

Manufactured by

**APPION**  
EPA PERFORMANCE



**FOR USE WITH:**

- Group III** R12, R134a, R401C, R406A, R500
- Group IV** R22, R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509
- Group V** R407A, R404A, R402A, R507, R407B, R410A

**UL CERTIFIED**

Per ARI Standard 740-98

To meet or exceed EPA regulations.  
For use with class III, IV and V refrigerants.

**Features**

- Refrigerant-isolated crankcase eliminates bearing contamination
- Solid-mounted pistons eliminate wrist pins and bushing wear
- 7-inch, 10-blade turbine fan blasting 600 CFM of cooling air
- 550 PSI high pressure shut off for R410A
- Pumps direct liquid and vapor
- Simple, easy-to-use design; no purge cycle required
- Pumps virgin refrigerant; no oil required
- Field serviceable
- **UL certified per ARI Standard 740-98**

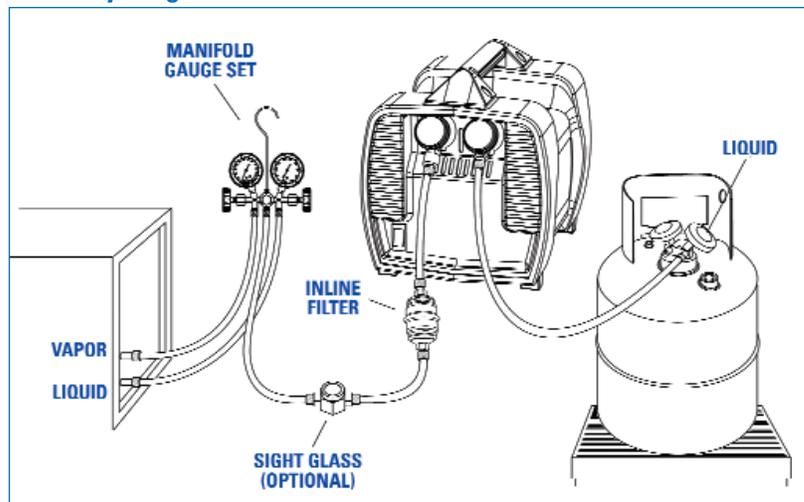
**Specifications**

Power: 1/2 HP, 115 VAC, 60 Hz, 10 Amps  
 Weight: 22 Lbs  
 Dimensions: 11.38" L x 9.40" W x 10.30" H

**Applications**

- Commercial A/C
- Commercial Refrigeration
- Residential A/C
- Appliances
- Roof Top Units
- Ductless Splits
- Heat Pumps
- PTACs
- Vending Machines
- Ice Machines

**Recovery Diagram**



**RATED IN ACCORDANCE WITH ARI STANDARD 740-98**

Refrigerant Groups	Push/Pull Liquid Refrigerant	Liquid Refrigerant	Vapor Refrigerant
III	10.78 lbs./min.	8.53 lbs./min.	0.26 lbs./min.
IV	11.31 lbs./min.	5.83 lbs./min.	0.31 lbs./min.
V	12.14 lbs./min.	4.31 lbs./min.	0.26 lbs./min.

# PORTABLE REFRIGERANT RECOVERY UNIT, OIL-LESS, TWIN CYLINDERS

# G5TWIN



Manufactured by

**APPION**  
Star Performance

### FOR USE WITH:

- Group III** R12, R134a, R401C, R406A, R500  
**Group IV** R22, R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509  
**Group V** R407A, R404A, R402A, R507, R407B, R410A



### Features

- Suitable for high-volume recovery
- Twin cylinders/twin condensers
- Refrigerant-isolated crankcase eliminates bearing contamination
- Solid-mounted pistons eliminate wrist pins and bushing wear
- 7-inch, 10-blade turbine fan blasting 600 CFM of cooling air
- 550 PSI high pressure shut off for R410A
- Simple, two-valve operation; no purge cycle required
- Pumps direct liquid and vapor with no throttling required
- Pumps virgin refrigerant; no oil required
- Field serviceable

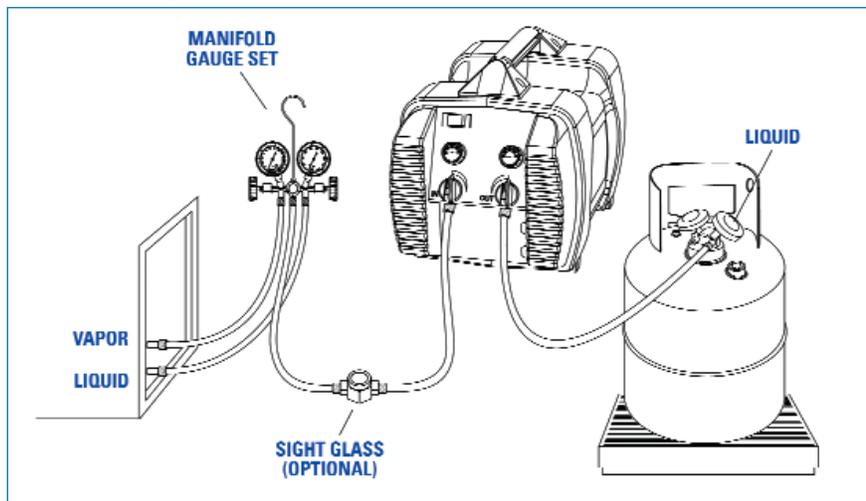
### Specifications

Power: 1/2 HP, 115 VAC, 60 Hz, 10 Amps  
 Weight: 24 Lbs  
 Dimensions: 13.75" L x 9.40" W x 10.30" H

### Applications

- Commercial A/C
- Commercial Refrigeration
- Residential A/C
- Chillers
- Supermarkets
- Ocean Vessels
- Factory/Production Lines
- Pumping Stations
- Salvage Yards
- Ice Rinks
- Roof Top Units

### Recovery Diagram



### RATED IN ACCORDANCE WITH ARI STANDARD 740-98

Refrigerant Groups	Push/Pull Liquid Refrigerant	Liquid Refrigerant	Vapor Refrigerant
III	16.59 lbs./min.	6.20 lbs./min.	0.61 lbs./min.
IV	17.58 lbs./min.	6.99 lbs./min.	0.55 lbs./min.
V	10.19 lbs./min.	3.47 lbs./min.	0.66 lbs./min.

