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Warnings and Safety Information

This machine is for use by trained and certified professionals only.

Always wear gloves and eye protection when using this machine or handling refrigerants.

Read all Material Safety Data Sheets (MSDS) for any compounds that you are likely to encounter. Failure to do so could lead to injury or death. This equipment is not to be used with any combustible or flammable materials, doing so could lead to injury or death.

To reduce the risk of fire, extension cords must be at least 12AWG and not longer than 15 ft. This equipment should be used in areas with mechanical ventilation providing at least four air changes per hour, or be located at least 18" above the floor. Do not use this equipment near any spilled or open containers of gasoline or other flammable liquid.

Remove all refrigerant from the system before connecting the vacuum pump. Attempting to evacuate the system while it is under high pressure may cause damage to the vacuum pump.

To reduce the risk of equipment damage or fire, do not leave the TEZ8 running while unattended.

Disconnect the TEZ8 from the power supply before any maintenance or service of the TEZ8 to reduce the risk of electrical shock or injury.

Keep out of reach of children at all times.

Machine Usage

Caution: Always use a grounded 3-prong outlet.

- **Caution:** Always remove all refrigerant from the system before connecting the vacuum pump. We recommend using the Appion G5Twin for this purpose. Equipment damage may occur if the evacuation is started while the AC/R system is under high pressure.
- **Note:** For the deepest final vacuum, ensure that all fittings and hose connections are properly and tightly secured before beginning the evacuation process.
- **Note:** Before beginning the evacuation process, verify that the Debris Monitor/Catch tube (located in the right-front corner of the TEZ8) is free and clear of any debris or oil.

Standard Setup

- 1. Install a fresh TEZOM oil cartridge into the front of the Appion TEZ8 Vacuum Pump before using (See *Page 5: Changing the Oil* for further details).
- 2. Connect the pump to the system according to the AC/R manufacturer's guidelines.
 - **A.** Install a vacuum-rated ball valve or manifold between the system and the TEZ8 to allow for isolation of the system at the end of the evacuation process.
- **3.** If you are using a vacuum gauge, attach it to the access port on the system that is farthest from the TEZ8.

Standard Setup Continued

4. Turn the power switch ON.

Note: The TEZ8 is designed with a soft start to prevent unnecessary stress and wear on the pump. Open the cap on the 1/4" inlet port when starting the vacuum pump to allow it to start easier. Close the 1/4" port cap tightly once the TEZ8 is running at full speed.

5. Evacuate the system, following standard servicing procedures.

Shut Down Procedure

- 1. Close the manifold valve between the pump and the system.
- 2. Slowly remove the hose from the pump inlet to remove any residual oil from the pump.
- 3. Turn the power switch OFF.
- 4. Keep inlet ports capped when not in use to prevent moisture accumulation inside the pump.

Hose Attachment

The TEZ8 is equipped with four input fittings of different sizes. These fittings should be kept sealed with the included Appion MegaSeal[™] caps when the pump is not being used to prevent moisture from accumulating inside the pump. For increased flow and shorter evacuation times, multiple inputs may be used at once.

The input assembly can be swiveled to allow easy access to the desired ports, depending on hose and system port availablity.

To change the orientation, loosen the screw collar under the ports by turning it counterclockwise. You can then swivel the input fittings to face the desired direction. Once you have oriented the fittings, tighten the screw collar by turning it clockwise.



Remote Exhaust Vent Connection

A Remote Exhaust Vent Connection is located on top of the front face of the TEZ8. It is threaded for connection to a standard garden hose, which can be used to vent exhaust to another location. To minimize any back pressure on the pump, be sure the hose is free of any obstructions and is the shortest length needed to reach the desired exhaust location.

Debris Monitor/Catch Tube

The TEZ8 is equipped with a clear Debris Monitor/Catch Tube located in the right-front corner of the machine which allows you to observe the incoming airflow for debris, oil or any other material which could damage the pump. Be sure to empty and clean this tube after every job.

