# Vacuum Pump with Manifold Gauge Set

## User Manual

Read Carefully Before Use
Keep for Future Reference

Orion Motor Tech

UM-VPH-0030-V2

# Disclaimer

Read this disclaimer completely and carefully before proceeding with the rest of the manual content.

1. Product Modifications

   Any modifications or alterations to Orion Motor Tech (OMT) products void any warranties and may result in damage or injury. OMT shall not be liable for any damages resulting from such modifications or alterations.

2. Compliance with Laws

   Customers shall be liable for ensuring that the use of OMT products complies with all applicable laws and regulations in their respective jurisdictions. OMT shall not be responsible for any violations of laws or regulations resulting from the use of OMT products.

3. Correct Use

   Always use OMT products only as directed in the accompanying manuals. Failure to follow instructions may result in injury or damage.

   Always ensure the assembly, installation, operation, maintenance, or repair of OMT products is carried out by a competent person.

   Regular maintenance should be performed throughout the lifecycle of OMT products. You are responsible for ensuring the products operate as intended.

   Always wear appropriate protective gear.

4. Third-Party Products

   OMT shall not be liable for any damages or losses resulting from the use of third-party products in conjunction with OMT products. Customers shall refer to the third-party's guidelines and/or warranties (if any) for any third-party products used.

5. Limitation of Liability

   OMT shall not be liable for any direct, indirect, punitive, incidental, special, or consequential damages to property or life, whatsoever arising out of or connected with the use or misuse of OMT products. In no event shall OMT's liability exceed the value of the products sold.

6. Warranty

   Refer to the sales page for warranty information.

This disclaimer states the entire obligation of OMT with respect to OMT products. If any part of this disclaimer is determined to be void, invalid, unenforceable, or illegal, including but not limited to the warranty disclaimers, liability disclaimers, and liability limitations set forth above, the invalid or unenforceable provision will be deemed superseded by a valid and enforceable provision that most closely matches the intent of the original provision and the remainder of the agreement shall remain in full force and effect.

# Contact Us

Thank you for choosing our products! If you have any questions or comments, contact us and we'll address your issues ASAP!

support@orionmotortech.com

https://orionmotortech.com/

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# 1 Safety Information

## Danger

- Read **ALL** these instructions carefully before use and keep them for future reference. Provide these instructions to anyone who will use this product.

  Provide these instructions with this product if it is ever given or sold to a third party. Failure to do so may lead to serious property damage and severe personal injury.
- **ONLY** use this product for its intended purpose, evacuating and charging air conditioning (A/C) systems using **R134a**, **R12**, **R22**, or **R502** refrigerant.

  **DO NOT** use with **ANY** other refrigerants, which can damage this product and your property.

  Any other use **NOT** specified herein could potentially pose risks and void **ALL** warranties stated or implied.
- These instructions are **ONLY** an introduction to this product.

  For specifics on particular tasks, consult the service manual provided by your A/C system's manufacturer as well.
- **DO NOT** use this product while you are tired or under the influence of drugs, alcohol, or strong medication.
- **DO NOT** allow use by children under the age of **18**, anyone **WITHOUT** specialized **HVAC** training, persons unfamiliar with this product and its compatible A/C systems, or people whose physical or mental impairment precludes safe use.
- **ALWAYS** keep children, bystanders, and pets away during use. Restrict access to your work area as needed.
- **ALWAYS** ensure that your work area is clean, bright, well-ventilated, and free of explosives or heat sources, especially when working on systems that contain refrigerants or other substances that pose the risks of fire, explosion, carbon monoxide poisoning, etc.

  Cluttered or dark areas invite accidents.

  Working on refrigerant in closed environments may result in carbon monoxide poisoning and other problems.

  Firecrackers, open flames, and other similar things may cause fires or explosions.
- **ALWAYS** wear appropriate personal protective equipment (PPE) including breathing, eye, and hand protection when you use this product for systems that contain refrigerants or other substances capable of generating harmful gases or causing burns, scalds, frostbite, etc.

  Refrigerants can irritate your eyes, nose, throat, and skin or cause frostbite, heart arrhythmia, unconsciousness, and **EVEN** death.

  Hearing protection is also necessary due to the noise generated by this device during operation.
- **DO NOT** operate this product if any component is damaged or shows any sign of malfunction.

  Repair or replace problematic components before further use.

  **NEVER** replace any components with nonidentical or unauthorized ones.
- **ALWAYS** turn off your A/C system **BEFORE** performing evacuation with this product.
- **ALWAYS** check that the vacuum pump's power cord is undamaged **BEFORE** evacuation.

  **NEVER** use electrical devices with **ANY** problematic power cords.

  **NEVER** attempt to remove **ANY** permanently preconnected power cords.
- **DO NOT** move the vacuum pump by pulling on its power cord or modifying its power plug.
- **ONLY** use the vacuum pump with stable, compatible, and well-grounded power sources.

  **DO NOT** use 3-to-2 prong adapters, ungrounded extension cords, or extension cords of insufficient gauge for the pump's expected electrical load.
- In case of power loss during operation, unplug the vacuum pump **IMMEDIATELY** until power is restored.
- **DO NOT** get the vacuum pump wet or operate it with wet hands or in highly humid environments.

  **DO NOT** rinse the entire pump with tap water, immerse it completely in water, or expose it to rain.

  In the event of any signs indicating that any electrical component accidentally becomes wet, disconnect the pump from power **IMMEDIATELY** and wait for it to completely dry **BEFORE** resuming use.
- **ALWAYS** avoid **ALL** direct contact with the vacuum pump oil.

  If contact accidentally occurs with the skin, remove contaminated clothing and flush with copious amounts of water.

