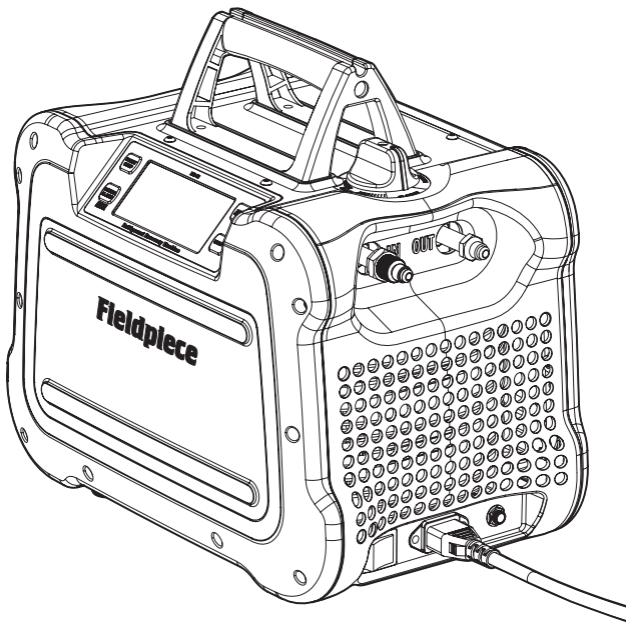


Fieldpiece[®]

Refrigerant Recovery Machine

OPERATOR'S MANUAL

Model MR45INT



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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 MR45INT 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 5, 12)

What's Included

- MR45INT Refrigerant Recovery Machine
- 10 Extra Mesh Screens for Input Port
- 3 Extra O-ring for Input Port
- 65 cm IEC Power Cord
- Operator's Manual
- 1 Year Warranty

WARNINGS

Do not use to pump hydrocarbons, explosion risk.

Do not use to pump flammable media, explosion risk.

Do not connect MR45INT to power unless the local environment has been verified 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 fill 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.

Description

The MR45INT is the first variable speed DC motor recovery machine with a digital display. Recover refrigerant easier and quieter than ever before. Connect your hoses to the conveniently placed ports without navigating around dark tight spaces or picking the machine off the ground. View status messages and pressures directly on the big bright display.

Carry the lightweight machine to and from the job site easily. Turn the single rubberized control valve to route refrigerant through MR45INT, and use the self-purge function to recover the last traces into the recovery cylinder instead of being left in the machine or released into the environment.

Features

- **Lightweight (10 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 Operating Voltage (190 to 255 VAC)**

Certifications



WEEE

Correct disposal of this product: This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

Specifications

Display: 2 x 10000 count LCD with status messages

Backlight: Blue 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: 190 to 255 VAC @ 50/60 Hz 1 phase

Nominal Current Draw: 7.0 A

Valve: Single dual-route ball valve

Input Port Filtration: 9 mm mesh screen, stainless

Noise: Sound pressure level <70 db(A)

Dimensions: 376 mm x 250 mm x 344 mm (14.8" x 9.8" x 13.5")

Weight: 10 kg (22 lbs)

Operating Environment: 0°C to 43°C (32°F to 109°F)

Storage Environment: -20°C to 60°C (-4°F to 140°F)

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

Performance Data

Refrigerant	R22	R134A	R407C	R410A
Push/Pull Recovery (kg/min)	4.6	5.4	5.2	7.2
Liquid Recovery (kg/min)	4.7	2.9	5.1	5.6
Vapor Recovery (kg/min)	0.28	0.28	0.33	0.33
Final Recovery Vacuum (kPa)	50.8	50.8	50.8	50.8
Residual Trapped Refrigerant (kg)	0.005	0.008	0.004	0.005
High Temp (104°F) Vapor Recovery (kg/min)	0.40	-	-	-

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 MR45INT to prevent injury or damage to you or equipment.

Environmental

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

MR45INT Protection

1. Use only on approved list of refrigerants (page 8).
2. Do not use with hydrocarbons.
3. Ensure mesh screen filter is installed and clean (page 32).
4. 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 MR45INT.
4. Perform self test periodically (page 24).
5. Ensure power cord is not damaged.
6. Ensure power cord is fully connected to IEC port (page 17).
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. Overfilling 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 MR45INT 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 MR45INT 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 MR45INT after the job is complete.

