DESIGNED & ASSEMBLED IN THE USA

BLUE ALPINE

Owners Manual

Medium - BA40MFD
Large - BA70LFD

Machine Revision 1 & 2

Updated Owners Manual & Recipes PDF

Document number A00106

Revised December 9, 2025

Contents

1 Thank You

Thank you for purchasing a Blue Alpine freeze dryer! We hope you enjoy many years of service and enjoyment from your machine. This manual provides important information about the initial setup, proper use, maintenance, repair, and troubleshooting of your freeze dryer.

Freeze drying is an incredible process that preserves food for up to 25+ years. Home freeze drying is all about simplifying a relatively scientific process so virtually anyone can do it. Here at Blue Alpine, we are excited to be part of your freeze drying journey.

1.1 Stay Up To Date

Currently, to provide a better experience for our customers, the owner's manual is constantly being updated to accommodate specifics of all revisions of machines in production or in beta testing. Stay up-to-date by using the online version of the owner's manual. Follow the QR code below to get the latest owner's manual. Or find it on our downloads page at www.bluealpinefreezedryers.com

Feel free to print the owner's manual, but currently, we do not recommend it due to how frequently it's being updated.

Full Owners Manual & Recipes PDF

Click Here, or visit our downloads page at www.bluealpinefreezedryers.com.

Labels

Warnings and other helpful labels are added throughout the owners manual for your safety and convenience. Reference these warnings when setting up and operating your freeze dryer.

WARNING

- Incorrect operation could result in bodily injury or death.

CAUTION

- Incorrect operation could result in bodily injury or equipment damage or failure.

NOTICE

- Helpful suggestions and information to operate the machine most efficiently.

QR Codes

Throughout the owner's manual, there are QR codes to videos covering appropriate topics. Included with each Code will be a clickable link if this document is being viewed in PDF format.

If you are having troubles accessing any videos, please contact us to receive a link through email. See customer support on page 73.

Safety

We are committed to the safety of our customers. For your safety, please read through all information and follow all labels and instructions. Below is a video showing some of the safety consideration for operating, maintening, and servicing the freeze dryer and vacuum pump.

Customer Safety Video
Scan the QR code or Click Here to see the video.

2 Safety Information

To reduce the risk of fire, electric shock, or other injury, follow all instructions and safety guidelines.

General Safety

- **Only** use the freeze dryer as described in this manual.
- Read and follow warning labels and symbols on the freeze dryer. These labels provide essential safety information.
- Keep ventilation openings clear of obstruction.
- **Always** keep the freeze dryer upright on a flat, level surface before and during operation.
- **Do not** place the freeze dryer near sources of heat, such as stovetops, ovens, or radiators.
- **Do not** place the freeze dryer directly on floors, carpets, or rugs.
- When not in use, turn the freeze dryer off and disconnect from power by removing the plug from the outlet.
- **Always** unplug your freeze dryer from the power outlet before cleaning or servicing your freeze dryer.
- **Do not** plug in or unplug the heat rack while the freeze dryer is powered.
- Place freeze dryer on an easily cleanable, water-resistant surface, such as stainless steel, hard plastic, concrete, or stone.
- **Do not** place or immerse the freeze dryer, power cord, or plug in water.
- If you use any chemicals while freeze-drying or while cleaning your freeze dryer, follow proper safety protocols for those chemicals.
- **Do not** operate the freeze dryer above 90°F or below 32°F.
- If the freeze dryer is damaged or not functioning correctly, stop using it and contact **Customer Support** immediately (see page 73).
- This freeze dryer is not to be used by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, without supervision or instruction by a person responsible for their safety.
- Keep the freeze dryer out of reach of children.
- Freeze dryers are not toys. Supervise children when they are near the freeze dryer at all times and **never** allow them to play with the freeze dryer

WARNING

- Do not damage the refrigerant circuit.
- Possible actions that could lead to damaging the refrigeration system include, but are not limited to, attempting to service the refrigeration system, attempting to charge the refrigeration system, using sharp or hot objects next to the refrigeration system, attempting to alter the refrigeration system, or attempting to disassemble the refrigeration system.
- Damage caused to the refrigerant circuit could lead to fire, explosion, severe bodily injury, or death.
- If the freeze dryer trips a breaker contact customer service. Forcibly resetting a breaker on a freeze dryer with a locked compressor rotor and improperly sized breakers can cause fire and or a catastrophic failure.
- Please contact customer support for help regarding your refrigeration system.

WARNING

- Do not store explosive substances such as aerosol cans with a flammable propellant in the appliance.
- Do not attempt to freeze-dry explosives, flammable liquids, or other unstable substances.

CAUTION

- Do not use mechanical devices or other means to accelerate the defrosting process, unless recommended by the manufacturer.
- Do not use electrical appliances in or on the freeze dryer, unless recommended by the manufacturer.
- Always ensure that repairs are made by a competent person or an appropriately certified technician as applicable for the repair.

NOTICE

- Excessive oil mist from the pump can possibly hinder and or cause damage to some smoke detectors. If your freeze dryer will be operated in a space that has a smoke detector we recommend you purchase an upgraded oil mist filter from our website.

Food Safety

Food safety is the sole responsibility of the freeze dryer operator. All food safety considerations applied to typical food preparation should be applied when processing food in a freeze dryer.

If there are any questions about a specific food or processing method, please consult the USDA, FDA, and other federal and state recommendations and regulations.

Freeze drying can easily preserve microbes that are hazardous to human and animal health. It is important to keep your machine clean and dry. Bacteria and mold thrive in warm, wet environments, which can be present in freeze-dryers if not properly maintained.

Freeze drying does not explicitly cook food. It only removes the water from the food. Food should be treated the same before, during, and after freeze drying. For example, raw chicken should be treated with the same caution before freeze-drying, while freeze-drying, and after freeze-drying and packaging.

Freeze drying is a scientific process that has only been simplified for home use in recent years. As such, any specific application of freeze drying may require the operator to perform some additional internal or external laboratory testing. Such testing is the responsibility of the freeze dryer operator.

Ensure your freeze dryer is placed on an easily cleanable, water-resistant surface, such as stainless steel, hard plastic, concrete, or stone, for proper sanitation. Follow instructions on cleaning your machine as found on page 35.

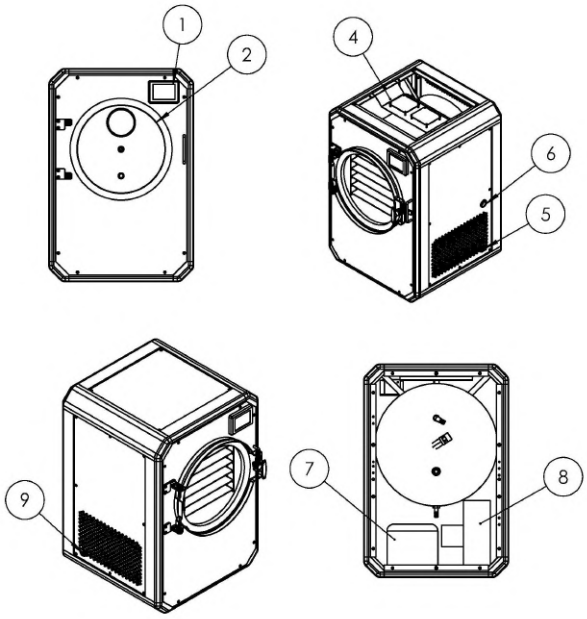
3 About Your Freeze Dryer

3.1 What's Included With Your Order

- 1x Freeze dryer
- 1x Power cord
- 1x Impulse sealer
- 1x Premium vacuum pump + oil
- 5x Stainless steel trays
- 5x Silicone mats
- 50x Mylar bags
- 50x Oxygen absorbers

3.2 General Components Overview

1. [1] Control Panel
2. Chamber
3. Heat Rack
4. Electronics Bay
5. Vacuum Outlet
6. Vacuum Hose Location
7. Compressor
8. Condenser
9. Drain Hose Location



NOTICE

- The drain hose and vacuum hose are not always on the sides depicted above; each hose will be marked for your convenience, otherwise, the side with an outlet for powering your vacuum pump will be the vacuum hose side.

For a full list of service parts, see page 67.

3.3 Technical Specs

Specification	Medium	Large
Model	BA40MFD	BA70LFD
Dimensions X Y Z (in)	20” x 21” x 30”	24” x 25.5” x 34”
Machine Weight	110lbs (50kg)	130lbs (59kg)
Shipping Weight	180lbs (82kg)	220lbs (100kg)
Chassis material	Aluminum	Aluminum
Door material	Polycarbonate	Polycarbonate
Chamber diameter	14in	15.7in
Max load capacity	15lbs (7kg)	25lbs (11kg)
Max liquid capacity	1.37gal (5.2L)	3.25gal (12.3L)
Max 24 hr period sublimated ice capacity	1.43gal (5.4L)	2.61gal (9.8L)
Max overall sublimated ice capacity	2.25gal (8.5L)	3.62gal (13.7L)
Max lbs/yr Food (Prefrozen & 90% uptime)	3,360lbs	6,132lbs
Standard Tray count	5	5
Tray size (in)	9.25” x 13”	13” x 18”
Tray size standard	1/4 cookie sheet	1/2 cookie sheet
Total Tray area	601in^2	1170in^2
Mat material	FDA Food Grade Silicone	FDA Food Grade Silicone
Power cord length	6ft(1.83m)	6ft(1.83m)
Voltage	120V 60Hz	120V 60Hz
Maximum power draw	13A (1560W)	17A (2040W)
Average power draw	9A (1080W)	12A (1440W)
Heating system power	590W	710W
Vacuum pump max cont. amperage	4.5A	4.5A
Cooling capacity	520W	857W
Cooling capacity per tray area	.89 W/in^2	.73 W/in^2
Refrigerant	R1270, Propylene	R1270, Propylene
Charge mass	70.0g	150.0g
Refrigeration Compressor	1/3 HP Cubigel	1/2 HP Cubigel
Included vacuum pump	6-8 CFM, 1 HP	8 CFM, 1 HP
Vacuum pump oil change frequency	4-5 Batches	4-5 Batches
Lowest heat rack temp setting	1°F (-17°C)	1°F (-17°C)
Highest heat rack temp setting	165°F (73.8°C)	165°F (73.8°C)
Max ambient operating temp	90°F (32.2°C)	90°F (32.2°C)
Min ambient operating temp	32°F (0°C)	32°F (0°C)
Min ventilation space around unit	1ft (30.5cm)	1ft (30.5cm)
Min room area with 8ft ceiling	20 ft^2 (1.85m^2	20 ft^2 (1.85m^2
Operating noise level	64 - 78 dB	64 - 78 dB
Vertical spacing between trays - 5 tray	1.57in (40mm)	1.33in (34mm)
Vertical spacing between trays - 4 tray	2.04in (52mm)	1.73in (44mm)
Vertical spacing between trays - 2 tray	4.13in (105mm)	3.54in (90mm)
Vertical spacing between trays - 1 tray	8.26in (210mm)	7.16in (182mm)

For a full list of service parts, see page 67.

4 Initial Setup

Initial Setup Video
Click Here, or find our YouTube video titled
"How To Set Up Your Blue Alpine Freeze Dryer" for a video demonstration.

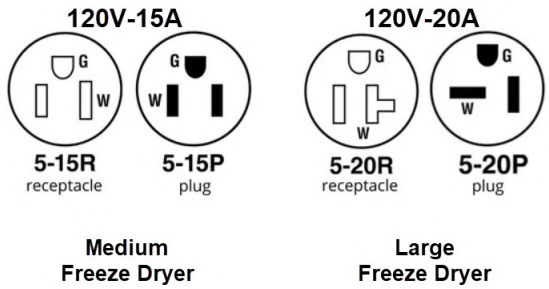
4.1 Unpacking

1. Remove the impulse sealer, vacuum pump, and accessory box from the shipping pallet.
2. Cut along the edges of the freeze dryer's cardboard packaging to remove one side of the cardboard packaging. **Do not cut in the middle of the box**, or you may scratch or damage the freeze dryer.
3. Remove the freeze dryer from the cardboard packaging through the opening.
4. Open the door and remove the black rubber seal. Cut and remove the orange shipping zip ties on the front sides of the tray rack.
5. You may remove the scratch protectors from the door and touchscreen.

4.2 Installation

1. Choose a suitable location for your freeze dryer. Please read and consider the following points when choosing your location.
   - Only run the freeze dryer on a level surface.
   - The freeze dryer creates a noticeable amount of noise (64 - 78 dB, or about the same as a clothes dryer).
   - In order to properly drain your freeze-dryer, ideally, your machine should be on an elevated surface, so the drain hose and valve are below.
   - The machine creates heat, so the room in which it operates will become warmer.

- The ambient temperature at the location must be between 32°F and 90°F. Operating outside of these ranges can cause liquid refrigerant to be sent back to the compressor, shortening the life of the refrigeration compressor.
- The freeze dryer can have water condensate around some of the refrigeration lines and the drum while defrosting. This water will melt. It is typically best to keep your freeze dryer on a surface that can be easily cleaned and is impervious to water, such as stainless steel or stone.
- Your freeze dryer will need to be plugged directly into a 110V wall outlet. **Never plug the freeze dryer into an extension cord.** Extension cords will cause the refrigeration compressor to burn up. **Never plug the freeze dryer into 220V power.** Doing so will void the warranty.
- The outlet used should have a 15 amp breaker for the medium and a 20 amp outlet for the large. **The outlet must have a ground.** You should **NOT** use an adapter that gets rid of the ground pin; doing so will void the warranty. Ensure that the freeze dryer is the only device on the circuit. Powering other devices on the same circuit as the freeze dryer could cause the breaker to trip or the refrigeration compressor to be underpowered.



- If your specific installation requires a GFCI, please note that the GFCI should be as close to your electrical panel as possible. GFCI receptacles are prone to nuisance tripping when farther away from the electrical panel.
- The vacuum pump produces a lot of heat if left in a closed space. The space the freeze dryer is in needs to have a minimum square footage of 20ft² with an 8ft ceiling. Additionally, the machine needs to have at least 1ft of spacing on all sides for air flow. You can improve the freeze dryer's performance by putting a fan on the condenser.

2. Set power switches on both the freeze dryer and vacuum pump to OFF (the power switches are located on the back of each). **Note:** The premium vacuum pump does not have a switch and will turn on as soon as powered, as controlled by the freeze dryer.
3. Make sure the heat tray rack is connected to the plug at the back of the machine. To do this, open the door and remove the black rubber door seal. Remove the heat rack and inspect the connection. The heat tray rack may have rotated during shipping. Make sure the heat tray rack is reinserted with the orange heat pads face down. The electronic connector plug should be stored above the heat tray rack. Reinstall the rubber door seal and close the door.
4. plug the freeze drying into a 110V wall outlet. **NOT a 220V outlet**
5. Plug your vacuum pump into the outlet on the side of the freeze-dryer.
6. Set power switches on both the freeze dryer and vacuum pump to ON. **Note:** The premium vacuum

pump does not have a switch.

7. Follow full vacuum pump set-up instructions as found in the next section.

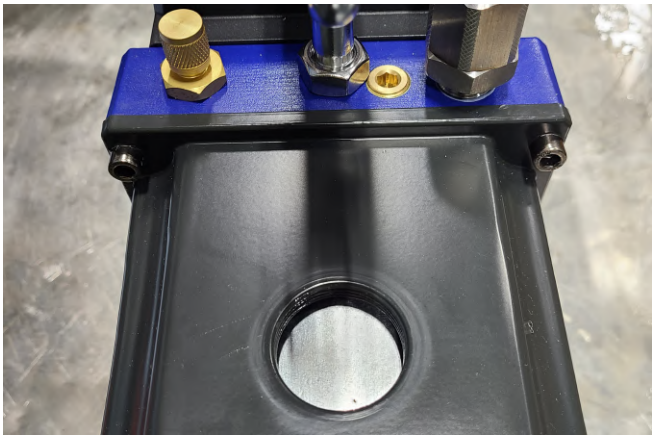
4.3 Vacuum Pump Set Up

1. Plug your vacuum pump into the outlet on the side. The corresponding hose will be marked ”vacuum hose”. Additionally, the vacuum pump hose port will be significantly higher on the side of the machine than the drain hose port.
2. Connect the vacuum hose to the hose barb on top of the vacuum pump. **Note:** The drain hose should have a valve on the end, preventing you from connecting to your vacuum pump. The drain hose is marked as ”drain hose” if the valve is not present.

CAUTION

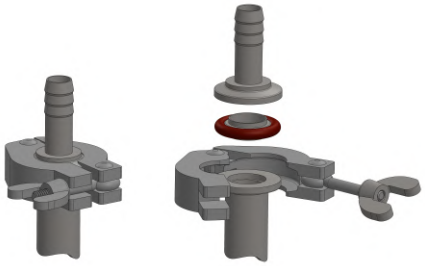
- Connecting your vacuum pump to the drain hose during operation will cause extreme amounts of moisture to be ingested into the pump, and will void your pump warranty.

3. Optionally, you can attach the spring clamp included with your vacuum pump over the vacuum pump hose to ensure a solid connection. **Note:** the vacuum pressure is strong enough to cause the flexible hose to make a tight seal.
   To attach the spring clamp, disconnect the vacuum hose from the vacuum pump, slide the spring clamp over the hose, reattach the hose to the pump, then position the clamp over the end of the hose and barb.
4. Remove the oil mist filter on top of the vacuum pump.
5. In the opening left by the oil mist filter, slowly pour the included break-in oil until the oil level fills 1/3 to 1/2 of the sight glass. Use a funnel as needed. **Note:** Oil above the recommended level will affect the ability of the pump to pull vacuum, and oil below the level could cause damage to the pump.



