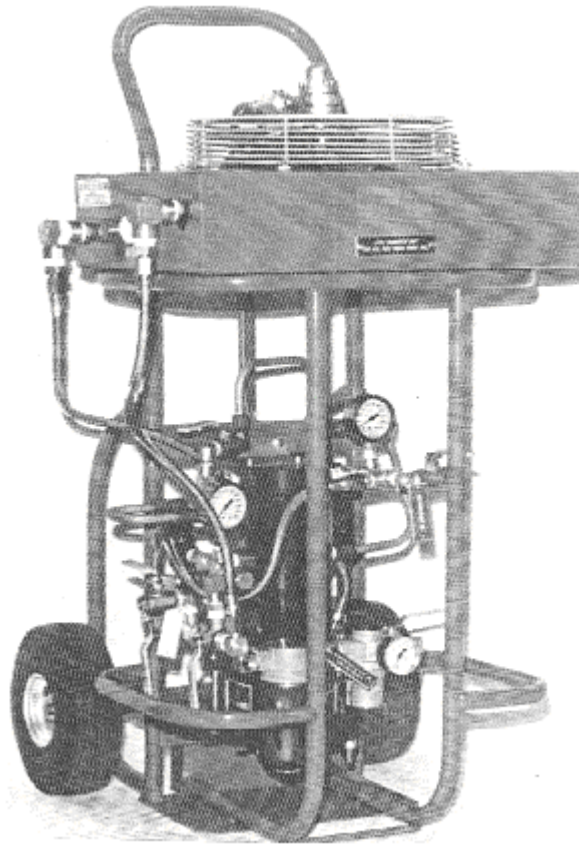


# *OPERATING INSTRUCTIONS*



## **MODEL LV20 LARGE CAPACITY REFRIGERANT RECOVERY UNIT**

**NATIONAL REFRIGERATION PRODUCTS  
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**MODEL LV20**  
**FOR USE WITH R12, R22,**  
**R114, R134a, R500 & R502**

For safety reasons it is very important to fill all cylinders by weight in accordance with the cylinder supplier's instructions and ARI guidelines.

- ALWAYS USE HIGH PRESSURE CYLINDERS WITH 2 VALVES. CYLINDERS MUST BE DOT APPROVED, SUCH AS CYLINDERS SUPPLIED BY NRP.
- DO NOT OVERFILL CYLINDERS. Cylinders should be filled to a maximum of 80% capacity. Use a scale to weigh cylinders.
- DO NOT MIX DIFFERENT REFRIGERANTS IN A CYLINDER. Mixtures can not be separated.
- ALWAYS WEAR RUBBER GLOVES AND SAFETY GOGGLES WHEN TRANSFERRING REFRIGERANT.
- BEFORE FILLING AN EMPTY CYLINDER, ALWAYS EVACUATE THE CYLINDER TO AT LEAST 1000 MICRONS TO REMOVE AIR AND NON-CONDENSABLES. NON-CONDENSABLES WILL INCREASE DISCHARGE PRESSURE DRASTICALLY.
- PLEASE EVACUATE OR PURGE THE LV20 RECOVERY UNIT AND HOSES BEFORE YOUR RECOVERY JOB TO AVOID INTRODUCING NON-CONDENSABLES IN THE RECOVERY CYLINDERS.
- ALWAYS USE A C163F FILTER DRIER BEFORE THE INLET VALVE OF THE LV20. THIS DRIER WILL CAPTURE PARTICULATE AND WILL PREVENT DAMAGE TO THE VACUUM PUMP, O-RINGS AND INTERNAL SEALS OF THE LV20.

## HOW TO USE THE LV20

The NRP LV20 is simple to use because it will pump either refrigerant liquid or vapor in the same way. There is no need to change the piping or valve settings of the unit. There is no risk of slugging the pump or risk of damage by running the pump dry.

### POWER REQUIREMENTS

To power the LV20, dry compressed air is needed; 40 CFM at 100 PSI is best and recommended. If there is a lower air pressure or capacity, the pumping capacity of the pump will be reduced.

The condenser fan is powered by an air motor. Condenser fan speed can be changed by the small air pressure regulator in the condenser fan air line. A small oiler is in line for the condenser fan only.