  If contact accidentally occurs with the eyes, **IMMEDIATELY** flush them with copious amounts of water for at least 15 minutes while seeking medical attention.

  **NEVER** swallow the oil, which may cause **FATAL** problems.
- **DO NOT** run the vacuum pump **WITHOUT** the provided oil or with its oil inlet left open.

  **ALWAYS** maintain the oil level between the **MIN** and **MAX** height marks on the reservoir window during use.

- **ALWAYS** be sure to apply the correct attachments and connections.

  Failure to follow this may result in severe equipment damage and personal injury.

| Connected To | | Product Parts/Attachments |
|---|---|---|
| Low-Pressure service port of A/C system | | Blue hose, blue coupler, blue valve |
| High-Pressure service port of A/C system | | Red hose, red coupler, red valve |
| Vacuum pump | | Yellow hose, middle port between the valves |
| Refrigerant can | Puncture style | Yellow hose, taper-pin tap, middle port between the valves |
| | Self-Sealing style | Yellow hose, round-pin tap, middle port between the valves |

- **ALWAYS** perform leak tests for this product and your A/C system **BEFORE** charging.

  Address the issue(s) in time and ensure that everything is leak-free before continuing on your way.
- Stay alert, watch what you are doing, and use common sense when using this product.
- If you begin to develop symptoms such as headaches, dizziness, or nausea during use, stop work and get fresh air **IMMEDIATELY**.

  **DO NOT** continue work until better ventilation is provided for your work area.
- **DO NOT** leave this product unattended during use.
- Use **EXTREME** caution when disconnecting the quick couplers and hoses after use. They may still contain some refrigerant under pressure.
- **DO NOT** maintain this product with harsh abrasives or caustic chemicals.
- **NEVER** disassemble the vacuum pump or manifold gauge.

  **NEVER** modify their internal components **WITHOUT** professional guidance.

# 2 Specifications

## Vacuum Pump

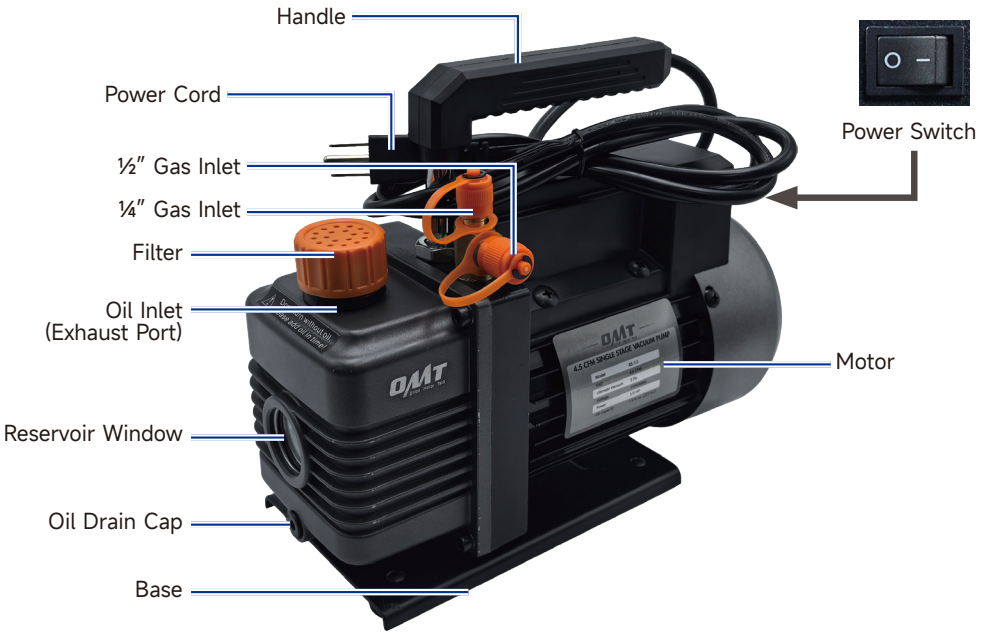
| | | |
|---|---|---|
| **Input Voltage & Freq.** | AC 110V, 60 Hz | |
| **Rated Power** | ⅓ HP | 245 W |
| **Evacuation Speed** | 4 cfm | 0.11 $m^3$/m |
| **Oil Capacity** | 7.6 fl. oz. | 225 ml |
| **Dimensions** | 10.6 × 4.3 × 8.5 in. | 27 × 11 × 21.5 cm |
| **Net Weight** | 10.6 lb. | 4.8 kg |