6. Reattach the oil mist filter. **Note:** On the primium pump, the threads on the oil mist filter are plastic and can break if tightened too hard. For best results, tighten only until snug.
7. After your first batch, the break-in oil should be replaced. See vacuum pump maintenance on page 30 for oil change instructions.

Setup for a commercial pump is virtually the same as the premium pump except the use of KF fittings instead of threaded fittings. See the diagram for how to install a KF fitting, or the video below.



Commercial Vacuum Pump Setup Video
Scan the QR code or Click Here to see the video.

Additionally, the commercial pump must be set to 115V, **NOT** 230V. Ensure the red switch next to the power cord is set to 115V.

4.4 First Loads

All Blue Alpine freeze dryers are off-gassed in the factory during testing. However, there can be some lingering Volatile Organic Compounds (VOCs) on the tray rack, and the silicone mats have not been off-gassed. The silicone mats have been tested and do meet FDA regulations for food-grade silicone, but because they have not been off-gassed, they have the potential to cause an odd taste in the food of the first batch. For this reason, it can be a good idea to have the first batch be a bread run, but it is not required.

How to do a bread run

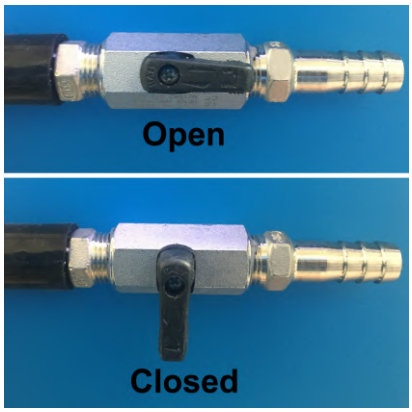
1. Cover each mat with bread and insert trays into the freeze-dryer.
2. On the control panel, press **Settings** then **Edit Default Drying Settings**.
3. Press **Next** Page until **BREAD RUN OVERRIDES** comes up.
4. Press **START** and follow any additional instructions and prompts.
5. Feel free to perform the bread run for all sets of silicone mats that have been purchased.
6. Discard the used bread.

If this setting does not appear on your machine (due to software or model version,) load your bread as normal, then turn on a **QuickStart** batch. Skip the freeze cycle, then adjust the shelf temperature up to 165°F and the time to 12 hours. The unfrozen bread and temperature will allow the bread to act as a sponge to soak up the VOC's. This can also assist with removing lingering smells from past batches.

First Load

After the bread run, we recommend candy, meat, or bananas for a first batch because these types of food are very forgiving. A candy package is included with your machine for your convenience. In general, the built-in recipes will work best.

When you run a load, the user interface will prompt you to make sure the drain valve is closed. A closed drain valve will have the nob perpendicular to the hose. An open drain valve will have the nob parallel to the hose. See the image below.



5 Controls

This section is intended to help you navigate your freeze dryer's software efficiently.

5.1 Home Page

This is the home page. The freeze dryer will default to this page every time it is turned on. From here, you can immediately begin a freeze drying cycle by pressing **QUICK START**.

For particular settings to your cycles, the **RECIPES** page will offer different presets to choose from. The **SETTINGS** page will be used for editing default settings and running hardware tests.

5.2 QuickStart

The **QUICK START** page makes it easy to quickly begin a freeze drying cycle. Pressing **START** will begin a cycle using the default settings.

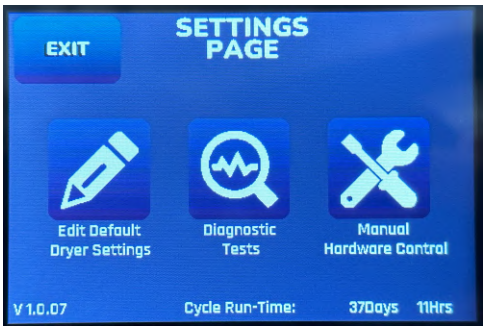
If the freeze dryer chamber still has ice from a previous cycle, the **DEFROST** option will immediately begin thawing out the freeze dryer. You can press **SKIP FREEZE CYCLE** to immediately begin a dry cycle.

5.3 Recipes

The **RECIPES** page offers preset freeze drying food groups including candy, greens, meat, fruit, liquid, and delicates. These presets are more optimized for the freeze drying performance of that particular food. See a breakdown of the recipes on page 49.

Each preset can also be modified with the **EDIT** button to change the default freeze time, dry time, dry temperature, and pressure.

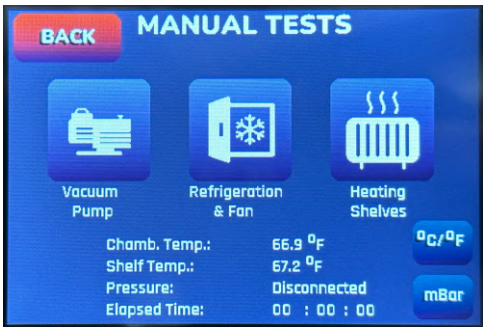
5.4 Settings



From the **SETTINGS** page, the default dryer settings can be modified by selecting **Edit: Default Dryer Settings**. These settings include the default freeze time, dry time, dry temperature, and pressure for the **QUICK START** setting. Measurement unit preferences, sound settings, and a factory reset are also found in this menu.

A thorough quality control test can also be run by pressing the blank upper right corner of this page.

5.5 Manual Tests



The **MANUAL TESTS** page allows for individual components of the freeze dryer to be turned on or off. The vacuum pump, refrigeration and fan, and the heating shelves can all be toggled. Sensor measurements will also be shown.

This page can be helpful in diagnosing your freeze dryer. If any sensors are disconnected, this will be shown where the sensor measurements are displayed.

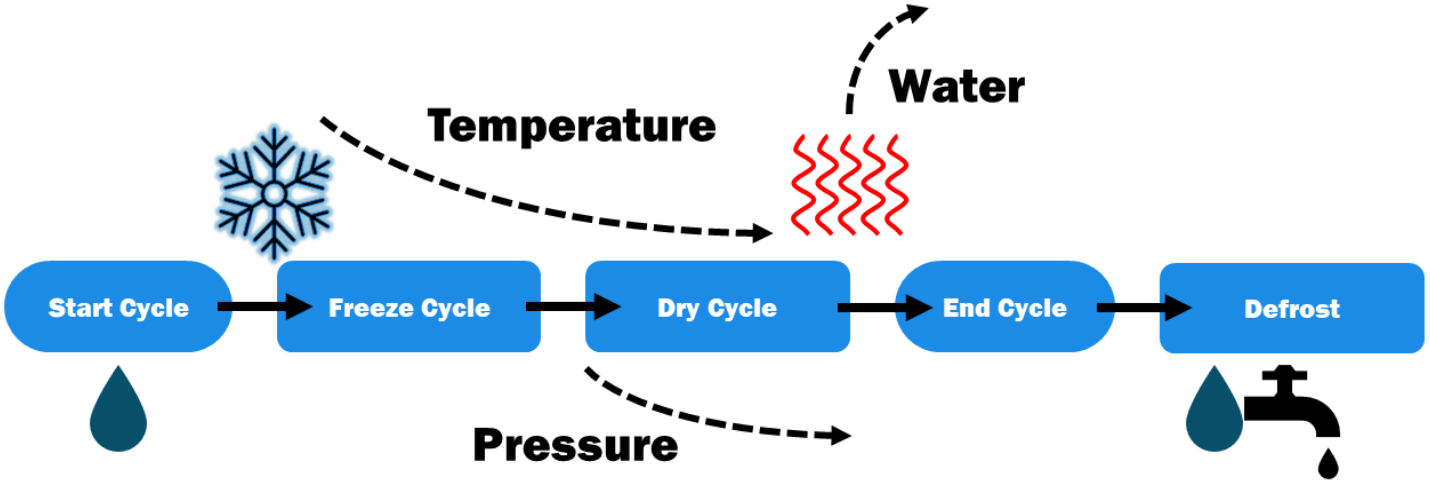
6 How To Freeze Dry

6.1 Overview

Freeze drying is an incredible process that preserves food for up to 25+ years. This is done by removing water from food without harming the structure of the food or its nutrients.

The process starts by freezing the food to between -25°F (-31°C) to -40°F (-40°C). Once the food is thoroughly frozen, the vacuum pump is engaged, and the pressure within the chamber is reduced. With a low enough pressure, ice will turn directly into vapor without melting. This is called sublimation. Sublimation can be sped up by adding a little bit of heat through the tray rack. The evaporated water will collect on the cold chamber walls, leaving the food dry.

The entire freeze-drying process can take 18-36 hours and varies greatly depending on the material, thickness of the food, and volume of food being dried.



6.2 Preparation

Every food is prepared differently, for unusual cases see our recipes on page 49.

Thickness

The thickness of the food is extremely important to the quality of the end product. In general, fruits, vegetables, and meats need to be sliced before they are freeze-dried. There is no minimum thickness, but if cut too thick it may slow down the process or not freeze-dry at all. For example, strawberries and bananas tend to freeze dry best when they are sliced to a thickness between 3/16” and 1/2” (5mm - 13mm). As a general rule of thumb, this thickness range is applicable to all food types. If cut thicker,

Thicker slices may leave pockets of water in the middle of the food and will significantly slow down the drying process because the ice in the center will have further to travel when sublimating, and if too deep, may be impossible to extract.

Keep in mind that certain foods contain significantly more water than others. Foods with a higher water

content will require a longer drying time. For example, drying a batch of candy is significantly faster than drying liquids or fruits.

Orientation

All food needs to be placed as flat as possible on the tray. Avoid stacking food or overfilling the trays.

Liquids

Attempting to load trays filled with liquid into the freeze dryer can be dificult and will most likely result in spilled product. Instead, place the empty trays in the tray rack and pull them out by only a few inches one at a time to pour liquid into. This way, the trays are already in place and only need to be slid back to be ready to freeze-dry.

Preparing the machine

Load the food into the tray rack, close the door, and turn the handle. Make sure the vacuum pump is turned on and plugged into the outlet on the side of the machine, and close the drain valve.

Select recipe

Depending on the food you wish to freeze-dry, select ”Quick Start” from the home menu or a recipe from the recipe selection. To learn more about each recipe, see our recipes on page 49

No matter what recipe you select there will be a reminder page to close the door and drain valve. If the valve is not fully closed, it will cause a vacuum pressure error. When ready, press ”Start” to begin the cycle. You should hear the refrigeration system turn on, but the vacuum pump should not turn on yet. **The vacuum pump will only turn on during the dry cycle.**

6.3 Freeze Cycle

The freeze cycle typically takes 8 hours (factory default setting). You can adjust the freeze time if you need a shorter or longer freeze cycle.

If you have pre-frozen food. Don’t skip the freeze cycle completely. Adding frozen food to a warm chamber may cause ice to melt in the food. This will likely trip a vacuum error and will also cause excess water being ingested by the pump. Instead, run the freeze-cycle empty first for 30 - 40 minutes to cool the chamber before loading frozen food. Adding an additional 2-hour freeze time, even if the food is frozen, can help ensure a better final product.

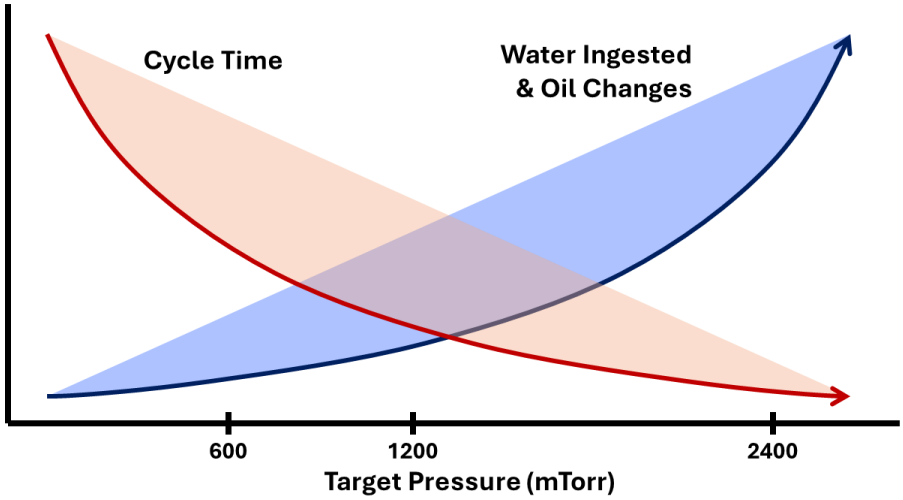
If you are attempting to freeze-dry ice cream, run a full freeze cycle; the most common cause of ice cream failure is skipping the freeze cycle.

6.4 Dry Cycle

The three most important parameters for the dry cycle are the set pressure, the set temperature, and the dry time. The set pressure helps determine how aggressive or gentle a dry cycle is. The temperature

is simply the final temperature of the heat trays. And the dry time can very greatly depending on how thick the food is, how much food is in the chamber, and what the ambient temperature is.

During the dry cycle the vacuum pump will turn on, and attempt to reach the target vacuum pressure. This will start the sublimation process. Lower pressures will result in faster cycle times but also more water ingested into the pump, resulting in a need for more oil changes.



To make this process quicker, the food is gently heated as well. **The key to making high-quality freeze-dried food is precise heating.** If the food is heated too high or too quickly, the ice might melt and cause the food to collapse, and its texture, taste, and nutrition will degrade, but if not heated enough, the freeze-drying process could take significantly longer than it needs to.

The freeze dryer is intelligently controlled by a robust algorithm. The system utilizes sensors to accurately regulate the temperature of the food and the pressure of the chamber.

Fruits tend to be the most delicate materials, requiring more gentle heating. Meats, candy, and liquids are more robust and can handle more aggressive temperatures. Refer to our recipes for typical settings on page 49, but keep in mind, there may be some trial and error depending on the food.

Each shelf on the tray rack will be heated to approximately the same temperature. There can be a 4°F to 10°F difference between the temperature of the shelves. This is normal and is not an issue for the vast majority of foods. If you are drying a variety of foods, when selecting a recipe, use the final shelf temperature setting for the food with the lowest recommended temperature.

As water sublimates, the resulting water vapor increases the chamber pressure, so the freeze dryer applies only enough heat to create the desired target pressure. Toward the beginning of the cycle, the shelf temperature will be very low. The shelf temperature will not read the full temperature until the end of the cycle. When there is no more water inside the food, the pressure will decrease because there is little water to ”boil” off. The pressure sensors are very accurate, but have a lower limit of 200 mTorr and will not show lower pressures.

Running the freeze dryer with warmer room temperatures will result in longer cycles and more water being injected into the pump, as well as the refrigeration system working harder. This could cause premature wear on the refrigeration system but may not be noticed until years later. Running the system with colder room temperatures will result in faster cycles and less water in the pump.

6.5 End of Dry Cycle

At the end of the dry cycle, the freeze dryer will continue to freeze dry, but it will do it at a much gentler rate. It will continue to cycle the pump on and off to keep the chamber under vacuum, but it turns the vacuum pump off for long periods of time in order to extend the life of the vacuum pump.

The trays will continue to heat as well. As long as the recipe was set correctly initially, it is impossible to freeze-dry food for too long. Therefore it is safe to allow the machine to sit in this end-of-cycle state until you are have time to package the food. However, it is best if you try and package the food within 24 hours to make sure you do not loose the batch to a power outage or anything else.

During this end-of-cycle state, you will notice that the chamber ice will retreat away from the door. This is normal since the end of the chamber and the door are warmer than the refrigerant lining.

6.6 Determine Completion

At the end of the dry cycle, you can check your food. While the chamber is under vacuum, it is impossible to open the door. Slowly open the drain valve to bring the chamber back to atmospheric pressure. **The trays may be hot immediately following the dry cycle.**

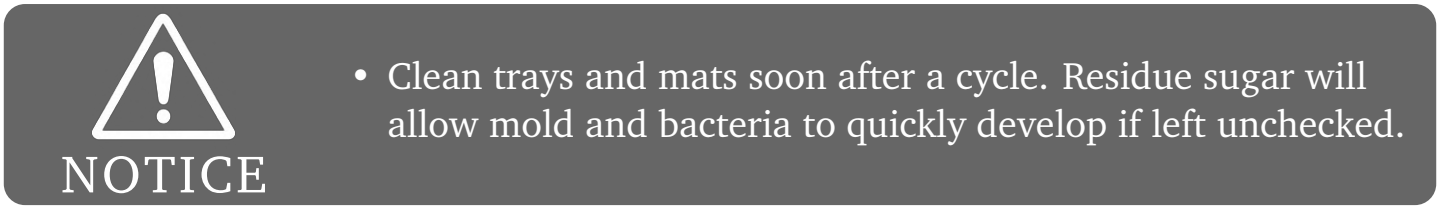
There are many ways to check for moisture; sadly, no method is foolproof. When possible, use more than one method to verify completion.

- **Touch and Sight:** Remove a sample of food from a tray and crack it in half. Most foods should have a crispy snap and a dry texture in the middle. Some foods may be more leathery than crispy. Inspect the food for discoloration; often, moist food will be slightly darker in the middle. Hold the sample to a sensitive location on your skin, such as your lips. If you feel ice or a colder temperature, the food needs more dry time. But if the temperature is consistently warm, it may be done.
- **Weight:** As you near completion, you can remove your trays by pausing the cycle and releasing the pressure by opening the drain valve, weigh each tray and note down the weight, then resume the dry cycle. Repeat weighing the food every two hours; when you see no drop in weight, the food is likely done.
- **Moisture Detector:** There are tools that can detect moisture in food; follow the instructions included with the moisture meter used to determine completion.
- **Chamber Pressure** If the chamber pressure drops to or below 200 mTorr consistently for 1-2 hours, the food is likely done or close to being done.

Keep in mind, inconsistent sizes in food cuts can make determining completion difficult. If your food sizes are inconsistent, use the touch and sight method and try to sample the largest pieces, as well as pieces from different locations on the trays.