RECOVERY EQUIPMENT





# GS3700



## PORTABLE REFRIGERANT RECOVERY UNIT, OIL-LESS

RECOVERY EQUIPMENT



### FOR USE WITH:

**Group III** R12, R134a, R401C, R406A, R500

**Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509

**Group V** R407A, R404A, R402A, R507, R407B, R410A



**UL CERTIFIED**  
Per ARI Standard 740-98  
To meet or exceed EPA regulations.  
For use with class III, IV and V refrigerants.

### Features: GS3700

- Fastest overall recovery rates in its class
- Rugged high density double walled housing
- Self purge to prevent cross contamination
- Pumps liquid or vapor at the same time
- Powerful 1 HP oil-less compressor
- Built in suction filter
- Low pressure shut-off
- High pressure shut-off for R410A

### Specifications

Power: 1 HP, 115 Volt, 50/60 Hz

Weight: 36 Lbs

Dimensions: 14.50" L x 8" W x 12" H

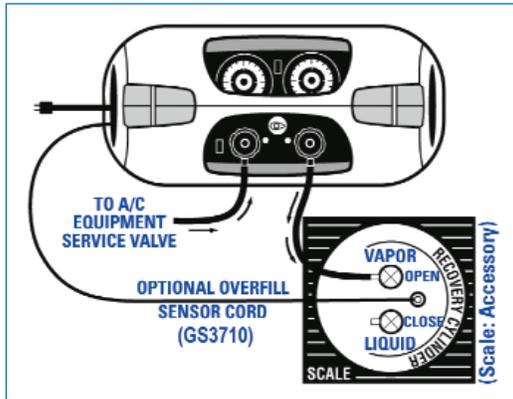
### Applications

- Commercial A/C
- Commercial Refrigeration
- Roof Top Units
- Ice Machines
- Residential A/C
- Appliances

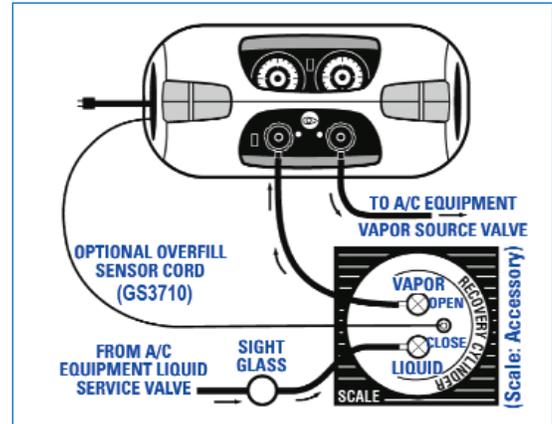
### Features: GS3710

- Same as above
- Overfill sensor cord

### Direct Liquid/Vapor Recovery Diagram



### Liquid Push-Pull Recovery Diagram



### RATED IN ACCORDANCE WITH ARI STANDARD 740-98

Refrigerant Groups	Push/Pull Liquid Refrigerant	Liquid Refrigerant	Vapor Refrigerant	Shut-Off Vacuum
III	13.88 lbs./min.	4.74 lbs./min.	0.33 lbs./min.	10"
IV	15.80 lbs./min.	6.86 lbs./min.	0.49 lbs./min.	10"
V	15.36 lbs./min.	6.50 lbs./min.	0.51 lbs./min.	10"



**For use with:**

- Group III** R12, R134a, R401C, R406A, R500
- Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509
- Group V** R407A, R404A, R402A, R507, R407B, R410A

**Features: LV2000**

- Patented pump-out feature
- Patented compressor sight glass for monitoring of oil level and easy access compressor oil drain
- Electrical cord wrap
- Low cost
- Easy to use
- Attractive, compact design

**Features: LV2001**

- Same as above
- 3 positive shut-off hoses and liquid sight/glass

**Specifications**

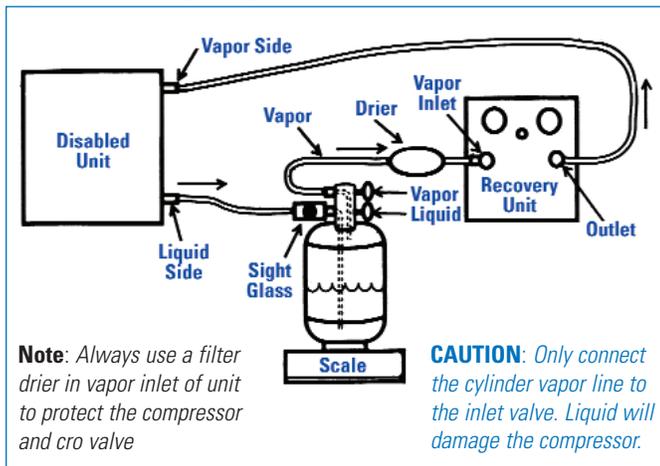
Power: 8 Amps, 115 Volt, 60 Hz, 1PH (**LV2000, LV2001**)  
 4 Amps, 220 Volt, 50 Hz, 1PH (**LV2002**)

Unit Weight: 47 Lbs  
 Shipping Weight: 54 Lbs  
 Dimensions: 20" L x 10.50" W x 15" H  
 Connections: 1/4" MFL  
 Oil Charge: 150 Alkyl Benzene