Note: Monitor this tube regularly during operation, as liquids present in the tube may raise the vapor pressure at the pump and drastically increase evacuation times.

Positive Pressure Relief

If there is residual pressure in the system when the pump is attached to the system, the Debris Monitor/Catch Tube will automatically disengage to relieve any positive pressure, preventing damage to the TEZ8.

Once the pressure has been relieved, restart the TEZ8 and the suction will draw the tube back into position, reseating itself on the double o-ring seal. If the catch tube does not reseat completely, simply open the protective door and press the tube upwards into position.

Changing the Oil

It is a good idea to always use clean fresh oil in your Appion TEZ8 vacuum pump. This not only prolongs the life of the pump, but also helps you to achieve a rapid and deep ultimate vacuum. Changing the oil in the Appion TEZ8 is as easy as installing a new TEZOM oil cartridge following the procedure below. Replacement TEZOM Oil Cartridges can be purchased from your local wholesaler.

Note: Be sure to only use genuine Appion T<u>EZ</u>OM Oil Cartridges in your TEZ8 vacuum pump to ensure optimal performance. The use of other vacuum oil may inhibit the ultimate vacuum depth that can be achieved.

Note: The re-use or refilling of an Appion T<u>EZ</u>OM Oil Cartridge may introduce contaminants and debris into the pump, resulting in lost performance or damage to the TEZ8.

- 1. Turn ON the Appion TEZ8 momentarily with one of the inlet ports open to remove any residual oil from the pump. Then turn the machine OFF and unplug from power source.
- 2. Open the large door on the left side of the machine to gain access to the TEZOM oil cartridge.
- **3.** While holding the lower part of the TEZOM, pull the cartridge out of the side of the vacuum pump. (Fig. 1)
- Locate and remove the cap and protective seal from the top of a new TEZOM. The cap can be used to seal the old TEZOM for easy disposal. (Fig. 2)
 Note: Dispose of the waste oil in accordance with your local regulations.
- **5.** Locate the flat side of the new TEZOM and hold the cartridge so that this is facing toward the machine.
- 6. Place the oil suction tube into the new TEZOM and insert the top of the TEZOM first to make sure the oil suction tube remains inside the cartridge. (Fig. 3)







Changing the Oil Continued

- Gently push the bottom of the cartridge forward until the TEZOM is secured in place. (Fig. 4)
- **8.** Close the protective door until the latch engages, and continue with the evacuation process.

Fig. 4

How Often Should You Change the Oil?

A vacuum pump can only pull a vacuum as deep as the vapor pressure of the sealing oil. When oil becomes saturated or contaminated, the vapor pressure rises and the evacuation process can slow to a halt.

It is recommended that the oil in your TEZ8 be changed and a fresh TEZOM installed at the beginning of every new job. Doing this will ensure that your TEZ8 is supplied with clean, dry oil with ultra-low vapor pressure maximizing the performance of your TEZ8.

With the clearly visible oil cartridge located on the front of the TEZ8, you can easily monitor and identify wet or dirty oil. As the oil becomes more opaque, this indicates an increased level of contamination. For example, as moisture is drawn into the TEZOM Cartridge, the oil will take on a white, milk-like appearance. Similarly, other contaminants from the system will turn the oil dark and sludge may accumulate in the cartridge.

Imagine that your TEZOM oil cartridge is like a paper towel that the TEZ8 is using to dry the system. If the system has a significant amount of moisture in it, your paper towel gets saturated quickly and stops absorbing the moisture as it should. At this point you have to decide wether or not you can wait for the paper towel to dry and continue to use the same one or discard it and get a fresh paper towel to dry more, faster.

The moisture absorbed in TEZOM oil may eventually evaporate but it takes time. Just like changing to a fresh paper towel, replacing the TEZOM cartridge speeds the evacuation process up by keeping the oil clean and dry.

