OPERATING INSTRUCTIONS

REVAC/REVAC-UL

OIL-LESS REFRIGERANT RECOVERY UNIT/VACUUM PUMP
PULLS 500 MICRONS - (PATENTED)

NATIONAL REFRIGERATION PRODUCTS
985 WHEELER WAY • LANGHORNE, PA 19047
(215) 638-8909 • FAX (215) 638-9270

MODELS REVAC/REVAC-UL

The REVAC/REVAC-UL Units can recover liquid refrigerant when using a recovery cylinder with a 2 port valve or a cylinder with 2 valves. One liquid and one vapor.

The REVAC-UL unit is equipped with an automatic recovery cylinder shut off. This shutoff maintains a maximum 80% fill of the recovery cylinder by volume.

Always use a scale to prevent overfilling of refrigerant cylinders when using the REVAC. Maximum fill weights are noted on a label on the top cover.

- *ALWAYS USE CYLINDERS APPROVED FOR RECOVERY* (NRP model NC50U or equivalent).
- *DO NOT MIX DIFFERENT REFRIGERANTS IN A CYLINDER.* Mixtures cannot be separated.
- *ALWAYS WEAR RUBBER GLOVES AND GOGGLES WHEN TRANSFERRING REFRIGERANT.*
- *ALWAYS USE AN 053 FILTER DRIER AT INLET OF THE REVAC/REVAC-UL TO PROTECT THE COMPRESSOR PRESSURE REGULATOR AND SOLENOID VALVES.*

NOTE:

1. All valves on the REVAC/REVAC-UL must be in the closed position except when the machine is in use. The
2. REVAC/REVAC-UL is just like a refrigeration unit and must not be open to air since moisture will damage the compressor.
3. Connect the REVAC/REVAC-UL to a properly grounded 115 volt 1 phase 60 HZ outlet. Do not use an extension cord longer than 25 ft. The voltage drop will damage the compressor.
4. Refrigeration hoses should not exceed eight feet in length. For optimum recovery rates use 3/8" ID hoses not longer than five feet (it may be necessary to adapt down to 1/4" fittings).
5. Always use National Vacuum Pump Oil or equivalent when filling the vacuum side of the REVAC/REVAC-UL
6. Fill vacuum pump oil to 1/2 sight glass maximum (While compressor is running). Just a teaspoon low affects the ultimate vacuum. If oil is too low, you will hear the exhaust baffle chatter. If the oil level is too high, excess oil will be blown out the exhaust.
7. After evacuation, oil contains rust forming water and corrosive acids. Drain immediately while pump is warm.
8. Care should be taken to avoid contact on skin and clothing when changing oil. Used oil should be disposed of in a leak proof corrosive-resistant container.
9. If the oil is badly contaminated, flushing the REVAC/REVAC-UL vacuum pump may be necessary.
10. The REVAC/REVAC-UL compressor and oil must be above 30° F for proper operation.

USE AN 053 DRIER ON THE INLET LINE OF THE REVAC/REVAC-UL UNIT TO PROTECT THE COMPRESSOR AND TO PREVENT PARTICLES FROM INTERFERING WITH THE PROPER OPERATION OF THE PRESSURE REGULATOR AND SOLENOID VALVES. The Drier must be changed after recovery from a burnout system. The Drier must be changed before transferring another refrigerant to avoid mixing refrigerant. The Drier must be changed after recovering 50 pounds of refrigerant.

The REVAC/REVAC-UL is suitable for R12, R22, R502, R134a, blends and new refrigerants.
May not be suitable for all blends. Please consult the factory!

Always remove Schraeder cores from access fittings on disabled units. This type of restriction reduces recovery rate drastically. (Use a Schraeder core removing tool, NRP Part # CR-1 which allows hose connection without venting.)

When starting up the REVAC/REVAC-UL always turn the power switch on first, then open the outlet and inlet ball valves respectively. Do not open the inlet first or pressure may build up quickly on the discharge and cause the REVAC/REVAC-UL to shut off on high head! When starting the REVAC/REVAC-UL under high pressure conditions press and hold the "Equalize Button" on the control panel for 5 seconds. This equalizes the pressure between the high and low sides of the unit and allows the compressor to start under no load.

WARNING

Avoid the use of an extension cord because the extension cord may overheat. However, if you must use an extension cord, the cord must be AWG 14/3 minimum, oil resistant, meet N.E.C. and 25 feet long maximum.

