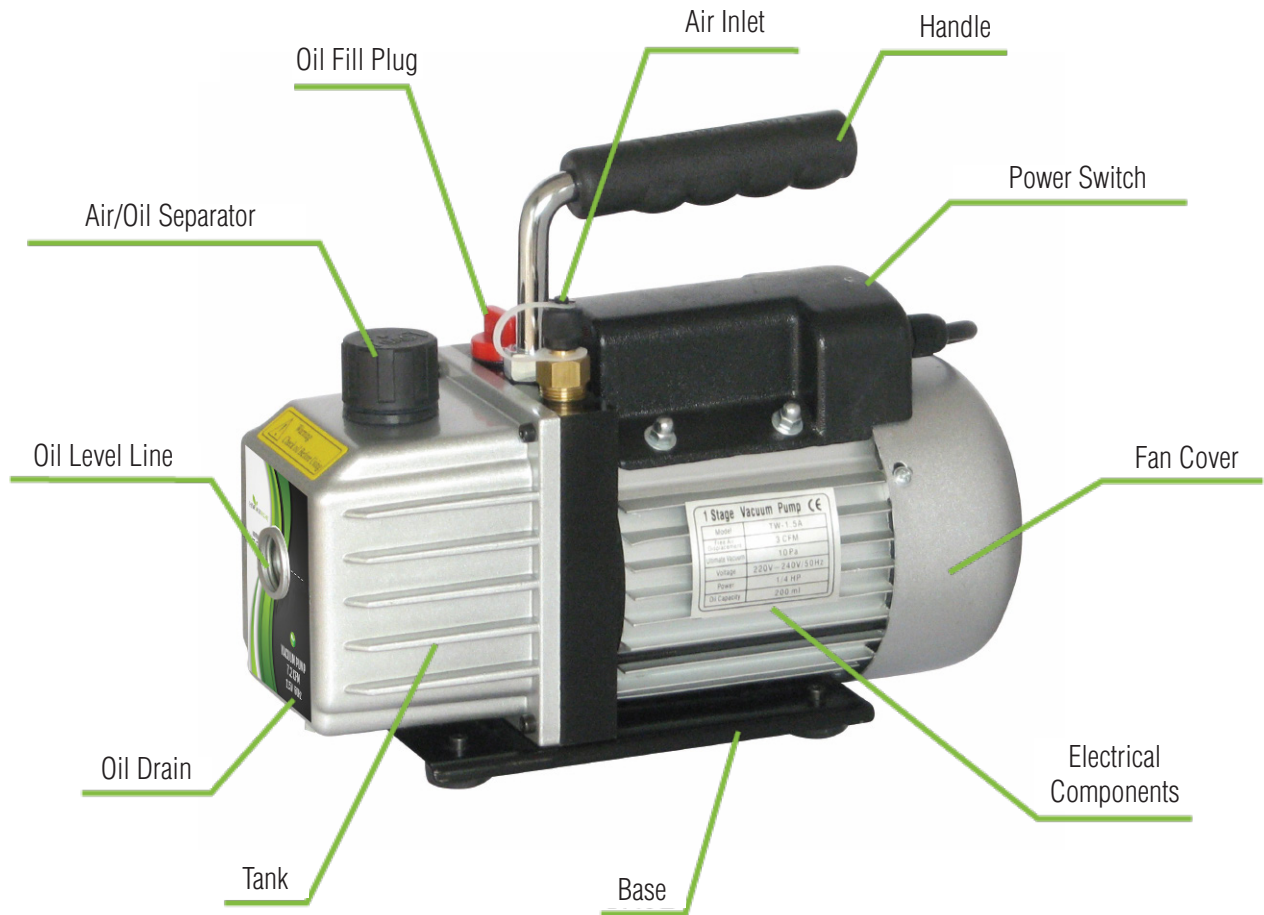


HARVEST RIGHT 7.2 CFM VACUUM PUMP | 2-STAGE DIRECT DRIVE VACUUM PUMP



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OPERATING MANUAL

WARNING: UNIT DRAINED OF OIL FOR SHIPMENT. DO NOT OPERATE WITHOUT ADDING OIL.

