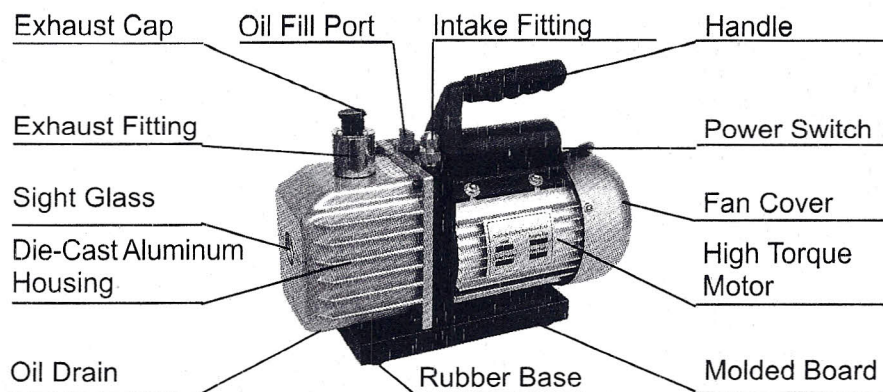


VACUUM PUMP

I. Pump components



II. Operating manual

(1) Before using your vacuum pump

In all cases, motors are designed for operating voltages plus or minus 10% of the normal rating. Single voltage motors are supplied fully connected and ready to operate.

1. Check to be sure the voltage and frequency at the outlet match the specifications on the pump motor decal. Check the ON-OFF switch to be sure it is in the OFF position before you plug the pump into an outlet. Check to be sure the gas ballast valve is closed. Remove and discard the exhaust plug from the end of the pump's handle.

2. The pump is shipped without oil in the reservoir. Before starting the pump, fill it with oil. Remove the OIL FILL cap and add oil until oil just shows in the bottom of the sight glass. The approximate oil capacity of the pump is 220~250ml.

3. Replace the OIL FILL cap and remove the cap from one of the inlet ports. Turn the motor switch to ON. When the pump runs smoothly, replace the cap on the inlet port. This may take from two to 30 seconds depending on the ambient temperature. After the pump runs for approximately one minute, check the sight glass for proper oil level. The oil level should be even with the sight glass OIL LEVEL line. Add oil if necessary.

Note: When the pump is running, the oil level should be even with the line on the

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sight glass. Underfilling will result in poor vacuum performance. Over filling can result in oil blowing from the exhaust.

(2) To use the gas ballast feature:

Moisture from the A/C-R system that is carried into the pump as a vapor tends to condense into a liquid and combine with the vacuum pump oil. When moisture contaminates the pump oil, it reduces the pump's ability to reach its ultimate deep vacuum level.

The gas ballast valve purges a small amount of atmospheric air through the exhaust chamber. This extra volume of air mixes with the vapor from the refrigerant system to prevent condensation and to help exhaust moisture in the form of vapor from the pump.

To use the gas ballast, start the pump and open the gas ballast valve until the system has reached approximately 1000-3000 microns. Close the valve to allow the pump to pull down to its ultimate vacuum level. The gas ballast valve is located beside the handle, opposite the inlet fitting.

The gas ballast valve may be opened or closed at any time during pump operation. It is fully open at two turns counterclockwise.

(3) To shut down your pump after use

To help prolong pump life and promote easy starting, follow these procedures for shutdown.

1. Choose the manifold valve between the pump and the system.
2. Remove the hose from the pump inlet.
3. Cap the inlet port to prevent any contamination or loose particles from entering the port.

III. To maintain your high vacuum pump

1. Vacuum Pump oil:

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The condition and type of oil used in any high vacuum pump are extremely important in determining the ultimate attainable vacuum. We recommend the use of High Vacuum Pump Oil. This oil has been specifically blended to maintain maximum viscosity at normal running temperatures and to improve cold weather starts.

2. Oil Change Procedure

(1) Be sure the pump is warmed up.

(2) Remove the OIL DRAIN cap. Drain contaminated oil into a suitable container and dispose of properly. Oil can be forced from the pump by opening the inlet and partially blocking the exhaust with a cloth while the pump is running. Do not operate the pump for more than 20 seconds using this method.

(3) When the flow of oil has stopped, tilt the pump forward to drain residual oil.

(4) Replace the OIL DRAIN cap. Remove the OIL FILL cap and fill the reservoir with new vacuum pump oil until the oil just shows at the bottom of the sight glass. The approximate oil capacity of the pump is 220~250ml.

(5) Be sure the inlet ports are capped, then turn on the pump. Allow it to run for one minute, then check the oil level. If the oil is below the sight glass OIL LEVEL line, add oil slowly (with the pump running) until the oil reaches the OIL LEVEL line. Replace the OIL FILL cap, making sure the inlet is capped and the drain cap is tight.

(6) a) If the oil is badly contaminated with sludge that forms when water is allowed to collect in the oil, you may need to remove the oil reservoir cover and wipe it out.

b) Another method of dealing with heavily contaminated oil is to force the oil from the pump reservoir. To do this, allow the pump to run until it is warmed up. While the pump is still running, remove the oil drain cap. Slightly restrict the exhaust. This will back-pressure the oil reservoir and force the oil from it, carrying more contaminants. When the oil ceases to flow, turn off the pump.

Repeat this procedure as required until the contamination is removed.

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Replace the OIL DRAIN cap and refill the reservoir to the proper level with fresh pump oil.