Tech Tips

General

1. Store in the self purge or recover position. Do not store in the CLOSED position as trapped air and refrigerant can expand and damage components.
2. For extended storage, purge with nitrogen, set to RECOVER, and screw non-sealing caps onto the ports.
3. Recovery machines are not vacuum pumps and should not be used for deep evacuations.
4. Do not run the machine without the mesh screen filter (page 32). Doing so will void the warranty and damage the machine.
5. 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" fitting).
Core depressors removed.
Ball valve shutoffs instead of low loss fittings.
Replace if worn.
3. Manifold gauges are not necessary for recovery 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 25).

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.

Controls

Backlit Digital Dual Display and Buttons

IEC Power Cord Storage

Port Routing Control Knob

Mesh Screen Filter

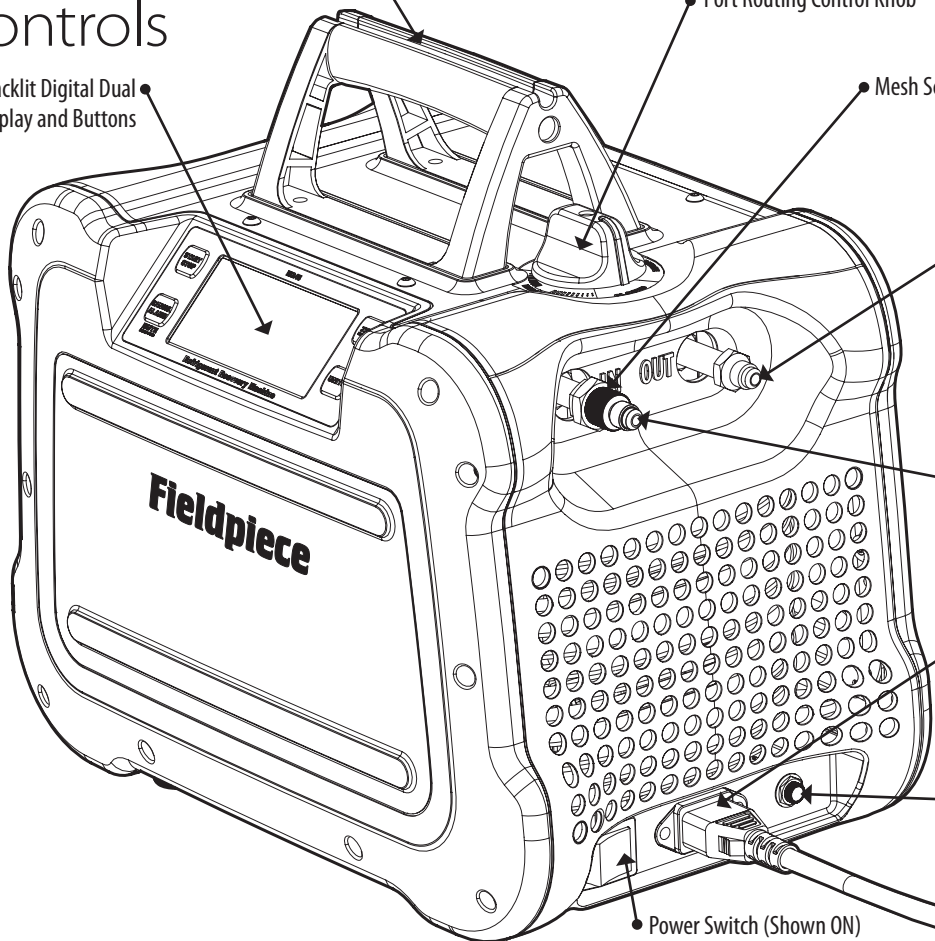
Output Port

Input Port

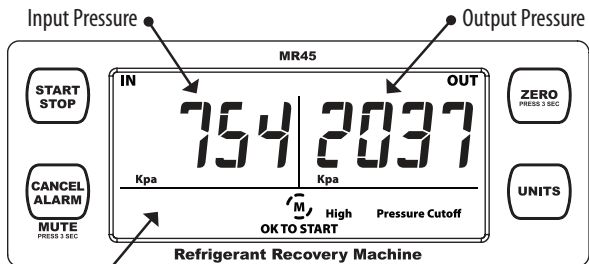
IEC Power Cord Port and Plug

80% Overfill Sensor Port (Cable Not Included)

Power Switch (Shown ON)



Display and Buttons



● Status Icons and Messages

START/STOP

Start or Stop the motor.

