

# *OPERATING INSTRUCTIONS*



## **MODEL GS2000 / GS2001**

**OIL-LESS REFRIGERANT RECOVERY UNIT**

**NATIONAL REFRIGERATION PRODUCTS**

**985 WHEELER WAY • LANGHORNE, PA 19047**

**(215) 638-8909 • FAX (215) 638-9270**

# MODEL GS2000 /GS2001

The GS2000 / GS2001 Unit can recover liquid refrigerant directly from a disabled unit. The high side and low side may be manifolded together into the GS2000 / GS2001

For safety reasons never fill a cylinder more than 80% by volume.

- ALWAYS USE CYLINDERS APPROVED FOR RECOVERY (NRP model NC50U or equivalent DOT 4BA400).
- ALWAYS EVACUATE CYLINDERS FOR 15 MINUTES OR 1000 MICRONS PRIOR TO FIRST USE.
- DO NOT MIX DIFFERENT REFRIGERANTS IN A CYLINDER. Mixtures cannot be separated.
- ALWAYS WEAR RUBBER GLOVES AND GOGGLES WHEN TRANSFERRING REFRIGERANT.
- ALWAYS RECOVER LIQUID FIRST THEN VAPOR.
- ALWAYS USE A 052 FILTER DRIER AT INLET OF GS2000 TO PROTECT THE GS2000 COMPRESSOR.

When operating the GS2000/GS2001 ensure that:

1. All valves on the GS2000 / GS2001 must be in the closed position except when the machine is in use. The GS2000 / GS2001 must not be open to air as moisture may damage the compressor and internal piping.
2. Connect the GS2000 / GS2001 to a properly grounded 115 volt 1 phase 60 HZ outlet. Do not use an extension cord longer than 25 ft., with a minimum wire size 14/3. Excessive voltage drop may damage the compressor.
3. Refrigeration hoses should not exceed eight feet in length.
4. Use a 052 DRIER on the inlet line of the GS2000/GS2001 unit to protect the compressor from dirt and particulate.
5. The filter drier must be changed after recovery from a burnout system.
6. The filter drier must be changed before transferring another refrigerant to avoid mixing refrigerant.
7. The filter drier must be changed after recovering 50 pounds of refrigerant.
8. Always remove Schrader cores from access fittings on the disabled unit. This type of restriction reduces the recovery rate. (Use a Schrader core-removing tool, which allows hose connection without venting.)
9. When starting up the GS2000 / GS2001 always turn the power switch on, then open the outlet ball valve, depress the compressor start switch, and open the inlet ball valve. Do not open the inlet first or pressure may build up quickly on the discharge and cause the GS2000 / GS2001 to shut off on high head pressure safety.

GS2000 / GS2001 unit is certified for use to recover R12, R22, R502, R134a, R410A. The GS2000 / GS2001 will recover refrigerant blends.

## **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 number 14/3 minimum, be oil resistant, meet N.E.C. and be a maximum of 25 feet.

**THE FOLLOWING DAMAGE TO THE GS2000 IS NOT COVERED BY THE WARRANTY:**

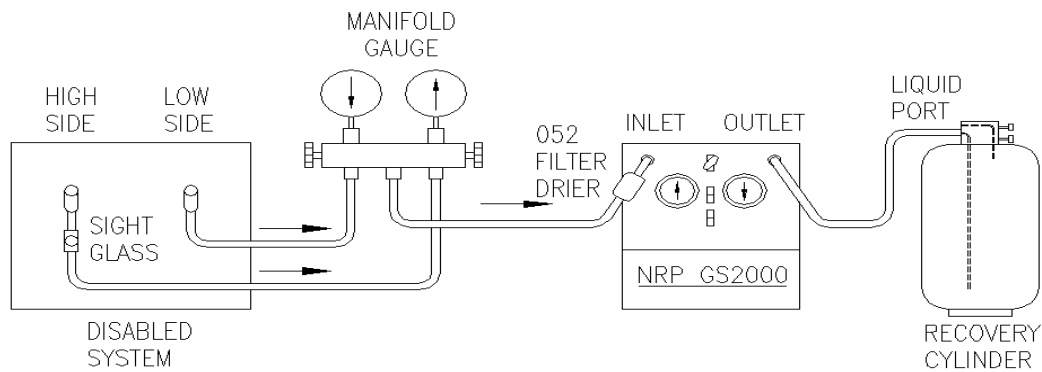
Damage to the compressor or recovery/pumpout valve due to particulate entrained in contaminated refrigerant as a result of not employing a 052 inlet filter drier. Particulate such as brass or copper shavings may damage or interfere with the operation of the compressor and valving.