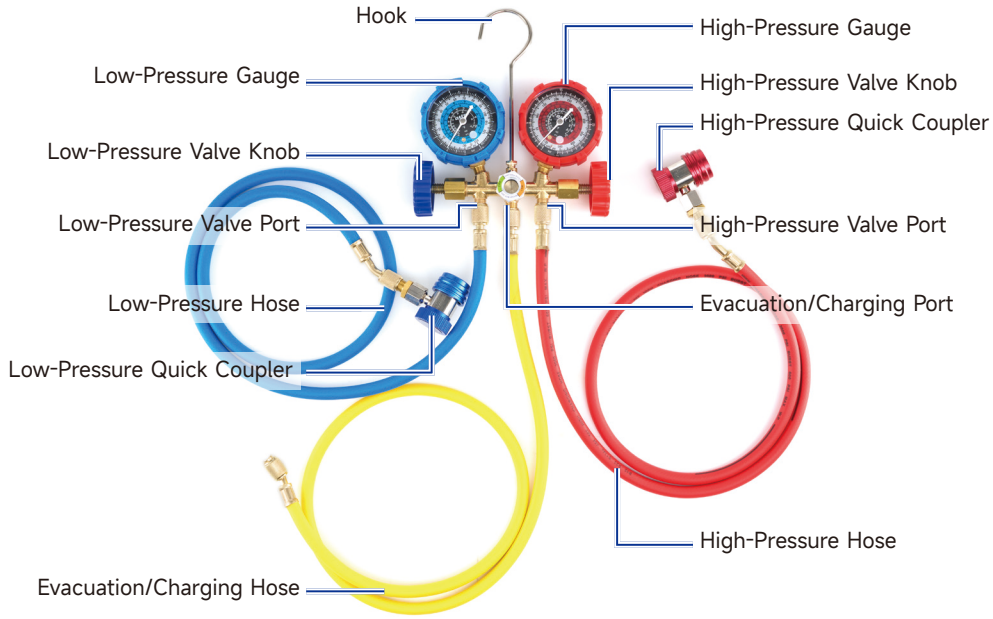
## Gauge Set

| | | | |
|---|---|---|---|
| **Compatible Refrigerants** | | R134a, R12, R22, and R502 | |
| **Low-Pressure Gauge** | **Pressure Range** | 0 to 250 psi | 0 to 17.2 Bars |
| | **R134a Temp. Range** | – 40 °F to 100 °F | – 40 °C to 38 °C |
| | **R12 Temp. Range** | – 40 °F to 100 °F | – 40 °C to 38 °C |
| | **R22 Temp. Range** | – 50 °F to 70 °F | – 45 °C to 21 °C |
| | **R502 Temp. Range** | – 80 °F to 60 °F | – 62 °C to 16 °C |
| **High-Pressure Gauge** | **Pressure Range** | 0 to 500 psi | 0 to 34.5 Bars |
| | **R134a Temp. Range** | 0 °F to 190 °F | – 18 °C to 88 °C |
| | **R12 Temp. Range** | 0 °F to 210 °F | – 18 °C to 99 °C |
| | **R22 Temp. Range** | 0 °F to 160 °F | – 18 °C to 71 °C |
| | **R502 Temp. Range** | – 50 °F to 160 °F | – 45 °C to 71 °C |
| **Hoses** | **Length** | 3 ft. 11 in. | 1.2 m |
| | **Max. Pressure** | 3000 psi | 206 Bars |
| **Net Weight** | | 4.9 lb. | 2.2 kg |

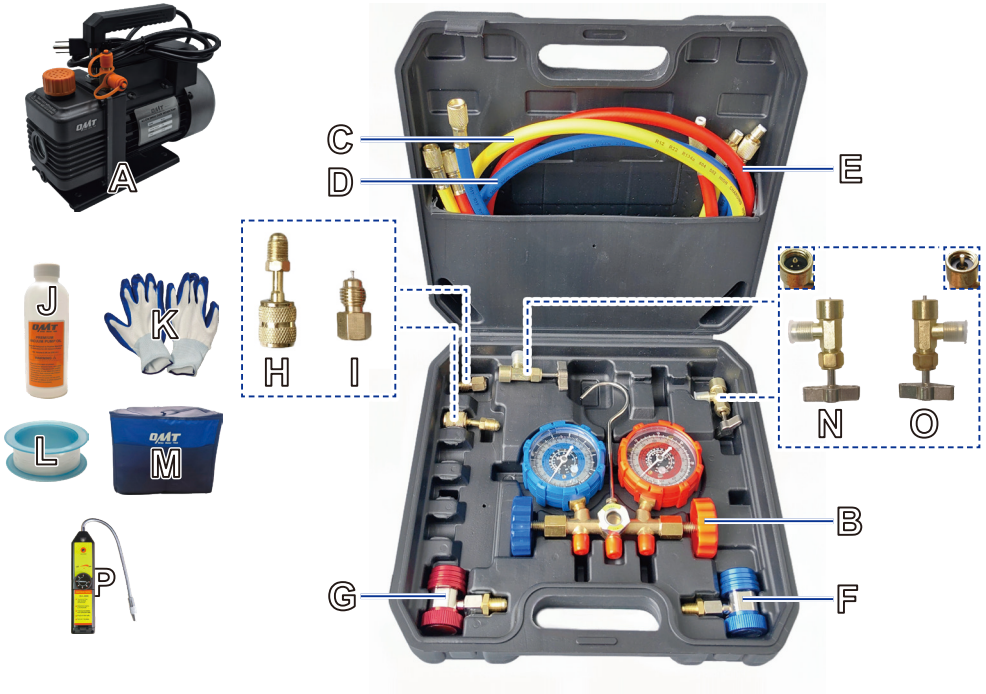
* Note that the negative readings are given in inches of mercury (inHg) roughly equal to half the equivalent value in psi.

# 3 Product Diagram



# 4 Package List




| No. | Name | Qty. |
|---|---|---|
| A | Vacuum Pump | 1 |
| B | Gauge Set | 1 Set |
| C | Evacuation/Charging Hose (Yellow) | 1 |
| D | Low-Pressure Hose (Blue) | 1 |
| E | High-Pressure Hose (Red) | 1 |
| F | Low-Pressure Quick Coupler (Blue) | 1 |
| G | High-Pressure Quick Coupler (Red) | 1 |
| H | ½″ Male to ¼″ Female Adapter | 1 |

| No. | Name | Qty. |
|---|---|---|
| I | ¼″ Male to ⅜″ Female Adapter | 1 |
| J | Vacuum Pump Oil | 1 |
| K | Work Gloves | 1 Pair |
| L | Tape | 1 |
| M | Bag | 1 |
| N | R134a Tap with Taper Pin (Puncture Style) | 1 |
| O | R134a Tap with Round Pin (Self-Sealing Style) | 1 |
| P | Leak Detector | 1 |

**Necessary but Not Included:**

- Refrigerant Can
- Micron Gauge
- M4 Hex Wrench

# 5 Preparation

**Danger**

Refrigerant can irritate your eyes, nose, throat, and skin or cause frostbite, heart arrhythmia, unconsciousness, and **EVEN** death.

