Place the condenser (5) onto the pallet mount (4) installed in section *Vertical stand assembly* on page 33.
2. Align the side port located on the bump trap (2) and the matching flange on the condenser (5).
3. Place the greased seal washer (1) between the two flanges.
4. Adjust the condenser (5) until the flanges line up evenly.
5. Open and loosen the quick clamp (3).
6. Close the quick clamp (3) around the flanges and seal then tighten the clamp.

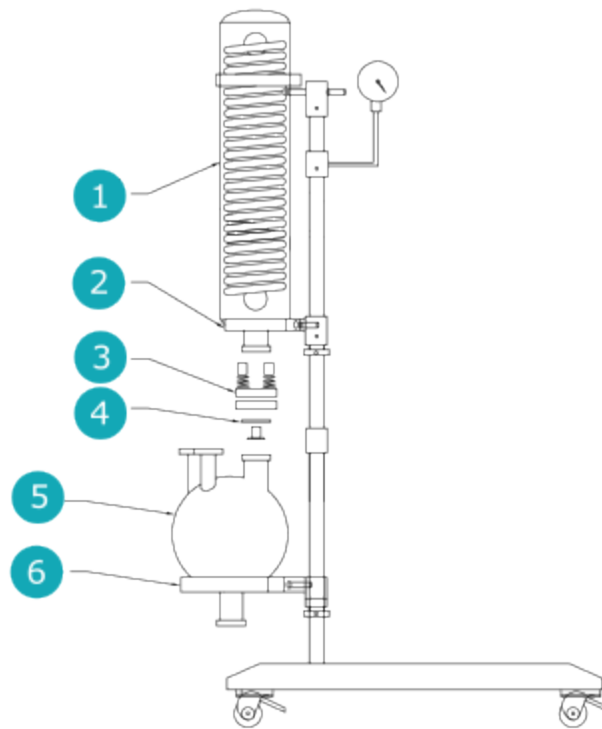
3.8 Receiving flask assembly

3.8.1 Receiving flask assembly (RE-1005)



Large pallet mount ring must be installed prior to receiving flask installation.

The seal washer used between the condenser and the receiving flask has a valve in the middle. This center valve must hang down inside of the receiving flask.



- | | |
|---|------------------------------|
| 1 | RE-1005 condenser |
| 2 | Pallet mount |
| 3 | Quick clamp |
| 4 | Sealing flange (insert down) |
| 5 | Receiving flask |
| 6 | Large pallet mount |

Figure 16 - Receiving flask assembly (RE-1005)

To assemble the receiving flask, follow these steps:

1. Place the receiving flask (5) onto the pallet mount (2) and keep the parts low to the base for now.
2. Grease and add the sealing flange gasket (4) onto the top of the large receiving flask (5) flange.
3. Ensure the center of the sealing flange gasket (4) hangs down inside of the receiving flask (5).



The sealing flange serves a very important role in allowing the rotovap to run continuously. If you do not install this part correctly, you will not be able to empty the receiving flask without shutting down the system. The valve closes when vacuum is lost in the receiving flask allowing the system to continue recovery while the flask is emptied. When vacuum is reintroduced, the flask equalizes with the system. The valve falls back down and allows the recovered solvent to be collected.

