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AR 600

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AITCOOL

Refrigerant Recovery Machine

OPERATOR'S MANUAL

AR 600

WARNINGS

Do not use to pump hydrocarbons, explosion risk.

Do not use to pump flammable media, explosion risk.

Do not connect AR600 to power unless the local environment has been rerified to be clear of combustible gas with a trusted leak detector; explosion risk.

Inhalation of high concentrations of refrigerant vapor can block oxygen to the brain causing injury or death.

Refrigerant liquid can cause frostbite.

Never use an overfill sensor as the primary indicator of recovery cylinder fiIll status; explosion risk. Use a scale as the primary indicator.

Do not apply pressure above 2.6 MPa to the inlet port.

Do not apply pressure above 3.86 MPa to the outlet port.

The recovery cylinder and hoses used must comply with local regulations.

Important Notice

This is not a consumer machine. Only qualified personnel trained in the recovery or pumping of refrigerant may operate this machine.

Read and understand this operator's manual in its entirety before using AR600 to prevent injury or damage to you or equipment.

Class A2L Refrigerant Safety Notice

Class A2L refrigerants (mildly flammable) can be recovered safely ONLY by qualified personnel explicitly trained in the use and handling of A2L refrigerants. This manual is in no way a replacement for proper training.

See additional A2L warnings (pages 1, 5)

Features

★ Lightweight(11.3 kg)

★ Smooth and Fast Operation (1 HP DC Motor)

★ Digital Display with Status Messages

★ Reliable Rubberized Construction

★ Easy to Access Port Design

★ Hex Nut Secures Input Port During Hose Removal

★ 80% Overfill Sensor Protection Port

★ Power Cord Storage

★ Ceramic Cylinders

★ Class A2L Refrigerant Compatible

★ Self Purge

★ Wide 0perating Voltage (85 to 265 VAC)

Specifcations

Display: 2x10000 count LCD with status messages

Backlight: White color

Measurement rate: 3.3 times per second, nominal

Input Port Pressure Sensor Range: -76 cmHg to 4100 kPa (-30"Hg to 600 psig)

Output Port Pressure Sensor Range: -76 cmHg to 4100 kPa (-30" Hg to 600 psig)

High Pressure Cutoff: 3850 kPa (558 psig), nominal

Pressure Relief Valve: 4.2 MPa (609 psig), nominal

Resolution and Units: 5 Kpa (2 cmHg), 1 psig(1"Hg),
0.05 bar (2 cmHg), 0.01 Mpa (2 cmHg)

Pressure Sensor Accuracy:

±1.3 cmHg, ±0.5" Hg (Vacuum)

±(0.6% of reading +14 kPa),± (0.6% of reading +2 psig)

Final Recovery Vacuum: 38 cmHg, 14.9" Hg

Compressor: Twin cylinder reciprocating (oil-less)

DC Motor: 1 HP (variable smart speed)

Power Source: 85 to 265 VAC @ 50/60 Hz 1 phase

Nominal Current Draw: 7.0A

Valve: Single dual-route ball valve

Noise: Sound pressure level <70 db(A)

Dimensions: 380x250x350 mm

Weight:11.3 kg (24.9 lbs)

Operating Environment: 0℃ to 43℃ (32℉ to 109℉)

Storage Environment: -20℃ to 60℃(-4℉ to 140℉)

Approved Refrigerants: 12, 22, 32*, 134A, 143A*, 401A, 401B, 401C, 402A, 402B, 404A, 407A, 407B, 407C, 407D, 408A, 409A, 410A, 448A, 452A, 500, 502, 507, 509, 1234YF*, 1234ZE*

★ Class A2L (mildly flammable) refrigerant

Safety Information

First Aid for Refrigerant Exposure

Inhaled: Move to fresh air immediately.

Eye: Immediately flush eye with water. Seek medical attention.

Skin: Immediately flush skin with water. Seek medical attention.

General

1. This is not a consumer machine. Only qualified personnel trained in the recovery or pumping of refrigerant may operate this machine.

2.Read and understand this operator's manual in its entirety before using AR600 to prevent injury or damage to you or equipment.

Environmental

1.Use only within operating conditions (0℃ to 43℃)

2.Ensure fan opening is clear of debris.

3.Explosion and fire risks:

Do not use near sewer lines.

Do not use in poorly ventilated enclosed areas.