### Clearing Your Work Area

Make sure the work area meets the following conditions:

- No children, bystanders, or pets
- Clean and clear of any clutter or dirt that may affect operation or pose safety hazards
- Well-lit and ventilated but adequately protected from the elements
- Free of explosives and sources of heat such as firecrackers and open flames

### Putting on Proper PPE

Hand, breathing, and eye protection are required and should meet the standards by ANSI (American National Standards Institute) or OSHA (Occupational Safety and Health Administration).

The recommended ones include:

- Work Gloves
- Dust Masks
- Goggles

### Checking the Product

After unpacking, check that all items are included and undamaged.

If necessary, ask your local dealer or contractor for new identical replacements.

**Danger**

Using this product with missing, broken, nonidentical, or unauthorized parts **WILL** pose a series of safety hazards.

### Familiarizing Yourself with Your A/C Systems

For optimal safety, be sure to know your A/C system and take sufficient training before using this product.

Failures and accidents could happen due to a lack of training.

# 6 Initial Setup

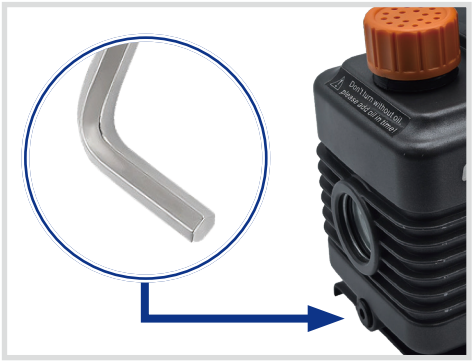
**⚠Warning**

- Make sure your surroundings **ARE** safe for using this product.

  Avoid operating in crowded, dark, or cluttered areas. Ensure **NO** explosives or ignition sources nearby.
- Be sure that **ALL** connections **ARE** tightly secured.
- If working on an HVAC system, check that it has been turned off **BEFORE** starting work.

## 6.1 Adding the Oil into the Vacuum Pump

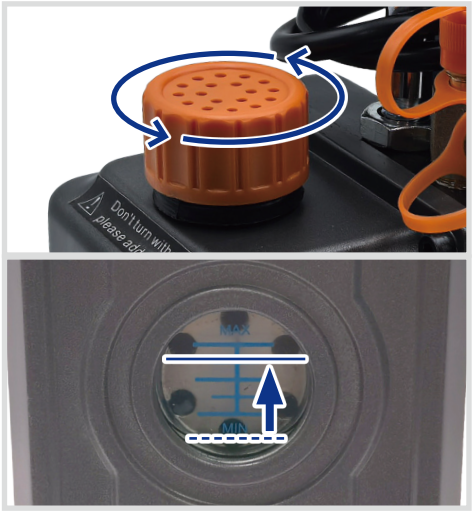
1. Place the vacuum pump on a firm level surface away from any potential sources of ignition or heat, and make sure the oil drain is tightly closed by screwing its cap into place with an M4 hex wrench (not included).



2. Unscrew the pump's filter counterclockwise by hand, exposing the oil inlet. CAREFULLY add the vacuum pump oil (J) until the reservoir window is covered between the "MIN" and "MAX" height marks.

   **⚠Warning**

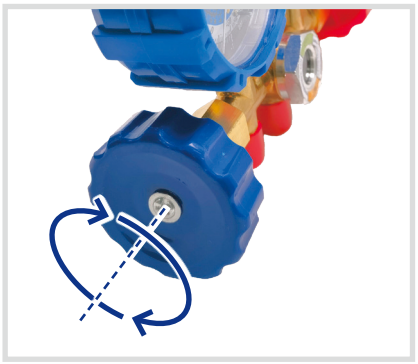
   **NEVER** add the oil near open flames or sparks. Failure to do so may result in fire or explosion.

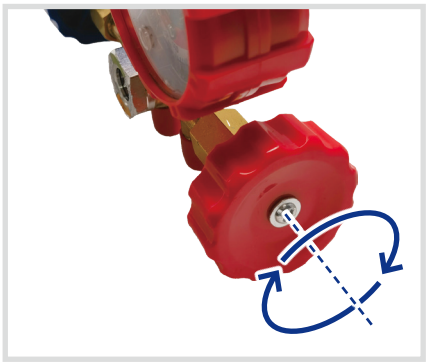


3. Tighten the filter into place by hand.

## 6.2 Connecting the Hoses to the Gauge

1. Turn the knobs on the gauge set (B) completely clockwise, **FULLY** closing its low-pressure (LP) and high-pressure (HP) valves.





2. Unscrew the two port caps below the blue and red knobs, and wrap the ports' threading with the provided tape (L).

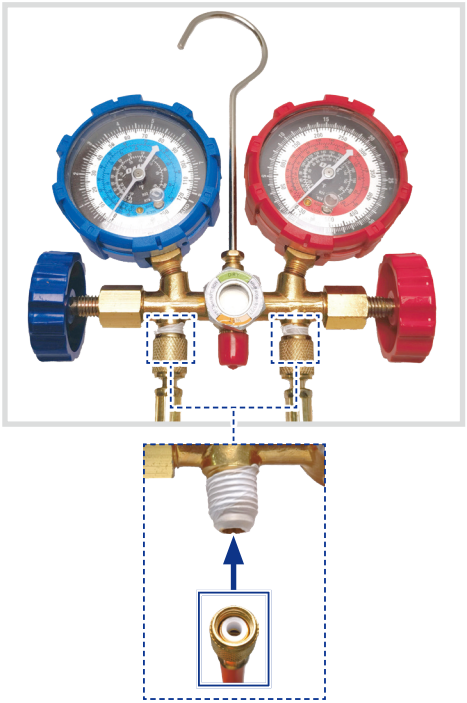
> **Note**: Due to unit conversion, the dimensions may vary slightly. Refer to the metric measurements for accuracy.