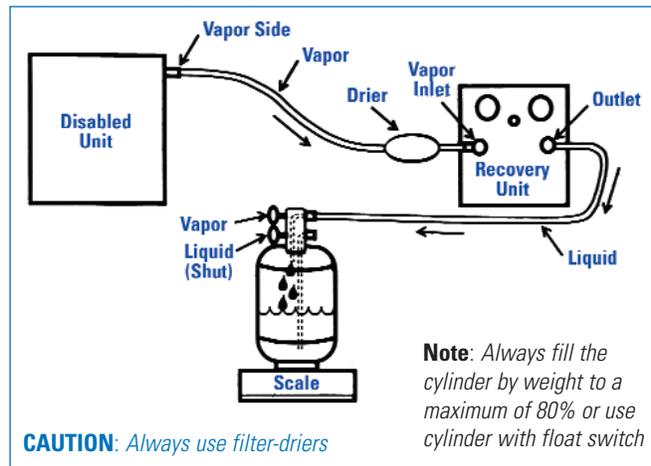
**Applications**

- Commercial A/C
- Commercial Refrigeration
- Roof Top Units
- Ice Machines
- Residential A/C
- Appliances

**Liquid Recovery Diagram**



**Vapor Recovery Diagram**



**RATED IN ACCORDANCE WITH ARI STANDARD 740-98**

Refrigerant Groups	Push/Pull Liquid Refrigerant	Vapor Refrigerant	Shut-Off Vacuum
GR III	10.25 lbs./min.	0.48 lbs./min.	10"
GR IV	11.00 lbs./min.	0.46 lbs./min.	10"
GR V	8.30 lbs./min.	0.33 lbs./min.	10"



# REVAC



## COMBINATION OIL-LESS REFRIGERANT RECOVERY UNIT AND VACUUM PUMP

RECOVERY EQUIPMENT



### FOR USE WITH

- Group III** R12, R134A, R401C, R406A, R500
- Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509 & Blends\*

**Patented True Vacuum Pump  
Pulls 500 Microns!**

### Features for REVAC

- Two units in one!
- 1 HP compressor (1.5 CFM)
- Accessory compartment
- Attractive tool box design
- True vacuum pump - 500 microns
- Manual or auto switching to system evacuation
- 1/4" hose adapters
- 053 drier supplied

### Additional Features for REVAC-UL

- Tank overfill protection
- UL listed
- Comes with 3 hoses, a 50 lb. cylinder and sight glass
- Patented pump out feature

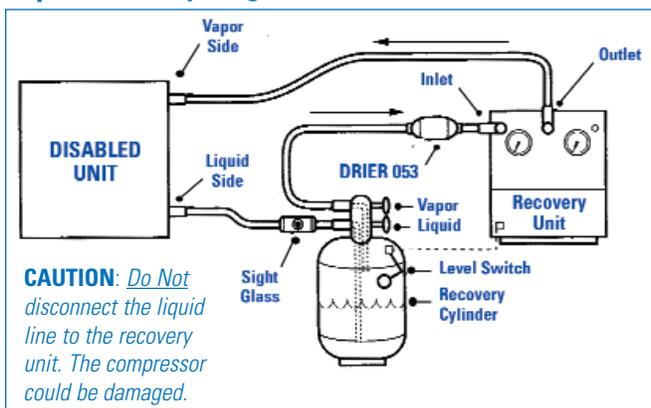
### Specifications

Power: 1 HP, 12.5 Amps, 115 Volt, 60 Hz, 1PH  
 Unit Weight: 50 Lbs  
 Shipping Weight: 58 Lbs  
 Dimensions: 10.25" L x 22" W x 11" H  
 Connections: 3/8" MFL

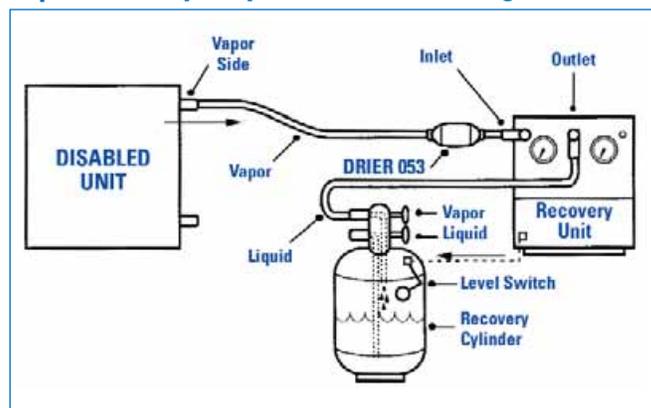
### Applications

- Commercial A/C
- Commercial Refrigeration
- Roof Top Units
- Ice Machines
- Residential A/C
- Appliances
- Vending Machines

### Liquid Recovery Diagram



### Vapor Recovery & System Evacuation Diagram



### RATED IN ACCORDANCE WITH ARI STANDARD 740-98

Refrigerant Groups	Push/Pull Liquid Refrigerant	Vapor Refrigerant	Shut-Off Vacuum
GR III	12.35 lbs./min.	0.40 lbs./min.	10"
GR IV	13.05 lbs./min.	0.42 lbs./min.	10"

\* May not be applicable for all refrigerant blends. Consult factory for proper application.