IV. Troubleshooting Guide

Your pump has been designed for dependable use and long life. If something should go wrong, however, the following guide will help you get pump back into service as quickly as possible.

If disassembly of the pump is required, please check your warranty. The warranty may be voided by misuse or customer tampering which results in the pump being inoperable.

1. Failure To Start

Check the line voltage. The pumps are designed to start at $\pm 10\%$ line voltage (loaded) at 32°F. At extremes, however, switching between the start and run windings may occur.

2. Oil Leakage

① Be sure the oil is not a residual accumulation from spillage, etc.

② If leakage exists, the module cover gasket or the shaft seal may need replacing.

If leakage exists in the area of the oil drain plug, you may need to reseal the plug using a commercial pipe thread sealer.

3. Failure To Pull A Good Vacuum

① Be sure the vacuum gauge and all connections are in good condition and leak-free. You can confirm leakage by monitoring the vacuum with a thermistor gauge while applying vacuum pump oil at connections or suspected leak points. The vacuum will improve briefly while the oil is sealing the leak.

② Be sure the pump oil is clean. A badly contaminated pump may require several oil flushes.

③ Check to be sure the gas ballast knob is tightly closed.

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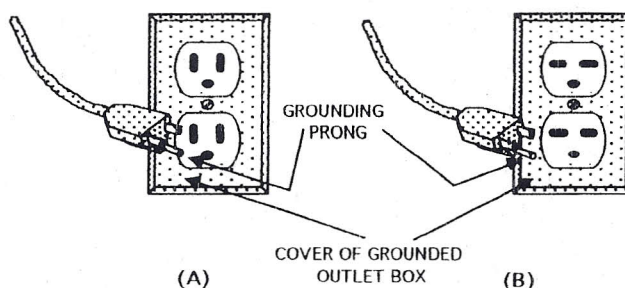
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SAFETY INSTRUCTIONS

I. GROUNDING INSTRUCTIONS

This tool should be grounded while in use to protect the operator from electric shock. The tool is equipped with an approved three-conductor cord and three-prong grounding type plug to fit the proper grounding type receptacle. The green (or green and yellow) conductor in the cord is the grounding wire. Never connect the green (or green and yellow) wire to a live terminal. If your unit is for use on less than 150 volts, it has a plug that looks like that shown in sketch (A) in Figure 1. If it is for use on 150 to 250 volts, it has a plug that looks like that shown in sketch (B). Use of an extension cords or a 2 prong adapter is not recommended.

FIGURE 1
GROUNDING METHODS



II. TOOL SAFETY INSTRUCTIONS

- 1. Keep Work Area Clean**
Cluttered areas and benches invite accidents.
- 2. Avoid Dangerous Equipment**
Don't expose power tools to rain. Don't use power tools in damp or wet locations. Keep work area well lit.
- 3. Keep Children Away**
All visitors should be kept safe distance from work area and appliance.
- 4. Store Idle Tools**
When not in use, tools should be stored in dry, high, and locked location out of the reach of children.
- 5. Don't Force Tool**
It will do the job better and be safe at the rate for which it was designed.
- 6. Use Right Tool**
Don't force small tool or attachment to do the job of a heavy-duty tool.
- 7. Wear Proper Apparel**
Do not wear loose clothing or jewelry which may get caught in moving parts. Tie back long hair or use a proper hair net.
- 8. Use Safety Glasses**
Use safety glasses with all rotating tools. Also use a face or dust mask if cutting operation is dusty.
- 9. Don't Abuse Cord**
Never carry tool by cord or yank it to disconnect from receptacle. Keep cord from heat, oil, and sharp edges.
- 10. Secure Work**
Use clamps or a vise to hold work. It's safer than using your hand and it frees both hands to operate tool.
- 11. Don't Overreach**
Keep proper footing and balance at all times.
- 12. Maintain Tools with Care**
Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.
- 13. Disconnect Tools**
When not in use; before servicing; when changing accessories such as blades, bits, cutters, etc.
- 14. Avoid Accidental Starting**
Be sure switch is OFF when plugging in.



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WARRANTY POLICY

Arbe Machine Mfg., Inc. warrants all products furnished by it are free from defects in material and workmanship at the time of shipment for a period of eighteen (18) months from the date of shipment, or one (1) year from the date of installation, whichever occurs first. Claims must be made during that period and are limited to the replacement of parts claimed to be defective.

This warranty shall not extend to products that have been misused, neglected, altered or repaired without factory authorization during the warranty period. Operating conditions beyond our control such as improper voltage, excessive ambient temperatures, or other conditions that would affect the performance or life of the product will also cause the warranty to become void.

Permission to return parts for warranty repair must be obtained, and all returns must be prepaid factory. If, after examination, the product or part is found to be defective, it will be repaired or replaced on a no-charge basis and returned. On the other hand, if it is determined that the warranty has not been breached by Arbe Machine Mfg., Inc., then the usual charges for repair or replacement will be made. Parts or products that are obsolete or those made to special order are not returnable.

This limited warranty applies only to the above and is for the period set forth. Arbe Machine Mfg., Inc.'s maximum liability shall not, in any case, exceed the contract price for the product, part, or component claimed to be defective; and Arbe Machine Mfg., Inc. assumes no liability at all for any special, indirect, or consequential damages arising from defective equipment.

**THERE ARE NO WARRANTIES IMPLIED OR EXPRESSED THAT
EXTEND BEYOND THOSE CONTAINED IN THIS LIMITED WARRANTY.**

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