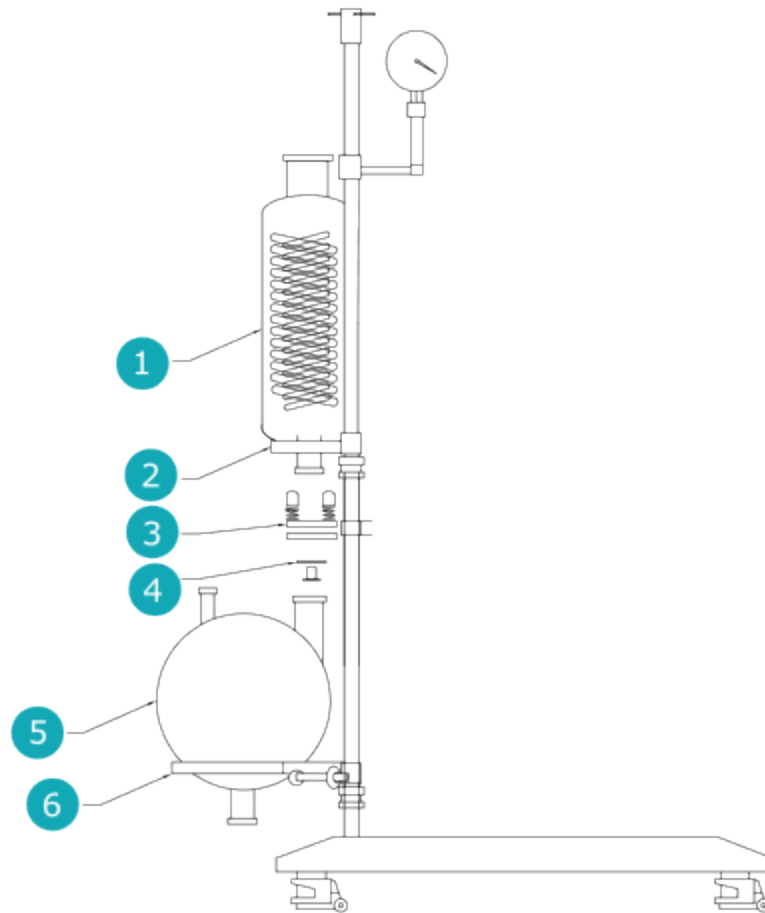
4. Raise the pallet mount (6) clamp until it meets with the bottom of the condenser (1).
5. Adjust the receiving flask (5) until the flanges line up evenly.
6. Open and loosen the quick clamp (3).
7. Close the quick clamp (3) around the flanges and seal then tighten the clamp.

3.8.2 Receiving flask assembly (RE-1020 and RE-1050)



Large pallet mount ring must be installed prior to receiving flask installation.

The seal washer used between the condenser and the receiving flask has a valve in the middle. This center valve must hang down inside of the receiving flask.



- | | |
|---|------------------------------|
| 1 | Auxiliary condenser |
| 2 | Pallet mount |
| 3 | Quick clamp |
| 4 | Sealing flange (insert down) |
| 5 | Receiving flask |
| 6 | Large pallet mount |

Figure 17 - Receiving flask assembly (RE-1020, RE-1050)

To assemble the receiving flask, follow these steps:

1. Place the receiving flask (5) onto the pallet mount (2) and keep the parts low to the base for now.
2. Grease and add the sealing flange gasket (4) onto the top of the large receiving flask (5) flange.
3. Ensure the center of the sealing flange gasket (4) hangs down inside of the receiving flask (5).



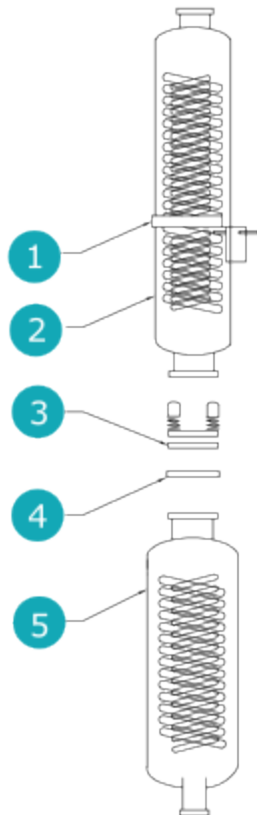
The sealing flange serves a very important role in allowing the rotovap to run continuously. If you do not install this part correctly, you will not be able to empty the receiving flask without shutting down the system. The valve closes when vacuum is lost in the receiving flask allowing the system to continue recovery while the flask is emptied. When vacuum is reintroduced, the flask equalizes with the system. The valve falls back down and allows the recovered solvent to be collected.

4. Raise the pallet mount (6) clamp until it meets with the bottom of the condenser (1).
5. Adjust the receiving flask (5) until the flanges line up evenly.
6. Open and loosen the quick clamp (3).
7. Close the quick clamp (3) around the flanges and seal then tighten the clamp.

3.9 Main condenser assembly (RE-1020 and RE-1050)



- Before assembling the main condenser, ensure that the auxiliary condenser and vertical stand with condenser strap is assembled.
- Use an assistant for help to stabilize the main condenser.