Large tonnage systems or systems that have been exposed to excessive moisture may require more than one oil change to quickly complete the evacuation process. While this would be very difficult with another vacuum pump, the TEZ8 has been designed so that you may remove and replace the TEZOM cartridge while the pump is running without breaking the vacuum.

Changing the oil in the Appion TEZ8, while it is running, is as easy as installing a new TEZOM oil cartridge following the above procedure steps 2 through 8.

Note: When you change the T<u>EZ</u>OM cartridge while the pump is running, some oil from the oil return will drip out after the old T<u>EZ</u>OM cartridge has been removed and before the new one is in place. This is normal and should be cleaned up as soon as the new cartridge is in place.

Why Should You Use a High Vacuum Pump?

Air Conditioning and Refrigeration systems are designed and tested to operate at their most efficient only when they are completely evacuated and charged with virgin refrigerant. Any moisture left in a system before it is charged will decrease the system's efficiency and can lead to system damage and potentially system failure.

Damage caused by moisture is one of the leading causes of failures in AC/R systems. Moisture combines with refrigerants to create acids that corrode copper plating inside the system. Refrigeration oil readily absorbs water and can turn into a sludge, losing its lubricating ability. The only way to remove moisture from a system is to completely evacuate the system and pull a deep vacuum throughout the entire system.

As the pressure in a system decreases, the boiling point of water also decreases. The following chart shows that you can get water to boil at 72° F by creating a vacuum of 29.12 Inches Hg (just over 20,000 microns) in a system.

Temperature in °F	Inches of Mercury	Microns*	Pounds/Sq. In. (Pressure)
212°	0.00	759,968	14.696
205°	4.95	535,000	12.279
194°	9.23	525,526	10.162
176°	15.94	355,092	6.866
158°	20.72	233,680	4.519
140°	24.04	149,352	2.888
122°	26.28	92,456	1.788
104°	27.75	55,118	1.066
86°	28.67	31,750	.614
80°	28.92	25,400	.491
76°	29.02	22,860	.442
72°	29.12	20,320	.393
69°	29.22	17,780	.344
64°	29.32	15,240	.295
59°	29.42	12,700	.246
53°	29.52	10,160	.196
45°	29.62	7,620	.147
32°	29.74	4,572	.088
21°	29.82	2,540	.049
6°	29.87	1,270	.0245
-24°	29.91	254	.0049
-35°	29.915	127	.00245
-60°	29.919	25.4	.00049
-70°	29.9195	12.7	.00024
-90°	29.9199	2.54	.000049

*Remaining pressure in system in microns.

Vacuum Gauge Placement

For a system to be adequately dehydrated, a deep vacuum must be achieved throughout the entire system, not just the point where the vacuum pump is connected. For the most accurate reading of vacuum depth throughout the system, it is recommended that you attach a vacuum gauge at an access port on the system that is farthest from the TEZ8.

Helpful Hints Continued

The Greater the Flow the Faster You Go

The rate of flow during the evacuation of a system is referred to as "throughput." The throughput depends on the resistance to flow and the pressure drop between the entrance and exit of a hose or channel. Large

diameter hoses and clear evacuation paths will ensure the most throughput and shortest evacuation times.

Remove restrictions such as core depressors in hoses or Schaeder-type valve cores to ensure maximum flow. It is recommended to use an Appion Vacuum-Rated Valve Core Removal Tool (*see right*) in order to properly remove the access valve cores and maintain a good seal for a deep vacuum.



When a system is in a vacuum the pumping speed

is dramatically affected by the diameter and length of the hoses being used to evacuate. Using a 3/8" hose will allow FOUR times more throughput than a 1/4" hose. A 1/2" hose will allow 16 TIMES more throughput than a 1/4" hose.

Even if you have to connect to a 1/4" access port, due the principals of flow in a vacuum as they relate to pumping speeds, the use of a larger diameter hose will dramatically decrease your evacuation time.