Remember, you cannot ”over freeze-dry” food, so if in doubt, just add a few more hours of dry time.

If the cycle has completely ended and you need more dry time, you can restart the drying cycle by going back to the home screen and choosing Quick Start. At this stage in the process, it is not necessary to select a particular recipe. Skip the freeze cycle and go straight to the dry cycle. Adjust the dry time appropriately based on how moist the food sample was.



6.7 Defrost

After every batch, it is necessary to remove all of the ice that accumulates on the walls of the chamber. **Before defrosting the ice, remove the batch or else the food will rehydrate.** Place the drain hose in a bucket or container (1-5 gallons) and open the drain valve. Close the freeze dryer door. The defrost cycle uses the tray rack to heat the chamber and expedite the defrosting process. Allow all of the water to drain out of the freeze dryer, and then dry any remaining water in the chamber with a cloth.

It is a good practice that after the machine has been defrosted that the machine gets dried out with a towel or paper towel. There can be a significant amount of water left over after the defrost cycle that will need to be pushed to the drain or dried up manually. Once the machine is mostly dry inside the chamber, open the door and run the defrost cycle again. Make sure to leave the drain valve open as well. This will help prevent mold in the chamber and will lengthen the time between deeper cleanings.

- Not every batch will be successful, especially at first. There is a learning curve to freeze drying, so don't get discouraged if it does not work and a batch gets ruined.
- Every food is different. Some foods are significantly easier to freeze dry than others. That said, the machine's default settings should work on almost every type of food.
- Not all foods can be freeze dried. Chocolate, butter, oils, and excessively fatty items are examples of foods which can't be freeze dried.

6.8 Storing Your Freeze Dried Food

There are two methods for storing your freeze-dried food. The first is mason jars. While good show-pieces, mason jars are clear and don't block light, which can cause certain nutrients and vitamins to degrade. Mason jars are excellent for short-term storage and reusability. The second is 7 mil Mylar bags. Mylar bags are ideal for long-term storage. These can be easily sourced through the Blue Alpine website or purchased from third-party vendors. Not all bags are the same. If purchasing from third-party vendors, be sure to use 7 mil (per side) bags with at least a 1.2 mil aluminum lining, to ensure your food is safe from moisture and oxygen.

1. Move your freeze-dried food to the Mylar bag or mason jar.
2. Place one oxygen absorber packet in with your food. The O2 absorbers saturate after 30 minutes, so do not leave them out in the open air for too long. They can be stored in an airtight container such as a mason jar or resealed in their plastic packaging with the impulse sealer.

3. Evacuate as much air as possible from the Mylar bags. If using a mason jar, shut the jar.
4. Zip the Mylar bag closed. Use the included impulse sealer to heat seal the end of the Mylar bag. We recommend sealing 2-3 rows for added measure to ensure there are no missed leaks.
5. To preserve food even longer, consider purchasing a chamber vacuum sealer. These machines work by helping remove all the air from a Mylar bag before it is sealed. At least one oxygen absorber should be used, even if a chamber vacuum sealer is employed to seal the bags.

That's it! Your food is now preserved and will last for 20-30 years.

7 Customize Settings

After running several batches of food in your freeze dryer, you may want to start optimizing the settings to best suit your needs. Although parameters can be changed while a cycle is running, it is sometimes helpful to save custom values as the default settings. The default settings are what the ”quick start” uses. **Note:** Each individual recipe can be customized as well.

Generally, the factory settings will work for most applications, but some adjustments and forethought will inevitably be needed for each type of food. Adjusting the settings should only be done if you have sufficient experience with freeze drying. Also, the hardware and software that controls the freeze dryer is inherently intelligent. The system continuously monitors the process while precisely regulating the shelf temperature of the food and the chamber pressure.

From the home screen, select the ”SETTINGS” button and then select the ”EDIT: DEFAULT DRYER SETTINGS” button. Within the Edit menu, you can navigate to and adjust various settings such as:

Default Freeze Cycle Time: Increase the freeze time for larger batches and decrease for smaller batches. Default freeze cycle time is 8 hours.

Dry Cycle Time: Increase the dry cycle time for batches with more water content. Default dry cycle time is 24 hours.

Final Shelf Temperature: This is the highest temperature that food reaches during the drying cycle. In general, the final temperature should be in the range of 80°F to 125°F, depending on the food. You can find the recommended shelf temperatures in the recipes section on page 49. A general rule of thumb is that if the food is shriveling or collapsing, the temperature and pressure are too strong; otherwise, there may be room to turn up the temperature and pressure.

8 Advanced Settings

8.1 Candy Pre-warm

The Candy Pre-warm feature is intended to help certain candies that might require more heat to puff up and freeze dry. Enabling this option will turn on the heating shelves before vacuum drying the candy.

To access the Candy Pre-warm option, navigate to the candy recipes page. This feature enables you to customize your pre-warm time up to 10 hours and set your desired shelf temperature. Changing these settings will change both the pre-warm temperature and the dry cycle temperature. After the pre-warm is finished, the freeze dryer will proceed to the dry cycle and begin pulling vacuum while the candy is still hot. This process helps to expand and puff out the candy. If you choose not to use the Pre-warm option, your candy recipe will function like the other recipes on the machine.

Using this setting will cause the pump to ingest more water, and may require more frequent oil changes.

Note: The heating profile for the Candy Pre-warm mode is suggested, but may not provide the best results for a specific batch. It is recommended that you test various small loads of candy before attempting large loads to get the best results.

8.2 Maximum Shelf Temperature

This setting will drastically change the amount of time it takes to get the food dry. Generally you want to test a recipe by going lower on the maximum temperature and then testing batches with increasingly higher temperatures. **If the shelf temperature is too hot it will melt the ice in the food and the end product will be less than ideal**. This comes more into play with delicate foods like grapes and pineapple. Hardy foods like meat can often survive a higher temperature.

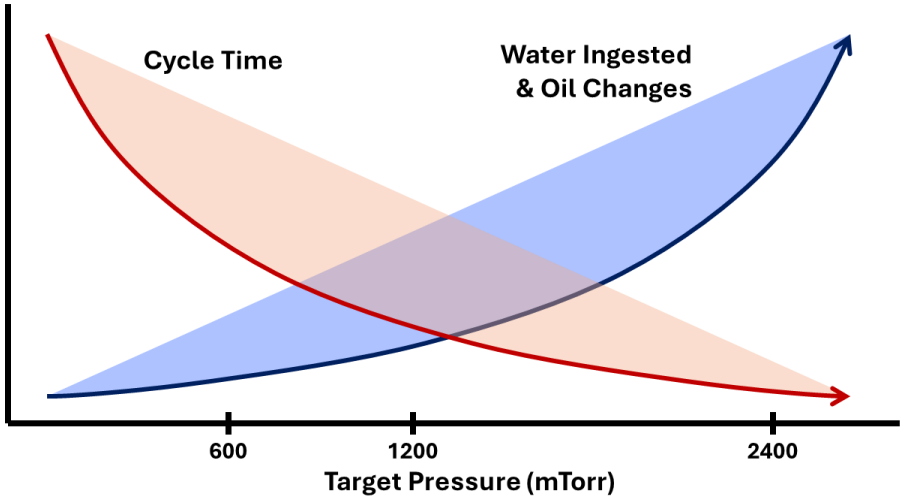
The shelf temperatures will not always operate at the maximum shelf temperature. These are controlled by an advanced algorithm that efficiently controls the chamber pressure by varying the shelf temperature. As the dry cycle continues and the water content of the food drops, the shelf temperature will approach the maximum shelf temperature.

8.3 Pressure Limit

The pressure limit is another great way to shorten or lengthen a cycle. Setting a lower pressure limit will heat the food more gently in the beginning of the cycle. Most of the water in the food is sublimated out in the beginning of the cycle. **Setting a lower pressure limit will increase the dry time, because the shelves will need to heat more slowly to avoid quickly increasing the pressure in the chamber**.

In contrast, setting a higher pressure limit will allow more heat to be put into the food quicker. This results in shorter dry times. The only drawback is that, as more water comes off the food, the pump

has a greater chance of ingesting water vapor. Setting the pressure limit too high will also decrease the quality of the food. Each food will be different, but a general rule of thumb is that anything above the triple point of water (4582 mTorr/ 611 Pascals) is not recommended.



9 Tips and Tricks

9.1 Pre-frozen, Canned and Ripe Food

Fresh food will freeze-dry better than pre-frozen food from the store. Pre-frozen food has a ”kill step” in its processing to kill bacteria. This could include blanching or other processes that can harm the integrity of the food and make it more susceptible to shriveling and collapse.

Similarly, fresh produce will freeze-dry better than canned. Oftentimes, canned food will shrivel and collapse more readily and will get soft faster when exposed to moisture from the air or the oxygen absorber because of the extra sugar from the canning syrups.

Sometimes if produce turns out shriveled it is simply because it was too ripe.

To overcome these obstacles, try setting the pressure and temperature 20% lower at a time until better results are found, or puree the food in a blender before freeze drying. This will result in a final product that is powdered instead of whole, but it may be the only way to freeze-dry certain foods.

9.2 Blueberries and Other Foods With Skins

In general, any food with a skin will have a harder time freeze-drying. Blueberries are especially difficult to freeze-dry. If possible, purée such foods and freeze-dry the purée. If that is not possible cut the berries into halves or quarters. Additionally, using a tooth pick or other small sharp object to puncture holes in each of the berries can help. This technique can be used for blueberries, cherries, grapes, huckleberries, etc.

9.3 Multi-food Batches

Running batches with multiple kinds of food may cause each food to acquire some flavor from the others. Avoid mixing foods you wouldn’t want to taste like each other in the same batch, such as fish and melons, or garlic and ice cream.

When running multi-food batches use the setting for the most delicate food in the batch. For example, with a batch containing strawberries and watermelon, the watermelon is significantly more delicate, so the whole batch should be treated as if it were only watermelon.

9.4 Juices

In general, juices do not freeze-dry very well and usually turn into a sort of fruit leather, regardless of the setting, most often due to the concentrated sugars. Some have reported watering down the juice significantly to dilute the sugars works well.

9.5 Smelly Foods

Some foods have very potent smells, such as garlic, beef liver, fish, and others. When freeze-drying these foods, the smell often remains even after cleaning and may impact the flavor of future batches. Be sure

so sanitize and clean every surface completely, (see page 35) and perform a bread run. (see page 16) Even so, some smells may stick around for a while.

Some of the foods known of leaving hard to remove smells include:

- Liver
- Garlic
- Fish
- Marijuana
- Some peppers
- Onion

10 Maintenance

In order to help your freeze dryer and vacuum pump last as long as possible. Performing proper maintenance is vital.

All vacuum pumps are consumable items and will be the first component to fail.
By providing proper oil and maintenance to your vacuum pump, you can extend its lifespan considerably.

WARNING

- Disconnect the power cord and ensure the machine has no power before cleaning or servicing.

10.1 Oil

- Dairyland Brand Vacuum Pump Oil (also branded as Clover Patch oil) is the best oil to use for freeze-drying vacuum pumps.
- Dairyland Brand Vacuum Pump Oil has detergents that help with sugar and water, which is common in vacuum equipment in the dairy industry. These detergents will help prevent rust and other buildup in your vacuum pump.
- The vacuum pump oil should be changed every 4 to 5 loads. There is a timer on the user interface, and there is a reminder that will pop up to remind you to change the vacuum pump oil.
- Used oil can be filtered and reused. For average batches, you can reuse the oil about 3 times (4-5 loads between oil changes).
- The more often you change your oil, the longer your pump will last.

10.2 Changing the Vacuum Pump Oil

Water, dust, and contaminants will enter the vacuum pump during normal use and will eventually cause the pump to fail. However, frequent oil changes will keep the pump running for many years. Change the oil in your vacuum pump every 4-5 batches. If you are only processing candy, oil changes can be done every 20 cycles, but the more often you change your oil, the longer your pump will last.

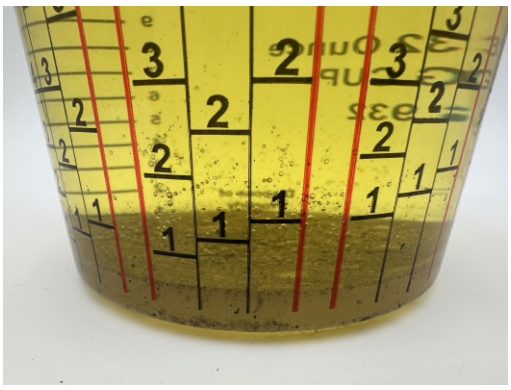
After each batch, check the quality of the oil in the pump through the sightglass. If the oil is milky, murky, discolored, or if other contaminants are visible, change the oil. **Never let the vacuum pump sit for extended periods of time (more than 1-2 days) with contaminated oil.** Used oil contains water and other contaminants that can corrode the pump. If you will not be using your freeze dryer, replace the oil in the vacuum pump with new oil to prevent corrosion. If water is left in the bottom of the casting for an extended time between loads, it can cause the pump head casting to rust.

If you have left your pump with old oil for too long, or feel like your pump might be rusting, see how to clean and prevent rust on page 31.

How To Change Oil:

1. Unplug the pump.
2. Remove the oil mist filter on top of the vacuum pump.
3. Have a funnel and storage container (minimum of 1 quart) placed under the pump drain valve to collect the used oil.
4. Position the vacuum pump on the edge of a table so that the oil can be captured in a container from the oil drain on the front. The container should be a minimum of 1 quart.
5. With the included driver, remove the oil drain plug and capture the used oil in an appropriate-sized container. Tip the machine forward for best results.
6. After the oil is drained, reapply the oil drain valve
7. In the opening left by the oil mist filter, slowly pour the included break-in oil until the oil level fills 1/3 to 1/2 of the sight glass. Use a funnel as needed. **Note:** Oil above the recommended level will affect the ability of the pump to pull vacuum, and oil below the level could cause damage to the pump.
8. Reattach the oil mist filter. **Note:** On the primium pump, the threads on the oil mist filter are plastic and can break if tightened too hard. For best results, tighten only until snug.

Oil can be reused if properly filtered. Once water and other particulates or contaminants are removed, you can reuse the same oil about 4 times. After that, follow standard legal oil disposal practices in your local area. Most auto repair stores offer oil disposal services.



Note: *Used oil will often have black particles in it, this is material from the casting of the pump and is normal.*

In order to filter your oil, you have two options:

Option 1: Let the used oil sit in a clear container. Eventually, the oil and water will separate, with the water on the bottom. You can then carefully pour the oil out, leaving the water behind. Or you can use an oil/water separator funnel. Keep in mind, the more water you have mixed in your oil, the longer it takes to settle.

Option 2: Brita-style water filter. This will help to clean the oil and is the fastest method. The downside to this is that the filters need to be replaced periodically, and it can be a little messier.

10.3 Gas Ballast Valve

The brass nob on the top of the pump is called the gas ballast valve. It allows air to flow through the oil in order to assist in removing water from the vacuum pump through the oil mist filter. Opening the gas ballast valve can cause the oil mist filter to become saturated more quickly, which could cause it to ”leak” oil. Opening the gas ballast valve just a crack **after** the chamber has reached target pressures can increase the life expectancy of your vacuum pump, but it will saturate the oil mist filter with oil. Opening the gas ballast valve before the chamber has reached the target pressure can cause oil to come out of the valve. It is recommended to leave the gas ballast valve closed unless it is really needed to keep water out of the vacuum pump.

10.4 Rust Prevention And Cleaning

Once a year, or if you feel you are building up rust in your pump, you can clean out your pump with Evapo-rust, an anti-rust product that can be found at most hardware stores.

How To Use Evapo-rust In Your Vacuum Pump

1. Change your oil as instructed on page 30.
2. Instead of replacing your old oil with new oil, use Evapo-rust. Fill to the same level.
3. Power on your vacuum for about 2 seconds to circulate the Evapo-rust.
4. Leave your pump off and let it rest for 24 hours, this will allow time for the Evapo-rust to eat away the rust.
5. After 24 hours, remove the Evapo-rust and replace regular vacuum pump oil.
6. Run a normal cycle, or a bread run as described on page 16. This step is to help your regular oil pick up and mix with the residue Evapo-rust left in the pump.
7. After the Cycle, remove the oil and dispose of it. (It cannot be filtered and used again.)
8. Add fresh oil.

10.5 Oil Mist Filter

Between batches, remove the oil mist filter and shake it upside down to remove the collected water.

Replace the oil mist filter about once a year. When the oil mist filter becomes clogged with oil, water, and particulates, it can cause the vacuum pump to work harder and draw more power.

10.6 Changing the P100 Filter

The pink filter at the back of the vacuum chamber is a P100 3M™ Particulate Filter 2097 and is intended to prevent food contamination from building up in the oil, as well as to prevent any vacuum pump feedback from contaminating food. The filter will require the oil to be changed less often, so it is highly recommended that the filter be used, but it is not absolutely necessary.

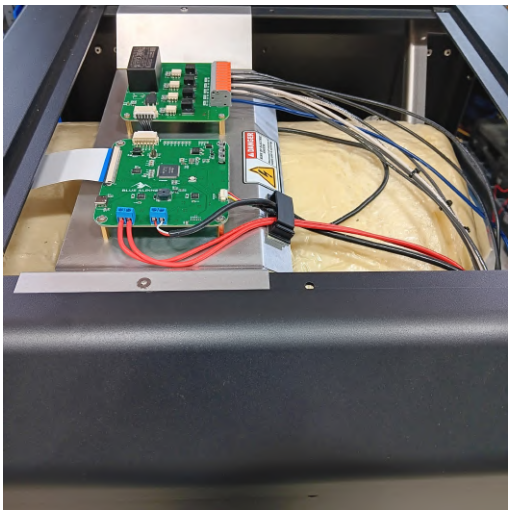
To change the filter, simply rotate it counterclockwise until it pulls off, and replace the filter with another clean P100 3M™ Particulate Filter 2097. The filter should be changed about every 6 months.

