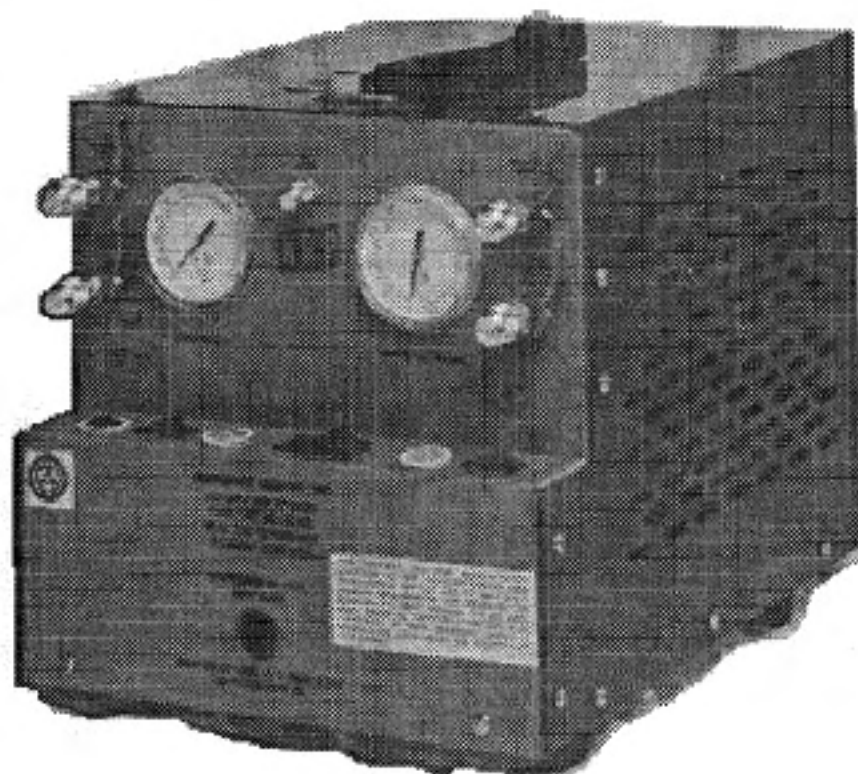


OPERATING INSTRUCTIONS



**MODEL FF1UL
REFRIGERANT RECOVERY UNIT
(PATENTED)**

- * ONE STEP LIQUID/VAPOR SET UP
- * NEW SUBCOOL FEATURE

**NATIONAL REFRIGERATION PRODUCTS
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MODEL FF1UL

The FF1UL Unit 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.

For safety reasons this unit is equipped with an automatic recovery cylinder shut off. This shut off maintains a maximum 80% fill of the recovery cylinder by volume.

- 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.
- EVACUATE YOUR FF1UL BY CONNECTING A VACUUM PUMP TO THE OIL CHARGE PORT FOR 15 MINUTES.
- ALWAYS USE AN 053 FILTER DRIER AT INLET OF FF1UL TO PROTECT FF1UL COMPRESSOR, PRESSURE REGULATOR AND SOLENOID VALVES.

NOTE:

1. All valves on the FF1UL must be in the closed position except when the machine is in use. The FF1UL is just like a refrigeration unit and must not be open to air since moisture will damage the compressor.
2. Connect the FF1UL to a properly grounded 115 volt 1 phase 60 Hz outlet. Do not use an extension cord longer than 25 ft. Voltage drop will damage the compressor.
3. Refrigeration hoses should not exceed eight feet in length. For optimum recovery rates use 3/8" ID hoses no longer than five feet. Use 1/4" to 3/8" adapters supplied for tank and system fittings.
4. USE AN 053 DRIER ON THE LIQUID SIDE OF FF1UL UNIT TO PROTECT THE COMPRESSOR AND TO PREVENT PARTICLES FROM INTERFERING WITH PROPER OPERATION OF PRESSURE REGULATOR AND SOLENOID VALVES. Drier must be changed after recovery from a burnout system. Drier must be changed before transferring another refrigerant to avoid mixing refrigerant. Drier must be changed after recovering 50 pounds of refrigerant.
5. FF1UL Unit is suitable for R12, R22, R502, R134A, blends and new refrigerants. The FF1UL must be charged with compatible lubricant. Use 32 viscosity Polyolester Oil for 134a.
6. Always remove schrader cores from access fitting on disabled unit. This type of restriction reduces recovery rate drastically. (Use a schrader core removing tool which allows hose connection without venting).