ZERO (press 3 seconds)

Zero pressure sensors. Set knob to RECOVER and uncap ports.

CANCEL ALARM

Cancel alarm currently sounding (temporarily mute).

MUTE (press 3 seconds)

Toggle mute for all sounds (setting is saved).

UNITS

Select pressure/vacuum units (setting is saved).

Status Icons and Messages

 The icon rotates when the motor is running.

 The icon is shown when MR45INT is set to MUTE.

OK TO START

Motor stopped. Temperatures, voltages, and pressures are currently safe to start the motor again.

COMPLETE

Motor stopped. Purge or recovery has reached 25 cmHg or 50 cmHg (10" Hg or 20" Hg) vacuum for 10 sec.

Tank 80% Full

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

Input Closed

Cannot zero pressures. Open input port.

Output Closed

Cannot zero pressures. Open output port.

High Voltage Warning

Motor stopped. Voltage was above 250 VAC.

Low Voltage Warning

Motor stopped. Voltage was below 200 VAC.

High Pressure Cutoff

Motor stopped. Output (cylinder) approached dangerous pressure.

Low Pressure Cutoff

Motor stopped. Input reached 25 cmHg or 50 cmHg (10" Hg or 20" Hg) vacuum for 10 sec.

Motor Fault 1

Motor stopped. Motor temp. measured above operating range.

Motor Fault 2 ("throttle" shows on display)

Motor stopped. Motor current (amps) rose above operating range. Throttle RECOVERY to reduce cylinder pressure (page 21).

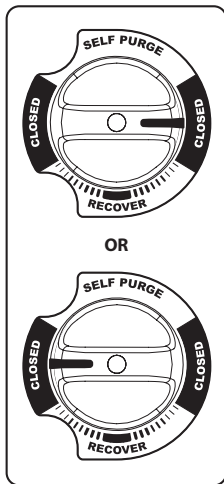
Motor Fault 3

Motor stopped for unknown reason.

Fault 3 ("PLug O.F.S" shows on display)

80% overfill Sensor not detected. Plug sensor cable into cylinder.

Port Routing Control



CLOSED

- Input and Output closed.
- Set to either closed position to close off both ports during setup.



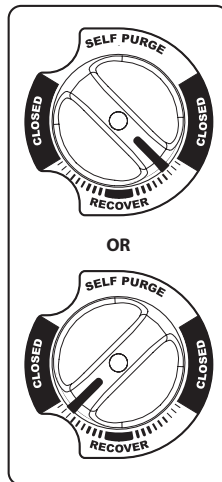
SELF PURGE

- 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.

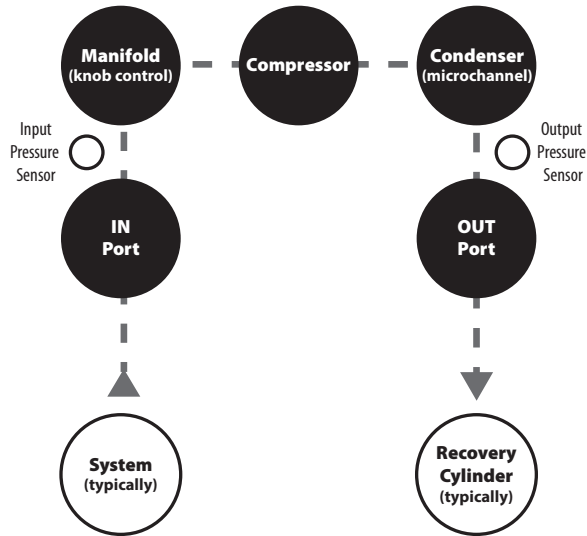


RECOVER (throttled)

- 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.

MR45INT Refrigerant Flow

Refrigerant liquid and vapor are pulled through the machine by the pressure difference created by the compressor. For maximum performance, increase the IN pressure and reduce the OUT pressure. See Tech Tips (page 14).