10.7 Refrigeration System

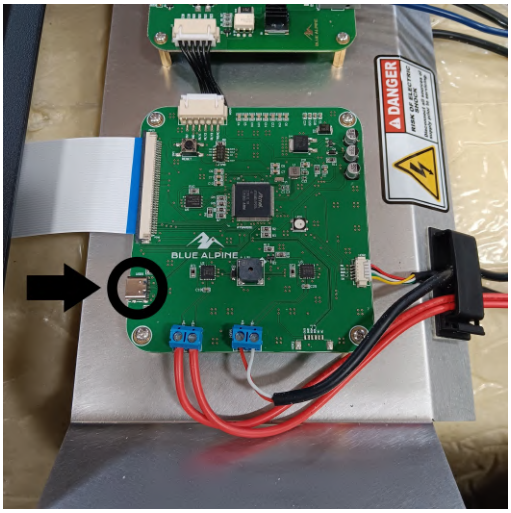
The refrigeration system includes the compressor, condenser, capillary tube, and evaporator. The only moving parts in the refrigeration system are in the compressor. The system is charged with R1270 refrigerant which is environmentally friendly but also flammable. It is important that if the refrigeration system is not cooling to speak to a qualified technician to determine what is wrong. Forcibly resetting a tripped breaker or bypassing the machines safety features while the compressor is in locked rotor condition can cause catastrophic failure or fire. It is recommended to replace the compressor every eight years or as required based on functional testing.

10.8 Updating Firmware

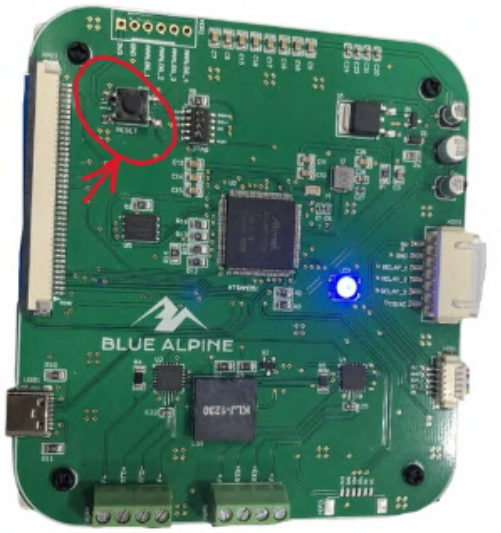
The latest firmware updates can be found on the Blue Alpine website. Navigate to the Downloads page and download the latest firmware for your model of freeze dryer.



1. Switch off and unplug your freeze dryer.
2. Open up the top panel of the freeze dryer using the screwdriver.

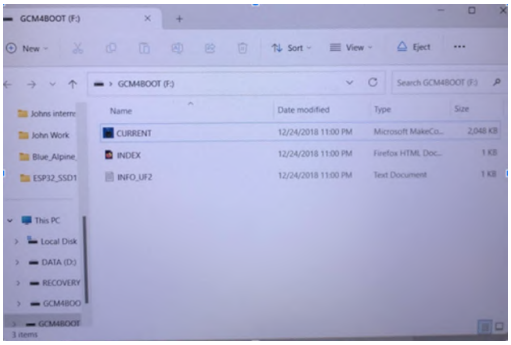


3. Find the USB-C port on the Blue Alpine data PCB (the green board on the right side of the machine) and plug in the USB-C connector.
4. Plug in the other end of the USB-C connector to your computer.



5. Press the reset button twice* to activate download mode. The GCM4BOOT drive window should pop up on your computer and will act like a USB drive; if not, check the connected USB devices on your computer and see if this drive is found.

   **The LED on the board lights green when in bootloader mode. If a red light is present, try pressing the reset button two more times. If the problem persists, contact support at (208)-607-1722.*



6. Drag and drop the new software (UF2 file) to the GCM4BOOT drive.
7. The new software will instantly upload and run on the board after this step.

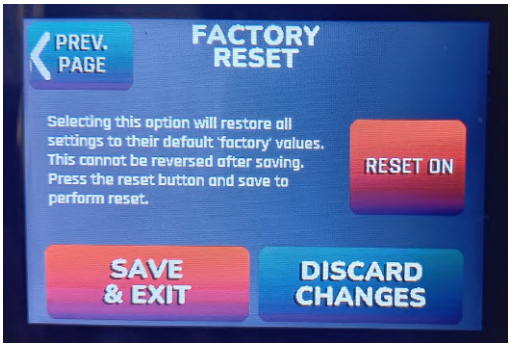
   Note: *The screen backlight will not work until the machine is powered back on.*

8. Unplug the USB-C Cable from the machine, and place the metal panel back onto the machine.

   NOTE: *As of patch **14**, multiple default values have changed. The machine is designed to not alter its default memory even with updates unless the user explicitly factory resets the machine. We recommend factory resetting the machine after the update. Please note that this will erase your personally saved settings.*

   For a full list of software changes see the Software Update Change Log on page 65.

10.9 Performing a Factory Reset



1. From the Home Screen, press the settings button.
2. Press ”Edit: Default Dryer Settings”
3. Press and hold the ”Next Page” button until the Factory Reset page appears.
4. Press the toggle called ”RESET OFF” until it reads ”RESET ON”
5. Press the ”SAVE & EXIT”

11 Cleaning

Cleaning your machine is vital to maintain food safety standards. Standing water can allow mold and bacteria to develop. After each cycle, open the door to allow the inside of the freeze dryer to air dry. An effective sanitation solution for surfaces exposed to food or moisture can be made at home with one tablespoon of bleach to one gallon of lukewarm water.

WARNING

- Unplug the machine before cleaning or servicing.
- Never remove the tray rack during or immediately after defrosting or heating.

CAUTION

- Do not clean a dirty compressor or frozen evaporator with a sharp object.

11.1 Cleaning the Tray Rack

Remove the door seal, take out the tray rack, and disconnect the wires. **Do not place it in a dishwasher or submerse it in water.** A rubber or silicone bristle brush will reach the tight spaces between the trays. **Do not** clean the insides of the wire connection directly.

Sanitize the tray surfaces with soap and water or the bleach sanitation solution. Rinse the tray rack with water and allow it to air dry.

11.2 Cleaning the Chamber

Spray or wipe down the inside of the chamber with the bleach solution, sanitize the walls, the drain hole on the bottom of the chamber, and the pass-through hole (the hole with protruding wires) on the back of the chamber.

Do not spray the electrical connector or the other hole in the machine. The other hole houses the pressure sensor. Spraying a cleaning solution in the pressure sensor housing may cause damage to the pressure sensor. A sterilizing, non-oil wipe can clean the inside of the pressure sensor hole. **Do not** clean the insides of the tray rack wire connection directly. Ensure the electrical connectors are free of moisture before reconnecting them.

You may also remove the P100 filter and clean the vacuum hole. This typically does not need cleaning because the filter removes any particles above 3 μm (microns) in size.

11.3 Cleaning the Door

The door is made of polycarbonate glass. Do not use any solvents when cleaning the door, such as rubbing alcohol. Clean both sides first with water or with the bleach sanitization solution. To prevent scratches, use a clean microfiber cloth.

11.4 Cleaning Inside the Freeze Dryer

Once or twice a year, remove a side panel and clean the inside the cabinet of the machine. Be extremely careful to avoid sharp corners. Use compressed air to blow out any dust in the condenser. Wipe down the inside panels and frames with a damp cloth. This keeps the refrigeration system running efficiently by allowing the refrigerant to be effectively condensed and cooled. Remove the top panel and use compressed air to clean the electronics and PCB's.

11.5 Cleaning The Refrigeration Condenser

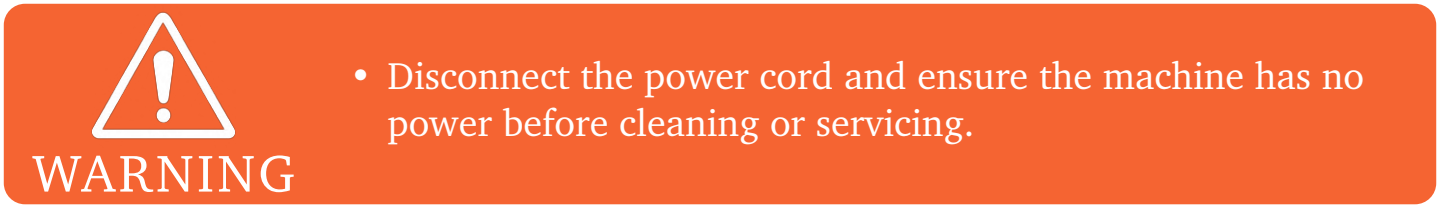
Every six months the refrigeration condenser should be cleaned. This can be done by taking off the side panel where the condenser is located and using a vacuum to remove any hair, dust, and debris from the heat exchanger fins. Failure to clean the condenser can result in premature refrigeration failure or reduced performance.

12 Troubleshooting

Many issues that might arise while using your freeze dryer can be very minor issues. Most often, with a small amount of troubleshooting, the solution is simple. If after troubleshooting you still can't find a solution, feel free to contact **Customer Support** on page 73.

If replacement parts are need while still under warranty, contact us for assistance. Otherwise, replacement parts can be ordered through our website.

When servicing or maintaining your machine, be sure to follow all safety instructions as provided on page 7.



If at any time visible damage is detected inside or outside the machine, such as burn or scorch marks, dislodged components, or excessive bending of the frame or panels, unplug your machine and contact customer support (page 73).

12.1 Freeze Dryer Won't Turn On

Check that the power cord is plugged in and that the mechanical power switch on the back of the unit is set to ON. Check that your circuit breaker is not tripped. If so, reset the circuit breaker. If the breaker continues to trip more than once, unplug your machine and contact customer support (page 73).

If the machine is receiving power, an LED will glow on the power PCB board. To check if this LED is on, you can remove the top panel. If the light is on, then the issues is with your screen and not your power. If the light is off, then there is a power issue. Contact customer support either way (page 73).

12.2 Chamber Pressure Not Achieving Vacuum

12.2.1 Most common issues:

- Update the software to the latest version. (See updating Firmware on page 33) The software is constantly being updated to handle errors better and communicate more effectively with sensors. Simply updating the software may resolve the issue.
- Make sure the pump is installed on the correct side of the machine, connected by the vacuum hose and not the drain hose.

- Make sure your chamber is clean and dry. If residual water is inside the chamber or the drain hose, it will evaporate and prevent the pressure from dropping.
- Make sure the orange zip ties for shipping were completely removed from under the door seal.
- Check that the drain valve is closed. (See page 17)
- Check that the door is sealing properly. (See page 39)
- Cold food added to a warm chamber or warm tray will cause ice to melt in the food, the pressure will boil the water, and cause the pressure to change, triggering a vacuum error. To prevent this, run a freeze cycle 30 minutes prior to putting food in the chamber. This will ensure that cold food is being placed into a cold chamber.

12.2.2 Ultimate Vacuum Test

This test can help you determine the health of your vacuum pump.

Remove any food from your machine and defrost it completely, wipe out any excess water, and allow time to air dry with the door open for best results.

On the control panel, go to ”Settings”, then ”Manual Hardware Control”, and turn on the vacuum pump and the refrigeration together. This test will determine what ultimate vacuum pressure the unit can reach. After running for an hour, the unit should be able to reach below 500 mtorr.

If the chamber is able to achieve pressure, then likely the food is not completely frozen when the dry cycle begins. Make sure frozen food is only placed into a cold chamber, as noted above, and give unfrozen food a full freeze cycle. Even if food is already frozen, it doesn’t hurt to add an hour or two of extra freeze time.

12.2.3 Checking For Leaks

1. Turn on your vacuum with the door and drain valve closed. You can do this by pressing ”Settings” from your home screen, then ”manual Hardware Controls,” then ”Vacuum Pump.”
2. Use isopropyl alcohol and a small syringe to pour small amounts of alcohol on potential leak locations, such as the hose barbs, and the hose barb threads on the drain valve, vacuum pump, and the chamber. And the Wire feed through threads. You will need to removed some side panels to access the hose barbs on the chamber and the wire feed through.
3. At each location, watch the vacuum pressure; if a leak is found, the pressure will spike rapidly. Give each location a few minutes each for best results.
4. If air is escaping through any gaps between the hose and a hose barb, detach the hose, and cut it back by 1in (25mm) to remove any imperfections, then reattach the hose.
5. Check the drain valve by turning the valve all the way closed and holding your thumb to the opening; if you feel suction, the valve will need to be replaced.
6. Replacement drain valves and hoses can be obtained through our website or for free through customer support if still under warranty. See customer support on page 73.

12.2.4 Vacuum Pump

Check that the vacuum pump oil is clean. Dirty oil or too much oil will cause the pump to not operate as efficiently as possible. Change the oil if needed.

Almost all oiled vein vacuum pumps uses reed valves. When food particles, sugar deposits, or other contaminants get under the reed valves, it can interrupt the vacuum seal of the valves.

Additionally, several O-ring seals on the vacuum pump can cause a vacuum error if damaged.

To check both the reed valves and the O-rings the pump will need to be drained of oil and the casing removed. The reed valves can be found under plastic covers on top of the casting, and the O-rings can be found on the casing. One on the drain valve, a large one on the casing seal and one on the oil mist filter.

Ensure the reed valves are clean and properly alinged over the holes they cover.

Check the O-rings for scratches, cuts, other damage, or misalignment.

For a tutorial on diagnosing your vacuum pump scan the QR code or click the link below:

How To Diagnose A Vacuum Pump
Scan the QR code or Click Here to see the video.

12.3 Vacuum Pressure Only Reading Atmosphere

If the vacuum pump is on and the vacuum sensor is only reading atmosphere, or around 750,000 mtorr, first try to open the door. If you can open the door, it's possible that the vacuum pump is not connected correctly or that the door seal is missing. Double check the vacuum hose is attached to your vacuum pump and check that the large black rubber seal is around the chamber opening; this seal is what the door should suction to when a vacuum is applied.

Try turning the machine on and off again to reset the pressure sensor.

Update the software to the latest version. (See updating Firmware on page 33) The software is constantly being updated to handle errors better and communicate more effectively with sensors. Simply updating the software may resolve the issue.

If none of the above solutions don't correct the issue, it is likely that the pressure sensor or the buffer board needs to be replaced. Contact customer support for assistance. (page 73

12.4 Door Not Sealing

Sometimes the doors shift in transit and can cause this issue. Make sure that the door handle is completely closed, with a full 180-degree turn.

Check that the door is sealing properly. The door seal should create a solid ring most of the way around the door seal, about 1/8" thick without vacuum. While under vacuum the black seal should be 1/2" thick all the way around. You may need to clean the black seal as well. If there is any hair, fur, or any other contaminants in or on the seal it could be causing the vacuum error.

If the door seal has large gaps in the seal while not under vacuum, try turning on the vacuum and pushing the door against the seal. If the door starts to seal only after pushing on the door, then the door needs to be adjusted so there are less gaps around the door.

To adjust your door, use an Allen wrench to loosen the bolts on the door hinges, these bolts are in a small track. Slide the door in the track closer to the machine and tighten the bolts again. Depending on your needs, you may only need to adjust a single hinge instead of both.

Additionally, the door latch can be adjusted by bending it with a pair of pliers.

12.5 Mist Coming Out of Vacuum Pump

This is normal. Often, mist will be visible around the oil mist filter when the vacuum pump is running. This is not smoke and is completely normal. To reduce oil mist, you can wrap a micro-fiber towel around the filter to absorb the mist or purchase an upgraded oil mist filter from our website.

12.6 Excessive Water in the Pump

To reduce water ingestion in your pump, do all of the following:

- **Defrost and drain your freeze dryer after every cycle**. Ice may become too thick and prevent water vapor from being captured on the walls of the chamber. This water vapor can be sent to the pump instead. A defrost is always needed except sometimes on candy loads.
- Check that there is no liquid water in the vacuum chamber during the dry cycle. All water must be removed or be frozen. If too much water vapor is created all at once, excess water vapor may be sent to the pump.
- Make sure to use the gas ballast valve properly as described on page 31
- Make sure the pump is connected to the vacuum hose. If it is connected to the drain hose, the pump will ingest liquid water after the defrost cycle.
- Make sure that the chamber and tray rack are cold if you are skipping the freeze cycle. Otherwise the food may melt too much and can cause liquid water in the chamber.
- Keep very wet loads to about 8 pounds of food for a medium freeze dryer or about 16 pounds for a large freeze dryer. Larger quantities of wet food could cause excess water vapor.

12.7 Dark Vacuum Pump Oil Discoloration

The oil in the vacuum pump can get discolored for several different reasons. There could be rust forming in the pump, the oil might be old, there may be too much acid or sugar in the food being freeze dried, or the gas ballast valve may need to be utilized.

To use the gas ballast valve properly, see instructions on page 31

Some acidic foods like pickles and pickled foods, can cause rust in the pump very quickly since some of the acid fumes will be ingested into the pump. When freeze drying highly accitic foods, change your oil more frequently. (ideally after every batch.) If you suspect that there is rust in your pump see Rust Prevention And Cleaning on page 31

Freeze drying candy can often make the vacuum pump oil very dark due to two factors.

- The candy cycle runs at a much higher pressure, and therefore, more water will be sent to the vacuum pump.
- Candy and other sugary foods like fruit can off gas some of the sugars, which can be ingested into the pump. These sugars can form brown deposits on the pump head that almost look like rust.

To reduce the oil discoloration you can reduce sugar and water vapor being sent to the pump by lowering the vacuum pressure and shelf temperature, which will also increase cycle times.