Please drain moisture which may accumulate in the moisture separator on the air inlet side of the LV20 to avoid damage to the pump. The air supply to the LV20 is not to be lubricated in any way, and if a rental compressor is being used, make sure that the air supply is coming off the dry or non-lubricated port of the air compressor. Some of the air compressors from equipment rental dealers, used for jackhammers, have an automatic oiler. Make sure not to use that air outlet.

There is a shut-off valve at the air inlet to shut off air to the pump, which will allow the pump to be turned on and off.

### Switching Stages During Recovery

The LV20 can be used in a single stage or in a two-stage mode.

- If the pumping rate is too fast or if there is not enough air to power the pump on one stage, the pump can be switched to a two-stage operation.
- During vapor recovery in the two-stage mode, the LV20 will recovery refrigerant into a vacuum of 25" Hg.

There is a 1/4 turn ball valve, which in the closed position makes the pump operate in one stage and in the open position, makes the pump operate in two stages. This valve can be switched open or closed at any time.

### REFRIGERANT RECOVERY (SEE FIGURE 1)

The unit is to be used in the single stage mode. During refrigerant recovery the LV20 valves should be set as shown in Figure 1. Since it is faster to recover refrigerant liquid than vapor, the refrigerant should be removed through the liquid side of the system. A 3/8" O.D. flared fitting should be used, with 3/8" refrigerant charging hoses. For convenience use a sight glass in line at the refrigerant outlet of the LV20 condenser. After the liquid has been removed, the left over vapor can be pumped out of the unit until the suction gauge on the LV20 reaches 0 PSI. When the suction gauge reaches 0 PSI, switch the pump to the two-stage mode of operation. This will allow for refrigerant vapor recovery down to 25" Hg vacuum