WARRANTY

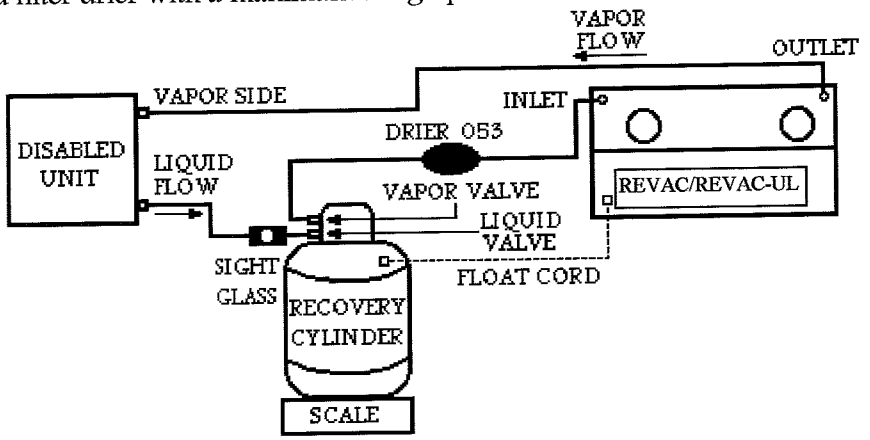
NRP Recovery Equipment is warranted to be free of manufacturing defect. NRP will repair or give credit for repair at NRP choice if any NRP Recovery Units or accessories have manufacturing defects. Any warranty claim must be submitted in writing within one year of purchase with copy of invoice. In no event shall NRP be liable for the cost of labor charges, lost profits, injury to good will or any other special consequential damages for defective goods, late delivery or non-delivery. There are no warranties which extend beyond the description of the face hereof, and NRP makes no warranty of merchant ability or fitness for specific purpose. Warranty does not cover damage by improper operation or abuse.

THE FOLLOWING DAMAGES TO THE REVAC/REVAC-UL ARE NOT COVERED BY THE WARRANTY:

A. Damage to the compressor which is due to liquid being introduced at the inlet valve of the REVAC/REVAC-UL unit which would slug the REVAC/REVAC-UL compressor and damage the compressor valves.
B. Damage to the suction pressure regulator or to the solenoid valves due to particles which would have been brought in with contaminated refrigerant because the inlet filter drier 053 was not used. Particles such as shavings will interfere with the CRO and with the solenoid valve.

DIAGRAM (1): Liquid Recovery-External Push/Pull Method

NOTE: Do Not connect liquid line to recovery unit. Compressor will be damaged. Always use a U.L. listed filter drier with a maximum design pressure of 350 PSI.



Liquid refrigerant is transferred directly from the disabled unit to the bottom of the recovery unit at a rate of 12 lb./min. The recovery unit pumps refrigerant vapor from the top of the cylinder to the disabled unit. This maintains a lower pressure in the cylinder than in the disabled unit which pulls refrigerant to the cylinder.

1. Connect the disabled unit to the cylinder and recovery unit as shown in Diagram (1). Use 3/8" hose less than 5 feet long. Connect a sight glass onto the liquid port of the recovery cylinder as shown. Connect the yellow float cord on the REVAC-UL to the float switch on the recovery cylinder. The Cylinder must be standing upright. (There is no yellow float cord on the REVAC)

2. Open both valves on cylinder.

3. The Pump out switch should be in the "Off" position.

4. Turn on the recovery unit. (The REVAC-UL compressor will operate only if the yellow float cord is connected to the NC50U.)

5. Open the outlet valve.

6. Open the inlet valve.

7. Liquid refrigerant should be visible in the sight glass.

8. When liquid transfer is completed or the cylinder is 80% full, **immediately shut off the valves on the cylinder and recovery unit .** The REVAC-UL will automatically stop when the NC50U cylinder is 80% full. The tank full light will also come on.