INTRODUCTION

Each vacuum pump has been factory tested to guarantee 25 microns (25,400 Microns = 1 Inch of Hg) or better, and listed CFM performance. The serial number has been recorded.

NOTE: Vacuum pumps are not to be used on Ammonia or Lithium Bromide (salt water) systems. Pump maintenance is the responsibility of the owner.

MOTOR SPECIFICATIONS

Pump and oil must be above 30°F. Line voltage must be equal to motor nameplate $\pm 10\%$. Normal operating temperature is approximately 160°F, which is hot to the touch. Line voltage and ambient conditions can slightly affect this. Motor has automatic resetting thermal overload protection.

The pump is designed for continuous duty and will run for extended periods without overheating.

Model	HR-7-115
CFM	7.2 CFM
Motor	3/4 HP, 1725 RPM
Voltage	Standard 115V, 60 Hz
Plug	US 110V
Intake Port	3/4" JIC flare
Oil Capacity	21 oz (680 cc)
Dimensions	17-5/8"h x 9-1/8"w x 14"l
Weight	35 lbs



PUMP MAINTENANCE

In order to make the best use of your investment, familiarize yourself with the features and operating instructions before starting pump. With routine care and following proper maintenance guidelines, your pump will give you years of reliable service. Pumps are designed for deep vacuum work in air conditioning and refrigeration systems.

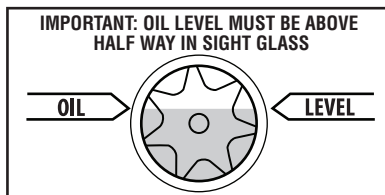
For longer pump life, vacuum pumps are recommended for use in conjunction with Harvest Right oil filters.

Adding Oil

Pump oil acts simultaneously as a coolant, lubricant and sealant.

1. Slowly add oil until oil level rises to the top of the oil level line.
2. Replace oil fill plug.

If oil is too low, you will hear air out of the exhaust. If the oil level is too high, excess oil will be blown out of the exhaust.



IMPORTANT: Use oil specifically refined for deep vacuum pumps. Using oil not refined for deep vacuum pumps and/or operating with contaminated oil will void warranty.

Pump oil should be changed after **every** batch with either filtered or new oil. Failure to do so will void the vacuum pump warranty. If system is heavily contaminated, oil may have to be changed several times during evacuation. After initial fill up, it is best to check oil level with pump running.

After evacuation, oil contains rust forming water and corrosive acids. Drain immediately while pump is warm.

Changing Oil

To reach deep vacuum, pumps need clean, moisture-free oil throughout evacuation. Care should be taken to avoid contact on skin and clothing when changing oil. Used oil should be removed while the pump is warm and the oil is thin. It should then be filtered for future use or disposed of.

1. Unscrew black plug counterclockwise in drain base to open.
2. Drain pump.
3. Close drain on pump. Remove oil fill cap and fill to top of oil level line with pump oil.
4. Replace oil fill cap.

Oil Filtration

Using an oil filter is a great way to save money, preserve the life of your vacuum pump, allow your freeze dryer to perform as efficient as possible, and be more eco friendly. Filtering the oil is quick and easy, and will aid the performance of your freeze dryer. Changing the oil between each batch is required for warranty purposes. When filtering used oil, you may want to use cardboard (or something similar) to absorb any oil that could potentially drip on the floor.

1. At the end of each batch (preferably when the oil is still warm) place the oil filter below the oil reservoir drain valve.
2. Open the oil reservoir drain valve and allow oil to drain into your oil filter. Assure all of the oil comes out by lifting the rear of the vacuum pump slightly.
3. Wait for the oil to filter through your filtration system (this may take a couple of hours).
4. Pour the filtered oil back into the vacuum pump.
5. Top off oil assuring the correct amount of oil is in your vacuum pump (the small circle in the sight glass is covered).
6. Start your freeze dryer.

*Occasionally you may choose to pour oil through the filter multiple times in order to better clean the oil.

How do I know that my filtered oil is clean for use?