COMPRESSOR OIL DRAIN

WARNING
OIL IN THE COMPRESSOR CAN BE HOT & UNDER PRESSURE.
PROCEED WITH CAUTION

The compressor oil drain is located on the bottom of the FF1UL Unit. Before draining oil, open all the valves on the unit to relieve pressure. Then remove fitting cap and schrader, tilt unit on 45 degree angle; oil will drain quickly into container by gravity. (No hose needed.) Drain oil into a container for proper disposal.

ALWAYS DRAIN COMPRESSOR OIL AFTER RECOVERY FROM A BURNED OUT SYSTEM

COMPRESSOR OIL SIGHT GLASS

During normal operation a very small amount of compressor oil (less than 1/4%) will be carried out of FF1UL Unit. The compressor oil level should be at 1/2 sight glass (located in front of the FF1UL). When oil level decreases, oil needs to be added to the compressor. Use 150 viscosity alkylbenzene oil. Open outlet valve to relieve pressure and leave outlet valve open. Inlet valve should be closed. To add oil, attach hose (Schrader core should be removed for faster oil filling) to "Oil Charging port". Transfer fresh oil from a container by turning FF1UL Unit on until sight glass is 1/2 full. DO NOT OVERFILL. Then turn unit off, close oil port and FF1UL valve. Then evacuate FF1UL Unit. (Normal oil charge is approximately 14 ounces).

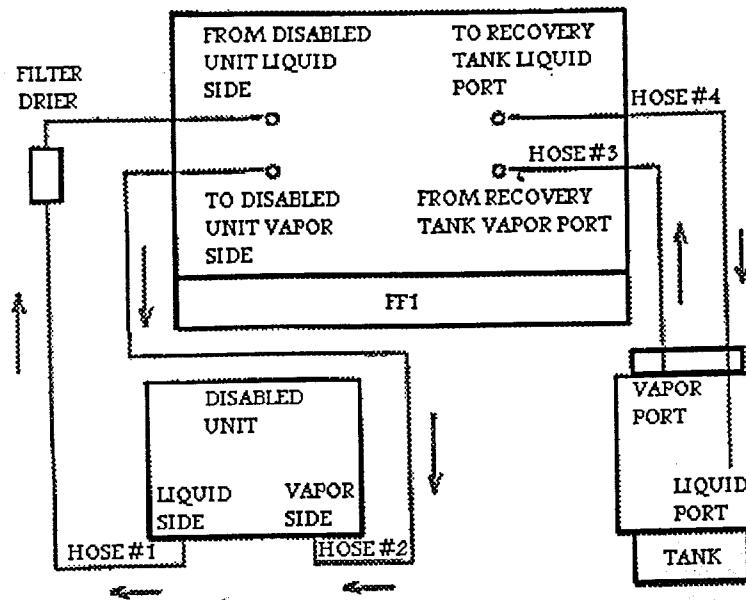
WARNING

1. 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 number 14/3 minimum, be oil resistant, meet N.E.C. and be 25 feet long maximum.
2. THE FOLLOWING DAMAGES TO THE FF1UL ARE NOT COVERED BY THE WARRANTY.
 - Damage to the compressor which is due to liquid being introduced at the inlet valve of the FF1UL unit which would slug the FF1UL and damage the compressor valves.
 - Damage to the compressor due to the compressor being run without oil.
 - 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 053 filter drier was not used. Particles such as shavings will interfere with the CRO and with the solenoid valve.

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 Unit 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.

DIAGRAM (1): FF1UL LIQUID AND VAPOR RECOVERY



- 1) NO HOSE CHANGES ARE REQUIRED TO SWITCH FROM LIQUID TO VAPOR!
- 2) HOSE (2) AND HOSE (3) HAVE NO FUNCTION DURING VAPOR RECOVERY!