**FIGURE 1 - REFRIGERANT RECOVERY MODE (LIQUID OR VAPOR)**

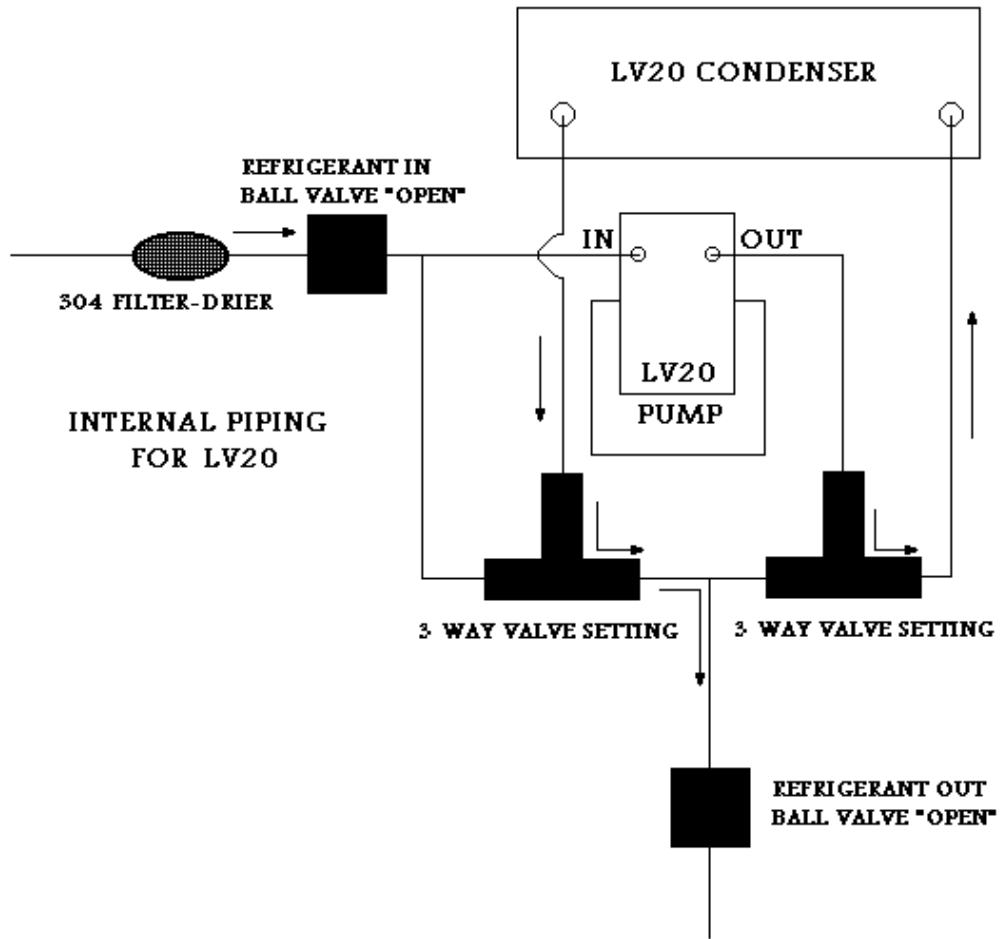
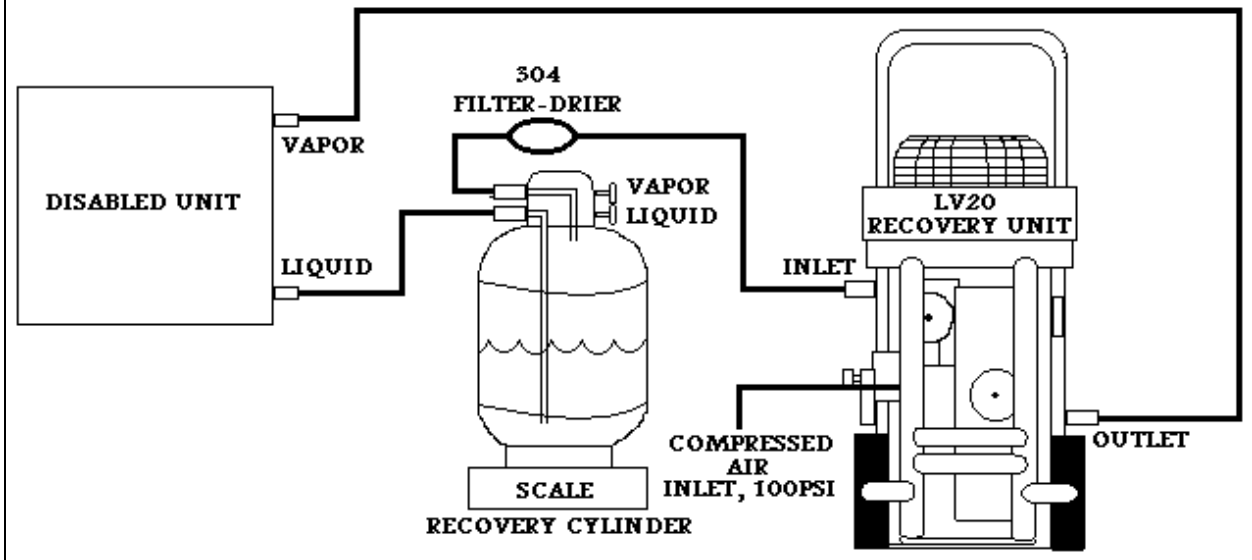


FIGURE 2 - LIQUID RECOVERY



## LIQUID RECOVERY (SEE FIGURE 2)

Figure 2 shows one way to recover liquid when using a cylinder with two valves, such as a 1000 lb. or 2000 lb. cylinder. Liquid refrigerant is transferred directly from the disabled unit to the bottom of the cylinder at a rate of 20 lb./min. or more. 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 the refrigerant to the cylinder.

1. Connect the disabled unit, cylinder, and recovery unit as shown in Figure 2. Use a 1000 lb. cylinder or larger.
2. Open both valves on the cylinder and both valves on the recovery unit.
3. Turn recovery unit on. Condenser fan should be turned off.
4. Refrigerant liquid can be seen through the sight glass.
5. When liquid transfer is complete or the cylinder is 80% full, turn recovery unit off, shut off valves on cylinder and recovery unit.

### NOTES:

1. Fill cylinder by weight, or use cylinder level gauge to avoid overfilling.
2. Operate must always be watching unit during recovery operation.
3. To recover vapor, see Figure 3.

## LIQUID AND VAPOR RECOVERY (SEE FIGURE 3)

Figure 3 shows how liquid and vapor can be recovered in the same manner. Once liquid has been recovered as shown in Figure 2, the running vapor can be extracted with the recovery unit as shown in Figure 3. Vapor is recovered at a rate of approximately 3 lb./min., depending on suction pressure. If it is preferable, liquid can be recovered as shown in Figure 3 without risk of slugging the pump.