Do not use near gasoline, acetylene, or other flammable gases.

Do not use to pump hydrocarbons.

Do not use near flames or sparks.

Assume all components are pressurized.

Personal Protection

1.Frostbite danger. Be careful using hoses.

2.Use personal protective equipment:

Wear safety goggles.

Wear earplugs if using for long durations.

Wear protective gloves.

3.Use a scale as the primary indicator of refrigerant cylinder fill status. Overfill sensor protection should only be used as backup.

AR 520 Protection

1.Use only on approved list of refrigerants .

2.Do not use with hydrocarbons.

3.Use a filter drier on the input port and change it often to protect machine from contaminated refrigerants.

Setup

1. Ensure power switch is OFF before plugging into power.

2.Repair any damaged parts before using.

3.Disconnect power and allow fan to stop before opening or servicing AR600.

4.Perform self test periodically (page 14).

5.Ensure power cord is not damaged.

6.Ensure power cord is fully connected to IEC port (page 9).

7.Ensure all equipment is grounded.

8.Extension cord options:

14 AWG or thicker, up to 15 meters (50 feet)

12 AWG or thicker, up to 30 meters (100 feet)

9. Ensure extension cord is grounded, 3 conductor grounded.

Operational

1.Use correct refrigerant hoses with ball valve shutoffs.

2.Keep track of the current amount of refrigerant in the cylinder. Refrigerant scales are a good way to do this.

3.Overflling a cylinder past 80% can cause an explosion and violates DOT laws.

4.Close cylinder off from refrigerant if it reaches 80% of its capacity.

5.Use only DOT CFR 49 or UL-approved refrigerant cylinders for the refrigerant being recovered.

6.Use recommended accessories.

7.Monitor pressures and temperatures.

8.Self purge AR600 after each use. No refrigerant should remain in the machine.

Class A2L Refrigerants

1.Complete proper training for A2L refrigerant handling.

2.Ensure availability of a Class B dry powder fire extinguisher at the job site.

3.Self purge AR600 before arriving at the job site.

4.Ensure the area is clear of combustible gas before plugging into power.

5.Ensure power to nearby equipment is disconnected before opening the system.

6.Ensure there are no flames or sparks in the area, including cigarettes.

7.Ensure the power switch is OFF (0) before plugging into power.

A. Turn switch OFF.

B. Plug into power.

C. Turn switch ON.

D. Perform and complete recovery operation.

E.Turn switch OFF.

F. Unplug from power.

8. Always open valves of A2L refrigerant equipment slow enough to close them quickly if a dangerous situation arises.

9. Self purge AR600 after the job is complete.

Tech Tips

General

1. Store in the **Purge** or **Vapor** position. Do not store in the **Finish** position as trapped air and refrigerant can expand and damage components.

2.For extended storage, purge with nitrogen, set to **Vapor**, and screw non-sealing caps onto the ports.

3.Recovery machines are not vacuum pumps and should not be used for deep evacuations.

4. Understand the refrigerant safety data sheet (SDS).

Setup

1. Know the refrigerant of the system and make sure your recovery cylinder matches that type.

2.Hoses:

Short as possible (3/8" hose with 1/4" ftting).

Core depressors removed.

Ball valve shutoffs instead of low loss fttings.

Replace if worn.

3.Manifold gauges are not necessary for recovéry but can make it more convenient and increase speed by having 2 system hook ups.

4.Use a Schrader valve core removal tool to temporarily remove valve cores from service ports.

5.Use the push-pull method if recovering over 14 kg (30 lbs).

6.Evacuate your empty recovery cylinders to 75 cmHg (29.6" Hg) before use for fastest recovery.

7.Know how much refrigerant you expect to recover before starting.

8.Ensure there's enough room in the recovery cylinder to not exceed 80% filled during the job, or monitor and have a second cylinder ready.

9.Always purge hoses before recovery. If cylinder is too hot, use an ice bath to reduce the temperature and pressure of the cylinder.

10.If cylinder pressure is higher than expected, you can purge non- condensables into another cylinder (page 15).