- | | |
|---|---------------------|
| 1 | Condenser strap |
| 2 | Main condenser |
| 3 | Quick clamp |
| 4 | Sealing washer |
| 5 | Auxiliary condenser |

Figure 18 - Main condenser assembly (RE-1020, RE-1050)

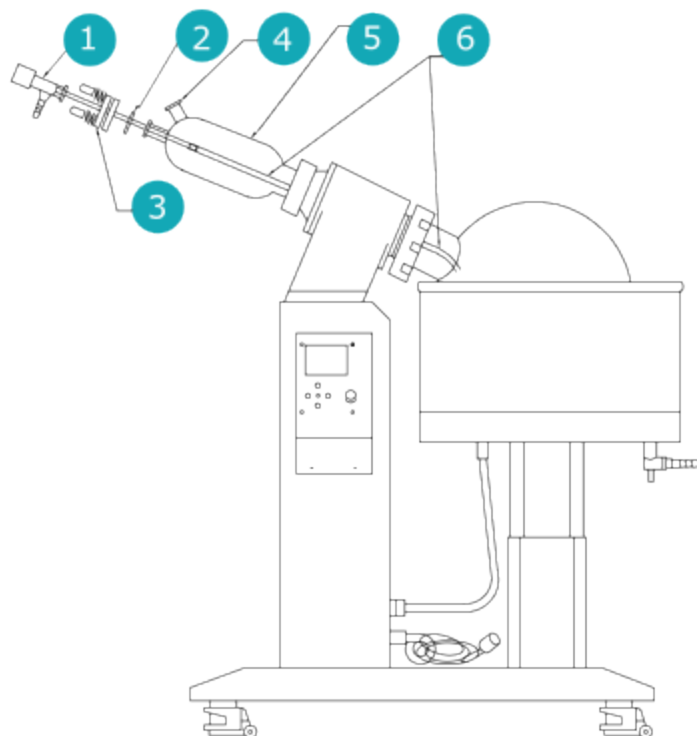
To assemble the main condenser, follow these steps:

1. Grease the seal washer (4) and place on top of the auxiliary condenser (5).
2. Place the main condenser (2) onto the seal washer (4) and attach the strap (1).
3. Adjust the main condenser (2) until the flanges line up evenly.
4. Open and loosen the quick clamp (3).
5. Close the quick clamp (3) around the flanges and seal (4), then tighten the clamp.

3.10 Feed tube assembly



- RE-1005 does not include a vent flange, it has a different style bump trap.
- PTFE feed tube must be installed on the feed tube before assembly.
- Feed tube assembly must be fed through the seal washer to be placed between both flanges.



- | | |
|---|-------------------------|
| 1 | Feed tube |
| 2 | Seal washer |
| 3 | Quick clamp |
| 4 | Vent flange (20L & 50L) |
| 5 | Bump trap |
| 6 | PTFE feed tube |

Figure 19 - Feed tube assembly

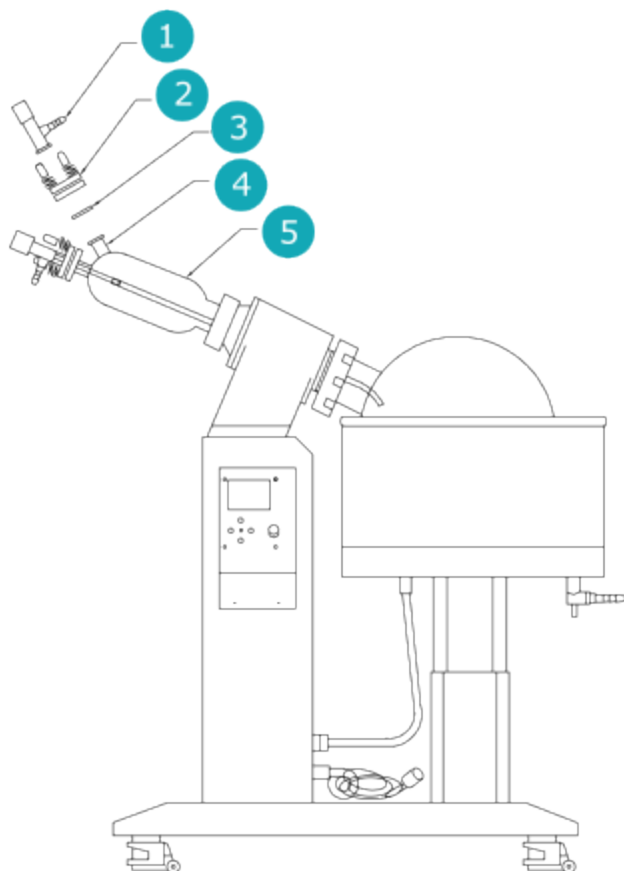
To assemble the feed tube, follow these steps:

1. Grease the seal washer (2) and slide it down the glass tube of the feed tube (1).
2. Push the PTFE feed tube (6) onto the end of the feed tube (1). (heat if necessary).
3. Slide the assembled feed tube (1)(2)(6) through the bump trap (5).
4. Adjust the feed tube (1) until the flanges line up evenly.
5. Open and loosen the quick clamp (3).
6. Close the quick clamp (3) around the flanges and seal (2), then tighten the clamp.