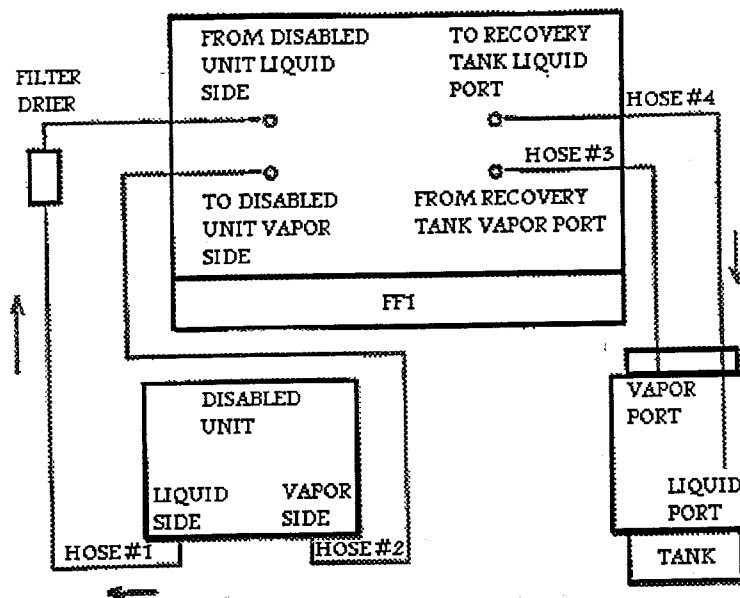
1. Liquid refrigerant is transferred directly from the disabled unit through the FF1UL to the liquid port of the recovery tank at a rate of 8-10 lb./min. The recovery unit pumps vapor from the top of the cylinder to the disabled unit. This maintains a lower pressure in the cylinder than in the disabled unit which pulls refrigerant to the cylinder.
2. Connect the disabled unit to the cylinder and recovery unit as shown in diagram (1). Use 3/8" hoses less than 5 feet long with 1/4" fittings to the tank. Connect an O53 filter drier onto the liquid side of the FF1UL as shown. Connect the yellow electrical cord on the FF1UL to the float switch on the recovery cylinder. The cylinder must be standing upright.
3. Open both valves on cylinder and both valves on FF1UL.
4. Turn recovery unit on. The yellow electrical cord on the FF1UL must be connected to the NC50U in order to run the unit! When the recovery tank becomes 80% full it will automatically shut off.
5. Refrigerant liquid should be visible in the sight glass.

When you have recovered all the liquid and there is none present in the sight glass, press the L/V momentary switch. This begins the vapor recovery process! No hoses or valve positions need be changed.

NOTE:

In some applications depending on hoses and tanks used, there may be a trickle of liquid in the bottom of the sight glass. This is from vapor condensing in the hoses. Disregard this liquid and go into the vapor mode directly. In some cases it may not be possible to recover the refrigerant in liquid form. There may not be liquid refrigerant or it has migrated to another part of the system. In such cases the refrigerant must be recovered in vapor form only.

DIAGRAM (2): FF1UL VAPOR RECOVERY FLOW DIAGRAM



6. When the pressure on the system gauge reaches 10" Hg vacuum, vapor recovery is complete. 0 PSIG for R-22
7. When vapor transfer is complete, or cylinder is 80% full, close all valves and turn recovery unit off.

NOTE:

- The recovery flow rate is slower at inlet pressures below 0 PSIG.
- Hoses (2) and (3) have no function in vapor recovery.

FF1UL VAPOR ONLY RECOVERY

In some cases it may be possible to recover the refrigerant liquid form. There may not be liquid refrigerant or it has migrated to another part of the system. In such cases the refrigerant must be recovered in vapor form. Only Hose (1) and Hose (4) are used for vapor recovery. The flow of refrigerant is the same as the flow in Diagram (2).

SUBCOOL FEATURE (SEE PAGE 7)

On hot days when the ambient reaches above 104 degrees F you may encounter some resistance recovering into a hot tank. With the subcool feature now all you have to do is press a button. This automatically turns your recovery unit into a refrigeration system with the recovery tank being the evaporator (IT GETS COLD). The subcool system lowers the pressure in your tank. The hotter the tank the more the cooling capacity. The recovery process itself is stopped until the FFIUL automatically returns the unit back into the vapor mode in five minutes. If more subcooling is needed simply redepess the subcool switch. You are not limited to (1) five minute period and the FFIUL always returns to the vapor mode.

PROCEDURE AFTER TRANSFERRING REFRIGERANT FROM A "BURN OUT"

1. Drain FFIUL compressor oil and replace with approximately 14 ounces of fresh refrigerant oil.
2. Less than 14 ounces of oil will drain out because oil is carried out during recovery.
3. Replace filter drier in suction line.
4. Evacuate FFIUL recovery unit and hoses for 15 minutes or 1000 microns.