Operational

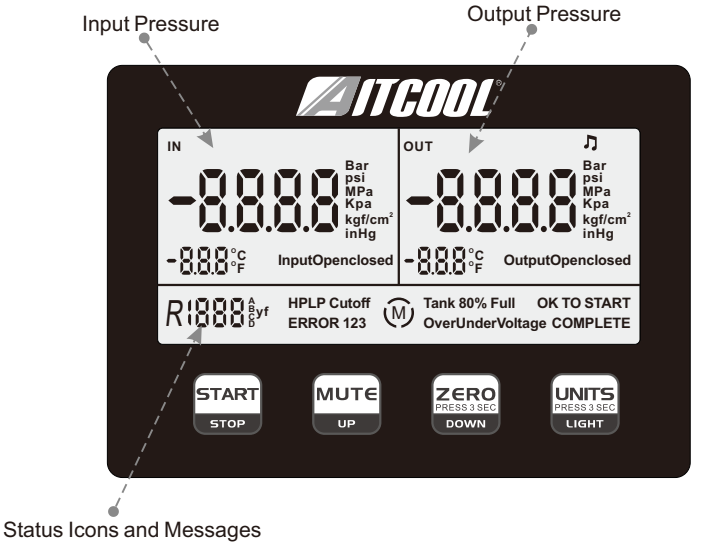
1.Recover as much liquid as possible before recovering vapor.

2.Recovery is faster when the recovery cylinder is cooler.

3.Recover from both suction and liquid lines at the same time for faster vapor recovery.


Handle
Port Routing
Control Knob
Output Port
Intput Port
Backlit Digital Dual
Display and Buttons
80% Overfill Sensor Port
（Cable Not Included）
Power Switch
(Shown ON)
Socket

Display and Buttons



START **STOP** **Start or Stop the motor.**

MUTE **UP** **Switch gas type, temperature unit, pressure units, control backlight.**

ZERO PRESS 3 SEC **DOWN** **Switch gas type, temperature unit, pressure units,mute.**

UNITS PRESS 3 SEC **LIGHT** **Switch gas type, temperature unit, pressure units.**

Status Icons and Messages

Ⓜ The icon lights up when the motor is running.

♫ The icon is shown when AR600 is set to sound.

OK TO START

1. When the motor is normal, the screen will light up **OK TO START**.
2.When the work is COMPLETE and the air pressure is restored TO 0.5bar, the screen will light up **OK TO START**.

Complete Display

After the work is completed, the generator will shut down and **COMPLETE** will light up (the input air pressure will be below -20InHg without fluctuation in one minute).

Tank 80% Full

Motor stopped.Overfill sensor triggered by liquid level of refrigerant in the recovery cylinder.

Input Open Display

It will light up when the input pressure is within the range of atmospheric pressure ± 5000Pa, and will not light up when the input pressure exceeds this range

Output Open Display

When the output pressure value is within atmospheric pressure ± 5000Pa, it will light up, beyond this range will not light up.

Over Voltage Warning

Moter stopped. Voltage was above 265VAC.

Under Voltage Warning

Moter stopped. Voltage was below 85VAC.

HP-Cutoff Display

1. The output pressure is greater than 3.8mpa, HP-Cutoff will light up.
2. After the output alarm is cleared, HP-Cutoff will not be displayed.

LP-Cutoff Display

COMPLETE light, LP-Cutoff light;COMPLETE don't show,LP-Cutoff will not be displayed.

ERROR 1

When the sensor is faulty, for example, the sensor is not connected,ERROR 1 will light up.

ERROR 2

When the motor fails, ERROR 2 will light up.

ERROR 3

For other faults, ERROR 3 will light up.

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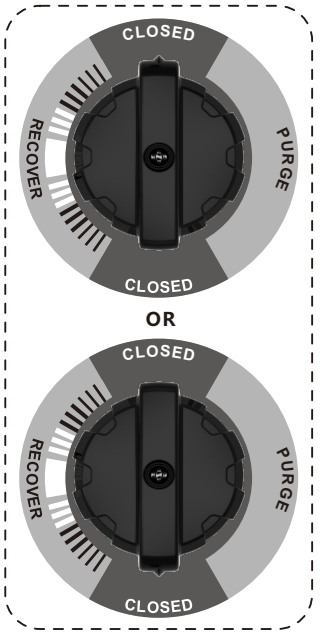
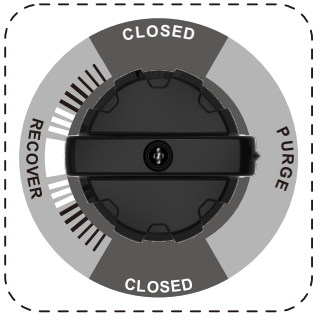
Port Routing Control



CLOSED

★ Input and Output closed.