3. Connect the provided hoses to the corresponding ports by hand.

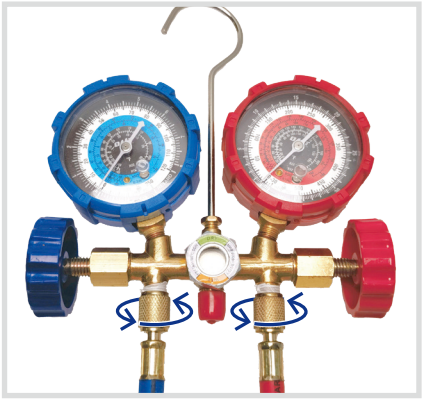
> **⚠ Warning**
>
> **DO NOT** mix up the three hoses, as they are **NOT** interchangeable.

> **Note**: Use the hose ends **WITHOUT** copper cores inside..

- Connect the blue LP hose (D) to the port below the blue knob (**LOW**).
- Connect the red HP hose (E) to the port below the red knob (**HIGH**).



4. Tighten these connections by hand using the hoses' locking nuts.



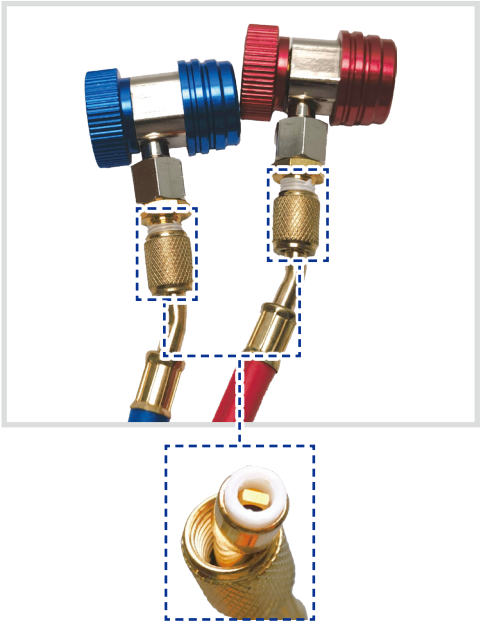
## 6.3 Connecting the Quick Couplers to the Pressure Hoses

1. Wrap the blue LP quick coupler (F) and red HP quick coupler (G)'s threading with tape.
2. Connect the blue and red hoses to their identically colored quick couplers by hand.

> ⚠ **Warning**
>
> **DO NOT** mix up these hoses and couplers, as they are **NOT** interchangeable.

> **Note**: Use the hose ends **WITH** copper cores inside.

3. Tighten the hose's locking nuts by hand to secure the connections.

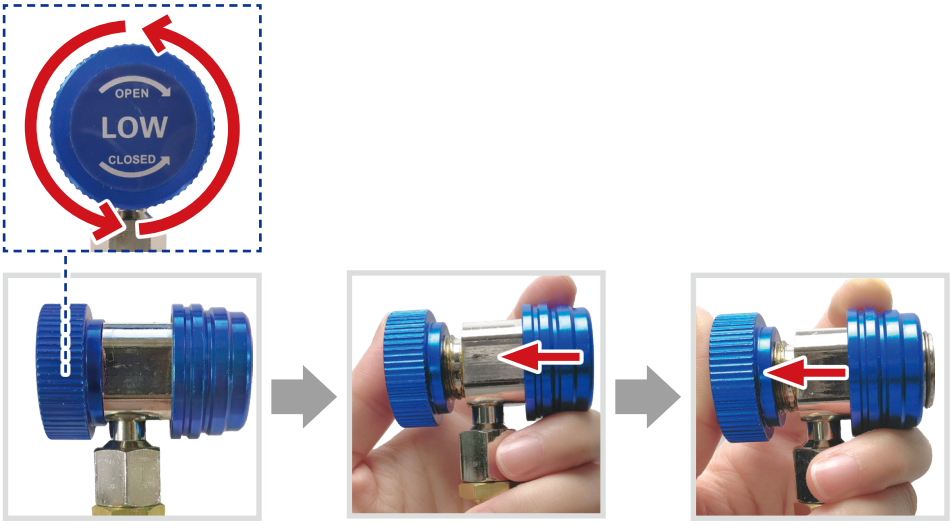


## 6.4 Connecting the Quick Couplers to Your A/C System

**⚠ Warning**

Ensure that your A/C system has been turned off.

1. Check that the vacuum pump is on a firm level surface near your A/C system.
2. Hang up the gauge using its hook to ensure optimal safety, stability, and accessibility during use.
3. Turn the blue and red quick couplers' knobs completely counterclockwise.
4. Hold one coupler and pull back the sleeve to the knob.
5. Push the coupler onto its matching service port of your A/C system.
6. Release the sleeve to secure the connection.