12.8 Vacuum Pump Oil Draining Slowly

If the oil in the vacuum pump is draining slowly, it is most likely due to the oil mist filter being clogged with oil or particulates. Remove the oil mist filter when changing the oil, and consider getting a new oil mist filter or cleaning the fiberglass media in the current one.

12.9 Oil In Vacuum Chamber

The vacuum pumps that are sold by Blue Alpine have a solenoid valve to help prevent back-streaming. This is where the vacuum of the chamber causes the pump to run in reverse and pull oil back up the intake of the pump. If the pump is not equipped with a solenoid or if the solenoid is sticking, the pump can backstream. If you suspect the solenoid is sticking, you can attempt to free it by plugging your pump into a wall outlet and turning it on and off at 5-second intervals.

12.10 Excessive Noise

A freeze dryer and its vacuum pump are relatively loud, about the same as a clothes dryer at 64 - 78 dB. This is typical. If the unit is excessively loud, check that there are no loose parts inside the machine. Check that the evaporator fan blades are in good condition. If not, contact customer support. (page 73)

Your vacuum pump has many moving parts and will make a variety of sounds as it turns on and transitions through different pressures. This is normal. Once it reaches the target pressure, the volume will reduce slightly.

Oftentimes, especially when re-pressurizing the unit, the ice that has collected on the chamber wall will crack. This can cause a very loud pop, but it is not a cause for concern.

If you still feel your machine is making abnormal sounds, feel free to contact customer support. (page 73)

12.11 Sensor Disconnect Error

Update the software to the latest version. (See updating Firmware on page 33) The software is constantly being updated to handle errors better and communicate more effectively with sensors. Simply updating the software may resolve the issue.

If updating the software does not work, the unit will likely need a power board with updated grounding and/or a new digital board. These are the two motherboards on the electronics tray on the top of the machine behind the screen.

12.12 Chamber Temperature Not Cooling

Check that the condenser (the component inside the machine with a fan attached to it) is clear of any dust or debris, and that there is sufficient space for airflow around the machine. It may also help to reduce the temperature of the room.

Check to make sure that the condenser fan is spinning. If you look through the holes on the right hand side of the machine, you should be able to see the condenser fan. Go to ”Settings”, then ”Manual Hardware Control”, then turn on refrigeration. The fan should turn on. If it does not, a new fan motor is likely needed.

For medium units with serial numbers below 1034, check to make sure the protector and/or protector wire is not damaged or burned. See the video below or contact customer support for more assistance. (page 73)

How to check the protector and the protector wire
Scan the QR code or Click Here to see the video.

Check that there are no punctures or cuts in the refrigeration circuit inside the freeze-dryer. If there is visible damage to the circuit, contact customer support. (page 73)

12.13 Burning or Shriveled Food

CAUTION

- Do not plug or unplug the heating racks while the unit is turned on. Doing so may cause the plugs to arc and damage the unit. Always turn off the machine before plugging or unplugging the heat racks.

If the unit is burning or severely shriveling the food first try to reduce the pressure and temperature for the recipe. For example, some melons may need to be reduced down to 800mtorr and 40 °F (4 °C) in

order to freeze dry without shriveling.

If the unit is severely burning food every cycle, regardless of changing the set temperature, clean the unit out and turn the unit off, then back on. With the unit on the home screen wait 45 minutes and then feel the shelves. If the shelves are hot while they are not turned on and the unit is still on the home screen, then most likely the power board is broken. Specifically the circuit that provides power to the heat rack has failed to close, so it is continuing to warm the heat rack.

Often, burning or collapsing food can be attributed to the types of food being freeze-dried, see Pre-frozen, Canned, and Ripe Food on page 28 for more information

12.14 Soggy or Chewy Food When Done

Sometimes food will be soggy or more chewy than normal. This is normal in some foods that are very sugary, but generally speaking the food should be crisp and fluffy. It is normal for food to become soggy as it is exposed to air and absorbs water from the air. If the food is soggy to any degree coming right out of the freeze dryer there are several possible causes. It is most likely that there was still water in the food. This can be solved by putting the food in for longer, or defrosting and running the food again.

The other possible cause is that there was to much sugar in the food and it was not able to dry properly. This can happen with canned fruits and juices.

Another possible cause is that the vacuum pressure was set too high. If you continue to have problems with a specific recipe try reducing the pressure, and possibly the temperature. It can also be a good idea to make the food chunks smaller and or thinner. If the food chunks are too big it can be hard for the water to escape from the inside of the food. Fruit and vegetable skins can also make it more difficult for the water to escape the fruit.

If the food is simply not done, you can try putting the food back in at a higher shelf temperature. It may be needed to refreeze the food before pulling the vacuum again. Meaning you may need to put the food though a full second cycle, rather than skipping the freeze cycle.

Soggy food could also be a symptom of a bad vacuum pump or a vacuum leak. To determine this, run an ultimate vacuum test, or a leak rate test, respectively.

12.15 Soggy or Chewy Food In Mylar Bag

If you find soggy or chewy food after opening a sealed mylar bag or mason jar, **do not eat it.** Moist or soggy food can harbor dangerous bacteria.

If you have this issue, there are a few things that could cause it.

12.15.1 Oxygen Absorbers

Oxygen absorber have a small amount of water in them to help with the chemical reaction that absorbs the oxygen. This is true of all oxygen absorbers, both ferrous and non ferrous. For example, on average a 300cc ferrous oxygen absorber can have .77g of water in it. If a single oxygen absorber is placed in a bag with too little food then it can make the food feel soggy.

To counter this:

- Package plenty of food in each package to dilute any water introduced by the oxygen absorber, or use a smaller/fewer oxygen absorbers.
- Try using the fewest number of oxygen absorbers as possible. If you use more than one absorber, place them on opposite ends of the bag so that the water from the absorbers is spread out over more food.
- Use a vacuum chamber sealer to pull more of the air out of the bag. This will not work for some foods that are soft, as it will crush the food.

The water from the absorbers is an acceptable amount of water as long as the quantity of food is enough to accept that water. For example, if you have 100g of food with 1% water content going into the bag, and you add a single oxygen absorber that has .77g of water in it, you will only be at 2% water content when the bag is sealed, which is acceptable.

Try not to shake the oxygen absorbers. They are the same material as hand warmers, and so if you shake them it will speed up the chemical reaction, which can get hot and cause steam. If they don't get hot, the oxygen absorbers will have a higher chance of keeping the water inside the packet.

If an absorber is already used or defective, it could introduce even more water into the bag.

12.15.2 Other Reasons

Punctures or improper seals in the mylar bag can introduce moisture very quickly. If the mylar bag is of poor quality or has a plastic window, then even without a picture, moisture can enter the bag over time. See Storing Your Freeze-Dried Food on page 23

If some of the food is not completely dry before packaging, the moisture will spread throughout the storage container, affecting all the food. Be sure to follow preparation instructions as found on page 19. And fully determine completeness as found on page 22. If in doubt, add more dry time, as you cannot over freeze-dry food.

12.16 Heat Rack Not Heating During Dry Cycle

In general, the freeze dryer will heat the food slowly throughout the dry cycle. It will only reach full shelf temperature at the end of the dry cycle. This is normal operation.

Update the software to the latest version. (See updating Firmware on page 33) The software is constantly being updated to handle errors better and communicate more effectively with sensors. Simply updating the software may resolve the issue.

Check that the electrical connection between the heat rack and machine is secure.

The pins inside each Deutsch connector should be pulled out, and all 6 should be at the same height. If any are pushed in, carefully pull the pins out with needle-nose pliers until locked in place. If the heat rack still does not reach temperature when testing on the manual hardware control page, contact Blue Alpine support on page 73.

If the heat racks never turn on at all during the dry cycle and the food is not done after an excessive amount of time, then it is more likely a vacuum leak, or the vacuum pump is warn out and no longer able to pull vacuum as well. The machine will only heat the trays a little at a time to prevent too much water

vapor being released, which is detected by the pressure sensor because water vapor affects pressure. If the pressure isn't low enough, then the machine will never turn the heat racks on.

Check the target pressure levels are being achieved; if not, see Chamber Pressure Not Achieving Vacuum on page 37.

For more information on this, see the video below.

How to check the protector and the protector wire
Scan the QR code or Click Here to see the video.

12.17 Excessively Long Batches

Make sure you are not overloading your trays or cutting your food too thick. See Preparation in How To Freeze Dry on page 19.

If batches are taking longer than desired, start by raising the set pressure and possibly the set temperature. This will help the machine pull more water off faster.

The most common cause for long batches is a vacuum leak, or the vacuum pump is warn out and no longer able to pull vacuum as well. The machine will only heat the trays a little at a time to prevent too much water vapor being released, which is detected by the pressure sensor because water vapor affects pressure. If the pressure isn't low enough, then the machine will never turn the heat racks on, which will cause the food to sublimate at a much slower rate.

Check the target pressure levels are being achieved; if not, see Chamber Pressure Not Achieving Vacuum on page 37.

12.18 Power Lost During Cycle

If the power to the freeze dryer is lost for any reason during a freeze or dry cycle, the freeze dryer will go into "limp mode" and turn on the refrigeration only. While in limp mode it will not heat the shelves or turn on the vacuum pump. Limp mode is to help keep the food frozen so it doesn't go bad. And to allow the user time to evaluate the situation after the power has been restored, to see if the food is salvageable, and what part of the cycle the machine should continue if the food is still good.

12.19 Funny Taste In Food

Freeze-drying will inherently alter the food, resulting in minor changes to texture and flavor, sometimes amplifying the natural flavors already found in the food. Many foods will reconstitute perfectly, but others will have noticeable changes in texture.

If you find that your food tastes abnormally odd, there are a few things that can cause that.

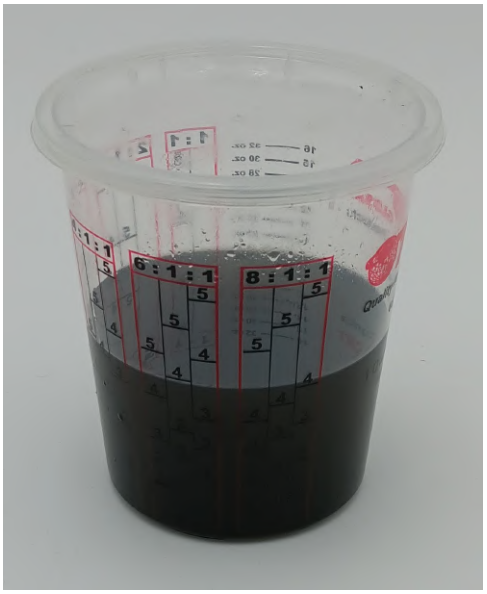
- Your silicone trays may be new and could be off-gassing VOCs. The silicone mats have been tested by a third-party lab and meet FDA regulations for food-grade silicone. However, according to the regulations, there can be a small amount of VOCs that can off-gas into your food. This is harmless, but it may alter the taste or smell.

  To help the mats off-gas faster, you can do a bread run. See how on page 16.

- If you run a batch of very spicy or potent food, such as garlic, peppers, or pickles, the following batch(s) might still be affected by the taste. Likewise, running batches with multiple kinds of food may cause each food to acquire some flavor from the others. Avoid mixing foods you wouldn't want to taste like each other in the same batch, such as fish and fruit.

13 FAQs (Frequently Asked Questions)

13.1 Why does my vacuum pump oil look so dark after the first batch?



It can be very alarming to check your machine after running your very first freeze-drying cycle to find that the oil in your pump looks significantly darker. In an average cycle oil discoloration should be minimal, so what is happening on the first run?

This results from a combination of two main sources.

1. Extra particulates from the casting process.
2. Slight imperfections in metal parts within the vacuum pump that when first operated, get worn in.

Each pump has it's own break-in period based on very small differences in from one pump to the next. In general your oil can be filtered and reused. After oil has been used for 30 cycles your should consider getting new oil and recycling it.

13.2 What does the freeze dryer do when it is finished with a cycle?

When the freeze dryer is finished with a cycle it simply continues to freeze dry wherever it left off. If it was freeze drying at 120°F, then it will continue to freeze dry at that temperature until you are able to pull the food out.

13.3 Does the freeze dryer automatically change to the next cycle?

Yes, the freeze dryer will automatically proceed to the next cycle without any input from the user. Depending on what recipe is being run, there can be 3 or 4 parts of a given recipe.

13.4 Why is my vacuum pump smoking?

This is normal. Often, mist will be visible around the oil mist filter when the vacuum pump is running. This is not smoke and is completely normal. To reduce oil mist, you can wrap a micro-fiber towel around the filter to absorb the mist or purchase an upgraded oil mist filter from our website.

13.5 Why is my machine so loud?

A freeze dryer and its vacuum pump are relatively loud, about the same as a clothes dryer at 64 - 78 dB. This is typical. If the unit is excessively loud, check that there are no loose parts inside the machine. Check that the evaporator fan blades are in good condition. If not, contact customer support. (page 73)

Your vacuum pump has many moving parts and will make a variety of sounds as it turns on and transitions through different pressures. This is normal. Once it reaches the target pressure, the volume will

reduce slightly.

Oftentimes, especially when re-pressurizing the unit, the ice that has collected on the chamber wall will crack. This can cause a very loud pop, but it is not a cause for concern.

If you feel your machine is making abnormal sounds, contact customer support. (page 73)

13.6 Can I move my machine or lie it down?

Yes, the frame of the machine is very strong, if needs be the machine can be oriented in any direction for transportation. Leave the machine in the upright position for 24 hours before use to allow the lubrication in the refrigeration system to settle back into place.

13.7 Why is my heat rack not heating up?

The heat rack will only turn on during the dry cycle, and it will only reach the target temperature at the end of the cycle, increasing slowly over the duration of the dry cycle.

If your heat rack is still not heating even at the end of the dry cycle, see Heat Rack Not Heating During Dry Cycle, in the troubleshooting section on page 44.

13.8 If I update software, will I be able to keep my custom settings?

Yes, all updates after patch 14 do not alter the default memory. The only way to reset the memory is with a factory reset. To update your firmware, see page 33.

13.9 Can I control my machine with Wi-Fi?

Current machines have built-in Wi-Fi hardware, but the app is still in development. When development completes, Wi-Fi control will be free with a software update.

13.10 Can I put my freeze dryer in my kitchen?

Yes. However, you may not want to because they are about as loud as a washing machine, and they also produce heat. An ideal location is a cool room, out of the way, most popular are basements or garages.

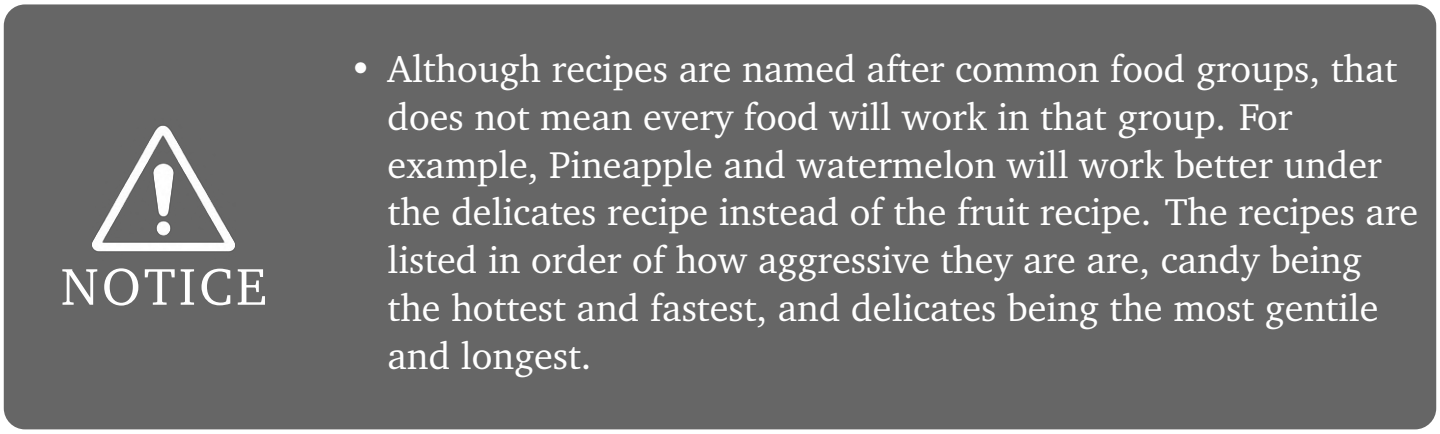
13.11 How often should I change my oil?

The more often you change your oil, the longer your pump will last. See how and when to change your oil on page 30.

14 Recipes

To navigate to the recipes page, click ”Recipes” from the home screen, while a batch is not in progress. If a batch is in progress you will not have the option.

The recipes page can help users quickly find settings more optimized to the specific foods they will be drying. The preset temperatures and pressures are a good starting point, but you may need to make small fine-tune adjustments to perfect the final product.



When running multi-food batches use the setting for the most delicate food in the batch. For example, with a batch containing strawberries and watermelon, the watermelon is significantly more delicate, so the whole batch should be treated as if it were only watermelon.

14.1 Multi-Stage Recipes

Some recipes include two or more stages on the dry cycle. The purpose of more than one stage is to start drying the food slowly and easily to help it stay intact, then increase the temperature to a more typical range in the second stage.

This setting can be toggled by clicking ”Settings” on the home page, then ”Edit Default dryer settings.” Press the ”Next page” left arrow until the ”Feature Settings” appears. You can then toggle off or on the ”Multiple Phase Recipe Controller.” It is set to on by default. We recommend using it for the best results.

14.2 Quick Start

On the home screen the ”Quick Start” button will start a very standard recipe. Most popular freeze-dried foods will work with this recipe.

14.3 Candy Recipe

The candy recipe is the most unique. It does not include a freeze cycle, because freeze-dried candy is a misnomer; it’s only vacuum dried. Instead of a freeze cycle there is an optional pre-warm cycle. Depending on the candy being process this pre-warm cycle can be very useful.