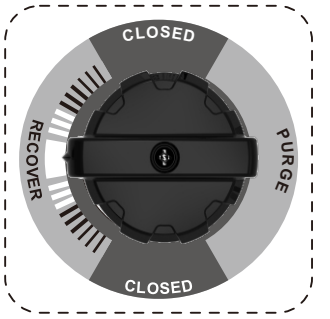
★ Set to either closed position to close off both ports during setup.



Purge

★ Input closed, Output open.

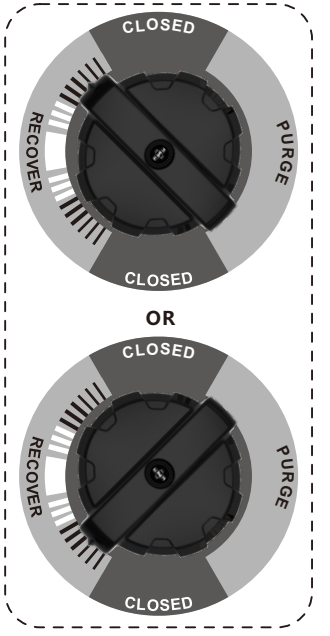
★ After recovery is complete, set to this position to close the IN port before you START the purge.



RECOVER

★ Input and Output fully open.

★ Set to this fully open position for most of the recovery process.



RECOVER(throttled)

★ Input and Output partially open.

★ Rotate away from RECOVER in either direction to reduce liquid slugging if knocking occurs. This slows the flow of refrigerant so the machine operates more smoothly.

★Only throttle as much as needed for smooth operation.

Dynamic Pressure Measurement

General

AR600 pressure readings are designed only for monitoring pressures. Do not use AR600 for diagnostic pressure measurements.

If a system's pressure is stable, AR600 pressure readings will be close to your other pressure gauges.

If a system's pressure is changing, pressure measurements at different locations within that system will be different. For every meter of 1/4" hose, the pressure may have a difference of approximately ±150 kPa.

Functions

Self Test

Perform this test to ensure the high pressure cutoff and pump are operational.

1. Set knob to **Vapor.**
2. Open IN port to air.
3. Connect a ball valve to OUT port. (Included caps are not sealed.)
4. Close the ball valve.
5. Press START to create a pressure at the OUT port.
6. AR600 is working well if High Pressure Cutoff occurs around 3800 kPa (550 psig) within 45 seconds. Cutoff time can increase if a hose is placed in front of your ball valve.

Self Purge

Use the SELF PURGE feature at the end of every recovery to pump the last bit of refrigerant out of AR600. Benefits include increased machine life, reduced environmental impact, and most importantly to prevent refrigerant mixing.

1. After recovery is complete, set knob to **Purge**. This closes the IN port and routes the AR600 condenser to the intake of the AR600 compressor.
2. Press START to empty AR600 into the recovery cylinder.
3. Once 25 cmHg (10"Hg) is reached for 10 seconds, the motor stops automatically.

Purging a Recovery Cylinder

When the cylinder pressure is higher than expected you may have non-condensables at the top of the cylinder. Use a second deeply evacuated cylinder to pull out the non-condensables.