1. Connect the disabled unit to cylinder and to the recovery unit as shown in Figure 3.
2. Open vapor valve on the cylinder (The cylinder liquid valve is always shut). Open both valves on the recovery unit.
3. Turn recovery unit on.
4. When inlet pressure on inlet gauge reaches 15" Hg, liquid and vapor recovery is complete. Turn the LV20 off and wait two minutes. If the pressure rises, turn the recovery unit on until the inlet pressure returns to 15" Hg (10" Hg for R-22).
5. When recovery is complete, or the cylinder is 80% full, turn the recovery unit off, shut off valves on cylinder and transfer unit.
6. The LV20 can recover to 25" Hg vacuum inlet pressure if required. The pump must be set for two stage operation below 0 PSIG inlet pressure.

**FIGURE 3 - LIQUID OR VAPOR RECOVERY**

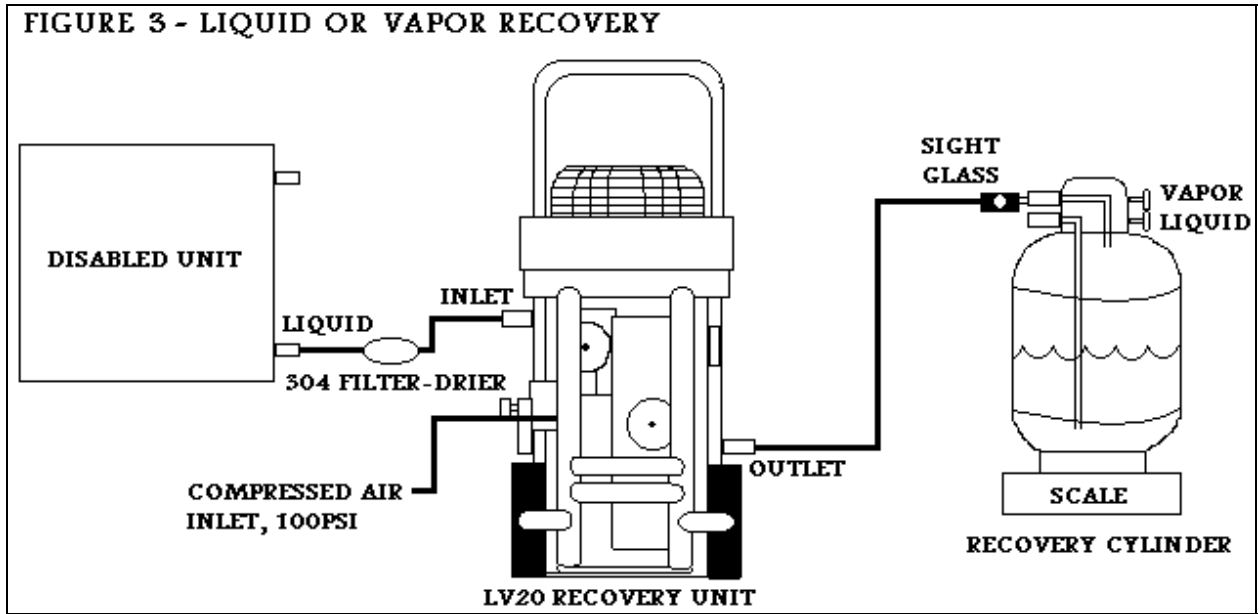
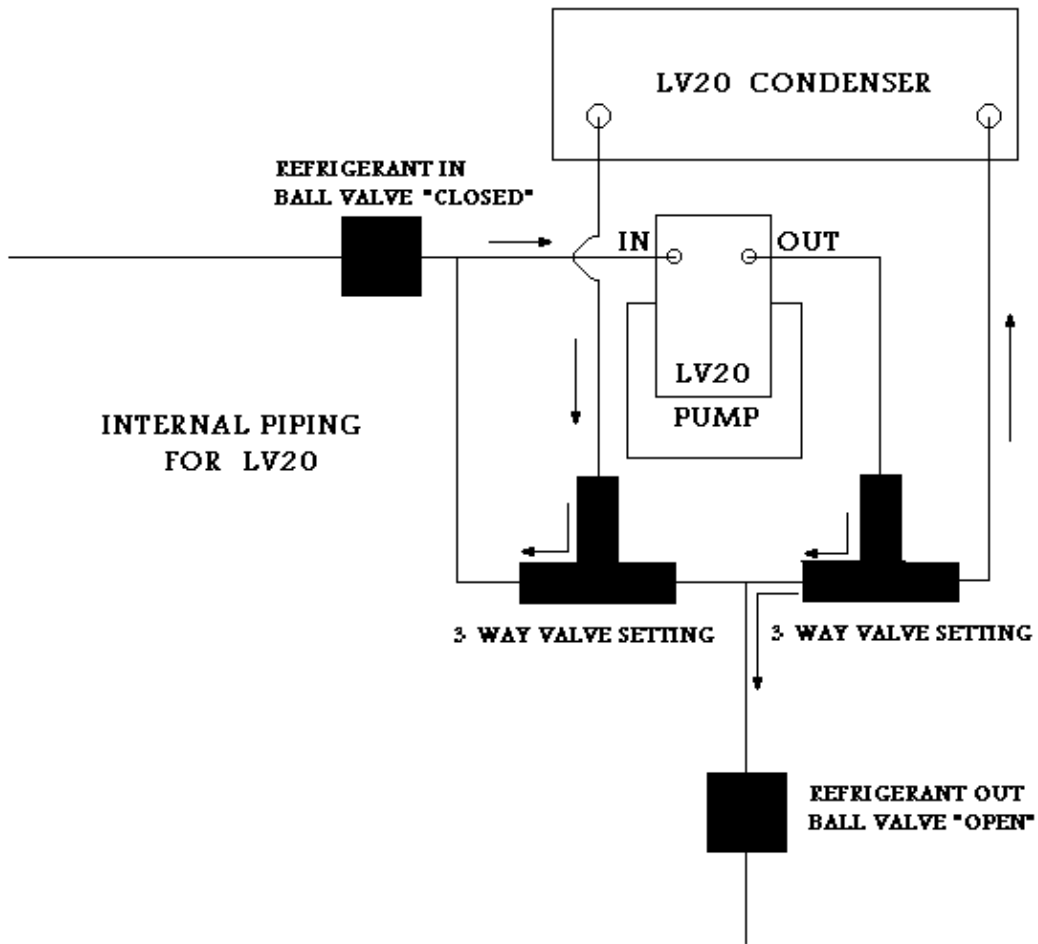