3.11 Vent valve assembly



Vent valve is not included on the RE-1005 model.



1 Vent valve

2 Quick clamp

3 Seal washer

4 Vent valve flange

5 Bump trap

Figure 20 - Vent valve assembly

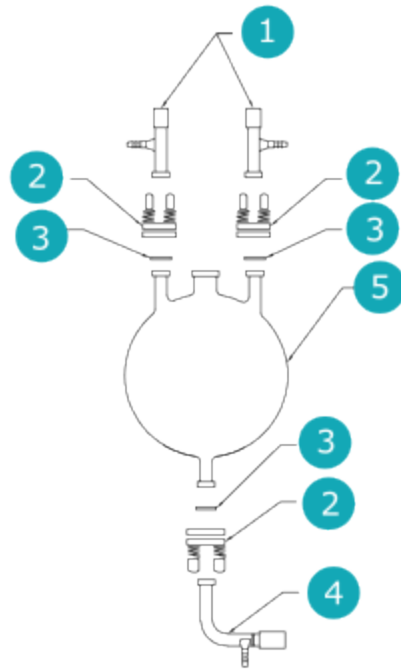
To assemble the vent valve, follow these steps:

1. Grease the seal washer (3) and place it onto the vent valve flange (4).
2. Adjust the vent valve (1) until the flanges line up evenly.
3. Open and loosen the quick clamp (2).
4. Close the quick clamp (2) around the flanges and seal (3), then tighten the clamp.

3.12 Receiving flask valves assembly



One vent valve is connected to the vacuum manifold. One is left open to allow air into the flask.



- | | |
|---|-----------------|
| 1 | Vent valves |
| 2 | Quick clamp |
| 3 | Seal washer |
| 4 | Drain valve |
| 5 | Receiving flask |

Figure 21 - Receiving flask valve assembly

To assemble the receiving flask valve, follow these steps:

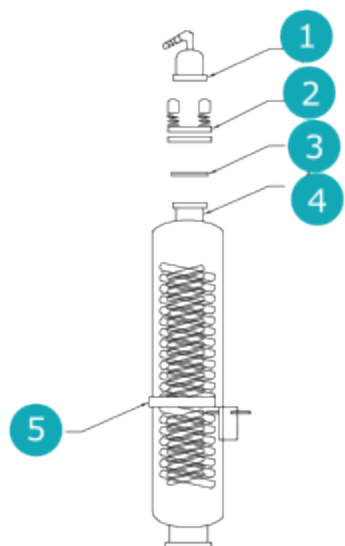
1. Grease the seal washers (3) and place them onto the receiving flask flanges (4).
2. Adjust the vent valve (1) until the flanges line up evenly.
3. Open and loosen the quick clamp (2).
4. Close the quick clamp (2) around the flanges and seal (3), then tighten the clamp.

You need to repeat the above steps for the bottom drain valve also.

3.13 Vacuum port assembly (RE-1020 & RE-1050)



Vacuum port is not included on the RE-1005 model.



- | | |
|---|-----------------|
| 1 | Vacuum port |
| 2 | Quick clamp |
| 3 | Seal washer |
| 4 | Condenser |
| 5 | Condenser strap |

Figure 22 - Vacuum port assembly

To assemble the vacuum port, follow these steps:

1. Grease the seal washer (3) and place it onto the condenser flange (4).
2. Adjust the vacuum port (1) until the flanges line up evenly.
3. Open and loosen the quick clamp (2).
4. Close the quick clamp (2) around the flanges and seal (3), then tighten the clamp.

4 Operations

This section describes common tasks required for the operation of the Rotary Evaporators.

4.1 Operating method

A good general guideline to follow is the "Rule of 20." This rule states that your bath temperature should be 20°C hotter than the boiling point or vapor temperature you are trying to achieve, and the coolant temperature should be at least 20°C cooler than the vapor temperature.