Dynamic Pressure Measurement

MR45INT pressure readings are designed only for monitoring pressures. Do not use MR45INT for diagnostic pressure measurements.

If a system's pressure is stable, MR45INT 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 RECOVERY.
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. MR45INT 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 MR45INT. Benefits include increased machine life, reduced environmental impact, and most importantly to prevent refrigerant mixing.

1. After recovery is complete, set knob to SELF PURGE. This closes the IN port and routes the MR45INT condenser to the intake of the MR45INT compressor.
2. Press START to empty MR45INT into the recovery cylinder.
3. Once 25 cmHg (10" Hg) is reached for 10 seconds, the motor stops automatically.

Purging a Recovery Cylinder

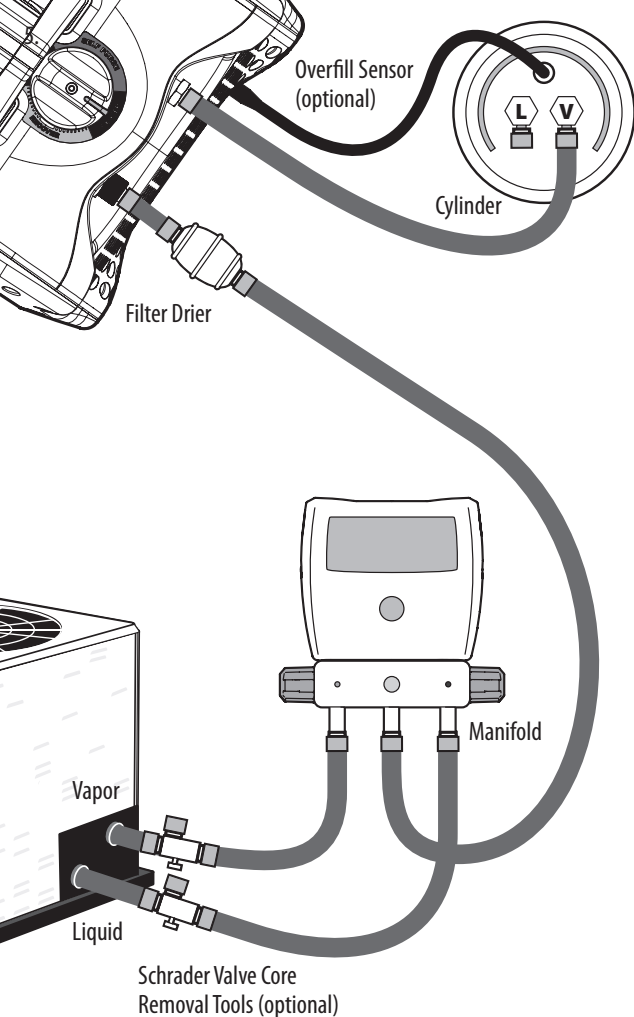
When the cylinder pressure is higher than expected you may have non-condensables at the top of the cylinder. Use a second deeply evacuated cylinder to pull out the non-condensables.

1. Leave pressurized cylinder undisturbed overnight.
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

MR45INT models have a 6.35mm (1/4") input for an 80% overfill sensor cable (sold separately). Always use a scale to determine how full a refrigerant cylinder is. The overfill sensor should only be used as a secondary indicator.

1. Connect the overfill sensor cable to MR45INT.
2. Connect the overfill sensor cable to an equipped recovery cylinder.
3. See pages 26-29 for recovery setup and operation.
4. MR45INT automatically stops when triggered by the overfill sensor.