FIGURE 4 - SELF-PUMP OUT MODE OF RECOVERY UNIT





## SELF PUMP-OUT OF RECOVERY UNIT (SEE FIGURE 4)

To avoid mixing refrigerant, it is important that at the end of each recovery operation, the refrigerant left in the LV20 recovery unit must be pumped out. This is shown in Figure 4.

The LV20 has a self pump-out system (Patent Pending) which is very easy to use.

1. Close inlet ball valve.
2. Open outlet valve of LV20 and recovery cylinder valve.
3. Turn LV20 power on.
4. When suction pressure gauge on the LV20 reaches 0 PSIG, switch pump to two stage operation. This will allow evacuation of the LV20 condenser to 25" Hg vacuum.

## MAINTENANCE

Under certain ambient temperature of 40°F or lower, the exhaust air from the LV20 can cause ice formation, causing the LV20 to stop pumping. Placing the pump in a warmer area can solve this problem.

After using the LV20 for removing highly contaminated refrigerants, use a few pounds of clean refrigerant to pump through the LV20 to clean out the LV20 pump.

## IMPORTANT NOTE

For trapping of particles a filter-drier size C163 must be installed at the refrigerant inlet of the LV20. The drier should be replaced after each job or as often as required, depending on the amount of rust and particulate which are in the system being pumped out. This will greatly reduced the amount of wear on the internal O-ring seals in the LV20.

## WARRANTY

National Refrigeration Products (NRP) Recovery Equipment is warranted to be free of manufacturing defects. 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 a copy of the invoice. In no event shall NRP be liable for the cost of the labor charges, lost profits, injury to good will, or any other special or 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.