The best indications for cleanliness are as follows:

- Oil is void of debris or particulates
- Oil is not milky or chalky
- Oil has clarity (the color may be yellow or amber and still have clarity)
- Your vacuum pump is achieving a pressure (mTorr) suitable for freeze drying

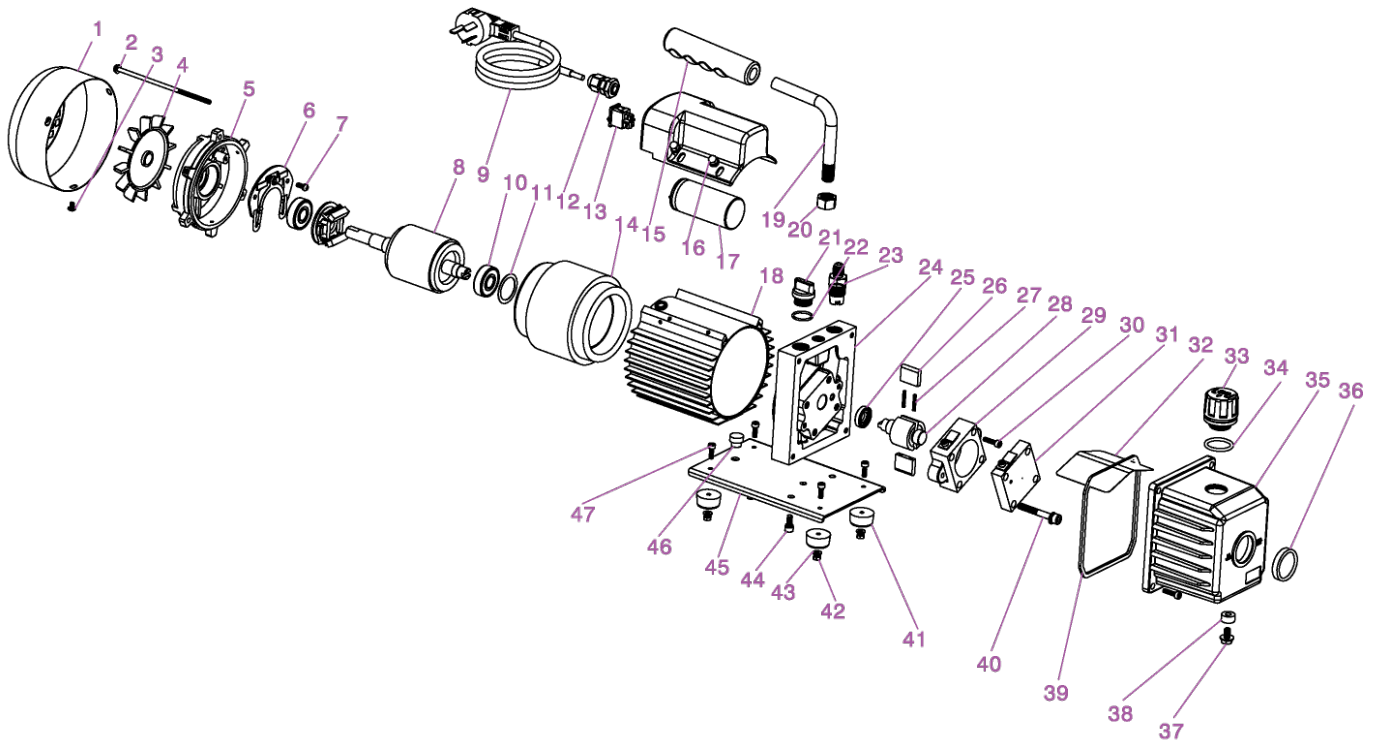
How do I know when I need to replace my oil filter?

- Oil won't drain through filter (this can happen over time as debris builds up)
- Oil isn't cleaning well (e.g., the oil continues to be milky or full of debris)

What do I do to replace my oil filter?

- Replace the batting, the filter jar, or purchase a replacement filter from Harvest Right, Part No. HR-OILFILTER.