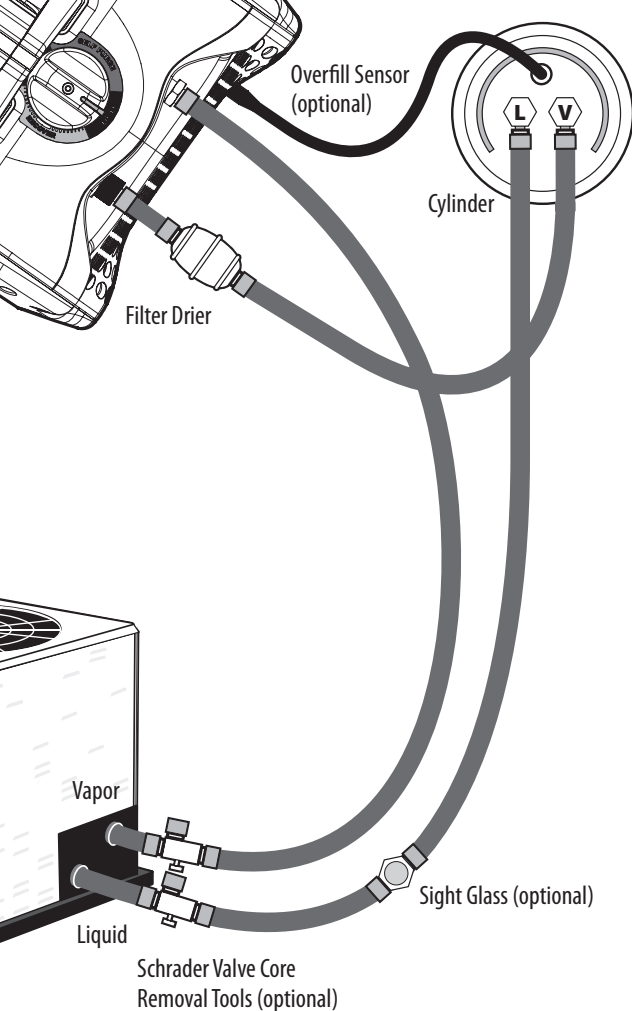


Direct Liquid/Vapor Recovery

This is the typical recovery method. Vapor and liquid lines are routed through your manifold, into MR45INT, and out to the recovery cylinder.

CAUTION: Understand all class A2L refrigerant warnings and notices if applicable (pages 5, 12).

1. Before connecting, switch to OFF (O), then plug into power.
2. Switch to ON (I).
3. Close valves of recovery cylinder, MR45INT, and manifold.
4. Set up as shown in the diagram.
5. Open valves of hoses and removal tools.
6. Set MR45INT to RECOVER.
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. MR45INT stops automatically after vacuum reaches 25 cmHg for 10 seconds. For a deeper vacuum, press START to continue recovery. MR45INT stops again after vacuum reaches 50 cmHg for 10 seconds. Press STOP to manually halt recovery at any time.
14. Set knob to SELF PURGE and press START to empty MR45INT. MR45INT stops automatically after vacuum reaches 25 cmHg for 10 seconds.
15. Close manifold and cylinder valves after self purge is complete.
16. Remove hoses from MR45INT, set knob to RECOVER, and cap ports.
17. Switch to OFF (O), 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.

CAUTION: Understand all class A2L refrigerant warnings and notices if applicable (pages 5, 12).

1. Before connecting, switch to OFF (0), then plug into power.
2. Switch to ON (I).
3. Close valves of recovery cylinder and MR45INT.
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 MR45INT to RECOVER.
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 27).
15. Switch to OFF (0), then unplug from power.

Troubleshooting

Status Messages

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 250 VAC. Motor stopped. Ensure power network voltage is between 200 and 250 VAC @ 50 Hz.

Low Voltage Warning

Voltage was below 200 VAC. Motor stopped. Check power network to ensure voltage is between 200 and 250 VAC @ 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 RECOVERY or SELF PURGE is complete. Ensure valves before the input port are open and the knob is not set to CLOSED.

Motor Fault 1

Motor temperature above operating range. Motor stopped. Extremely high ambient temperature, extended liquid recovery time, or high cylinder pressure can be the cause. Allow time for the motor to cool down before resuming, and throttle the RECOVERY (page 21).

Motor Fault 2 (“throttle” shows on display)

Motor current (amps) rose above operating range. Motor stopped. Extremely high ambient temperature, harsh liquid slugging, extended recovery time, or high cylinder pressure can be the cause. Throttle RECOVERY and start the motor. If fault occurs again, throttle even more and start the motor (page 19).

Motor Fault 3

Motor stopped for unknown reason. If this occurs repeatedly, there may be something wrong with MR45INT.

Fault 3 (“PLUG O.F.S” shows on display)

80% overfill Sensor not detected. Plug sensor cable into cylinder.