A pre-warm is most often needed to soften certain candies enough that the vacuum pressure will cause them to puff up. For other candies, if you use the pre-warm they may puff up too much, causing a mess.

Examples of candies that typically need pre-warmed:

- Lemon heads
- Candy Cane
- Candy Corn
- Starbursts

Examples of candies that do NOT need pre-warmed:

- Skittles,
- Jolly ranchers,
- Gummies,
- Milk Duds
- Peach Rings

During the dry cycle, the pressure is much higher than in typical freeze drying, about 10,000 mTorr instead of 1,100. This allows for greater heat transfer to keep the candy hot. The typical dry cycle is a little over 2 hours.

14.4 Greens Recipe

This recipe is great for all leafy produce. It has a primary and secondary stage. The primary stage starts the heat out low to ease the food into the process, then the second stage turns the heat up to finish drying everything out. But even the second-stage heat is still below average to keep any greens from shriveling.

14.5 Meats Recipe

This recipe is more intense because meat is very hearty and can hold its structure even with a hotter shelf temperature.

14.6 Fruits Recipe

Most fruits will work under this recipe. This recipe has two stages to help with some of the more delicate fruits, but the second stage has a more standard shelf temperature. Some fruits are very delicate and should not be used in this recipe, such as Pineapple, melons, and blueberries.

14.7 Liquids Recipe

A straightforward recipe that works for most liquids except juice. (Juice does not typically freeze-dry due to the high amount of sugars.)

14.8 Delicates Recipe

The 3-stage dry cycle in the delicates recipe will give the best chance for even the most fragile of food to freeze dry. Starting at 27°F in the first stage, then raising to 85°F on the second, then finishing with 105°F. Almost anything that can be freeze-dried will work under this recipe, but it takes much longer than the more typical recipes.

14.9 Editing Recipes

To edit any recipe, navigate to the recipes page, then press ”Edit”. Chose the recipe you wish to change, and make the adjustments you wish. If the recipe includes more than one stage, press ”Next” to see and edit them. Once your edits are complete, return to the recipe edit selection page and press ”Save & Exit”.

14.10 Resetting Recipes

If you edited a recipe, in each recipe’s edit page, there is a ”reset” button in the top right corner, which will reset the recipe back to its default settings.

To reset every recipe at once, perform a factory reset as described on page 34.

14.11 Things that do not freeze dry

There are some popular food that simply do not freeze dry. Sometimes its because they are oil-based foods, or they are too messy. Below is a list of the most common food that do not work.

Oil-based:

- Chocolate
- Lard and butter
- Peanut butter
- Nuts
- Cooking oils
- Mayonnaise
- Coffee Beans
- Potato chips
- Sour Patch Candy
- Red Hots Candy
- Oreos

Not Enough Water:

- Jerky
- Dry beans
- Dehydrated fruit
- Fruit leather
- Candied fruit
- Sugar
- Salt

Too Messy or Too Much Sugar:

- Honey
- Syrup
- Jams
- Jellies
- Jell-o
- Alcoholic Drinks
- Soda

Hard But Possible:

- Sausage
- Salami
- Pepperoni
- Heavy cream
- Canned fruit
- Canned veggies
- Juices

NOTICE

- Even some of the most ”impossible” foods can still be freeze-dried, but often it takes a complex, precise, and unusual process to pull it off.
- Some foods, especially those with high fat, can still be freeze-dried as part of a larger recipe. Such as heavy cream, mayonnaise, oils, lard, and butters. Including these as ingredients will significantly reduce the shelf life of your freeze-dried meal. Possibly down to a few months, depending on the content.

14.12 Second dry cycle

With really wet foods, you may notice a large amount of ice buildup on the chamber walls. If there is too much ice, it can slow down the sublimation rate. Sometimes running a second dry cylce can overcome this issue. To do this, remove the food and place it in a freezer, defrost the chamber, then start a new cycle. (Often, quick start will work well at this point adjust the shelf temperature as needed.) Don’t skip the freeze cycle. Instead, give 1-2 hours of freeze time, this will insure the chamber is cooled again before the food is reintroduce, and ensure any moisture still in the food or chamber is completely frozen before proceeding. (Liquid water in the chamber may cause a vacuum error.) After 30 minutes into the freeze cycle, place the food back into the freeze dryer. The clean chamber walls help force the last bit of water out of the food more easily.

14.13 Wax Paper

Some foods, especially candies and ice cream, have the potential to expand and make a mess. To help prevent messes in hard-to-clean places like the underside of the heat rack, place wax paper over the top of each tray. This will prevent things from sticking to your tray rack and won’t impede the drying process.

14.14 Special cases

- **Eggs:** Eggs work best when freeze-dried raw, and the texture is completely unaffected when re-constituted. Moving liquid eggs on a tray can be messy, so it can be easier to pour them directly into trays while still in the freeze dryer or freezer if you plan to pre-freeze.
- **Meat:** Meat freeze dries well both raw and cooked. For sanitation purposes, we recommend cooking meat before freeze-drying. The microbes and bacteria are not killed when freeze dried,

instead they are preserved along with the food. Any dust or powder that might break off of freeze-dried raw meat can pose a health risk.

For long-term storage, try and cut away as much fat as possible.

- **Watermelon:** Watermelon is one of the hardest foods to freeze-dry and also one of the wettest. Use the delicates recipe and try to keep loads towards the lower weight on your machine. 6-12 lbs for the medium and 12-16 lbs for the large.
- **Pineapple:** Pineapple is extremely difficult to freeze-dry; only the delicates recipe can work, and even then, you may need to increase the time of the first stage to 12-24 hours to allow it the best chance of survival, depending on the ripeness of the pineapple.
- **Grapes:** Grapes have a skin that will retain water, each grape will need to be cut in half or otherwise have the skin removed of punctured. Laying half-cut grapes face down on the trays can help prevent sugars from bubbling.
- **Ice Cream:** Even though ice cream is already frozen, don't skip the freeze cycle. The quick start recipe should work fine, but allow the full freeze cycle to run. If any amount of ice cream melts, it will foam and make a huge mess and ruin the ice cream.
- **Blue Berries:** Blue berries have a skin that retains water, each blue berry will need to be cut in half or otherwise have the skin removed of punctured. Laying half-cut blueberries face down on the trays can help prevent sugars from bubbling.
- **Pickles:** Pickles are fragile and should be processed with the delicates recipe. Pickles have acids that will come off with the water; some of these acids will enter your pump and will cause damage very quickly. When freeze-drying pickles, change your oil after every batch. And if you plan on freeze-drying pickles periodically, consider buying a dedicated vacuum pump for processing pickles, because even one batch will immediately shorten the lifespan of your pump.
- **Puree:** Many difficult-to-process foods become much easier to freeze-dry when blended and mixed with water. Most purees can be processed with the "quick start" recipe.
- **Liquids:** It can be very difficult to move a tray full of liquid without making a mess. To overcome this, pour liquids directly into the trays while in the machine. Pull each try out by a few inches for easy access, then slide them back in.
- **Tomatoes:** The skin of tomatoes will retain water; always cut tomatoes before freeze drying.
- **Potatoes and squash:** Blanching beforehand will help prevent the potatoes from oxidizing, turning them black.
- **Juices:** Juices typically don't work. But if watered down sufficiently, it can be possible. You may need ratios of 1:4 or higher to avoid turning the juice into a syrup.
- **Herbs:** If you freeze-dry herbs too fast or too hot, you might strip the fragrance away. Otherwise, herbs freeze-dry well and are unlikely to collapse. To preserve fragrance, though, use the greens recipe.
- **Jolly Ranchers:** Jolley ranchers will expand considerably, cut them in half to prevent too much of a mess.

15 Warranty & Refund Policy

15.1 Refund Policy

Customers may cancel their orders before shipment for a full refund minus a 3% fee to cover the card charges incurred by Blue Alpine. Card companies still charge us regardless of refunds.

Once a product has left our facility and is in transit, customers may return freeze dryers for a full refund, less all shipping costs and a restocking fee of 15%, if the return is within 30 days of the ship date.

Restocking and return shipping fees for customers outside of the continental 48 states of the United States will vary and are calculated on a case-by-case basis at the time of return.

A return merchandise authorization (RMA) must be issued via email or other written form of communication before items can be shipped back to Blue Alpine LLC. Blue Alpine LLC reserves the right not to refund any items that did not have an RMA before being shipped back. All returned products must be returned in their original packaging. Photos of the final packaging of the products must also be approved in writing via email or text. The Customer agrees that they are responsible for the packaging of the products that are to be returned and that they will place the items to be shipped in a position ready for pickup or drop off in accordance with the freight or parcel carriers guidelines as directed by Blue Alpine LLC.

Note: We do our best to work with shipping companies to deliver products as scheduled, but sometimes delays happen. Please be patient and understanding. Returning due to a late delivery will still incur return shipping costs and restocking fees.

Items categorized as ”Replacement Parts” and purchased from the Blue Alpine LLC website are sold on an as-is basis and are not covered under our standard product warranty. This does not apply to replacement parts issued by Blue Alpine LLC for warranty claims. By purchasing repair parts, the customer acknowledges and accepts that all sales are final. Note: Due to the nature of these parts, we cannot accept returns, as we are unable to verify whether a returned item is the originally purchased part or one that has been used and replaced during a repair, or damaged during the repair process. If you have any questions about this exclusion or need help selecting the correct part, please contact our support team before purchasing.

15.2 One-Year Warranty

Full One-Year Warranty only includes the U.S. continental 48 states

Warranty Period: Blue Alpine LLC freeze dryers are warrantied for a period of 12 months from the original ship date if shipped directly from the factory, or the date of purchase if purchased at a retail store. Proof of purchase is required for warranty. If the unit needs to be shipped back to our facility for maintenance, one additional month will be added to the warranty. Note: We no longer offer a ”one-year of use” warranty, as communicated in legacy social media, due to logistical complexity.

If the customer is capable of using the machine but chooses not to set it up or operate it, the warranty period will continue to elapse as specified.

Blue Alpine will be responsible for:

Cost of repair or, at our option, replacement of any part of the freeze dryer and/or vacuum pump which proves to be defective in workmanship or material. We are committed to making our products work and helping customers resume operation in a timely manner.

Consumer will be responsible for:

1. Performing repairs and/or replacement of most parts, under provided instruction and guidance from Blue Alpine LLC. Note: The machines were designed to be simple to work on, and most repairs are very easy. Blue Alpine LLC is happy to provide instruction, answer questions, and assist where possible.
2. Physically preparing the freeze dryer or other components for shipment back to Blue Alpine LLC. When asked, parts must be shipped back to Blue Alpine LLC before new parts can be sent. When returning shipping freight, photos of the shipment must be sent to Blue Alpine LLC before return shipping will be scheduled.
3. If Blue Alpine LLC ships a machine back to the factory under warranty because the customer provided pour diagnostic information and it is found that the machine is functioning properly and the issue was user error, bad installation, or otherwise not following the owners manual instructions, then the customer will pay $800 to ship the machine back to them which covers the cost of shipping.
4. The customer must promptly pick up or coordinate with Blue Alpine LLC to promptly arrange return shipment of items sent to Blue Alpine LLC for repair or warranty. Items not picked up or items for which customers have not properly coordinated with Blue Alpine LLC within two months of service completion will be considered abandoned and will become the property of Blue Alpine LLC. All payments for repair, shipping, etc. must be paid before items can be returned. Items returned for repair or warranty that have not had bills paid will also be considered abandoned after two months.
5. Properly cleaning the condenser unit every 6 months. Allowing the condenser unit to develop a mat of debris on the heat exchanger will damage the refrigeration system.

15.3 Limited 3-Year Warranty

Warranty Period: Blue Alpine LLC will provide a limited warranty for a period of 36 months from the original ship date if shipped directly from the factory, or from the date of purchase if purchased at a retail store. Proof of purchase is required for warranty. If the unit needs to be shipped back to our facility for maintenance, one additional month will be added to the warranty.

Blue Alpine will be responsible for:

Repair or, at our option, replacement of any part of the sealed refrigeration system (compressor, condenser, evaporator, tubing, condenser fan) due to defective workmanship or material.

Consumer will be responsible for:

1. Diagnostic charges for determining defects, and any costs for transportation and delivery of the appliance required because of the service.
2. Physically preparing the freeze dryer or other components for shipment back to Blue Alpine LLC. When asked, parts must be shipped back to Blue Alpine LLC before new parts can be sent. When returning shipping freight, photos of the prepared shipment must be sent to Blue Alpine LLC before return shipping will be scheduled.
3. Properly cleaning the condenser unit every 6 months. Allowing the condenser unit to develop a mat of debris on the heat exchanger will damage the refrigeration system.

International Limited Warranty (Also Alaska & Hawaii)

For units sold outside of the lower 48 states of the USA, Blue Alpine LLC will provide warranty on parts only. Shipping and or freight charges related to warranty claims will not be covered by Blue Alpine LLC.

Additionally, local services to install parts must be provided, coordinated, and paid for by the owner. If the customer wishes to pay for shipping a product to and/or from our facility, then Blue Alpine LLC will coordinate both shipping and in-factory repairs needed.

Shipping for international orders is insured by Blue Alpine LLC according to the FAS – Free Alongside Ship incoterms. Any additional shipping insurance beyond FAS will be coordinated by the buyer with their freight forwarder.

15.4 1-year Vacuum Pump Warranty

Warranty Period: Blue Alpine LLC will provide a full warranty for the period of 12 months from the original ship date if shipped directly from the factory, or from the date of purchase if purchased at a retail location. This warranty applies only to the freeze dryer vacuum pump used in clean environments and when operated in accordance with Blue Alpine instructions.

Blue Alpine will be responsible for:

Repair or, at our option, replacement of any part of the vacuum pump due to defective workmanship or material.

Consumer will be responsible for:

1. Performing repairs and/or replacement of most parts, under provided instruction and guidance from Blue Alpine LLC.
2. Physically preparing the vacuum pump or other components for shipment back to Blue Alpine LLC. When asked, parts must be shipped back to Blue Alpine LLC before new parts can be sent.

15.5 Normal Responsibilities of the Consumer

Note: This is a scientific process and an expensive machine. We ask that you learn everything you can about how the process works. It would be ridiculous to buy a car without knowing how to drive, please learn what's involved with freeze-drying before buying a freeze dryer.

This warranty applies only to freeze dryers used in clean environments and when operated in accordance with Blue Alpine instructions. The consumer is responsible for the following items:

1. Proper use of the appliance in accordance with the instructions provided with the product.
2. Proper installation in accordance with the instructions provided with the appliance and in accordance with all local electrical codes.
3. Proper connection to a grounded power supply of sufficient voltage, replacement of blown fuses, repair of loose connections, or defects in house wiring.
4. Operation in a clean, open area that has plenty of airflow and is not above 90°F or below 32°F.
5. Damages to the appliance during or after installation. Do not lift the unit by holding onto the door.
6. Properly maintaining and operating the freeze dryer and vacuum pump. According to instructions outlined in the owner's manual.
7. Proper preparation, processing, and packaging of food processed in the freeze dryer, according to instructions outlined in the owner's manual.
8. Performing software updates.
9. Minor part/component replacement, maintenance, and repairs according to instructions provided by Blue Alpine LLC personnel or the owner's manual such as but not limited to o-rings, gaskets, seals, electronics, valves, filters, etc. Note: Blue Alpine freeze dryers are designed with the customer in mind. Most repairs are very easy and fast, and all appropriate instructions/tutorials will be provided as needed.
10. Return of old parts per request of Blue Alpine LLC for evaluation when provided a shipping label by Blue Alpine LLC.
11. Transporting the freeze dryer from the delivery truck to the location where it will be used. Note: The delivery truck drivers will take the pallet off the truck, but will not deliver inside. Depending on the property, some trucks may only deliver to the closest accessible point determined by the driver. It is the customer's responsibility to communicate any possible delivery restrictions to the freight or delivery company and coordinate appropriately.

15.6 Warranty Limitations and Exclusions

Damages caused or perceived by or through any of the items listed below are excluded from the warranty. The exclusions outlined herein are critical to ensure that the warranty applies only to manufacturing defects or failures directly related to the quality of materials and workmanship, as intended by Blue Alpine LLC. Exclusions include:

1. Consequential or incidental damages, such as, but not limited to, property damage, flooding, fire, wind, or other damage caused by natural events.
2. Incidental expenses resulting from any breach of this written or any implied warranty.
3. Damages caused by services performed by persons other than those authorized by Blue Alpine.

4. Damages caused by parts other than Blue Alpine repair parts or parts obtained from suppliers other than Blue Alpine personnel.
5. Damage from external causes such as abuse, misuse, accident, inadequate power supply, or other events caused by the customer, environment, other people, or acts of God. (This does not include damage caused by the shipping company.)
6. Damage to products with original serial numbers that have been destroyed, removed, or altered and cannot be readily determined.
7. Damage caused by using an extension cord instead of a direct line connection to an available power supply.
8. Claims for personal injuries, incidental or consequential damages, or economic loss (profit or revenue), no matter the cause.
9. Damages caused by the use of an improper power supply, such as plugging the unit into a 220V outlet.
10. Damages caused by any interruption, brownout, power surge, lightning strikes, power receptacle, or other power service anomalies are not under warranty. Blue Alpine LLC recommends plugging your freeze dryer into an appropriately sized surge protector.
11. Cost of any express or expedited shipping for any purchases, repair parts, warranty service, or replacement items. If expedited shipping or services are needed, the customer can select what speed of service needed, then the customer will be charged for the expedited shipping before the items are shipped.
12. Service calls or costs that do not involve malfunction or defects in workmanship or material. For example, the shipping cost of a returned part that is not defective, or the cost of a local service technician when no repair is needed.
13. Any packaging materials, including the dust cover that comes with the machines. Note: The dust cover is considered packaging and may be damaged during shipping or unboxing.
14. Any damage caused by the customer to the vacuum pump, including, but not limited to, failure to change the oil at correct intervals, connecting the pump to the drain valve, using inappropriate cleaners in the pump, failure to put oil in the pump, and improper reassembly of the pump after or during maintenance. Note: Any damage to a vacuum pump that exceeds two replacement vacuum pumps will be assumed to be damage caused by the customer, likely related to how the customer is maintaining or failing to maintain the vacuum pump, regardless of if independently purchased or included with a freeze dryer.
15. Any food or material that is burnt, destroyed, and/or stuck to the silicone mats or the machine, or is otherwise considered a loss. Note: The quality of food processed in the machine can vary widely and change depending on even the smallest change in cycle parameters. Because of this, Blue Alpine accepts no responsibility for the quality of freeze-dried food or freeze-dried materials, nor does it accept responsibility for the packaging of the food or other freeze-dried materials.
16. Damages caused to the machine by food or other material being freeze-dried.
17. Any warping or other damage to the stainless steel sheet pans..