## **WARRANTY**

NRP Recovery Equipment is warranted to be free of manufacturing defect. NRP will repair or give credit for repair at NRP's 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.

### **GS2000 / GS2001 Liquid And Vapor Recovery**

**NOTE: Always use a U.L. listed filter drier with a minimum rated design pressure of 500 PSI.**



**Figure 1**

Liquid refrigerant is transferred directly from the disabled system through the GS2000 / GS2001 unit to the recovery cylinder at the approximate rate of 3.5lbs/min.

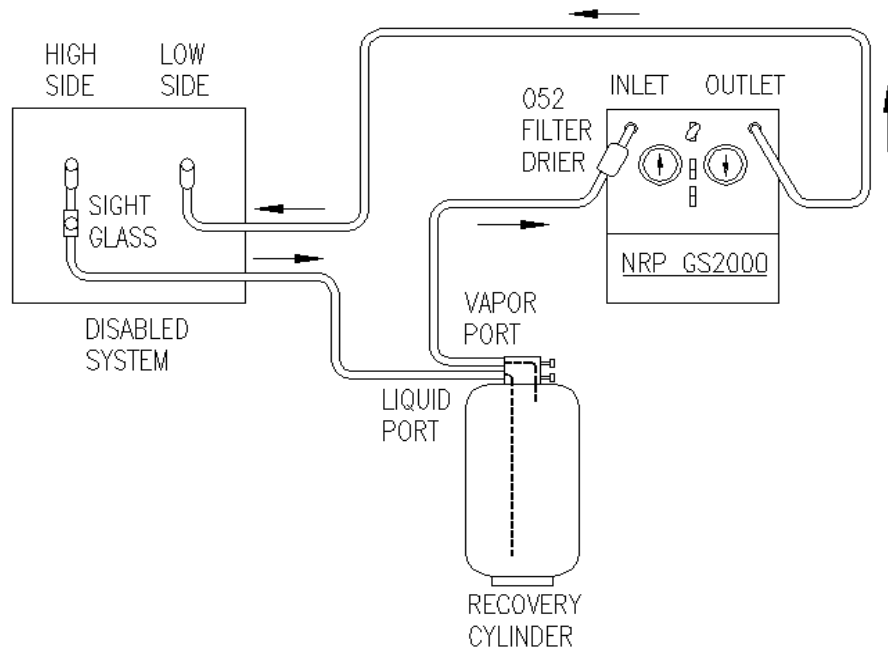
1. Open liquid valve on cylinder (vapor valve on cylinder is shut).
2. Turn GS2000 / GS2001 power switch on (pumpout valve in the recovery position).
3. Open outlet valve.
4. Depress compressor start switch.
5. Open inlet valve.
6. Open the hand wheel on the right side of the manifold. It is attached to the high side of the system. If you do not have a manifold attach a hose directly from the high side of the disabled system to the inlet of the GS2000 / GS2001.
7. Refrigerant liquid should be visible in the sight glass.
8. When liquid transfer is complete and there is no liquid showing in the sight glass the remaining vapor can be extracted. The GS2000 / GS2001 may vibrate and have an increase in it's noise level when switching form liquid recovery to vapor recovery, if this occurs simple feather back the inlet valve on the unit until the noise and vibration decrease, after a few minutes when the unit is in the vapor recovery mode, open the inlet valve all the way.
9. With the GS2000 / GS2001 still running and the high side manifold valve open, open the manifold valve attached to the low side. If a manifold is not available, continue recovering the refrigerant from the hose connected to the high side.
10. When the pressure on the inlet gauge reaches 10" Hg vacuum, vapor recovery is complete (0" Hg for R22) if the system contains less than 200 lbs. of refrigerant. If the system contains more than 200 lbs. of refrigerant, consult federal regulations for evacuation levels. Turn the GS2000 / GS2001 unit off and wait two minutes. If the pressure rises, turn the GS2000 / GS2001 on until inlet pressure drops to 10" Hg vacuum.
11. When vapor transfer is complete, or cylinder is 80% full, shut off valves on cylinder and recovery unit.
12. Pump out the GS2000 / GS2001 recovery unit at the end of each transfer operation per the instructions. (See page 7)
13. Turn recovery unit off.

**Note:**

- This recovery unit can recover refrigerant vapor to 20" of vacuum if required.
- The recovery flow rate slows down as the inlet pressure reduces.