Other Symptoms

MR45INT never reaches 25 cmHg or 50 cmHg.

Check for a leakage before the input port.

Recovery cylinder should be below 3200 kPa for 25 cmHg vacuum.

Recovery cylinder should be below 1600 kPa for 50 cmHg vacuum.

Input port shows frost or signs of leakage.

Ensure the grooved input fitting is hand tight before tightening the hex nut (page 32).

Recovery is slower than normal.

There could be an input blockage. Check mesh screen filter for blockage. Ensure knob is set to RECOVER.

Display does not turn on when plugged in.

Ensure power cord and outlet are okay.

Ensure power switch is flipped ON after plugging into power.

Excessive noise during liquid recovery.

MR45INT is experiencing a high load. Rotate the knob of MR45INT to throttle the refrigerant flow.

Overfill sensor not working correctly.

Check for loose connection. Overfill sensor may be broken. Verify overfill with scale. If overfill sensor is bad, mark tank for disposal.

Maintenance

General

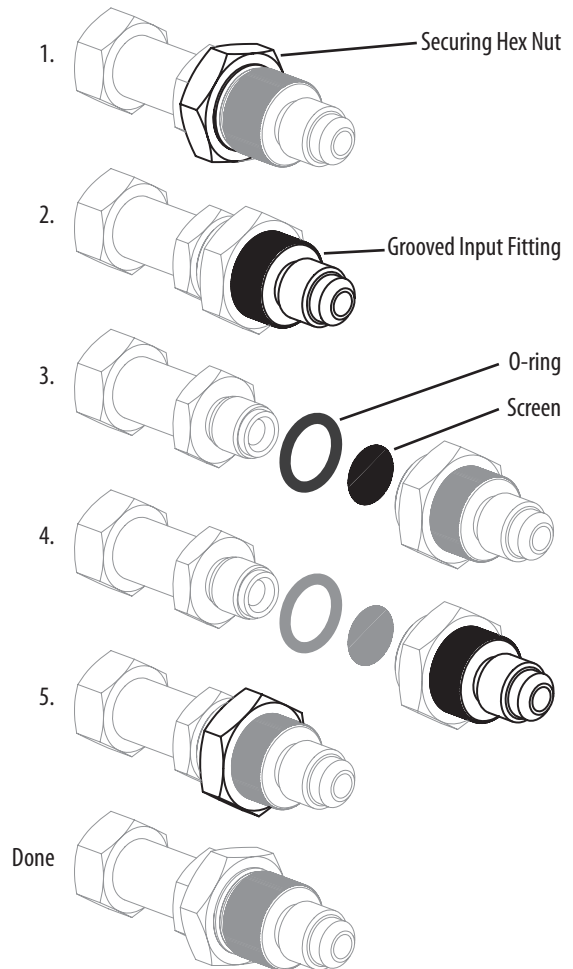
Wipe with damp cloth to clean the exterior.
Do not use solvents.

To extend the life of internal seals, occasionally pump a teaspoon of mineral oil through MR45INT.

Mesh Screen Filter

When the mesh screen filter becomes dirty and clogged, it means it's working to keep your MR45INT working well for a long time. You need to clean or replace this screen often. Visit our website for information on obtaining extra mesh screens.

1. Loosen (counter clockwise) the securing hex nut on the IN port.
2. Unscrew (counter clockwise) the grooved input fitting.
3. Clean or replace the mesh screen.
4. Hand tighten (clockwise) the grooved input fitting.
5. Tighten (clockwise) the securing hex nut with 1/8 turn with a wrench.



Limited Warranty

This machine is warranted against defects in material or workmanship for one year from date of purchase from an authorized Fieldpiece dealer. Fieldpiece will replace or repair the defective unit, at its option, subject to verification of the defect.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the machine.

Any implied warranties arising from the sale of a Fieldpiece product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. Fieldpiece shall not be liable for loss of use of the machine or other incidental or consequential damages, expenses, or economic loss, or for any claim of such damage, expenses, or economic loss.

Local laws vary. The above limitations or exclusions may not apply to you.

Obtaining Service

Warranty for products purchased outside of the U.S. should be handled through local distributors. Visit our website to find your local distributor.

MR45INT