18. Any damage to the silicone mats due to use, food preparation, cutting, cleaning, freeze drying, or otherwise. Note: The warranty on silicone mats and stainless steel pans is limited to 30 days from receipt and only for manufacturing defects.
19. All consumables such as the impulse sealer hot wire, impulse sealer PTFE parts, mylar bags, oxygen absorbers, vacuum pump oil, vacuum pump oil mist filter, vacuum pump carbon filter, and P100 chamber filter.
20. Items categorized as ”Replacement Parts” and purchased from the Blue Alpine LLC website. Replacement parts issued by Blue Alpine LLC can be included under this warranty at the sole discretion of Blue Alpine LLC. Note: All new or refurbished electronics, accessories, pumps, and other items that are provided to a customer in connection with a warranty claim are covered under the original warranty, at the sole discretion of Blue Alpine LLC, and do not in any way extend the warranty beyond the original warranty.
21. Refurbished vacuum pumps and all other refurbished or used accessories. Note: All refurbished vacuum pumps and other refurbished accessories are covered for manufacturing and shipping defects for a period of two weeks from the ship date.
22. Loud or noisy machines, unless such can be determined to be abnormal by Blue Alpine LLC. Note: Freeze-dryers are inherently loud, with volumes comparable to a washing machine or a loud dishwasher.
23. Blue Alpine LLC reserves the right to communicate with customers exclusivity via written email or text communication, especially if customers are demeaning, rude, or otherwise uncivil.
24. If the customer plugs a vacuum pump or other appliance into the freeze dryer that draws more amps than what is allowed by that circuit, Blue Alpine LLC reserves the right to void the warranty of the freeze dryer. For medium and large freeze dryers that maximum continuous amperage draw on the vacuum pump circuit is 4.5 amps.
25. Any damages, failures, or property damage caused from events relating to a customer resetting or forcibly resetting a breaker to power the freeze dryer after a breaker trip. If the freeze dryer is tripping the breaker, please call customer service.
26. Improperly cleaning of the condenser unit every 6 months. Allowing the condenser unit to develop a mat of debris on the heat exchanger will damage the refrigeration system and will be the responsibility of the customer to pay for any service arising from that lack of maintenance.
27. Replacement of parts, systems, pumps, tray racks, mats or any other item for smell. Smell cannot be adequately quantified to be able to be able to properly identify an actual cause.

15.7 Voiding Warranty and Other Exclusions

Items listed below will void the warranty in its entirety through action or inaction taken by the customer or others using the product.

1. Failure to use the product properly in accordance with any provided instructions and the owner’s manual.
2. Failure to adhere to the conditions of this warranty.

3. Any modifications or use of add-on after-market accessories.
4. Use of parts other than Blue Alpine repair parts or parts obtained from suppliers other than Blue Alpine personnel.
5. Removal, alteration, or destruction of original serial numbers on parts or products insomuch that they cannot be readily determined.
6. Transfer of ownership between end users.
7. Plugging the unit into a 220V outlet or other improper power supply.
8. Plugging the unit into an outlet that has reversed polarity (the outlets' hot and neutral are backwards) may also void the warranty, and will be decided by Blue Alpine LLC on a case-by-case basis.
9. Failure to return warrantied components to Blue Alpine LLC when requested.
10. Failure to change vacuum pump oil every 120 hours of use at a minimum, or failure to use Dairyland, Clover Patch, or Molykote L-1668 vacuum pump oil. Note: This will only void the 1-year vacuum pump warranty.
11. Using the product with any compound or substance that contains solvents, such as, but not limited to, acetone, toluene, alcohols, hexane, and ethyl acetate, will void the warranty on both the pump and the freeze dryer.
12. Using the product with any compound or substance that is generally considered hazardous, explosive, flammable, toxic, corrosive, oxidative, carcinogenic, or otherwise dangerous to health will void the warranty on both the pump and the freeze dryer.
13. Blue Alpine LLC reserves the right to void the warranty if the customer performs or arranges any repairs, modifications, or maintenance on the product without the prior written consent of the manufacturer via email or otherwise. The customer is required to contact the manufacturer before undertaking any such work.

15.8 Service

It is the customers responsibility to establish the warranty period by verifying the original purchase date. Keep a delivery slip, purchase receipt, or some other appropriate payment record. This written warranty gives you specific legal rights. You may have other rights that vary from state to state. Service under this warranty must be obtained by contacting Blue Alpine directly:

If you need service, please don't hesitate to contact us. We are happy to help.

Blue Alpine 80 East Industrial Park Rd, Saint Anthony, ID, 83445, United States

208-607-1722

contact@bluealpinefreezedryers.com

15.9 Shipping

Note: Note: Shipping times are just an estimate. Once the unit leaves our facility, we have very little control over final arrival times. Although delays in shipping are not common, we ask for patience in dealing with the shipping company and any delays that might arise.

Shipping Damage: Blue Alpine LLC will cover repair costs caused by shipping. If the machine is damaged during shipment, the customer is responsible for accepting delivery, regardless of damage, and immediately contacting Blue Alpine LLC to report the damage without opening the shipping packaging. Blue Alpine LLC reserves the right to decide whether to ship the customer replacement parts, such as panels, or to ship the machine back to Blue Alpine LLC's factory for repair. This decision will be determined based on the extent of the damage.

Storage Fees: Any storage fees that may occur because of the unavailability to receive the product by the customer will be the responsibility of the customer to pay. If the customer refuses to pay the storage fee, the machine will be returned to Blue Alpine LLC, and a refund will be issued, minus the storage fee, shipping fees, and a restocking fee. **Note:** Before machines leave our facility, we will call and establish a general time and customer availability for pickup. We will postpone shipping until this can be established.

15.10 Everything Else

1. **Non-Transferability of Warranty:** This warranty is extended only to the original purchaser of the product and is not transferable to subsequent owners. Any transfer of ownership voids the warranty.
2. **Purchase from a retailer:** If you have purchased from a 3rd party retailer, you will need to provide a receipt or proof of purchase to initiate any warranty claim.
3. **Return of Parts or Items:** If a new part or item has been provided to the customer under warranty, Blue Alpine LLC reserves the right to request that old or damaged parts or items be sent back to Blue Alpine LLC for evaluation or repair. If Blue Alpine LLC provides return shipping labels for parts or items and the customer does not ship them back within 30 calendar days, Blue Alpine LLC reserves the right to void the warranty on the freeze dryer.

15.11 Legal Disclosures & Special Circumstances

Blue Alpine offers substantial support for our freeze dryers. Customers can contact our dedicated customer service team for assistance with maintenance, repairs, and technical inquiries. Blue Alpine remains committed to providing general support and assistance to our customers. If you have any questions or require further information, please don't hesitate to contact our customer service team.

Blue Alpine LLC does not assume responsibility for any damaged food or financial losses as a result of or associated with using the Blue Alpine freeze dryers. Blue Alpine will provide maintenance and repair parts covered by the warranty during the warranty period.

Blue Alpine LLC does not assume responsibility for any food safety-related issues caused by the use of the freeze dryer, including but not limited to improper cleaning, improper maintenance, improper food preparation, or machine malfunction leading to food safety issues.

By purchasing a Blue Alpine Freeze dryer, the owner acknowledges that any operator of the freeze dryer has been properly trained on their specific application and the owner takes responsibility for the food safety relative to the freeze dryer, regardless of performance or design of the freeze dryer.

By purchasing from Blue Alpine LLC, the Customer expressly acknowledges and agrees to the terms and conditions outlined within the applicable warranty, as it is stated and without modification. The sections and topics described in the warranty, normal responsibility of the customer, exclusions, warranty breaches, shipping, everything else, and legal disclosures are independent and enforceable independently from all other sections.

By purchasing from Blue Alpine LLC, the Customer expressly acknowledges that there can be sharp edges on the sheet pan trays and on the inside of the machine, and that the freeze dryer has components that can become cold enough or hot enough to cause burns or injuries on unprotected skin, and that there are other inherent dangers associated with our product. The Customer agrees that they are solely responsible for themselves and their employees in regards to properly wearing the appropriate personal protective equipment for their specific use case of the freeze dryer. The Customer agrees not to hold Blue Alpine LLC responsible for any injuries caused by the lack of personal protective equipment, failure to follow warnings and instructions, or other injuries caused by dangers inherent to freeze dryers, whether specified or not.

If Blue Alpine LLC issues a full refund to a Customer for any product or service, such refund shall constitute a full and final resolution of all claims related to that transaction. Upon issuance of the refund, Blue Alpine LLC shall have no further legal, contractual, or warranty obligations to the customer, whether express or implied, including but not limited to any claims of defect, damages, performance, fitness for a particular purpose, or merchantability.

For the Special Circumstance of Customers who have specifically agreed in writing to participating in beta testing of non serial production freeze dryers or other products, Blue Alpine LLC reserves the right, at its sole discretion, to offer customers a full refund with additional reimbursement for some costs arising from the testing. A full refund and reimbursement will only be issued after all items and products have been returned to Blue Alpine LLC and have been evaluated for Customer caused damage, unless otherwise specified in an agreement. Any parts documented to be defective from the factory will not count against a full refund. The Customer agrees that total additional reimbursement shall not exceed two percent of the total cost of the original Customer purchase as documented on the original order or orders. All provisions of the Refund Policy, Warranties, Exceptions, and Legal Disclosures not expressly modified by this Special Circumstance shall remain in full force and effect.

Blue Alpine LLC reserves the right to refuse service or sales to any individual or entity at our sole discretion for instances that include: situations involving the use of profane, abusive, or threatening language directed toward our employees, disruptive or inappropriate behavior, non-compliance with company policies, or any conduct that interferes with the safe and respectful operation of our business. We are committed to maintaining a safe and respectful environment for both our customers and staff.

By purchasing from Blue Alpine LLC, the Customer agrees and understands that any and all transactions, exchanges, or purchases involving Blue Alpine LLC shall be considered to have originated within the jurisdiction and authority of Fremont County, Idaho. In accordance with this stipulation, any and all disputes or proceedings arising in connection with, or as a result of, any purchase, transaction, or contractual engagement with Blue Alpine LLC shall be adjudicated, processed, and resolved exclusively within the legal system governing Fremont County, Idaho. Each party shall bear its own attorneys' fees,

costs, and expenses, including travel expenses, incurred in connection with any legal proceedings or interactions between the parties.

All warranties and policies are defined based on what was publicly available online at the time of purchase, or through subsequent purchases. Some physical documentation delivered with merchandise can be out of date and should not be regarded as the most up to date version of company policies.

15.12 Definitions

- For the purposes of this document, the definition of ”Blue Alpine LLC” is synonymous with ”Blue Alpine”, ”Blue Alpine Freeze Dryers”, ”The Company”, ”Company”, ”we”, ”our”, and ”us”.
- For the purposes of this document, the definition of ”The Customer” is synonymous with ”Customer”, ”customer”, ”operator”, and ”you”.
- The term ”Warranty On Hold” means that there are actions or fees that the customer must attend to first before any further warranty services can be rendered. If a customers warranty is placed on hold the warranty period from the original purchase date will remain the same.

16 Disposal

If you wish to discard this product, please contact your local authorities for the correct method of disposal and for proper treatment, recovery, and recycling. It is important to comply with local regulations and guidelines for the proper handling and disposal of your freeze dryer.

Here are some local authorities and resources you can contact for guidance on disposal:

Municipal or City Government Offices: Contact your local municipal or city government offices, particularly departments responsible for waste management, environmental protection, or sanitation. They can provide information on local regulations regarding electronic waste disposal and may offer guidance on disposal options or designated drop-off locations.

Waste Management Authorities: In many areas, there are specific waste management authorities or agencies tasked with overseeing waste disposal and recycling programs. These authorities can provide guidance on proper disposal methods for electronic equipment and may offer services for electronic waste collection or recycling.

Environmental Protection Agencies: State or regional environmental protection agencies often provide resources and information on electronic waste disposal and recycling initiatives. They may have guidelines or programs in place to promote responsible disposal practices and prevent environmental harm.

Recycling Centers or Facilities: Contact local recycling centers or facilities that accept electronic waste for recycling. They can provide information on accepted items, drop-off locations, and procedures for recycling electronic equipment such as freeze dryers.

Online Resources: Websites or online databases maintained by government agencies or environmental organizations may provide information on electronic waste disposal options and resources available in your area. These resources can help you locate designated drop-off locations, recycling events, or collection programs for electronic equipment.

17 Software Update Change Log

- V2.17.3 and V1.17.3
  - Bread run button added to settings.
  - Upgraded refrigeration error handling on cycle start, this should also help with a bug that added several hundred hours to the cycle when the refrigeration error was overridden.
  - Button added to settings to allow customer to override pressure errors if they want. To but used by candy manufacturers.
  - Changed all popups from click anywhere to click here on popup to prevent false positive screen presses from screen case.
- V2.17.2 and V1.17.2
  - Fixed bug for default temperature and pressure under settings not saving properly.
  - 15% heat ramp control added to Liquids, Quickstart, and Meat to prevent ramping of temperature too quickly.
- V2.17.1 and V1.17.1
  - Both boards can now auto factory reset when new code is uploaded to the machine.
  - Added 4 phase recipes to Delicates, Fruits and Greens.
  - 15% heat ramp control added to Delicates, Fruits, and Greens to prevent ramping of temperature too quickly.
  - On 2B boards, either pressure input works. Allowing for direct connection to pressure sensor or connection through buffer board to the sensor.
- V2.16.9 and V1.16.9
  - Added vacuum error on the manual test, dry cycle, and diagnostics pages. This error checks if the pump has been on for 2 minutes yet the pressure has not moved from ambient indicating an error with the valve being open or not a good enough seal being made. This can also indicate that the pressure sensor has fallen out of calibration.
  - Added Electronics Test to the diagnostics page. This test should be run every time a power or digital board is replaced. This test will test all 4 main hardware components to ensure they are wired correctly and are doing as they should. This test will also tell the user exactly which wires may be swapped physically. Checks for ground faults. Checks sensor accuracy.
  - Added 5 minutes delay whenever the fridge turns off. The compressor will not be able to turn on within 5 minutes of its last activation. The code will add this time to the freeze or dry time. This was done to allow pressure in the compressor to equalize before it turns back on in order to help with overloading.
  - Added ultimate vacuum test to the diagnostics page. Runs 2 hours with fridge to make sure vacuum is working correctly.

  - Added another settings page for the complete vacuum setting. This allows the user to choose if they would like their pump to stay on the entire time on the complete page or if they would like it stay at a certain threshold by turning off and on. If the user has a vacuum pump that does not have a solenoid valve they will need the pump to stay on.
  - Fixed bug with defrost fan. Fan used to always be on even when the settings said it should be off.
  - Corrected a bug that popped up when reducing the set pressure below the recommended set pressure.
  - Corrected an issue with the default temp not being able to be saved below 32°F.
  - Turn off heat when shelf is disconnected. Before, the heat would only turn off after the 3 minutes of disconnect prior to the error page being thrown. In those 3 minutes of disconnect prior to the error page, the heat would lock on. Now, it turns off during those 3 minutes.
  - Changed it so no hardware can turn on within 4 seconds of each other.
  - Vacuum Run time is now counted and tracked. On the settings page, it is shown and every 120 hrs of pump run time, a pop up reminder comes up to remind the user to change the oil.
  - Shelf Temp is now displayed on the defrost page.
  - Enhanced good pressure value checking. Will ensure a good vacuum is being pulled by checking that it goes below 350,000 mtorr in 6 minutes and 100,000 mtorr in 10 minutes.

- V2.16.8 and V1.16.8
  - Added software version to manual test page in the bottom left of the screen.
  - Reverted Complete Page vacuum logic to previous logic. Previously, the vacuum pump would turn off below a threshold and turn on above. Biggest complaint is that it would flicker on and off rapidly. Now, the vacuum pump turns off below a certain pressure then once it goes above the other threshold, it waits for a time then turns it back on.
  - Fixed Leak Rate test to display only what we need and not to check sensor accuracy.
  - Added const bool benchDevelopment so that errors don't pop up. This needs to be set to false when pushed.
  - Added a const bool testingErrorPage so that it could automatically send the error page to the screen to look at it. Added software version number to that page.
- V2.16.7 and V1.16.7
  - Removed the fault print on the Max chip. Error thrown by the max chip are not ignored if the value being read is still accurate. Allowing for fewer critical shelf temp errors.
  - Killed page 20 (diagnostics) because of redundancy. This was added back in 16.9.
  - Added the off gas function to the QC.
  - Adjusted times on QC tests.

18 Service Parts Lists

18.1 Service Parts List - Medium - BA40MFD - REV 2

Replacement parts are available on our website.