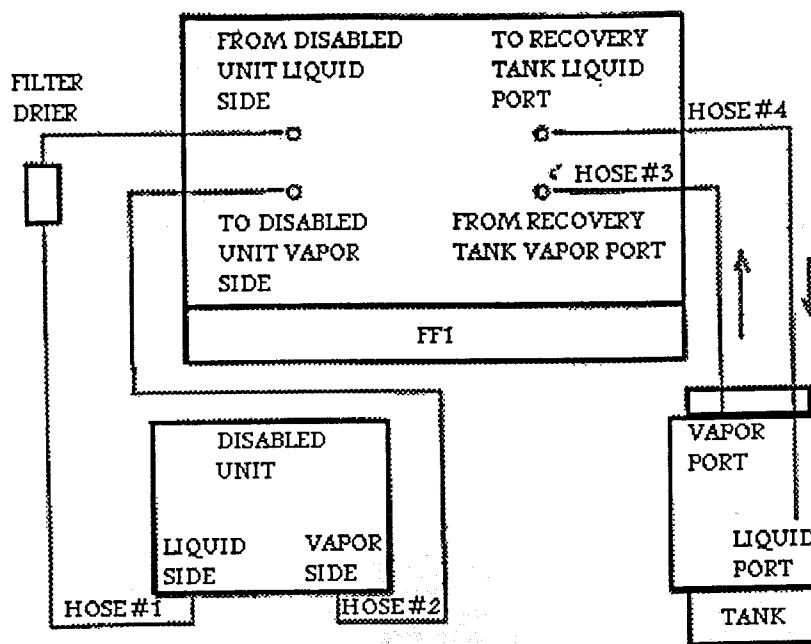
RECOMMENDATION

When recovering refrigerant it is always better not to stop and start the recovery unit compressor. As you are aware the compressor shouldn't 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 FFIUL compressor until the recovery job is complete.

CLEARING PROCEDURE TO FOLLOW BEFORE TRANSFERRING A DIFFERENT REFRIGERANT (SEE PAGE 7)

1. Connect hoses (3), (4) as per the FFIUL liquid and vapor recovery diagram to a recovery tank. The recovery tank should have between 5 and 10 lb. of refrigerant.
2. Close both "DISABLED SYSTEM" valves on the FFIUL.
3. Open both "RECOVERY TANK" valves on the FFIUL and liquid and vapor port valves on the recovery tank.
4. Turn the FFIUL unit on and switch it into the subcool mode immediately.
5. The subcool mode runs for 5 minutes and automatically switches back into the vapor mode.
6. Reset subcool mode a total of three times and then shut the unit off. Close valves on both FFIUL and recovery tank. Resetting into the subcool mode should be done as quickly as possible.
7. The FFIUL is now cleared. The complete process takes approximately 15 minutes.
8. A total evacuation of the FFIUL can only be achieved by using a vacuum pump.

DIAGRAM (3): FF1UL SUBCOOL AND SELF CLEARING



- 1) NO HOSE CHANGES ARE REQUIRED TO SWITCH FROM LIQUID TO VAPOR!
- 2) HOSE (1) AND HOSE (2) HAVE NO FUNCTION DURING SUBCOOL OR SELF CLEARING!

NOTE:

1. It is not necessary to change to oil from the FF1UL compressor before recovering different refrigerant.
2. After field evaluation and laboratory testing, we have established that this new procedure will prevent mixing different refrigerants. The recovered refrigerant quality is within ARI-700-95 as far as other refrigerant mix are concerned. This is less than 1/2% by weight of other refrigerants.
3. This new procedures will simplify the operation and maintenance of the FF1UL unit. The oil must still be changed after recovery form a burn out. Compressor oil level (1/2 sight glass) must be checked before each recovery.

USING YOUR FF1UL TO RECOVER REFRIGERANT R134a

The compressor in your FF1UL is compatible with refrigerant 134a. The FF1UL may be used to recover R134a as long as the mineral oil it is charged with is flushed and replaced with Polyester oil.

PROCEDURE FOR PREPARING AND FLUSHING SYSTEM WITH POLYESTER OIL

Your unit should not be used for at least one hour prior to this procedure. Ensure there is no existing pressure in the recovery unit. Tilt back of unit up on 45 degree angle. Remove cap and Schrader valve in oil charge port. remove cap and Schrader valve on compressor oil drain. Allow oil to drain into a bottle or container which can be later disposed of properly as per state and local codes. Follow the procedure for adding oil to your FF1UL. Charge with 14 oz. of NRP polyester oil. Drain and repeat this procedure a second time. This ensures that there is less than 1% crossover between oils. Evacuate unit for 30 minutes by manifolding to both inlet and outlet valves.