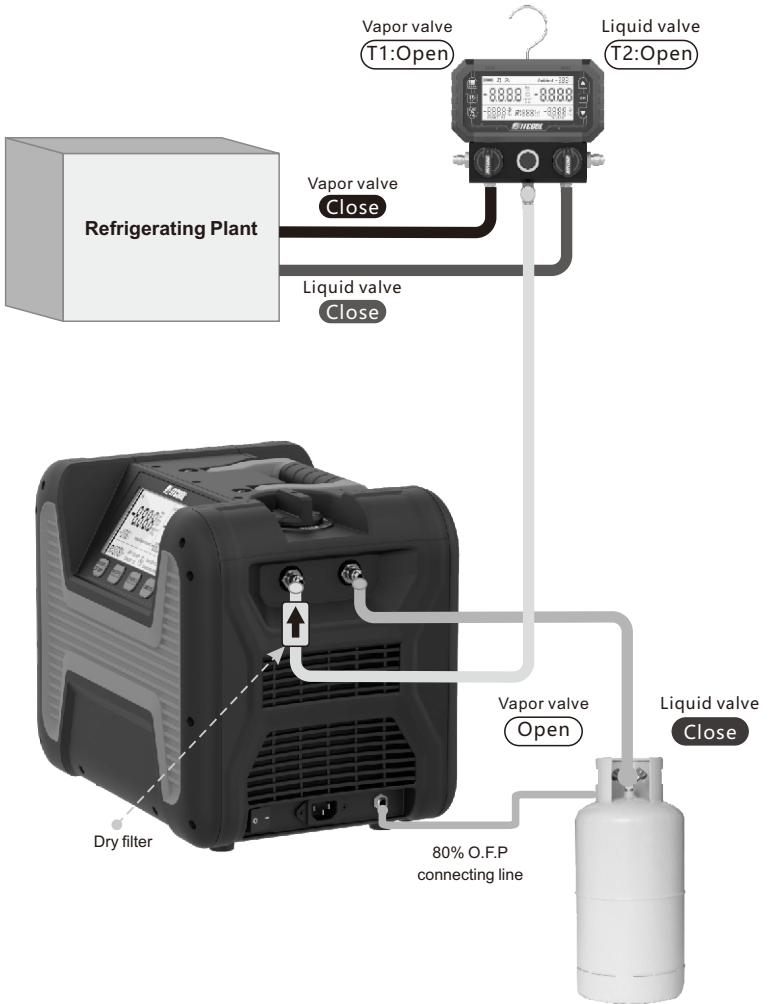
1. Leave pressurized cylinder undisturbed ove night.
2. Use a vacuum pump to evacuate another cylinder.
3. Use your manifold gauges to connect the closed vapor ports of the two cylinders.
4. Measure the vapor temperature of the pressurized refrigerant cylinder.
5. Use a P/T chart or digital manifold to find specified pressure.
6. Open the evacuated vapor port.
7. Open (purge) the pressurized vapor port until pressure is reduced to 35 kPa (5 psi) above specified pressure.
8. Close valves.
9. If desired, repeat in 15 minutes to allow the tank to settle again.

80% Overfill Sensor Cable Port

AR600 models have a 6.35mm (1/4") input for an 80% fill sensor cable (sold separately). Always use a scale to determine how full a refrigerant cylinder is. The fill sensor should only be used as a secondary indicator.

1. Connect the overfill sensor cable to AR600.
2. Connect the overfill sensor cable to an equipped recovery cylinder.
3. See pages 16-19 for recovery setup and operation.
4. AR600 automatically stops when triggered by the overfill sensor.