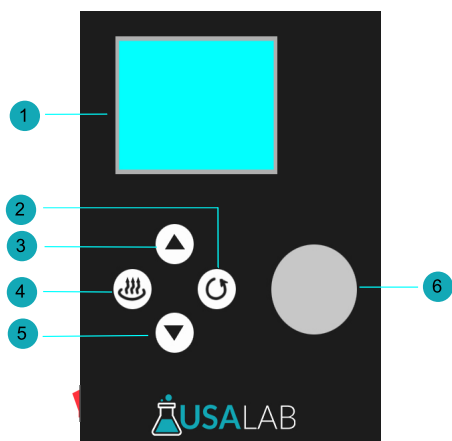
For instance: If you were trying to boil off a substance that has a boiling point of 70°C, you would want to set the bath temperature to 90°C and have the coolant in the condenser be 50°C or less.

If you'll be applying a vacuum, don't forget to check how the reduced pressure will effect your solvent's boiling point!

- Run your vacuum pump and chiller before operating the rotary evaporator.
- Please level and lock the wheels on the evaporator prior to filling your bath with water.
- Fill your bath about half way full, with 100% distilled water. Once filled, the unit should not move as to prevent any water from spilling from the bath.
- Raise the bath to the level that your solution will be in the flask.
- Using a hose to the feed tube valve, the solution to be evaporated can be injected into the boiling flask (using the negative pressure of the evaporator to draw the liquid into the boiling flask).
- Once the solution is filled (no more than half-way ex. 50L boiling flask = 25L of solution). The temperature, rotation speed and timer can be set and enabled.
- Once your receiving flask reaches 90%, you can break vacuum on your receiving flask using one of the glass valves. Close the vacuum source and then open the unconnected valve.
- The sealing washer valve on the receiving flask should close allowing you to drain the flask.
- Once drained, close the unconnected valve and then open the vacuum source.
- The sealing washer valve should open allowing the recovered solvent to fill the flask again.

4.2 Control panel operation

The control panel is located on the front of the evaporator.



-
- 1 LCD Display

 - 2 Press this key to start or shut down the rotation function

 - 3 Press this key to raise the bath, long press to raise continuously

 - 4 Press this key to start or shut down the heating function

 - 5 Press this key to lower the bath, long press to lower continuously

 - 6 **Settings** button: Press to enter the menu for temperature, speed, and timer settings
SP- Temp | SU - Speed | ST - Timer
-

Figure 23 - Control panel operation

4.2.1 Power on the unit

Flip the power switch on the left side of the display. The switch will glow if it is receiving power. The unit will beep twice and show a code before displaying the main menu.

4.2.2 Setting the temperature, speed, and time

To set temperature, speed, and time, follow these steps:

1. Press the silver knob (6) once to enter the settings menu.
2. Adjust the value for SP, SU, and ST by rotating the dial and pressing to confirm. (Timing function is not required to be set. 0 = infinite time).
 - **SP:** Temperature
 - **SU:** Speed
 - **ST:** Time

4.2.3 Starting and stopping the rotary evaporator



Ensure liquid solution, chiller, and vacuum source are fully installed and ready before operating the “rotovap”.

To start the rotary evaporator, follow these steps:

1. Raise the bath (3) to the same level as the solution in the flask. (It is very important to keep the liquid levels the same during the entire run.)
2. Place the dome cover onto the bath.
3. Press the heating button (4) and then the rotation button (2).
 - ▶ For Recovery Instructions, see *Operating method* on page 55

To shut down the rotary evaporator, follow these steps:

1. Press the rotation button (2) and then the heating button (4).
2. Lower the bath using button (5).

4.2.4 Heating above 100°C

Only set and heat above 100°C with silicone oil. Any oil spills on the grey bath cover will cause it to melt.



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.