Imagine that you are driving and encounter an accident on a busy highway. Traffic slows down while everyone gathers into one lane in order to pass the accident. An entire highway full of cars being forced into one lane for an entire trip is similar to how using small diameter hoses restricts throughput during an evacuation.

Now, imagine that instead of being forced into one line for the entire trip, the accident is quickly passed and the cars spread out into all of the lanes, returning traffic to full speed. This is how the principals of flow in a vacuum operate: the greater the flow, the faster you go.

It is best if a system has multiple access ports at different points along the system. By attaching to as many access ports as possible and evacuating from them simultaneously into the TEZ8, a technician can reach the deepest vacuum throughout the entire system, in the least amount of time.

Excessive or Trapped Moisture in a System

It may be more difficult to pull a deep vacuum if the system oil has had significant exposure to atmospheric air/moisture. Frequent oil changes due to contaminated TEZOM oil can be an indication that there is excessive moisture in a system.

Systems that use POE oil (approximately 100 TIMES more hydroscopic than mineral oil) can absorb a considerable amount of moisture when opened to atmosphere. Purging the system with dry nitrogen prior to evacuation can help clear the system of POE oil and moisture to reduce evacuation time considerably.

During the process of pulling a vacuum it is also possible that water or liquid may get trapped within the system. This is not uncommon and usually happens where the system has low points or "traps" that can catch moisture. While you are evacuating the system, look over the system for places on the outside of the piping where condensation or frost are forming. At any locations where you find condensation or frost on the outside of the piping you can be fairly certain that moisture is collecting inside.

Two possible methods for combating trapped liquid are applying heat to the outside of the piping with a heat gun or by blowing nitrogen through the affected part of the system.

Helpful Hints Continued

Extension Cords and Low Voltage

Vacuum pumps will work best when the voltage at the machine (while it is running) is between 115 and 122 volts.

Check that the voltage coming from the source outlet is adequate. Please note that the circuit could have many other items on it e.g. light fixtures, appliances, or other motors. All of these extra loads on the circuit will cause a lower voltage and reduced performance.

Likewise, long and thin extension cords also starve the motor of necessary voltage and can cause very dangerous overheating of the motor and extension cord. Extension cords should be at least 12AWG and not longer than 15 ft.

Care and Maintenance

Cleaning the Input Debris Screen

The TEZ8 is equipped with a clear monitor tube located in the right-front corner of the machine which allows you to observe the incoming airflow for debris, oil, or any other material which could damage the pump.

A small filter screen is located in the fitting at the top of this monitor tube to prevent large debris from entering the pump and causing damage. For best results, this screen should be cleaned regularly.

- 1. Open the door located on the right side of the machine to access the clear monitor tube.
- 2. Grab the monitor tube and pull it straight down to release it from the input fitting, then remove it from the machine. (Fig. 1)
- Remove the screen from the input fitting, clean it thoroughly and place it back into the fitting. If the screen is damaged, it should be replaced. (Fig. 2)
- 4.

Connect the monitor tube back up to the pump with the tube opening facing towards the top. Make sure that the spring is pushing against the bottom of the





Troubleshooting Guide

Symptom	Cause	Solution
Pump will not start.	Power cord not plugged in or plugged into a bad outlet.	Check power cord, try a different outlet.
	Motor in thermal overload.	Allow motor to cool down.
	Loose wire in machine.	Open case and check wire connections.
	Pump is designed to "soft start"	Open 1/4" inlet cap and start pump. Close cap tightly for evacuation.
Poor vacuum.	Loose hose connection.	Check all hose connections and flare caps for any leaks.
	Oil contaminated.	Replace with new oil.
	Low oil level.	Replace with new oil.
	Miscalibrated gauge	Recalibrate gauge, or try a different gauge.
Oil murky or dark in color.	Oil contaminated.	Replace with new oil.