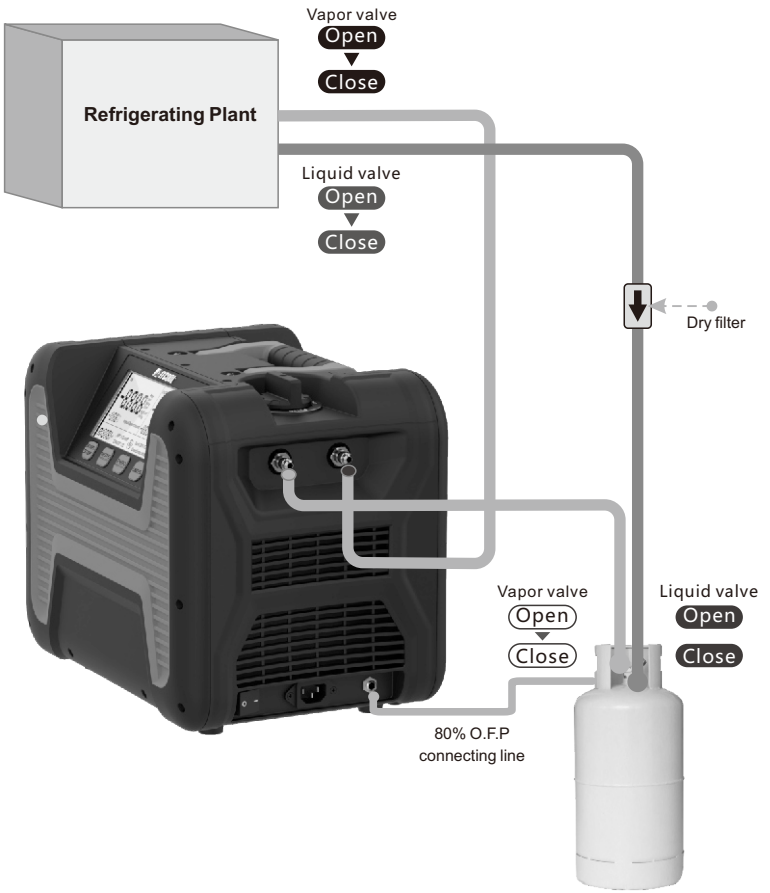
Direct Liquid/Vapor Recovery



This is the typical recovery method. Vapor and liquid lines are routed through your manifold, into AR600, and out to the recovery cylinder. CAUTION: Understand all class A2L refrigerant warnings and notices if applicable (pages 1, 5).

1. Before connecting, switch to OFF (0), then plug into power.
2. Switch to ON (I).
3. Close valves of recovery cylinder, AR600, and manifold.
4. Set up as shown in the diagram.
5. Open valves of hoses and removal tools.
6. Set AR600 to **Vapor**.
7. Open high side of manifold for liquid recovery.
8. To purge air from hoses, briefly unseat hose fitting at cylinder until vapor is seen. Unseat hose fitting at low side of manifold to purge low side hose.
9. Fully open vapor valve of recovery cylinder.
10. Press START to begin recovery.
11. Adjust the knob as needed to throttle refrigerant flow if liquid slugging (knocking)occurS,
12. When liquid recovery is complete, open low side of manifold for vapor recovery.
13. AR600 stops automatically after vacuum reaches 25 cmHg for 10 seconds. For a deeper vacuum, press START to continue recovery. AR600 stops again after vacuum reaches 50 cmHg for 10 seconds. Press STOP to manually halt recovery at any time.
14. Set knob to **Purge** and press START to empty AR600.AR600 stops automatically after vacuum reaches 25 cmHg for 10seconds.
15. Close manifold and cylinder valves after self purge is complete.
16. Remove hoses from AR600, set knob to **Vapor**, and cap ports.
17. Switch to OFF (0), then unplug from power.

Push/Pull Recovery



This method is only for larger systems with at least 14 kg of Liquid refrigerant. It's used to recover liquid before recovering vapor.

(AUTION; Understand all class A2L refrigerant warnings and notices if applicable (pages1, 5).

1. Before connecting, switch to OFF (0), then plug into power.,
2. Switch to ON (I).
3. Close valves of recovery cylinder and AR600.
4. Set up as shown in the diagram.
5. Open valves of liquid hose and removal tool at liquid system port.
6. To purge air from system liquid hose, briefly unseat hose fitting at cylinder's liquid port until vapor is seen.
7. Fully open liquid valve of recovery cylinder and allow to pressurize.
8. Set AR600 to **Vapor**.
9. Press START to begin recovery.
10. Fully open vapor valve of recovery cylinder.
11. To purge air from hoses briefly unseat hose fitting at vapor system port until vapor is seen.
12. Open valves of vapor hose and removal tool at vapor system port.
13. When liquid recovery is complete, press STOP to stop motor.
14. Close all valves and proceed to Direct Vapor Recovery (page 17).
15. Switch to OFF (0), then unplug from power.

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Tank 80% Full
Overfill sensor indicated the recovery cylinder is full. Replace recovery cylinder.

Input Closed
Cannot zero the displayed pressure because pressure sensor not open to atmosphere. Open input port.

Output Closed
Cannot zero the displayed pressure because pressure sensor not open to atmosphere. Open output port.

High Voltage Warning
Voltage was above 265 VAC. Motor stopped. Ensure power network voltage is between 85 and 265VAC @ 50 Hz.

Low Voltage Warning
Voltage was below 265 VAC. Motor stopped. Check power network to ensure voltage is between 85 and 265VAC @ 50 Hz.

High Pressure Cutoff
Output cylinder reached dangerous pressure. Motor stopped. Ensure all valves after the output port are open. The cylinder may need to be cooled or replaced to reduce pressure.

Low Pressure Cutoff
Input reached final recovery vacuum. Motor stopped. It's normal to see this after **Vapor** or **Purge** is complete. Ensure valves before the input port are open and the knob is not set to **Finish**.