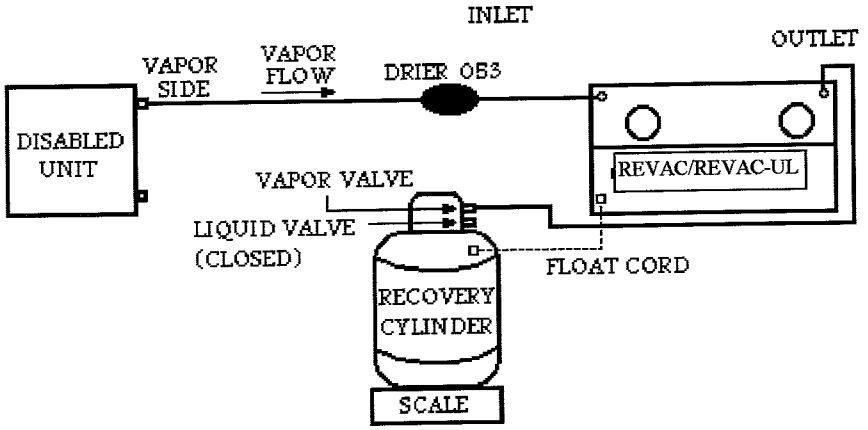
9. Turn the off recovery unit.

Note:

- In some cases it may not be possible to recover the refrigerant in liquid form. There may not be much liquid refrigerant or it may have migrated to another part of the system. In such cases the refrigerant must be recovered in vapor form.

- The Push/Pull method is recommended only for systems with service valves, having an access port, that can be front seated. (Isolating the high side from the low side on the disabled unit is recommended when using the Push /Pull method.)

DIAGRAM (2): Vapor Recovery



Once liquid has been removed as shown in Diagram (1), the remaining vapor can be extracted with the recovery unit as shown in Diagram (2). Vapor is transferred at a rate of approximately 1 pound per minute depending on the suction pressure.

1. Connect the disabled unit to the cylinder and to recovery unit as shown in Diagram (2). Use a 3/8" hose less than five feet long for faster recovery (The discharge and suction valves at disabled compressor can be manifolded for faster recovery). The cylinder must be standing upright.

2. Open the vapor valve on the cylinder (liquid valve on cylinder is shut). Open both valves on the recovery unit.

3. The Pump-Out switch must be in off position. Note: The REVAC-UL compressor will operate only if the yellow float cord is connected to the NC50U. There is no yellow cord to connect on the REVAC.

4. Turn the recovery unit on.

5. Open outlet valve.

6. Open inlet valve.

7. When the pressure on the inlet gauge reaches 10" Hg vacuum, vapor recovery is complete. Turn the REVAC/REVAC-UL unit off and wait two minutes. If the pressure rises, turn the recovery unit on the until inlet pressure is down to 10" Hg vacuum.

8. When vapor transfer is complete, or the cylinder is 80% full, shut the off valves on the cylinder and recovery unit.

9. Pump out the recovery unit at the end of each transfer operation per instructions. (See Pump Out Instructions page 6)

10. Turn off the recovery unit .

SELF PUMP-OUT PROCEDURE

To meet EPA requirements of no venting and to avoid mixing refrigerant, it is important that before recovering a different refrigerant, the remaining refrigerant left in the REVAC/REVAC-UL recovery unit be pumped out into a recovery cylinder.

The REVAC/REVAC-UL has a patented self pump-out system.

1. To pump out the REVAC/REVAC-UL unit, first close the inlet valve.
2. Connect a hose from the outlet of the REVAC/REVAC-UL to the Liquid Port on a recovery cylinder or, if you are at the end of a recovery operation just leave the outlet hose connected.
3. Turn on the pump out switch on.
4. Turn on the REVAC/REVAC-UL power switch.
5. When the inlet pressure gauge on the REVAC/REVAC-UL is down to 10" Hg vacuum, self pump out is complete.
6. When self pump out is complete, close the cylinder valve and outlet valve.
7. Turn off the pump out switch and then the power switch.

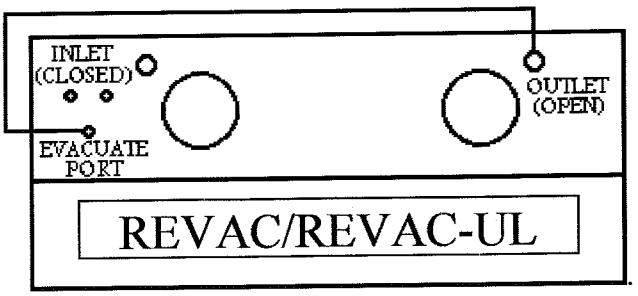
   A total evacuation of the unit can only be obtained by using the REVAC/.REVAC-UL's vacuum pump. This can be seen in Diagram (3)

   NOTE: There is generally a small quantity of refrigerant left in the REVAC-UL after Pump Out. Relieve this pressure from the REVAC-UL by opening the outlet valve. This is legal!
8. To facilitate the pump out cycle during high ambient condition when handling R22 or R502 it might be necessary to pump out the refrigerant into an empty cylinder or a cylinder which is less than half full. This will prevent the REVAC-UL from going off on high-pressure cut out.