Component	Qty	UoM
[A00103-00] P100 Filter 3M 2097	1	Units
[A00104-00] Evaporator Panel Label	1	Units
[A00105-00] Blue Alpine Logo Sticker	1	Units
[A00106-00] Owners Manual	1	Units
[A00107-00] Impulse Sealer	1	Units
[A00108-00] 7 mil Mylar Bags	50	Units
[A00110-00] Torx T20 Screwdrivers	1	Units
[A00111-00] Oxygen Absorbers 300cc	50	Units
[A00112-00] 5mm Hex Key Loop T Handle Allen	1	Units
[A00117-00] Machine Serial Number Label - Medium	1	Units
[A00121-00] Danger Electric Shock Stickers - Small	2	Units
[A00124-00] 1/4 Sheet Silicone Tray	5	Units
[A00128-00] Medium Dust Cover	1	Units
[BA-6DVP-01] 6CFM Pump	1	Units
[E00102-00] Molex Cable	1	Units
[E00105-00] Ground Terminal	4	Units
[E00106-00] PT1000 RTD Thermometer Sensor	1	Units
[E00107-00] 3.5” Touch Screen	1	Units
[E00108-00] Digital PCB Board SAMD51	1	Units
[E00110-00] 6 Pin XH Cable - 50mm length	1	Units
[E00111-00] Power Entry Module	1	Units
[E00112-00] 20A Switch SPST	1	Units
[E00113-00] AC Socket Panel Mount	1	Units
[E00116-00] Thermal Switch 75°C 10A NC	1	Units
[E00117-00] 75x25x5mm heat sink anodized black	1	Units
[E00119-00] 120 x 25mm Cooling Fan + Wire Guard - Medium Unit	1	Units
[E00120-00] 15 amp Power Cable 14 AWG Cord	1	Units
[E00124-00] Deutsch Solid Contacts Stainless Steel - Male	6	Units
[E00125-00] Deutsch 6 Pin Connectors Black - Male	1	Units
[E00126-00] 6.3mm Female Crimp Spade Connector	8	Units
[E00127-00] 4.8mm Female Crimp Spade Connector (170325-1)	3	Units
[E00128-00] Medium 6 Wire Feedthrough Cable Assembly	1	Units
[E00130-00] Rev 2 Power PCB Board	1	Units
[E00131-00] Buffer PCB Board	1	Units
[E00136-00] Deutsch 6 Pin Connector Black - Female	1	Units
[E00153-00] 40 Pin FPC Cable - 300mm length	1	Units
[E00155-00] 9x9x5 mm Heat Sink With Adhesive	4	Units

Table 1 continued from previous page

Component	Qty	UoM
[E90001-00] PVC4001 Vacuum Pressure Sensor Sub-Assembly	1	Units
[F00101-00] T-Handle	1	Units
[F00102-00] Stainless Handle	1	Units
[F00104-00] M4 x 12mm Flat Head T20 Torx Stainless Bolt	4	Units
[F00106-00] M5 x 12mm Flat Head T20 Torx Stainless Bolt	4	Units
[F00107-00] M5-3 Self Clinching Nut	8	Units
[F00109-00] M2.5 Standoff 15mm M to F Nylon	4	Units
[F00110-00] M2.5 x 6mm Pan Head Philips Stainless Screw	18	Units
[F00112-00] Rivet - 2.4mm (3/32”)	48	Units
[F00113-00] M4 x 6mm Flat Head T20 Stainless Bolt	6	Units
[F00114-00] M3 x 5mm Flat Head T15 Torx Stainless Bolt	2	Units
[F00115-00] M3-1 Clinch Nut Stainless	2	Units
[F00116-00] M4 Spacer - 19mm Long Nylon	4	Units
[F00118-00] M4-3 Self Clinching Nut Stainless	44	Units
[F00119-00] M4-2 Self Clinching Nut Stainless	8	Units
[F00120-00] M4 x 50mm Pan Head Philips Stainless Bolt	4	Units
[F00121-00] M5 x 20mm Flat Head T20 Torx Stainless Bolt	4	Units
[F00123-00] M5 x15 Washer Stainless	4	Units
[F00124-00] Rivet - 4.8mm (3/16”) Grip Range 0.125” to 0.25”	32	Units
[F00125-00] #8 x 5/8” Stainless Self Tapping Screws	20	Units
[F00126-00] M5 x 10mm Countersunk T25 Torx Stainless Bolt	3	Units
[F00128-00] M4 x 10mm Flange Head T20 Torx Steel Bolt	38	Units
[F00129-00] 8mm Thrust Bearing & 2 Washers	4	Units
[F00132-00] M8 x 45mm Flange Socket Head Stainless Bolt	2	Units
[F00134-00] M2.5 Stainless Nut	4	Units
[F00136-00] M2.5 Standoff 15mm F to F Brass	4	Units
[F00139-00] M2.5 x OD4.2 x L5.0 Brass Hot Melt Inset Nut	2	Units
[H00101-00] Vacuum Hose 13mm ID x 21.3mm OD Black No Wire	2,500	mm
[H00104-00] 14mm Barb to 3/8” NPTF Male Elbow	1	Units
[H00107-00] 1/2” Female to 1/2” Male NPTF Elbow	1	Units
[H00108-00] Chamber Filter Fitting	1	Units
[H00109-00] 14mm Barb to 1/2” NPTF Male Straight Fitting	1	Units
[H00110-00] Compression Nut	1	Units
[H00111-00] Drain Valve	1	Units
[H00112-00] 14mm barb to 3/8 NPTF Male Fitting	2	Units
[H00115-00] 20.5mm Spring Clamp	2	Units
[H00117-00] 1/2 ZG (BSPT) Compression Pump Fitting - 21.3mm Hose	1	Units
[P00101-01] Door Medium Unit Polycarbonate 20mm	1	Units
[P00108-00] Plastic Corners	8	Units
[P00111-00] 1 Inch Black Silicone Gasket For p100 Filter	1	Units
[P00112-00] SB-8 Plastic Grommet	7	Units
[P00113-00] SB-11 Plastic Grommet	1	Units

Table 1 continued from previous page

Component	Qty	UoM
[P00114-00] SB-19 Plastic Grommet	1	Units
[P00116-00] SB-30 Plastic Grommet	2	Units
[P00119-00] Silicone Rubber Door Seal Medium 382mm OD	1	Units
[P00122-00] Leak Lock	10	mL
[P00134-00] Wire Management Clip	7	Units
[P00135-00] 3.5” Screen Bezel Mount Part 1	1	Units
[P00136-00] 3.5” Screen Bezel Mount Part 2	1	Units
[P00137-00] 3.5” Screen Bezel Mount Part 3	1	Units
[R00101-00] Compressor/Condenser - NUG90LR - Medium	1	Units
[R00106-00] .036 Capillary Tubing	1,677	mm
[R00108-00] 1” LLPT Foam Tape	1,125	mm
[R00113-00] Copper Tubing 50ft Roll	1	Roll 50ft
[S00107-00] 5 Tray Rack Side Bar Medium	2	Units
[S00108-02] 5 Tray Rack Back Medium	1	Units
[S00109-00] Tray Rack Wire Guard Medium	1	Units
[S00110-00] 1/4 Sheet Stainless Pans	5	Units
[S00111-00] Extruded Chamfer Frame V2 Medium	4	Units
[S00112-00] Extruded Corner Profile Long Medium	4	Units
[S00113-00] Extruded Corner Profile Short Medium	4	Units
[S00114-00] Side Panel 1 Right Medium	1	Units
[S00115-00] Side Panel 2 Left Medium	1	Units
[S00116-00] Back Panel Medium	1	Units
[S00117-00] Top Panel Medium	1	Units
[S00119-00] Medium Rear Mounting Brackets	2	Units
[S00120-00] Medium Mounting Tabs - Front Top of the Chamber	1	Units
[S00121-00-BLACK] Front Panel Black Medium 3.5” Screen	1	Units
[S00121-00-BLUE] Front Panel Blue Medium 3.5” Screen	1	Units
[S00122-00] Medium Mounting Tabs - Front Sides of the Chamber	2	Units
[S00124-00] Electronics Tray Medium	1	Units
[S00128-00] M8 Door Bottom Bracket	1	Units
[S00129-00] M8 Door Top Bracket	1	Units
[S00130-00] M8 Tab - 5mm Black	2	Units
[S90020-00] Medium 80W Sensor Vulcanized Heating Tray Sub-Assembly	1	Units
[S90021-00] Medium 80W Vulcanized Heating Tray Sub-Assembly	3	Units
[S90022-00] Medium 110W Vulcanized Heating Tray Sub-Assembly	1	Units
[S90023-00] Medium 160W Vulcanized Heating Tray Sub-Assembly	1	Units

18.2 Service Parts List - Large - BA70LFD - REV 2

Replacement parts are available on our website.

Component	Qty	UoM
[A00103-00] P100 Filter 3M 2097	1	Units
[A00104-00] Evaporator Panel Label	1	Units
[A00105-00] Blue Alpine Logo Sticker	1	Units
[A00106-00] Owners Manual	1	Units
[A00107-00] Impulse Sealer	1	Units
[A00108-00] 7 mil Mylar Bags	50	Units
[A00110-00] Torx T20 Screwdrivers	1	Units
[A00111-00] Oxygen Absorbers 300cc	50	Units
[A00112-00] 5mm Hex Key Loop T Handle Allen	1	Units
[A00113-00] Compressor Compartment Label 1	1	Units
[A00114-00] Compressor Compartment Label 2	1	Units
[A00115-00] Exterior Fire Label	1	Units
[A00116-00] Compressor Compartment Label 3	1	Units
[A00118-00] Machine Serial Number Label - Large	1	Units
[A00121-00] Danger Electric Shock Stickers - Small	2	Units
[A00126-00] 1/2 Sheet Silicone Tray	5	Units
[A00127-00] Large Dust Cover	1	Units
[BA-8DVP-01] 8CFM Pump	1	Units
[E90001-00] PVC4001 Vacuum Pressure Sensor Sub-Assembly	1	Units
[E00102-00] Molex Cable	1	Units
[E00105-00] Ground Terminal	4	Units
[E00106-00] PT1000 RTD Thermometer Sensor	1	Units
[E00107-00] 3.5” Touch Screen	1	Units
[E00108-00] Digital PCB Board SAMD51	1	Units
[E00110-00] 6 Pin XH Cable - 50mm length	1	Units
[E00111-00] Power Entry Module	1	Units
[E00112-00] 20A Switch SPST	1	Units
[E00113-00] AC Socket Panel Mount	1	Units
[E00116-00] Thermal Switch 75°C 10A NC	1	Units
[E00117-00] 75x25x5mm heat sink anodized black	1	Units
[E00124-00] Deutsch Solid Contacts Stainless Steel - Male	6	Units
[E00125-00] Deutsch 6 Pin Connectors Black - Male	1	Units
[E00130-00] Rev 2 Power PCB Board	1	Units
[E00131-00] Buffer PCB Board	1	Units
[E00136-00] Deutsch 6 Pin Connector Black - Female	1	Units
[E00141-00] 120 x 38mm Cooling Fan + Wire Guard - Large Unit	1	Units
[E00146-00] Large 6 Wire Feedthrough Cable Assembly	1	Units
[E00147-00] 20 amp Power Cable 12 AWG Cord	1	Units
[E00153-00] 40 Pin FPC Cable - 300mm length	1	Units
[E00155-00] 9x9x5 mm Heat Sink With Adhesive	4	Units

Table 2 continued from previous page

Component	Qty	UoM
[F00101-00] T-Handle	1	Units
[F00102-00] Stainless Handle	1	Units
[F00104-00] M4 x 12mm Flat Head T20 Torx Stainless Bolt	4	Units
[F00106-00] M5 x 12mm Flat Head T20 Torx Stainless Bolt	4	Units
[F00107-00] M5-3 Self Clinching Nut	8	Units
[F00109-00] M2.5 Standoff 15mm M to F Nylon	4	Units
[F00110-00] M2.5 x 6mm Pan Head Philips Stainless Screw	18	Units
[F00112-00] Rivet - 2.4mm (3/32”)	48	Units
[F00113-00] M4 x 6mm Flat Head T20 Stainless Bolt	6	Units
[F00114-00] M3 x 5mm Flat Head T15 Torx Stainless Bolt	2	Units
[F00115-00] M3-1 Clinch Nut Stainless	2	Units
[F00116-00] M4 Spacer - 19mm Long Nylon	4	Units
[F00118-00] M4-3 Self Clinching Nut Stainless	52	Units
[F00119-00] M4-2 Self Clinching Nut Stainless	8	Units
[F00121-00] M5 x 20mm Flat Head T20 Torx Stainless Bolt	4	Units
[F00122-00] M5 x 0.8 Hex Nut Stainless	4	Units
[F00123-00] M5 x15 Washer Stainless	4	Units
[F00124-00] Rivet - 4.8mm (3/16”) Grip Range 0.125” to 0.25”	32	Units
[F00125-00] #8 x 5/8” Stainless Self Tapping Screws	20	Units
[F00126-00] M5 x 10mm Countersunk T25 Torx Stainless Bolt	3	Units
[F00128-00] M4 x 10mm Flange Head T20 Torx Steel Bolt	46	Units
[F00129-00] 8mm Thrust Bearing & 2 Washers	4	Units
[F00131-00] M4 x 65mm Pan Head Phillips Stainless Bolt	4	Units
[F00132-00] M8 x 45mm Flange Socket Head Stainless Bolt	2	Units
[F00134-00] M2.5 Stainless Nut	4	Units
[F00136-00] M2.5 Standoff 15mm F to F Brass	4	Units
[F00139-00] M2.5 x OD4.2 x L5.0 Brass Hot Melt Inset Nut	2	Units
[H00101-00] Vacuum Hose 13mm ID x 21.3mm OD Black No Wire	2,500	mm
[H00105-00] 1/2” NPTF Female Coupler 50mm Length	3	Units
[H00108-00] Chamber Filter Fitting	1	Units
[H00109-00] 14mm Barb to 1/2” NPTF Male Straight Fitting	1	Units
[H00110-00] Compression Nut	1	Units
[H00111-00] Drain Valve	1	Units
[H00112-00] 14mm barb to 3/8 NPTF Male Fitting	3	Units
[H00114-00] 3/8” NPTF to 3/4-16” Adapter Fitting	1	Units
[H00115-00] 20.5mm Spring Clamp	2	Units
[H00117-00] 1/2 ZG (BSPT) Compression Pump Fitting - 21.3mm Hose	1	Units
[P00108-00] Plastic Corners	8	Units
[P00111-00] 1 Inch Black Silicone Gasket For p100 Filter	1	Units
[P00112-00] SB-8 Plastic Grommet	7	Units
[P00113-00] SB-11 Plastic Grommet	1	Units
[P00116-00] SB-30 Plastic Grommet	1	Units

Table 2 continued from previous page

Component	Qty	UoM
[P00117-00] ABS Handle Panel Mount	4	Units
[P00122-00] Leak Lock	1	mL
[P00128-00] Door Large Unit Polycarbonate 20mm	1	Units
[P00130-00] Silicone Rubber Door Seal Large 421mm OD	1	Units
[P00132-00] 6in x 40lb Zip Tie	4	Units
[P00135-00] 3.5” Screen Bezel Mount Part 1	1	Units
[P00136-00] 3.5” Screen Bezel Mount Part 2	1	Units
[P00137-00] 3.5” Screen Bezel Mount Part 3	1	Units
[P00139-00] SB-50 Plastic Grommet	1	Units
[R00107-00] Compressor/Condenser - NPT16LR - Large	1	Units
[R00112-00] Copper Tubing 77ft Roll (23.5m)	1	Roll 77ft
[R00114-00] .042 Capillary Tubing	1,956	mm
[S00126-00] 1/2 Sheet Stainless Pans	5	Units
[S00128-00] M8 Door Bottom Bracket	1	Units
[S00129-00] M8 Door Top Bracket	1	Units
[S00130-00] M8 Tab - 5mm Black	2	Units
[S00131-00] Large Rear Mounting Brackets	2	Units
[S00132-00] Large Mounting Tabs - Front Top of the Chamber	1	Units
[S00133-00] Large Mounting Tabs - Front Sides of the Chamber	2	Units
[S00134-00] Electronics Tray Large	1	Units
[S00135-00] Custom Stainless Pot Chamber Large	1	Units
[S00137-01] 5 Tray Rack Back Large	1	Units
[S00138-00] 5 Tray Rack Side Bar Large	2	Units
[S00139-00] Tray Rack Wire Guard Large	1	Units
[S00140-01] Extruded Chamfer Frame Large	4	Units
[S00141-00] Extruded Corner Profile Long Large	4	Units
[S00142-00] Extruded Corner Profile Short Large	4	Units
[S00143-00-BLACK] Front Panel Black Large 3.5” Screen	1	Units
[S00143-00-BLUE] Front Panel Blue Large 3.5” Screen	1	Units
[S00145-01] Side Panel 1 Right Large	1	Units
[S00146-00] Side Panel 2 Left Large	1	Units
[S00147-00] Back Panel Large	1	Units
[S00148-00] Top Panel Large	1	Units
[S90016-00] Large 95W Vulcanized Heating Tray Sub-Assembly	3	Units
[S90017-00] Large 95W Sensor Vulcanized Heating Tray Sub-Assembly	1	Units
[S90018-00] Large 135W Vulcanized Heating Tray Sub-Assembly	1	Units
[S90019-00] Large 195W Vulcanized Heating Tray Sub-Assembly	1	Units

19 Customer Support

Please contact us if you have any questions or concerns.

Sales Email: contact@bluealpinefreezedryers.com

Support Email: support@bluealpinefreezedryers.com

Phone: 208-607-1722

Address: 80 East Industrial Park Rd Saint Anthony, ID, 83445

Support Hours

Mon-Fri, 8:30am-5:00pm MST

*Please have your order invoice and order ID ready before contacting Customer Support.