**GS2000 / GS2001 (Optional) Liquid Recovery - External Push/Pull Method**

**NOTE: Always use a U.L. listed filter drier with a minimum rated design pressure of 500 PSI**



**Figure 2**

The liquid refrigerant is transferred directly from the disabled system to the bottom of the recovery cylinder at the approximate rate of 10lb/min. The recovery unit pumps refrigerant vapor from the top of the cylinder to the low side of the disabled unit. This maintains a lower pressure in the cylinder than in the disabled unit. The difference in pressure draws the refrigerant to the cylinder.

1. Connect the disabled unit to the cylinder and recovery unit as shown in Figure 2. Use 1/4" hose less than 5 feet long. Connect a sight glass onto the high side of the system as shown. The cylinder must be standing upright.  
**WHEN USING THE GS2001 YOU MUST CONNECT THE YELLOW ELECTRIC CORD ON THE UNIT TO THE FLOAT SWITCH ON THE RECOVERY CYLINDER.**
2. Open both valves on cylinder.
3. The pump out valve should be pointing to recovery.
4. Turn the power switch on. (The yellow electrical cord on the GS2001 must be connected to the NC50U in order to run the unit.)
5. Open the outlet valve.
6. Depress the compressor start switch.

7. Open the inlet ball valve.
8. Refrigerant liquid should be visible in sight glass.
9. When liquid transfer is completed or cylinder is 80% full, **shut off valves on cylinder and recovery unit immediately**. The GS2001 will automatically stop when the NC50U cylinder is 80% full. The tank full light will also come on.
10. Turn 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 has 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. This enables you to isolate the high side from the low side on the disabled unit.

## VAPOR RECOVERY INSTRUCTIONS AFTER OPTIONAL LIQUID RECOVERY

Once liquid has been removed optionally as shown per Figure 2, the remaining vapor can be extracted with recovery unit set up as shown in Figure 1. Vapor can be removed by opening both high and low side manifold valves.

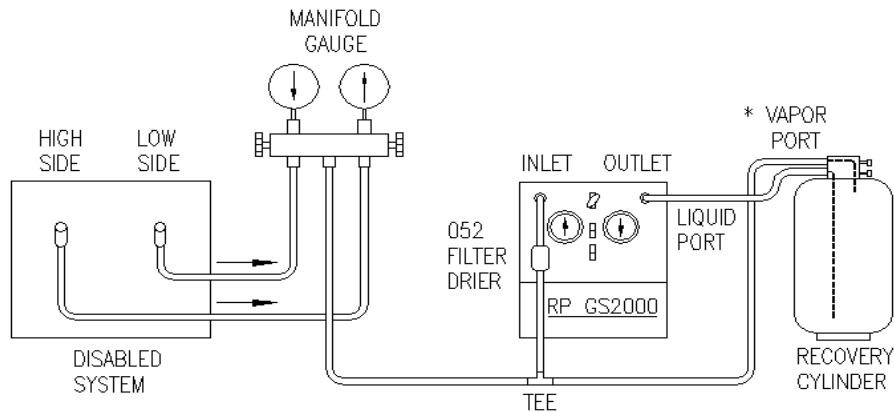
1. Open vapor valve on cylinder (liquid valve on cylinder is shut).
2. Turn GS2000 / GS2001 power switch on (pumpout valve in the recovery position).
3. Open outlet valve.
4. Depress compressor start switch.
5. Open inlet valve.
6. Open both hand wheels on your manifold set. If you do not have a manifold set connect a hose directly from the high side of the system to the inlet of the GS2000 / GS2001.
7. When the pressure on the inlet gauge reaches 10" Hg vacuum, vapor recovery is complete (0" Hg for R22). Turn the GS2000 / GS2001 unit off and wait two minutes. If the pressure rises, turn the GS2000 / GS2001 on until the inlet pressure drops to 10" Hg vacuum.
8. When vapor transfer is complete, or cylinder is 80% full, shut off valves on cylinder and recovery unit.
9. Pump out the GS2000 / GS2001 recovery unit at the end of each transfer operation per the instructions. (See page10)
10. Turn recovery unit off.

### Note:

- This recovery unit can recover refrigerant vapor to 20" Hg vacuum if required.
- The recovery flow rate slows down as the inlet pressure drops.
- When the GS2000 / GS2001 is switching from liquid recovery mode to vapor recovery mode the noise and vibration levels may increase. If this the noise and vibration levels become to high this can be corrected by feathering back the inlet valve until the noise and vibration levels subside. After a minute you can fully open the inlet valve until vapor recovery is complete.