PROCEDURE AFTER TRANSFERRING REFRIGERANT FROM A "BURN-OUT"

1. Replace the filter drier in suction line.
2. After Pump-Out has been completed open the outlet valve to atmosphere. Keep the inlet closed.
3. Connect a hose from the "Evacuate Port" to the Outlet valve as shown in Diagram (3)
4. With the Power and Pump-Out switches on, evacuate the recovery portion of the REVAC/REVAC-UL as shown below. Allow the vacuum pump pull down the recovery side of the REVAC/REVAC-UL for 15 minutes.
5. Total evacuation is now complete.
6. The oil in the vacuum pump should be changed after Self-Evacuation from a burned out system.

DIAGRAM (3): SELF-EVACUATION



PROCEDURE TO FOLLOW BEFORE TRANSFERRING A DIFFERENT REFRIGERANT

1. To avoid mixing different refrigerants in a recovery cylinder, always pump out and self-evacuate the recovery side of the unit at the end of each transfer operation. This pump-out/self-evacuate operation will remove the refrigerant from the condenser and internal piping of the recovery unit.
2. Follow Diagram (3) and the procedure for cleaning your unit after recovery from a "Burn Out".
3. Evacuate the REVAC/REVAC-UL unit with a vacuum pump for 15 minutes or 1000 microns. This evacuation will remove any refrigerant trace left in the REVAC/REVAC-UL unit's internal piping.
4. Mark refrigerant number on each recovery cylinder at time of recovery.
5. Remember that mixed refrigerant cannot be separated and that it is expensive to dispose of mixtures.

ADDING OIL TO THE REVAC/REVAC-UL

1. Oil is added through the port on the REVAC/REVAC-UL labeled "Oil Charge".
2. Oil can be directly added by using a bottle with a squirt head or, oil can be pumped in with a hand pump.
3. Remove the cap and schraeder core. Fill with oil to 1/2 sight glass. The pump must be running to properly align the oil level.
4. It is critical that the oil level is neither over or under filled. If the oil level is too high, the excess oil will be blown out the exhaust. If the oil level is too low, you will hear the exhaust baffle chatter.

DRAINING THE VACUUM PUMP

1. After evacuation, oil contains rust forming water and corrosive acids. Drain immediately while pump is warm.
2. Oil is drained out the bottom left side (From Front) of the REVAC/REVAC-UL.
3. Extend the left end of the REVAC/REVAC-UL off the edge of a table two inches.
4. Place a container on the floor directly under the drain port on the REVAC/REVAC-UL
5. Remove the cap and schraeder core on the "Oil Charge" port. This helps the oil to drain faster.
6. Open the drain valve on the side of the REVAC/REVAC-UL as shown in DIAGRAM (4)
7. Allow all the oil to drain out the bottom of the REVAC/REVAC-UL
8. If the vacuum pump oil is badly contaminated you should flush the pump out before adding a full charge.
9. The inlet to the vacuum pump should be closed. With the vacuum pump running, inject or pump between 1-2 teaspoons of vacuum pump oil into the "Oil Charge" port. Allow the oil to drain out . Do not run the vacuum pump for more than 20 seconds.