# TOTALLY AUTOMATIC PORTABLE REFRIGERANT RECOVERY UNIT, OIL-LESS



# AR1UL



**RECOVERY EQUIPMENT**

**FOR USE WITH**  
**Group III** R12, R134A, R401C, R406A, R500  
**Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509 & Blends\*

**One Step Recovery  
 No Switching Hoses!  
 SUBCOOL FEATURE**



### Features

- One step recovery
- Automatic sensing of liquid and vapor
- No switching hoses
- Attractive tool box design
- Tool and accessory compartment
- Tank overfill protection
- Self clearing mode
- Comes with 4 positive shut-off hoses and 50 Lb. cylinder
- Automatic shut-off at 10" Vacuum
- 053 drier supplied

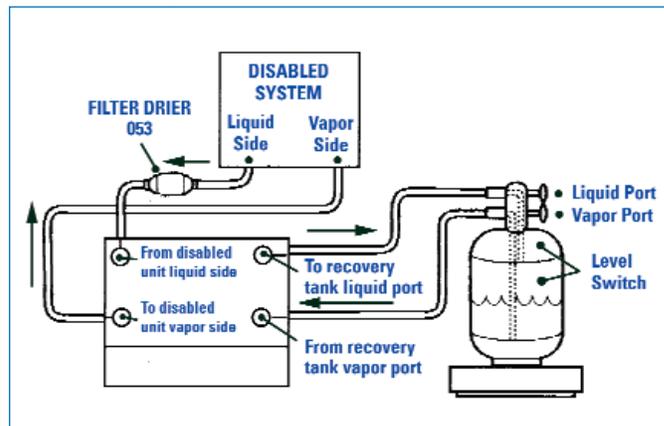
### Specifications

Power: 9 Amps, 115 Volt, 60 Hz, 1PH  
 Unit Weight: 46 Lbs  
 Shipping Weight: 59 Lbs  
 Connections: 3/8" MFL  
 Dimensions: 10.25" L x 22" W x 11" H

### Applications

- Commercial A/C
- Commercial Refrigeration
- Roof Top Units
- Ice Machines
- Residential A/C
- Appliances
- Vending Machines

### Recovery Diagram



### RATED IN ACCORDANCE WITH ARI STANDARD 740-98

Refrigerant Groups	Push/Pull Liquid Refrigerant	Vapor Refrigerant	Shut-Off Vacuum
III	10.8 lbs./min.	0.35 lbs./min.	10"
IV	11.5 lbs./min.	0.50 lbs./min.	0"

\* May not be applicable for all refrigerant blends. Consult factory for proper application.



### LIQUID AND VAPOR RECOVERY/RECYCLING UNIT



**For use with:**

- Group III** R12, R134a, R401C, R406A, R500
- Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509
- Group V** R407A, R404A, R402A, R507, R407B, R410A

The RLV700 is a recycling unit to be used in the contractor shop or in an equipment room. It is designed to recycle refrigerant in batches up to 160 pounds, to a quality within the IRG2 standard. The RLV700 has been tested in accordance with ARI-740 standard.

#### Features

- Easy to use
- Patented pump out feature
- Recycles liquid and vapor the same way - no need to change hoses
- Filters out acids, moisture, oil, chlorides, particulate and disposes of non-condensables to IRG2 quality up to 160 lbs. before a filter change is required
- Patented compressor sight glass and oil drain
- Comes with 2 positive shut-off hoses, 50 Lb. cylinder & liquid sight glass
- Electrical cord wrap
- Tank overfill protection
- 053 filter drier supplied

#### Specifications

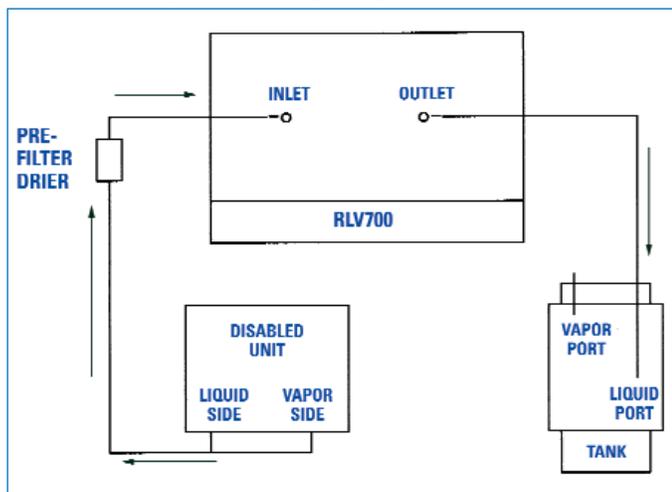
- Capacity:** Liquid recovery / Recycling up to .60 lb./min.  
Vapor recovery / Recycling up to .40 lb./min.
- Power:** 6.70 Amps, 115 Volt, 60 Hz, 1PH (**RLV700**)  
4.5 Amps, 220 Volt, 50 Hz, 1PH, (**RLV700E**)
- Unit Weight:** 120 Lbs
- Shipping Weight:** 164 Lbs
- Dimensions:** 15" L x 16" W x 35" H
- Vacuum:** 10" Hg
- Connections:** 3/8" MFL
- Oil Charge:** 150 Alkyl Benzene

#### Applications

- Contractor shop
- Equipment room

Standard (R12)	RLV700	IRG2
Water	10 PPM	10 PPM
Acidity	1 PPM	1 PPM
Chloride	Pass	Pass
Oil Residue	0.02%	0.02%
Non-Condensables	2%	2%
Particulates	Pass	Pass

#### Liquid and Vapor Recovery Diagram



\* May not be applicable for all refrigerant blends. Consult factory for proper application.

- For use with:**
- Group III** R12, R134a, R401C, R406A, R500
  - Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509
  - Group V** R407A, R404A, R402A, R507, R407B, R410A



The RAD700 is a recycling unit to be used on the job site in conjunction with a LV2000, LV1, ULV1, LV1C, LV1CUL, GS1, GS1UL, GS2, REVAC, and AR1UL or other recovery units. It is designed to recycle refrigerant in batches of 40lbs., to a quality within the IRG2 standard. The RAD700 has been tested in accordance to the ARI-740 standard.