REPLACEMENT PARTS



HARVEST RIGHT 7 CFM REPAIR PARTS

Ref. No.	Description
1	Fan Cover
2	Long Screw
3	Screw
4	Fan
5	Motor Cover
6	Centrifugal Switch
7	Screw
8	Rotor
9	Power Cable
10	Bearing
11	Waveform Gasket
12	Insulating Bushing
13	Switch
14	Stator
15	Handle Cover
16	Screw
17	Capacitor
18	Motor Cover
19	Handle
20	Nut
21	Oil Filling Port
22	O-ring
23	Inlet Fitting

HARVEST RIGHT 7 CFM REPAIR PARTS

Ref. No.	Description
24	Bracket
25	Oil Seal
26	Rotary-vane
27	Spring
28	Pump Rotor
29	Pump Body
30	Screw
31	Back Pump Cover
32	Cap Board
33	Oil/Air Separator
34	O-ring
35	Oil Tank
36	Oil Level
37	Oil Seal Cap
38	Seal Gasket
39	O-ring
40	Bolt
41	Rubber Feet
42	Nut
43	Flat Gasket
44	Screw
45	Baseboard
46	Bearing Pad
47	Screw

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Pump won't start	<ol style="list-style-type: none"> 1. Power cord not plugged in securely 2. Motor switch not on 3. Pump temperature below 30°F 4. Inconsistent line voltage 	<ol style="list-style-type: none"> 1. Plug power cord in securely 2. Turn motor switch to ON position 3. Warm up pump to 30°F and turn motor switch on 4. Line voltage must be within 10% of 115V
Pump won't pull deep vacuum	<ol style="list-style-type: none"> 1. Contaminated oil 2. Oil level too low 3. Air leak in system being evacuated 4. Pump inlet fittings missing or not tightened 5. Coupler slipping 	<ol style="list-style-type: none"> 1. Change oil 2. Add oil 3. Locate and repair leak(s) 4. Clean or replace o-ring 5. Tighten coupler setscrews to flats of cartridge and motor
Oil drips from point where shaft enters the pump housing	Damaged shaft seal	Replace shaft seal
Pump shuts down and will not start	Thermal overload may be open	<ol style="list-style-type: none"> 1. Disconnect pump from system 2. Wait approximately 15 minutes for motor to cool 3. Turn pump on 4. If it cycles off again, return pump to factory for repair
Pump cycles on and off from a completely cold start and then runs smoothly	<ol style="list-style-type: none"> 1. Oil backed up into cartridge and was being cleared out 2. Pump has not been shut down properly 	<ol style="list-style-type: none"> 1. Remove vacuum hose 2. Turn pump on 3. Replace vacuum hose

PUMP MAINTENANCE SCHEDULE

FREQUENCY	MAINTENANCE	INSTRUCTIONS
At the End or Beginning of Every Batch	Drain Oil into Oil Filter	https://youtu.be/zivKzXNEjmQ
At the End or Beginning of Every Batch	Add new or filtered oil	
Every 20 Batches or as needed	Remove Pump Cover Assembly	https://youtu.be/M_um0M27w0g

In order to maintain the performance and long life of your vacuum pump, follow the instructions found above. This is required in order to process warranty claims. Most importantly, when this maintenance schedule is followed, your freeze dryer will work more efficiently and perform better. For questions about how to perform any of this maintenance, please visit the links found in the table above or call Harvest Right Customer Support at 800.865.5584.

RETURN FOR REPAIR

In the event your pump requires repair, please contact Harvest Right Customer Service Department to obtain a Return Goods Authorization (RGA) number. Ensure that all returned products are packed to avoid any damage in shipment. Paperwork should be placed in a separate plastic bag and should include Harvest Right's assigned RGA number, a description of the problem and any customer assigned repair or purchase order number, if applicable.

NOTE: Remove oil in pump before packaging shipment.

Contact Customer Service for RGA number:

800.865.5584 Toll

Harvest Right

RGA# _____

95 North Foxboro Drive

Suite 100

Noth Salt Lake, Utah 84054

WARRANTY

Harvest Right 7 CFM vacuum pumps are warrantied against defects in materials and workmanship for one year—not filtering and changing oil will void warranty. Products are guaranteed when used in accordance with our guidelines and recommendations. Warranty is limited to the repair, replacement, or credit at invoice price, (our option) of products which in our opinion are defective due to workmanship and/or materials. In no case will we allow charges for labor, expense or consequential damage. Repairs performed on items out of warranty will be invoiced on a nominal basis; contact Harvest Right for details.

