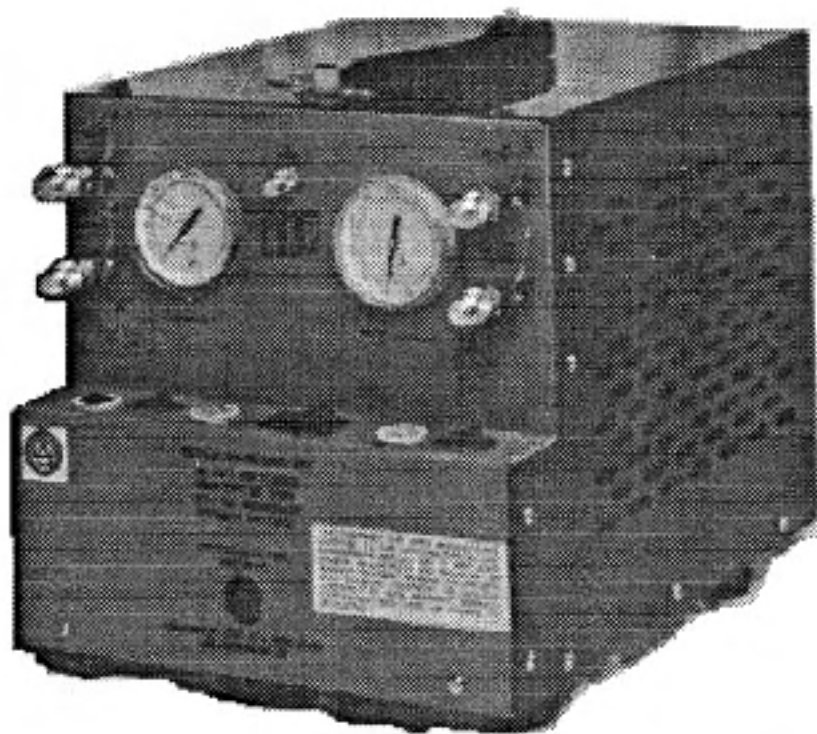


# *OPERATING INSTRUCTIONS*



## **MODEL FF1 REFRIGERANT RECOVERY UNIT (PATENTED)**

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

**NATIONAL REFRIGERATION PRODUCTS  
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## MODEL FF1

The FF1 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 it is very important to fill all cylinders by weight in accordance with the cylinder manufacturers' guidelines and ARI guidelines.

- ALWAYS USE CYLINDERS APPROVED FOR RECOVERY (NRP model NC50 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 FF1 TO PROTECT FF1 COMPRESSOR, PRESSURE REGULATOR AND SOLENOID VALVES.

### NOTE:

1. All valves on the FF1 must be in the closed position except when the machine is in use. The FF1 is just like a refrigeration unit and must not be open to air since moisture will damage the compressor.
2. Connect the FF1 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 (it may be necessary to adapt down to 1/4" fittings).
4. USE AN 053 DRIER ON THE LIQUID SIDE OF FF1 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. FF1 Unit is suitable for R12, R22, R502, R134A, blends and new refrigerants. The FF1 must be charged with compatible lubricant.
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 FF1 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 FF1 Unit. The compressor oil level should be at 1/2 sight glass (located in front of the FF1). When oil level decreases, oil needs to be added to the compressor. Use 150 alkylbenzene refrigeration 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 FF1 Unit on until sight glass is 1/2 full. **DO NOT OVERFILL.** Then turn unit off, close oil port and FF1 valve. Then evacuate FF1 Unit. (Normal oil charge is approximately 14 ounces)

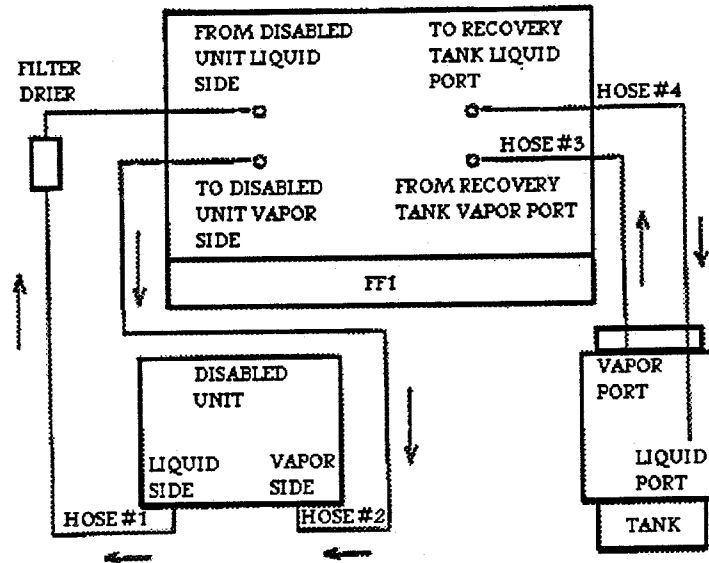
### WARNING

- A. 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.
- B. THE FOLLOWING DAMAGES TO THE FF1 ARE NOT COVERED BY THE WARRANTY.
  - A. Damage to the compressor which is due to liquid being introduced at the inlet valve of the FF1 unit which would slug the FF1 and damage the compressor valves.
  - B. Damage to the compressor due to the compressor being run without oil.
  - C. 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 O53 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): FF1 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!