**Features**

- Easy to use
- Recycles liquid and/or vapor - no need to change hoses
- Recycles to IRG2 standard in 40 lbs. batches before a filter change is required
- Low cost and portable for job site recycling
- Efficient compact design
- Easily accessible contaminants drain
- Convenient electrical cord wrap
- 052 drier supplied

**Specifications**

**Capacity:** Liquid recovery/recycling rate of .35 lb./min.  
 Vapor recovery/recycling rate of .35 lb./min.

**Power:** 6.10 Amps, 115 Volt, 60 Hz, 1PH (**RAD700**)  
 3.5 Amps, 220 Volt, 50 Hz, 1PH, (**RAD700E**)

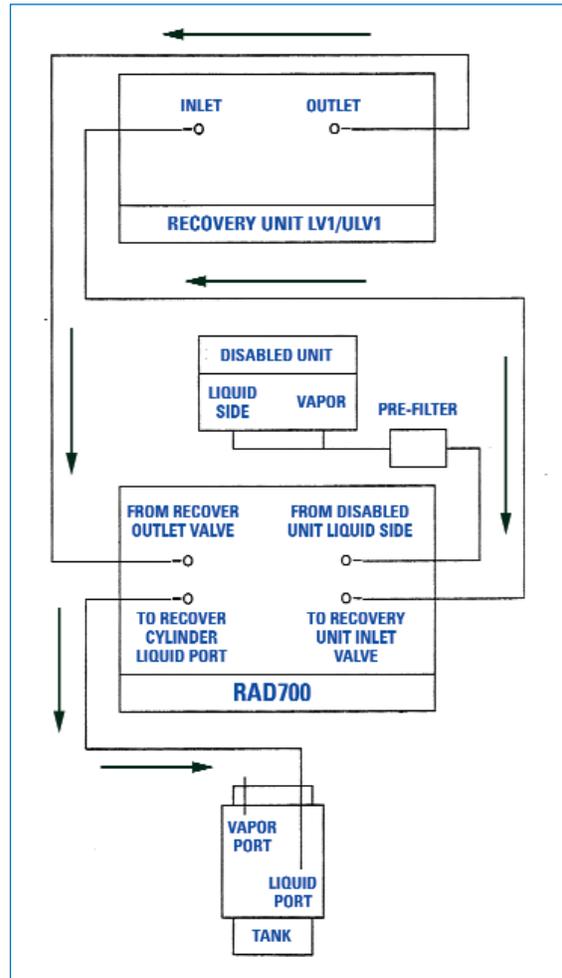
**Unit Weight:** 35 Lbs  
**Shipping Weight:** 44 Lbs  
**Connections:** 1/4" MFL  
**Dimensions:** 15" L x 12" W x 12" H  
**Vacuum:** 10" Hg

Standard (R12)	RAD700	IRG2
Water	10 PPM	10 PPM
Acidity	1 PPM	1 PPM
Chloride	Pass	Pass
Oil Residue	0.02%	0.02%
Non-Condensables	2%	2%
Particulates	Pass	Pass

**Applications**

- Commercial A/C
- Commercial refrigeration
- Residential A/C
- Rooftop units

**Recovery Diagram**



\* May not be applicable for all refrigerant blends. Consult factory for proper application.



**For use with:**

- Group II** R114
- Group III** R12, R134a, R401C, R406A, R500
- Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509
- Group V** R407A, R404A, R402A, R507, R407B, R410A



### Specifications

Air supply capacity: 40 CFM air at 100 PSI  
 Vapor recovery: 1.40 lbs./min.  
 Liquid recovery: 52 lbs./min.  
 Unit weight: 125 Lbs  
 Shipping weight: 158 Lbs  
 Dimensions: 28" L x 26" W x 45" H  
 Connections: 3/8" MFL Inlet, 3/8" MFL Outlet

### Applications

- Best suited for the industrial application where plant air is available
- Ideal for marine application
- Excellent for quick recovery in supermarkets or food plant systems which cannot afford downtime

### RATED IN ACCORDANCE WITH ARI STANDARD 740-98

Refrigerant Groups	Push/Pull Liquid Refrigerant	Liquid Refrigerant	Vapor Refrigerant	Shut-Off Vacuum
II	22 lbs./min.	9.4 lbs./min.	0.50 lbs./min.	15"
III	44 lbs./min.	16 lbs./min.	0.88 lbs./min.	15"
IV	52 lbs./min.	16 lbs./min.	1.25 lbs./min.	10"
V	20 lbs./min.	18 lbs./min.	1.26 lbs./min.	20"

\* May not be applicable for all refrigerant blends. Consult factory for proper application.

### To recover 200 lbs. or more, in high pressure systems.

The LV20 is designed for larger installations to transfer large quantities of liquid refrigerant.

The unit is mobile and mounted on a rugged steel frame for easy handling.

### The LV20 can pump clean or contaminated refrigerant liquid or vapor quickly and reliably without risk of damages due to slugging or running dry.

The transfer system is an air driven oil-less positive displacement pump. The LV20, which includes a condenser/subcooler coil, will pump vapor and condense it for faster transfer.

The transfer unit can also be effectively used to charge systems with refrigerant. 40 CFM of compressed air at 100 PSI is required to operate the LV20 effectively.

With a lower air CFM or pressure, the capacity of the unit decreases. If plant air is not available, a 15 HP air compressor can be used.