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5 Service and maintenance

5.1 Part maintenance

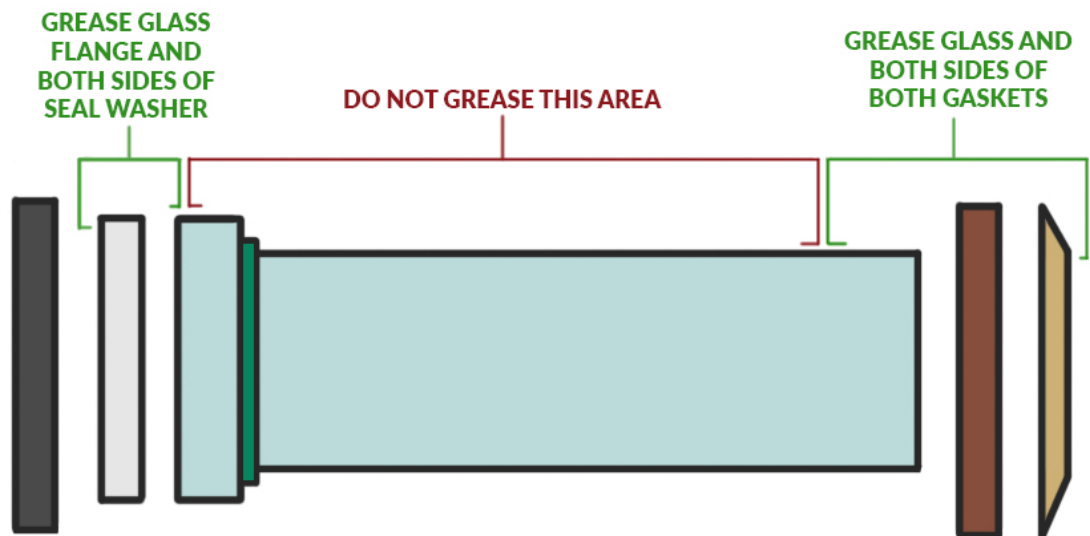


WARNING

You must disconnect the plug before cleaning or maintenance.

- Please 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 substance during cleaning, or else shock or other accidents will occur.

Periodic maintenance of the vapor duct is required. See image below for vacuum grease locations. If the vapor duct is not maintained, vacuum leaks and loud grinding noises in the motor area may occur.



5.2 Long term storage

To store the evaporator for long term, ensure the following:

- Drain and dry out the unit.
- Inspect the unit for damages or concerns.
- Clean the outside of the unit.
- Coil the cord into a circle.
- Place the unit in a level, low humidity environment.

6 Troubleshooting

If you encounter issues with your unit, refer to the following table.

Table 2 - Troubleshooting for the Rotary Evaporators.

Problem	Possible cause	Solution
The unit is plugged in but the power indicator light or LCD panel won't turn on.	Check the power cord to see if its loose or disconnected.	Re-connect the power cord.
	Power switch failure.	Replace the power switch.
	Circuit board failure.	Stop using the machine and contact us immediately.
The rotation indicator turns on but the motor does not rotate.	Motor failure.	
The heating indicator turns on but the bath does not heat.	Circuit board failure.	Replace the relay or switch.
	Faulty relay or level switch.	
The temperature display shows □□□	Faulty heater element.	Replace the heater element.
	The bath temperature sensor has a short circuit or an open circuit.	Check sensor and wiring.
The temperature display shows "Er-1", ALM1 identifier is on.	The bath temperature sensor has a short circuit or an open circuit.	Check the sensor and wiring.
The temperature display shows "Er-2", ALM1 identifier is on.	The bath protection sensor has a short circuit or an open circuit.	
The temperature display shows "Er-3", ALM1 identifier is on.	The bath protection sensor exceeds the set value.	

Problem	Possible cause	Solution
The temperature display shows "Er-1", ALM2 identifier is on.	Faulty power module.	Remove the boiling flask. Run the unit under no load. If the fault continues, stop using the machine and contact us immediately.
The temperature display shows "Er-2", ALM2 identifier is on.	The motor has stalled.	
The temperature display shows "Er-3", ALM2 identifier is on.	Holzer logic error.	
The temperature display shows "Er-4", ALM2 identifier is on.	Board under voltage.	Check the power cord voltage value.
The temperature display shows "Er-5", ALM2 identifier is on.	Board over voltage.	
The temperature display shows "Er-6", ALM2 identifier is on.	Serial communication fault.	Stop using the machine and contact us immediately.
An abnormal noise occurs.	Abrasions on the seal ring.	Replace the seal ring.
	Abrasions on the internal gears.	Stop using the machine and contact us immediately.
	A lack of grease in the motor shell.	
	Failure of the motor bearings.	