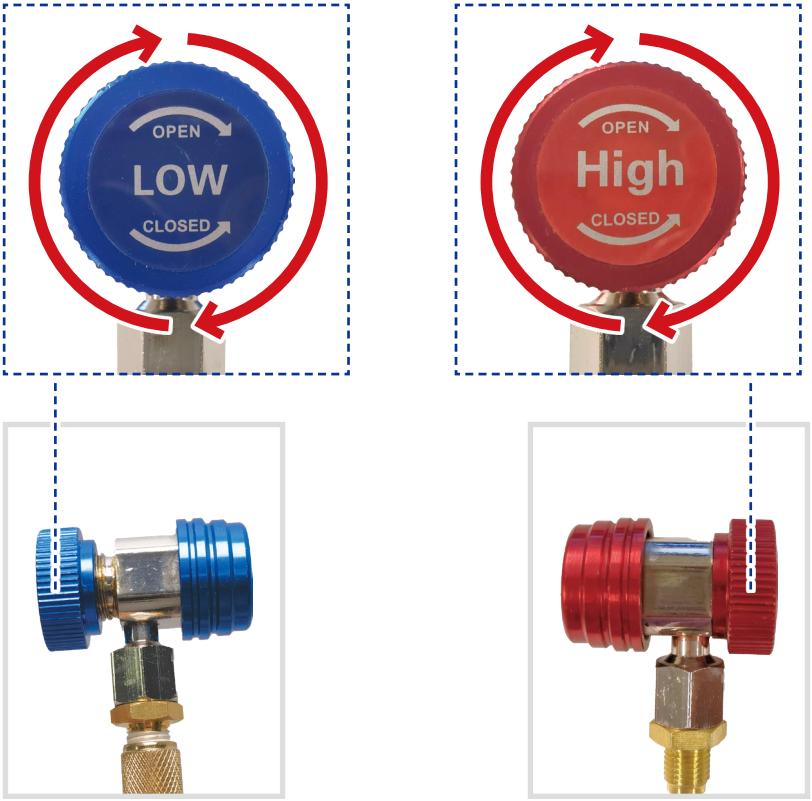



7. Repeat steps 4 – 6 for connecting the other coupler to the A/C system.

**⚠ Warning**

- **DO NOT** connect the two couplers to the **INCORRECT** service ports to prevent system malfunctions and safety hazards.
- **ALWAYS** refer to the instructions and guidelines provided by the manufacturer of your A/C system for proper installation procedures.

8. Turn the blue and red quick couplers' knobs completely clockwise.



# 7 Operation

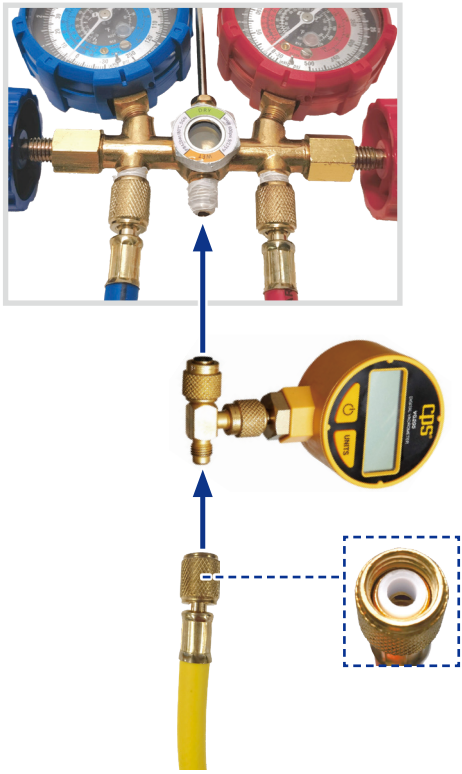
You can evacuate your A/C system, and then charge it with refrigerant.

## 7.1 Evacuation

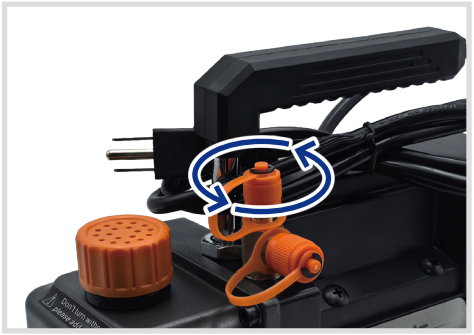
> ⚠ **Warning**
>
> Again, check that your A/C system has been **COMPLETELY** turned off.

1. Remove the evacuation/charging (E/C) port cap by hand and wrap the ports' threading with tape.
2. Connect a micron gauge (not included) to this port and the yellow E/C hose (C).

> **Note**:
>
> - Use the hose end **WITHOUT** a copper core inside.
> - Wrap the micron gauge's threading with tape.



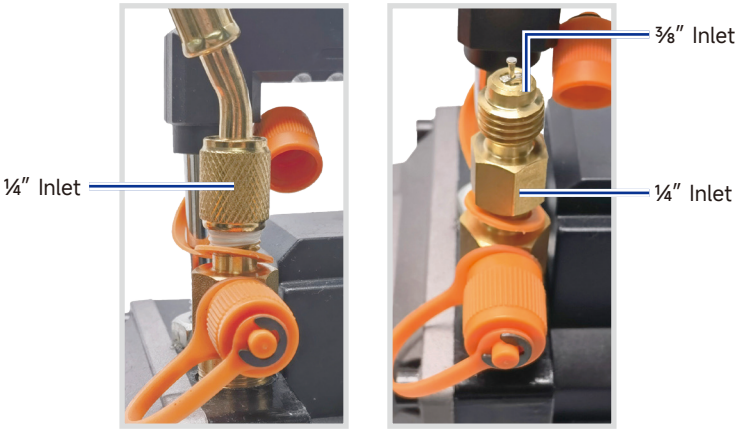
3. Unscrew the vacuum pump's ¼″ gas inlet cap counterclockwise, and wrap the inlet's threading with tape.