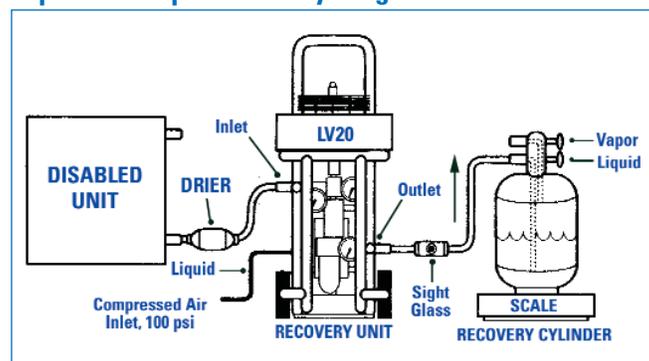
**The LV20 does not require electric power.** The condenser fan air motor is factory piped to the air regulator. The two stage standard pumping feature allows for refrigerant recovery to 25" vacuum if required.

The LV20 is supplied with a unique patented condenser pump out system to avoid unnecessary venting of refrigerants.

**The LV20 is also available in a base mounted configuration. This version, Model LV20B, is convenient when it is necessary to carry the unit through small passages or access hatches.**

Filter Drier 163F supplied.

### Liquid and Vapor Recovery Diagram



**For use with:**

- Group III** R12, R134a, R401C, R406A, R500
- Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509
- Group V** R407A, R404A, R402A, R507, R407B, R410A

The LV5 is designed for commercial installations. It consists of a belt-driven open-type compressor, which will recover systems to 20" Hg vacuum.

The LV5 has been designed to be simple to operate and service.

The unit is mobile with all components mounted on a sturdy steel frame. It utilizes a rugged open compressor which eliminates all problems related to the handling of contaminated refrigerant. Any recovery cylinder with one or two valves can be used.

For large systems, the LV5 can work as a supplementary unit to handle vapor recovery in combination with liquid recovery pump.

C163F filter drier is supplied.



### Specifications

**Power:** 1.5 HP, 20 Amps, 230 Volt, 60 Hz, 1PH (LV5)  
1.5 HP, 16 Amps, 220 Volt, 50 Hz, 1PH (LV5E)

**Unit Weight:** 236 Lbs

**Shipping Weight:** 267 Lbs

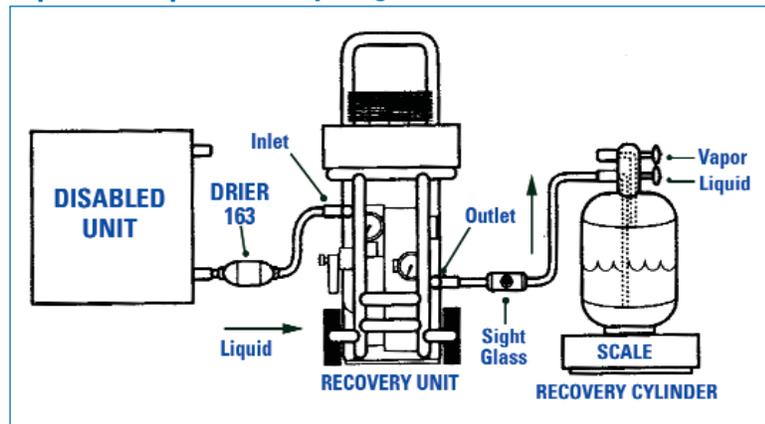
**Dimensions:** 24" L x 22" W x 45" H

**Connections:** 3/8" MFL Inlet, 3/8" MFL Outlet

### Applications

- Large field erected systems with long piping runs
- System requiring large vapor capacity
- Supermarkets
- Salvage yards

### Liquid and Vapor Recovery Diagram



### RATED IN ACCORDANCE WITH ARI STANDARD 740-98

Refrigerant Groups	Push/Pull Liquid Refrigerant	Liquid Refrigerant	Vapor Refrigerant	Shut-Off Vacuum
III	27.50 lbs./min.	7.85 lbs./min.	1.00 lbs./min.	15"
IV	31.50 lbs./min.	10.25 lbs./min.	1.20 lbs./min.	10"
V	15.56 lbs./min.	7.8 lbs./min.	0.88 lbs./min.	22"

\* May not be applicable for all refrigerant blends. Consult factory for proper application.



### For use with:

- Group II** R114
- Group III** R12, R134a, R401C, R406A, R500
- Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509

The LV8 recovery system is an air driven positive displacement pump which includes a 1.5 HP oil-less air compressor to power it.

The LV8, which includes a condenser/sub cooler coil, will pump vapor and condense it for faster transfer.

**Any recovery cylinder with one or two valves can be used.**

**The NRP LV8 is very easy to use because it will pump either refrigerant liquid or vapor in the same way.**

**There is no need to change piping or setting of the unit. There is no risk of slugging the pump or risk of damage by running the pump dry. The LV8 will recover systems to 20" Hg vacuum.**

The transfer unit may also be used very effectively to charge systems with refrigerant.

The LV8 can be used with plant air at 10 cfm, 100 PSI when available, instead of unit mounted air compressor.

The unit is supplied with a unique patented condenser pump out system to avoid unnecessary venting of refrigerant.

C163F filter drier is supplied.

### Specifications

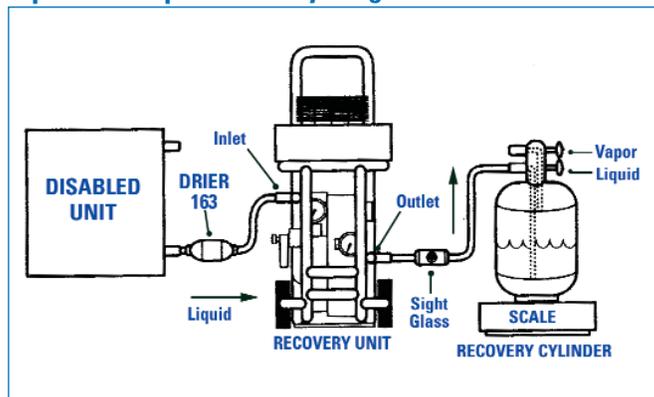
- Air Supply Capacity: 10 CFM air at 100 PSI
- Power: 1.5 HP, 10 Amps, 230 Volt, 60 Hz, 1PH, (LV8)
- 1.5 HP, 8.5 Amps, 220 Volt, 50 Hz, 1PH, (LV8E)
- 1.5 HP, 20 Amps, 115 Volt, 60 Hz, 1PH, (LV8/115)
- 1.5 HP, 3 Amps, 460 Volt, 60 Hz, 3PH, (LV8/460)