Electrical Diagram



Parts Diagram



- 1. Left Side Panel
- 2. Exhaust Chamber
- 3. Exhaust Port Cover
- 4. Input Assembly
- 5. Handle
- 6. Power Switch
- 7. Back Panel
- 8. Power Cord
- 9. Right Side Panel
- 10. Motor Bracket
- 11. Fan Blade
- 12. Motor

- 13. Pump Assembly
- 14. Debris Screen
- 15. Oil Port Cover
- 16. Front Panel
- 17. Debris Tube Spring
- 18. Debris Tube
- 19. Debris Tube Door
- 20. TEZOM Door
- 21. TEZOM Support
- 22. Front Panel Insert

Appion reserves the right to make changes to product and specifications without notice.

Manufacturer warrants that the equipment will, under normal and anticipated use, be free from defects in refriger-ant related parts for a period of one (1) year from and

after the date of shipment, and be free from defects in electrical related parts for a period of ninety (90) days from and after the date of shipment, but in all cases excluding consumables and other matters as hereinafter provided. Labor is NOT covered and shall be the sole cost and responsibility of the Purchaser. The obligation of Manufacturer under this limited warranty is limited to the supplying of parts (excluding consumables and all plastic parts) as hereinabove specifically provided. Parts shall be new or nearly new. Manufacturer assumes no liability for failure in performing its obligations therunder if failure results, directly or indirectly, from any cause beyond its control, including but not limited to, acts of God, acts of government, floods, fires, shortages of materials, strikes and other labor difficulties or delays or failures of transportation facilities.

Manufacturer shall be liable to replace the applicable parts only if (i) Manufacturer is properly notified by Purchaser upon discovery of the alleged defects, (ii) defective parts are returned to Manufacturer upon authorization with all transportation charges prepaid by

Purchaser, (iii) Manufacturer's examination of the parts discloses to its satisfaction that the defects were not caused by the Purchaser or its agents and (iv) the parts are otherwise covered by Manufacturer's limited warranty.

Purchaser shall be responsible to select the means of transportation and bear the cost of inbound and out-bound freight expense associated with any replacement parts, and all risk of loss attendant thereto.

Notwithstanding anything contained in this warranty to the contrary, (i) this limited warranty shall become null and void upon the use of any improper chemicals or in the event any modifications or improper service or installation is performed on the equipment, (ii) this limited warranty does not apply to consumable materials such as, but not limited to, indicator lamps, fuses, all fluids, filters, coatings, seals, etc., and (iii) this limited warranty is applicable only to Purchaser, and no subsequent purchasers of the equipment from Purchaser shall be entitled to any warranty whatsoever from Manufacturer, express or implied.

THIS WARRANTY CONSTITUTES THE SOLE AND EX-CLUSIVE WARRANTY OF MANUFACTURER WITH RE-SPECT TO THE EQUIPMENT, THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, AND MANU-FACTURER SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING (WITHOUT LIMITATION), ANY AND ALL WARRANTIES AS TO THE SUITABILITY OR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF THE EQUIPMENT FURNISHED HERE-