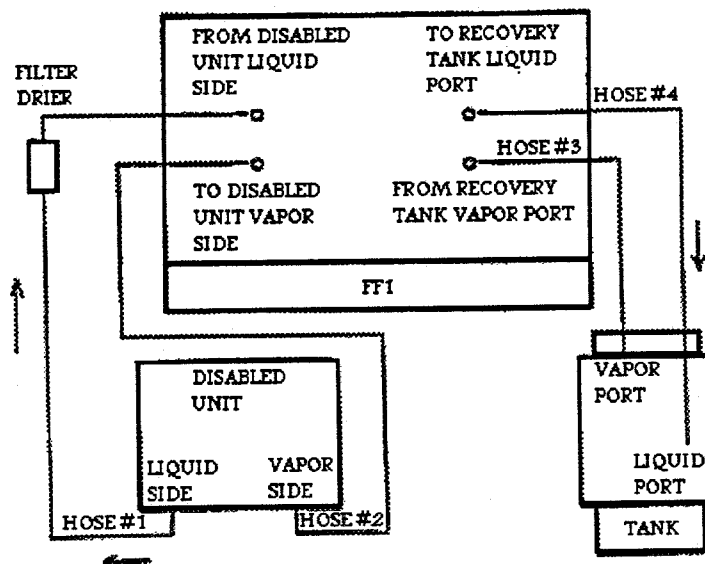
Liquid refrigerant is transferred directly from the disabled unit through the FF1 to the liquid port of the recovery tank at a rate of 8-10 lb./min. The recovery unit pumps vapor from the top of the cylinder to the disabled unit. This maintains a lower pressure in the cylinder than in the disabled unit which pulls refrigerant to the cylinder.

1. 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 a sight glass and O53 filter drier onto the liquid side of the FF1 as shown.
2. Open both valves on cylinder and both valves on FF1.
3. Turn on the recovery unit.
4. Refrigerant liquid should be visible in the sight glass.
5. 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 cases it may 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): FF1 VAPOR RECOVERY FLOW DIAGRAM



1) NO HOSE CHANGES ARE REQUIRED TO SWITCH FROM LIQUID TO VAPOR!

2) HOSE (2) AND HOSE (3) HAVE NO FUNCTION DURING VAPOR RECOVERY!

6. Vapor recovery is complete when the pressure on the system gauge reaches 10" Hg vacuum (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.

**SUBCOOL FEATURE**

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 FF1 automatically returns the unit back into the vapor mode in five minutes. If more subcooling is needed simply repress the subcool switch. You are not limited to (1) five minute period and the FF1 always returns to the vapor mode.

## PROCEDURE AFTER TRANSFERRING REFRIGERANT FROM A "BURN OUT"

1. Drain FF1 compressor oil and replace with approximately 14 ounces of fresh refrigerant oil. Less than 14 ounces of oil will drain out because oil is carried out during recovery.
2. Replace filter drier in suction line.
3. Evacuate FF1 recovery unit and hoses for 15 minutes or 1000 microns.

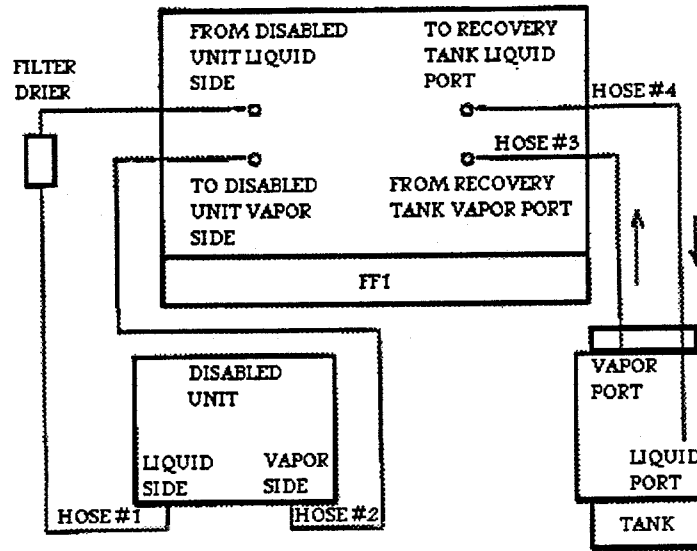
## RECOMMENDATION

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 FF1 compressor until the recovery job is complete.

## CLEARING PROCEDURE TO FOLLOW BEFORE TRANSFERRING A DIFFERENT REFRIGERANT

1. Connect hoses (3), (4) as per the FF1 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 TANK" valves on the FF1.
3. Open both "RECOVERY TANK" valves in the FF1 and liquid and vapor port valves on the recovery tank.
4. Turn the FF1 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 FF1 and recovery tank. Resetting into the subcool mode should be done as quickly as possible.
7. The FF1 is now cleared. The complete process takes approximately 1 minutes
8. A total evacuation of the FF1 can only be achieved by using a vacuum pump.

### DIAGRAM (3): FF1 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:

- It is not necessary to change to oil form the FF1 compressor before recovering a different refrigerant.
- 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 as far as other refrigerant mix are concerned. This is less that 1/2% by weight of other refrigerants.
- This new procedures will simplify the operation and maintenance of the FF1 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 FF1 TO RECOVER REFRIGERANT R134a

The compressor in your FF1 is compatible with refrigerant 134a. The FF1 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 FF1. Charge with 14oz. 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 the "Oil Charge" port and "To Recovery Tank Liquid Port" valve.