- Unit Weight: 169 Lbs
- Shipping Weight: 202 Lbs
- Dimensions: 24" L x 22" W x 45" H
- Connections: 3/8" MFL Inlet, 1/2" FPT Outlet

### Applications

- High pressure chillers
- Supermarkets
- Large packaged A/C units
- In factory units
- Salvage yards

### Liquid and Vapor Recovery Diagram



### RATED IN ACCORDANCE WITH ARI STANDARD 740-98

Refrigerant Groups	Direct Liquid Refrigerant	Push/Pull Liquid Refrigerant	Vapor Refrigerant	Shut-Off Vacuum
GR II	9.20 lbs./min.	11.50 lbs./min.	0.22 lbs./min.	15"
GR III	15.00 lbs./min.	30.10 lbs./min.	0.30 lbs./min.	15"
GR IV	16.50 lbs./min.	32.45 lbs./min.	0.29 lbs./min.	10"

\* May not be applicable for all refrigerant blends. Consult factory for proper application.

# TRANSPORTABLE RECOVERY SYSTEM

# VR11



RECOVERY EQUIPMENT

The VR11 unit is easily transportable and can be used for both liquid and vapor recovery.

**The VR11 will help you recover the refrigerant charge from a chiller to meet the requirements of the Clean Air Act.**

The VR11 will evacuate the chiller to 29" Hg vacuum using its 1 HP belt-driven vacuum pump rated at 40 microns and 10.6 cfm.

**Rated in accordance with ARI Standard 740-98.**

### Unit Includes

- 1 NC50U Recovery Cylinder for Vapor
- 1 15 foot 3/4" hose
- 2 10 foot 3/4" hoses
- 1 6 foot 1/4" hose
- 1 Relief valve, set at 20 psig to purge non-condensables, if required
- 1 C165 filter drier

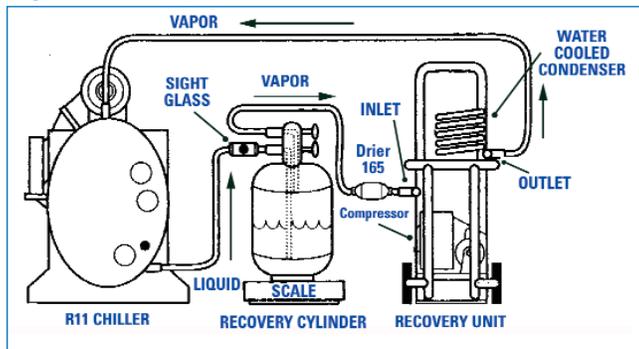
### Specifications

Vapor recovery: 0.86 lbs./min.  
 Liquid recovery: Push/Pull 84 lbs./min.  
 Vacuum capacity: 29" Hg (20 AMP Service Required)  
 Power: 1 HP, 18.50 Amps, 115 Volt, 60 Hz, 1PH, (VR11)  
 1 HP, 6 Amps, 220 Volt, 50 Hz, 1PH, (VR11E)  
 Unit Weight: 246 Lbs  
 Shipping Weight: 296 Lbs  
 Dimensions: 28" L x 26" W x 45" H  
 Connections: 5/8" MFL

### Applications

- Low pressure chillers
- Transportable by van or truck
- Easily removable within equipment and mechanical rooms

### Liquid Recovery Diagram



Liquid recovery is done by using the push-pull method as shown in the diagram above. A lower pressure is created in the recovery cylinder which forces the liquid refrigerant from the chiller into the cylinder.

The pumping rate will increase if the chiller pressure is raised from 5 to 10 psig by raising the water temperature. The rate will also improve if a 3/4" or 1" connection is used at the chiller.

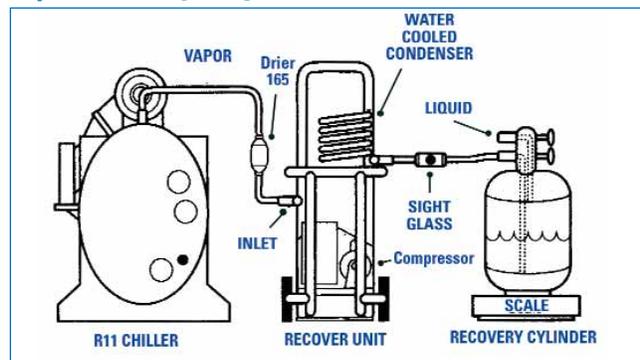
The VR11 includes one 50 pound recovery cylinder NC50U with a float-type shut-off switch. This switch will shut off the VR11 when the recovery cylinder is 80% full.

Additional, larger tanks, NRP model N250T, N665T etc. can be purchased separately if required.



For use with Group I  
R11, R113, R123

### Vapor Recovery Diagram



Once all the liquid has been recovered, the remaining vapor can be extracted with the recovery unit as shown in the diagram above.

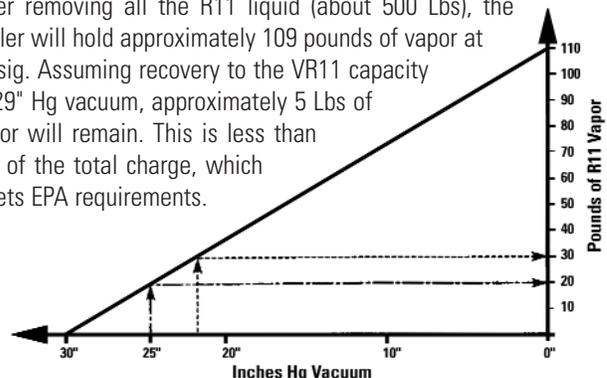
The VR11 utilizes a water cooled condenser which requires approximately 3 gpm of water between 40°F and 75°F.