Problem	Possible cause	Solution
Low vacuum pressure.	Abrasions of the glass rotary shaft.	Replace the glass rotary shaft.
	Abrasions on the seal ring.	Replace the seal ring.
	Incorrect installation of the Teflon vacuum break seal washer.	Remount the seal ring.
	Leaking from any of the seal washers or glass port valves.	Replace the seal washer or glass port valve o-ring.
	Ageing of the vacuum hose.	Replace the vacuum hose.
Uneven bath lifting.	Circuit board or motor failure.	Stop using the machine and contact us immediately.
	Abrasion or rusting of the sliding bearing.	

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7 Decommissioning, disassembly and disposal

After the service life of the equipment is reached, the equipment must be disposed of in an environmentally appropriate manner.



WARNING

Risk of serious injury or death!

All electronics and batteries, if fitted, must be recycled according to local regulations.

All metal components can be recycled according to local regulations.

All fluids must be fully drained and disposed of according to local regulations.

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8 Technical specifications

Technical specifications of each Rotary Evaporator model are mentioned below.

Table 3 - Technical specifications

Model	RE-1005	RE-1020	RE-1050
Power Requirements	110V 60Hz Single Phase	220V 50/60Hz Single Phase	
Heating Power	2200 W	5000 W	6500 W
Environmental Conditions	<ul style="list-style-type: none"> Indoor use and altitude up to 2000m. Temperature range of 0° to 50°C. Max relative humidity of 50% at 50°C. Transient over voltages up to the levels of over voltage category II. These levels of transient overvoltage are typical for equipment supplied from the building wiring. Temporary overvoltage occurring on the mains supply. Applicable pollution degree of the intended environment (Degree II). Manufacturers may specify more restricted environmental conditions for operations. 		
Boiling Flask Capacity	5L	20L	50L
Evaporation Rate <small>Approx.</small>	H ² O 2L/hr Ethanol 4L/hr	H ² O 5L/hr Ethanol 12L/hr	H ² O 7L/hr Ethanol 15L/hr
Rotation Speed	20-120 RPM		
Maximum Loaded Volume	≤ 60% of total liquid volume of evaporation flask		
Glass Composition	GG-17 - 3.3 - High Grade Borosilicate Glass		
Receiving Flask Capacity	3L	10L	20L
Condenser Surface Area	0.27m ²	Main: 0.8m ² Aux: 0.39m ²	Main: 0.91m ² Aux: 0.52m ²
Barb Connections	Vacuum: 1/2" Condenser: 5/8" Solvent Drain: 5/8" Bath Drain: 1/2"		
Temperature Range	Ambient + 5°C to 100°C (180°C with silicone oil)		

Model	RE-1005	RE-1020	RE-1050
Bath Material	SS304 - Stainless Steel		
Bath Fluids	Distilled water or silicone oil		
Max Bath Level	Do not exceed 1" from the top of the bath		
Glass Vacuum Rating	399.9Pa 5 Torr 5,000 Millitorr		
Rotary Vacuum Seal	PTFE + Viton		
Casters	Durable leveling swivel casters (4pcs.)		
Unit Dimensions	35" x 18" x 53"	43" x 30" x 80"	52" x 30" x 84"
Shipping Dimensions and Weight	48" x 40" x 50" 198lbs	48" x 40" x 54" 337lbs	48" x 40" x 62" 423lbs
Compliance	ETL (UL and CSA)		

9 Spare parts

For a list of spare or replacement parts, contact USA Lab for details.

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10 Warranty

USA Lab products are warranted to be free of workmanship, mechanical, and material defects for one to three years from the date of purchase depending on product. Within this warranty period, USA Lab will replace or repair components that fail due to manufacturer defect.

Within continental United States repairs or parts, shipping charges will be covered in full or in part by USA Lab.

For all other locations, 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 not cover wrongful input voltage. The customer needs to be responsible for 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.

10.1 Returns policy

USA Lab offers a 30-day returns 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 returns policies:

- USA Lab does 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. USA Lab does not accept returns on any solvents or consumables.
- For pre-orders, there is a 10 % non-refundable fee associated with canceled pre-orders. This covers the banking fees and the hold fee.
- By default, a minimum of 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, without exceptions. You are responsible for the return shipment unless deemed defective by USA Lab. In that case, USA Lab 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, wear, or damage, 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.

- After 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.

- Contact support@usalab.com at USA Lab

▶ *Contact information on page 2.*

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