## REDUCING RECOVERY TANK INTERNAL PRESSURE

When working with certain high pressure refrigerants, or in high ambient temperature conditions, it may be necessary to lower the recovery tank pressure. The tank pressure can be reduced, by connecting the GS2000 as shown in diagram 3. The tank pressure is reduced, by using the GS2000 to remove high-pressure vapor by condensing to a liquid before returning to the tank. Whenever the recovery tank pressure gauge exceeds 350 psig, the manifold connected to the vapor valve must be opened to allow the high pressure vapor to go to the recovery unit inlet valve.



\* OPEN VAPOR PORT ON TANK WHENEVER TANK PRESSURE EXCEEDS 350 psi.

Figure 3

As illustrated in figure 3, a brass tee is used to connect the vapor port on the recovery cylinder and the charging line on the manifold to the inlet valve on the GS2000. The outlet valve is connected to the liquid port on the recovery cylinder. The manifold hoses are connected to the high and low side of the disabled unit. The valves on the manifold should be closed when attempting to reduce the recovery cylinder pressure.

1. If tank pressure exceeds 350 psig, open the recovery tank vapor valve.
2. When the pressure returns to an acceptable level, then close the recovery tank vapor valve.
3. **NEVER ATTEMPT TO EXCEED THE ALLOWABLE CAPACITY OF THE RECOVERY CYLINDER.**
4. If the recovery cylinder approaches its capacity limit before the system is fully recovered, replace the cylinder with an evacuated recovery cylinder.

The recovery tank can be pre-cooled by connecting the inlet of the GS2000 to the vapor port of the tank and the outlet to the liquid port of tank. Open the liquid and vapor ports on the tank and the inlet and outlet valves on the GS2000. The valves on the manifold should be closed. Restrict the outlet pressure to 100 psi higher than the inlet pressure, but do not exceed 300 psi. Operate the GS2000 until the tank cools down. The recovery tank must contain five (5) pounds of liquid for this procedure.

As an alternate method to subcooling, when recovering high pressure refrigerants (i.e. R410A) in high ambient conditions, and recovery tank pressure rises and slows the recovery process, recovery time can be decreased by switching to an empty/evacuated recovery cylinder. For R410A refrigerant make sure your cylinder is rated 4BA400.



## **SELF PUMP-OUT RECOVERY UNIT**

To meet EPA venting restrictions and to avoid mixing refrigerant, it is important that before recovering a different refrigerant, the remaining refrigerant left in the GS2000 / GS2001 recovery unit is pumped out into a recovery cylinder.

The GS2000 / GS2001 has a self pump-out system which is very easy to use. (U.S. pat. no. 5,247,802)

1. To pump out the GS2000 / GS2001 unit, first close the inlet valve on GS2000 / GS2001.
2. Open valve on recovery cylinder liquid port.
3. Turn the Recovery/Pump-Out Valve  $\frac{1}{4}$  turn CCW to the Pump-Out position.
4. Turn GS2000 / GS2001 power switch on.
5. Open outlet ball valve on GS2000 / GS2001.
6. Depress compressor start switch.
7. When the inlet pressure gauge on the GS2000 / GS2001 drops to 4" Hg vacuum, self pump out is complete.
8. When self pump out is complete, close cylinder valve and outlet valve.
9. After completing self pump-out, rotate the pump out valve back to recovery and turn the power switch off.
10. A total evacuation of the unit can only be obtained by using a vacuum pump.

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

1. Replace filter drier in suction line.
2. Evacuate GS2000 / GS2001 recovery unit and hoses by manifolding lines to the inlet and outlet valves.
3. Connect the center tap of the manifold to a vacuum pump and evacuate for 15 minutes or to 1000 microns.

### **PROCEDURE TO FOLLOW BEFORE TRANSFERRING A DIFFERENT REFRIGERANT**

1. To avoid mixing different refrigerants in a recovery cylinder, always pump out the recovery unit at the end of each transfer operation. This pump-out operation will remove the refrigerant from the condenser and internal piping of the recovery unit.
2. Replace filter drier in suction line before recovering a different refrigerant.
3. Evacuate the recovery unit with a vacuum pump for 15 minutes or 1000 microns (Optional). This evacuation will remove any trace refrigerant left in the recovery unit's internal piping.

4. **Mark the refrigerant number on each recovery cylinder at time of recovery.**
5. **Remember that mixed refrigerants cannot be separated and that it is expensive to dispose of mixtures.**

## **RECOMMENDATION**

**When recovering refrigerant it is best not to stop and start the recovery unit compressor. The compressor should not be allowed to short cycle. Short cycling the compressor may trip the thermal overload protection on the motor windings. It is best not stop the GS2000 / GS2001 compressor until the recovery job is complete. If the compressor must be stopped the 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.**