UNDER. THE EXCLUSIVE REMEDY OF PURCHASER AGAINST MANUFACTURER FOR ANY BREACH OF THE FOREGOING LIMITED WARRANTY SHALL BE TO SEEK REPLACEMENT OF THE AFFECTED PARTS. IN NO EVENT WILL MANUFACTURER'S LIABILITY IN CONNECTION WITH THE EQUIPMENT WHICH IS FOUND TO BE DEFECTIVE EXCEED THE AMOUNTS PAID BY PURCHASER TO APPION HEREUNDER FOR SUCH EQUIPMENT WHICH IS SPECIFICALLY FOUND TO BE DEFECTIVE. THESE LIMITATIONS APPLY TO ALL CAUSES OF ACTION IN THE AGGREGATE, BOTH AT LAW AND IN EQUITY, AND INCLUDING WITHOUT LIMITATION, BREACH OF CONTRACT, BREACH OF WAR-RANTY, MANUFACTURER NEGLIGENCE, INFRINGE-MENT, STRICT LIABILITY, MISREPRESENTATION AND OTHER TORTS AND CONTRACTUAL CLAIMS. EXCEPT FOR THE EXCLUSIVE REMEDY PROVIDED ABOVE FOR MANUFACTURER'S BREACH OF THIS LIMITED WAR-RANTY, PURCHASER, FOR ITSELF AND ITS SUCCES-SORS AND ASSIGNS, HEREBY WAIVES AND RELEASES MANUFACTURER FROM ANY AND ALL OTHER CLAIMS OR CAUSES OF ACTION THEY HAVE AGAINST MANU-FACTURER ON ACCOUNT OF OR ASSOCIATED WITH THE EQUIPMENT PURCHASED HEREUNDER OR FOR APPION BREACH OF THIS LIMITED WARRANTY. IN NO EVENT SHALL MANUFACTURER BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, SUCH AS, BUT NOT LIMITED TO, LOSS OF ANTICIPATED PROFITS, LOST SAVINGS, LOST REVENUES, FINES, OR OTHER ECONOMIC LOSS IN CONNECTION WITH OR ARISING OUT OF THE EXIS-TENCE, FURNISHING, FUNCTIONING OR USE OF ANY ITEM OF EQUIPMENT PROVIDED UNDER THIS AGREE-MENT, EVEN IF MANUFACTURER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND/OR SUCH DAMAGES ARE REASONABLE AND/OR FORE-SEEABLE. FURTHER, PURCHASER FOR ITSELF AND ITS SUCCESSORS AND ASSIGNS, WAIVES AND RELEASES ANY RIGHTS THEY MAY HAVE TO BRING AN ACTION ARISING OR RESULTING FROM THIS AGREEMENT, REGARDLESS OF ITS FORM, MORE THAN FIFTEEN (15) MONTHS AFTER SHIPMENT OF THE AFFECTED EQUIP-MENT BY MANUFACTURER TO PURCHASER.

The provisions of this warranty shall supersede any contrary provisions contained in this agreement, any docu-ment supplied by Manufacturer to Purchaser or by Purchaser to Manufacturer, or any other agreement, written or oral, between Purchaser and Manufacturer, notwithstanding the fact that the provisions contained in this warranty directly conflict with other terms or provisions of this agreement or such other documents, or that such other documents or agreements were provided, delivered, made or executed subsequent to this agreement unless such agreements are in writing, specifically refer to this agreement, specifically provide that they are amending this and are signed by the President of Manfacturer.

WARRANTY SERVICE

To Validate your warranty, follow these steps within 10 days of purchase:

- **1.** Complete the Warranty Card below.
- 2. Send (1) completed Warranty Card and (2) copy of your sales receipt to:

Appion Inc. 2800 South Tejon Street Englewood, CO 80110

To obtain warranty service, contact your wholesaler/distributor to obtain a Return Goods Authorization (RGA) Number. <u>All returned goods MUST be accompanied by an RGA in order to receive service.</u>

WARRANTY CARD					
Please complete this and return it within 10 days of purchase with a copy of your sales receipt to validate your warranty					
Name of Purchaser Company		Phone Number			
Street Address City		State Zip Code			
Model	Serial Number	Date of Purchase	Place of Purchase		
Please select your pr (Check all	rimary line of business. I that apply)	How did you learn about our products? (Please only check one)	What features most interested you ? (Check all that apply)		
Automotive		Wholesaler	High Production		
Commercial		Recommended By:	Low Maintenance		
Residential		Magazine	Versatility		
Service		Mailing	Portability		
Installation		Newspaper Ad	Ease of Use		
		Internet	Other:		

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