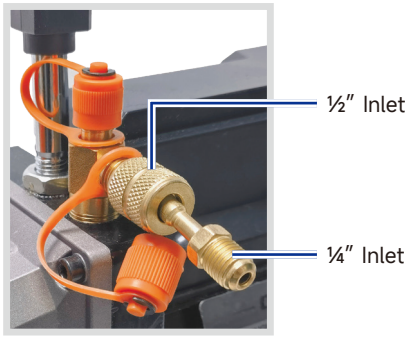


4. Connect the other end of the yellow E/C hose to the inlet by hand using its copper core end.

**Note**:

- In the event of the ¼″ gas inlet malfunctions, connect the hose to the ½″ gas inlet using a ½″ male to ¼″ female adapter (H).
- The ¼″ male to ⅜″ female adapter (I) is provided for connecting a ⅜″ diameter hose to the ¼″ gas inlet if needed.



5. Make sure they are tightly joined and turn the micron gauge on.
6. Open the blue LP valve by turning its knob completely counterclockwise.

7. Connect the vacuum pump to a stable, compatible, and grounded power source. Turn on the pump by flipping its power switch to **I** and the evacuation begins.

8. When the micron gauge reads less than 500 microns, your A/C system is fully cleared. Close the blue LP valve by turning its knob **COMPLETELY** clockwise and turn off the pump by flipping its power switch to **O**.

9. Disconnect the micron gauge from the gauge set and the yellow E/C hose. Disconnect the yellow E/C hose from the pump.

## 7.2 Charging

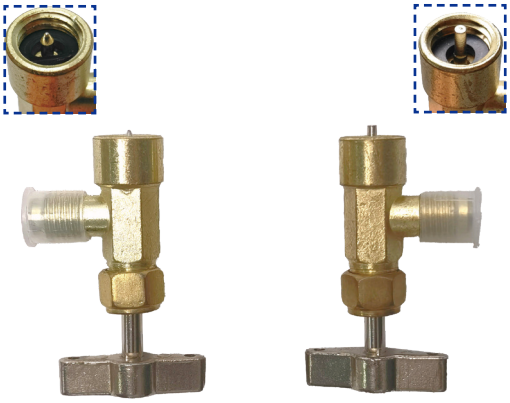
**⚠Warning**

- **ALWAYS** keep your refrigerant cans away from heat sources and direct sunlight.
- Be sure **NOT** to open your refrigerant cans by accident in **ANY** way.
- Ensure that **BOTH** valves on the gauge **ARE** completely closed **BEFORE** starting work.
- **NEVER** leave your refrigerant cans or the gauge unattended when charging A/C systems.
- **ALWAYS** wear proper PPE when disconnecting the couplers and hoses after charging is complete, as they may contain some refrigerant under pressure.

1. Choose a provided R134a tap (N or O) for your R134a refrigerant can as you need, and remove the outlet's cap.

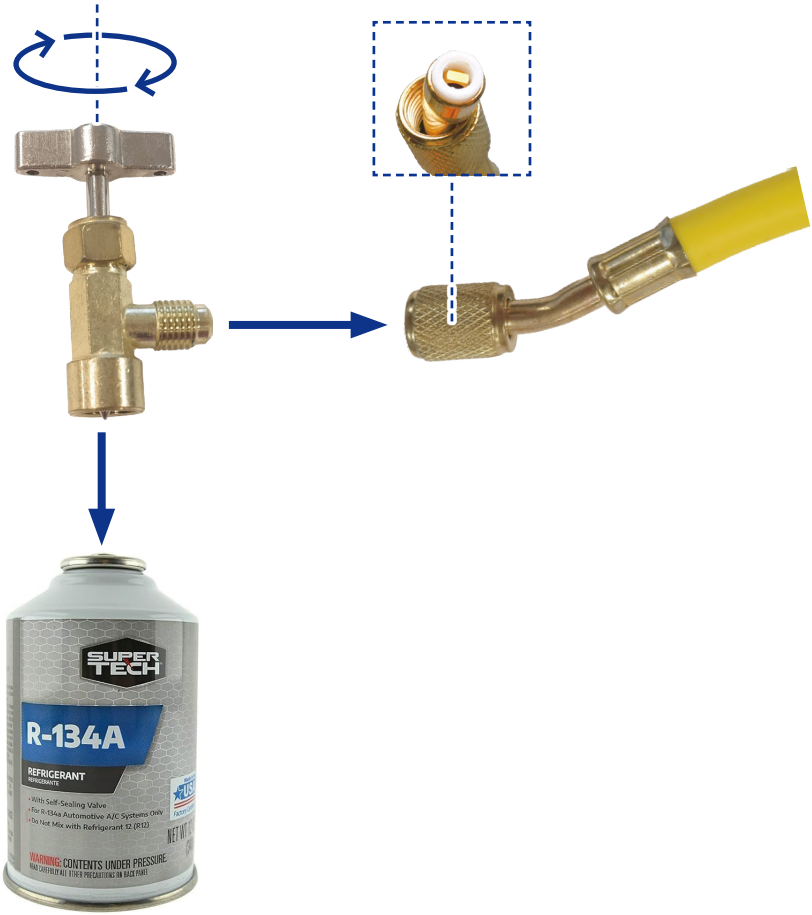
**Note**:

- Use taps (not included) that match your refrigerant cans (R12, R22, or R502).
- Some big refrigerant cans are equipped with taps to regulate the flow of refrigerant.

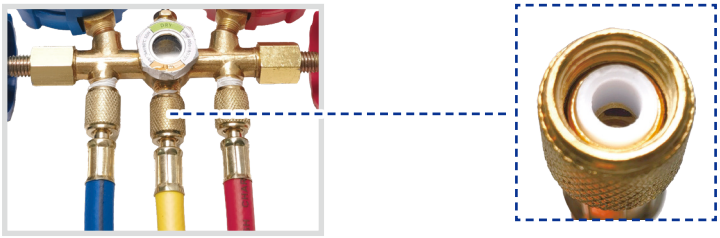


2. Check that the tap has been closed by turning its knob **COMPLETELY** clockwise. Connect the outlet of the tap to the yellow E/C hose and its inlet to your refrigerant can.