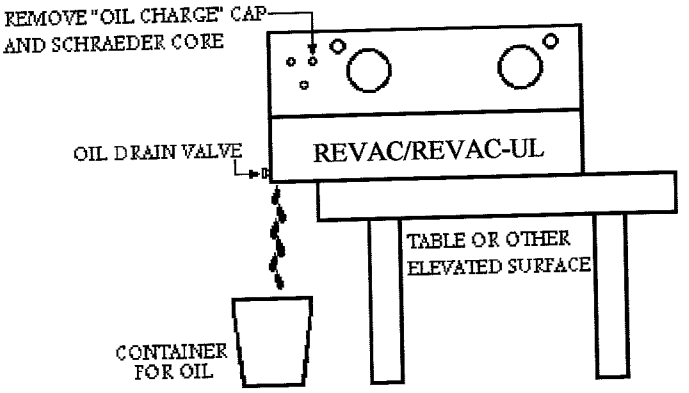
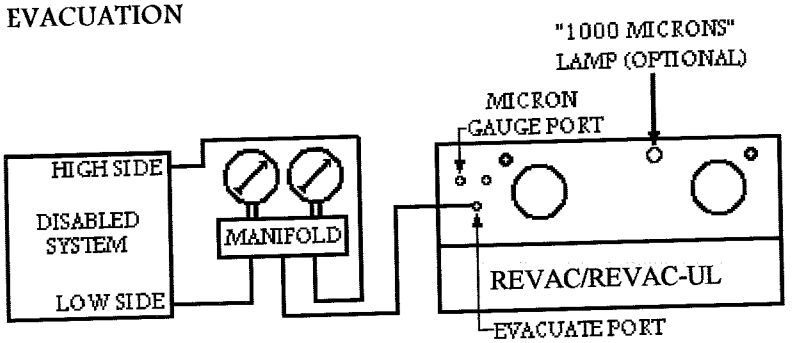


DIAGRAM (4): DRAINING VACUUM OIL

SYSTEM EVACUATION INSTRUCTIONS

1. Change vacuum pump oil after every evacuation.
2. Connect a hose manifolded from the high & low side of your disabled system to the "Evacuate Port" on the REVAC/REVAC-UL as shown in DIAGRAM (5).
3. Turn on the "Evacuate" switch and the "Power" switch. (Note: It is not necessary to turn on the "Evacuate" switch if you do not have the micron electronics option)
4. When lit, the lamp labeled "1000 Microns" (Optional) lets you know you have reached an acceptable field evacuation or, connect a micron gauge to the access port labeled "Micron Gauge" and obtain an exact reading.

DIAGRAM (5): SYSTEM EVACUATION



RECOMMENDATION

When recovering refrigerant it is always better not to stop and start the recovery unit compressor. As you are aware the compressor should not be allowed to short cycle which increases the compressor temperature. The compressor may go off on thermal overload to protect the motor winding. Therefore do not stop the REVAC/REVAC-UL compressor until the recovery job is complete. If you must stop the unit in the middle of a recovery job follow the instructions for pump-out before shut down. This will help keep the pressures low when restarting.

NATIONAL REFRIGERATION PRODUCTS INC.
TAKES INDUSTRY LEAD BY OFFERING ARI CERTIFIED
REFRIGERANT RECOVERY EQUIPMENT

National Refrigeration Products, Inc., a leading manufacturer of refrigerant recovery equipment, is the first manufacturer to receive ARI-740 certification for their full line of recovery equipment.

The Air Conditioning and Refrigeration Institute (ARI) is the leading industry association of manufacturers of refrigeration, air conditioning, and heating equipment. As part of their mission, ARI develops rating systems and administers tests in order to set industry performance standards for HVAC/R equipment manufacturers. ARI also publishes a compliance listing so contractors and specifiers can easily verify and compare equipment.

REVAC/REVAC-UL RECOVERY RATES

Refrigerant To Recover	Liquid Refrigerant Recovery Rate (lb./min.)	Vapor Refrigerant Recovery Rate (lb./min.)	Shut off Vacuum (in HG Vac.)
R12	12.6	1.16	10"
R22	12.8	0.94	0"
R502	12.0	1.02	10"
R134a	12.0	1.02	10"

REVAC/REVAC-UL TROUBLE SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
Unit will not recover liquid.	1. Schraeder valve not removed on unit 2. Hose not connected to liquid line receiver/condenser. 3. Split system or heat pumps with expansion valve will not self equalize pressure quickly	1. Remove Schraeder valve core 2. Connect hose to liquid line. **Note:** It may be necessary to braze in a fitting system with a piercing valve system. 3. Connect hose from outlet of REVAC-UL to pressurize high side of disable unit at compressor discharge valve.
Unit cuts on high head pressure (375-400 PSIG) or overload during recovery or pump out cycle.	1. Recovery cylinder not evacuated before use. . 2. Hoses not purged 3. At high ambient temperature recovery cylinder goes above 130° F 4. Valve core not removed on disabled unit.	1. Evacuate recovery cylinder before use! Note: Air is not condensable 2. Purge all hoses before use. 3. Place recovery cylinder in ice/water bath, to reduce outlet pressure. 4. Remove Schraeder valve core which restricts inlet flow.