> **Note**: Use the hose end **WITH** a copper core inside.




3. Connect the yellow E/C hose to the E/C port of the gauge set using the hose end **WITHOUT** a copper core inside.



4. Turn the knob counterclockwise to allow the refrigerant to flow through the hose.


5. Start your A/C system and set it to the maximum cooling and fan speed.

6. Open the red HP valve by turning its knob completely counterclockwise. Check for any leakage before charging.

   a. If the red HP gauge's pointer keeps swinging, activate the provided leak detector (P). Turn its control knob to any setting from **2** to **7** and place its sensing tip close to any joint or hose. (The larger the number is, the higher the operational intensity is.)

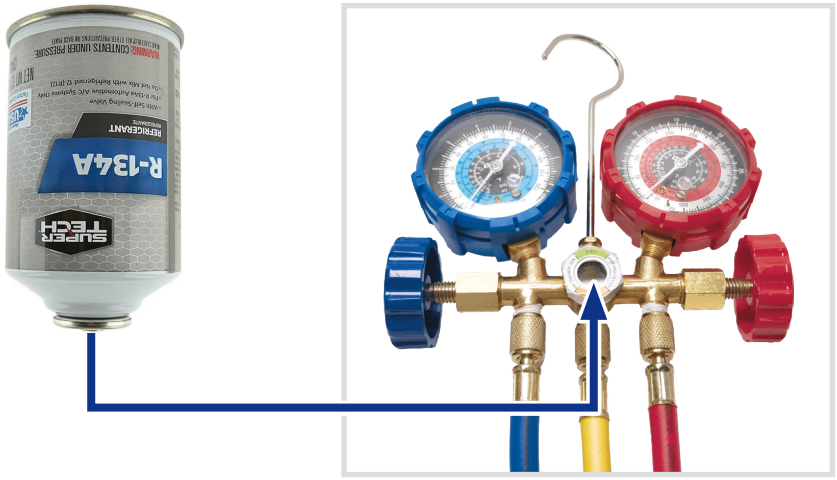
   b. If its operational ticking sound escalates, there is a leakage. Close the red HP valve by turning its knob completely clockwise immediately, and then deactivate the detector by turning its knob to **1**.

   c. Repair or replace any detected loose joints or worn parts before further use.

   Once there is no leakage, close the red HP valve by turning its knob completely clockwise.

7. Open the blue LP valve by turning its knob completely counterclockwise and charging begins.

8. To check if the small refrigerant can is empty, invert the can and **GENTLY** shake it. If refrigerant is visible from the glass window, there is still some refrigerant left in the can.




9. To change the small empty refrigerant can, you **MUST** close the blue LP valve and the tap by turning their knobs **COMPLETELY** clockwise before reconnecting a new refrigerant can.

> **⚠ Warning**
>
> - NEVER discard discarded refrigerant cans at will or put them in ordinary trash cans.
> - Discarded refrigerant cans MUST be disposed of in accordance with local waste disposal regulations.

10. Consult your A/C system's specifications to find its recommended pressure, usually between 25–80 psi (1.7–5.5 bars).

11. Once the system reaches the recommended pressure, stop charging the system by turning the blue LP valve knob **COMPLETELY** clockwise. Close the tap by turning its knob **COMPLETELY** clockwise.

12. Disconnect the two quick couplers from your A/C system and take down the gauge set.

13. Disconnect the three hoses from the quick couplers, the tap, and the gauge set.

14. Keep the tap securing on the partially used refrigerant can or disconnect it from the empty can.

# 8 Maintenance

- Disconnect the pump from power between uses and before undertaking any cleaning, maintenance, or repair.
- Clean the exterior of the pump with a soft damp cloth. Do not use harsh abrasives or caustic chemicals. Do not allow any electrical component to become wet or damp.
- When the oil turns turbid or its level falls below the "MIN" height mark of the reservoir window, replace it using the following procedure:

    1. Make sure the remaining oil is warm. If you are unsure of your oil's temperature, plug in and turn on your pump, running it for about 10 minutes to heat the oil sufficiently. Turn off the pump and unplug it before continuing.
    2. Remove the oil drain cap using your M4 hex wrench (not included). Grip the handle of the pump and tilt it down to drain the remaining oil into a suitable container.
    3. Screw the cap into place and start filling it as instructed above. Once the initial oil can has been used up, only use oil of equivalent weight (ISO 100 or SAE 30) as a replacement.

- **NEVER** scrape or abrade the hoses or drop the pump or gauges on hard or rough surfaces.
- If any copper core preinstalled in any hose is damaged or worn, replace it with a new identical one using the valve core wrench (not included). If any part of the pump or gauge set is damaged, worn, or shows signs of malfunction, repair or replace it with a new identical one before further use.
- If the pump and gauge set will not be used for an extended time, store them and their accessories in a cool, dry, and clean place away from direct sunlight and inaccessible to children.

# 9 Troubleshooting

| Problems | Solutions |
| --- | --- |
| The vacuum pump cannot be turned on. | Check your power supply and the pump's power cord.<br>Correct any problems as needed. |
| | Move the pump to a warmer location, wait a while, and activate your pump. |
| The vacuum pump turns off automatically during use. | The thermal protector will deactivate your pump if its motor reaches 160 °F (70 °C). Wait about 15 minutes to let it cool down and restart your pump. |

Orion Motor Tech

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