As with liquid recovery, the recovery time is improved if the connections at the chiller are changed to 3/4" or 1".

### R11 Vapor must also be recovered to meet EPA requirements

To illustrate the need to recover both liquid and vapor, take an example of a 350 ton chiller which has a charge of about 600 pounds of R11.

The chiller, which is about 15 feet long, has a combined evaporator/condenser volume of about 300 cubic feet. From standard refrigerant tables, 0 psig R11 vapor weighs .364 lb./ft<sup>3</sup>. After removing all the R11 liquid (about 500 Lbs), the chiller will hold approximately 109 pounds of vapor at 0 psig. Assuming recovery to the VR11 capacity of 29" Hg vacuum, approximately 5 Lbs of vapor will remain. This is less than 1% of the total charge, which meets EPA requirements.



Pounds of vapor left in a 350 Ton chiller at various vacuum levels

**For use with Group VI:**  
R13, R23, R508, R508A, R503



### Specifications

Liquid Capacity: 5 lbs./min.  
Unit Weight: 76 Lbs  
Shipping Weight: 112 Lbs  
Dimensions: 24" L x 22" W x 45" H

### Specifications

Vapor Capacity: 1.5 lbs./min.  
Vacuum: 0 psig  
Unit Weight: 95 Lbs.  
Shipping Weight: 131 Lbs  
Dimensions: 24" L x 22" W x 45" H

The LP13 pump will recover at a rate of 5 pounds per minute depending on available air pressure and CFM. The LP13 includes an oil-less air driven pump which requires 30 CFM of air at 100 PSIG.

**Use only with cylinders rated to 2000 PSI working pressure.**

The LP13 pump will not transfer vapor, but will not be damaged if it runs with vapor only.

Two 6 ft. braided hoses with 5/16" SAE connections are included.

The VR13 recovery unit will recover at a rate of 1.5 pounds per minute. Recovery rate will vary with compressed air and refrigerant pressure. The VR13 includes an oil-less, air driven pump which requires 30 CFM of air at 100 PSI.

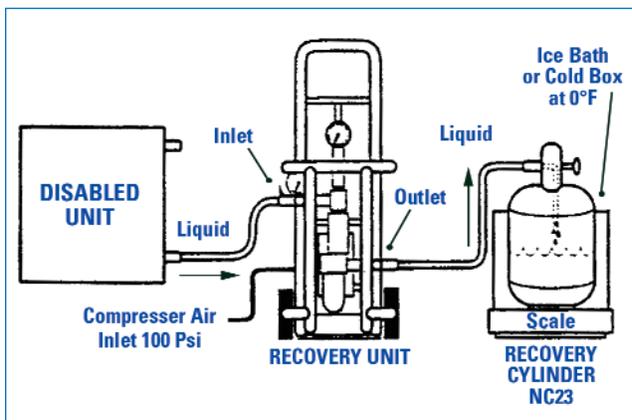
**Use only with cylinders rated to 2000 PSI working pressure.**

The VR13 will not pump liquid refrigerant.

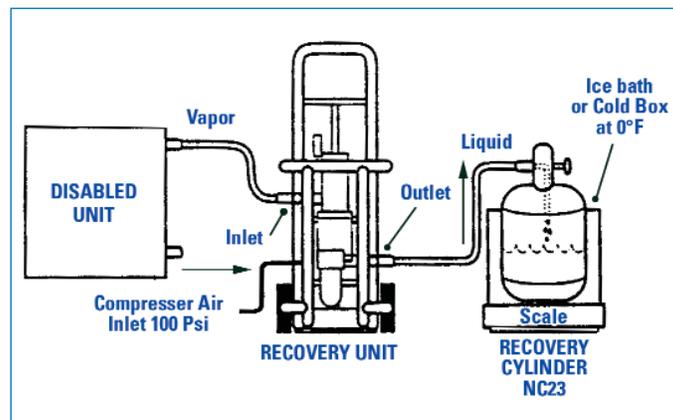
**Recovers systems to 0 psig as required by the EPA**

Two 6 ft. braided hoses with 5/16" SAE connections are included.

### Liquid Recovery Diagram - LP13



### Vapor Recovery Diagram - VR13



# REFRIGERANT TRANSFER STATION

# TS4



The TS4 will pump liquid or vapor in the same way without resetting the unit. There is no risk of damage by running the pump dry or slugging it.

The TS4 evacuates refrigerant from cylinders to 4" vacuum and automatically shuts off. The TS4 can be field adjusted to evacuate cylinders to a lower vacuum level if required.

The unit is supplied with a unique patented pump-out system to avoid venting or mixing of different refrigerants.

### Easy to use:

1. Connect cylinders.
2. Turn power on.
3. The TS4 will stop automatically when the tanks to be emptied are under vacuum.

**Needs little maintenance.** Trouble-free for wholesaler personnel. Just clean mesh strainer as needed.

**Versatile Transfers** from single valve or dual valve cylinders into larger single valve or dual valve cylinders.

**Will prevent mixing refrigerants.** Patented pump-out system evacuates the transfer station before pumping a different refrigerant.

**Fast** Four 30 or 50 Lb cylinders are emptied & under vacuum in less than 25 minutes. The TS4 control panel is simple and easy to use.

### Specifications

**Power:** 30 Amps, 230 Volt, 60 Hz, 1PH, (TS4)  
30 Amps, 220 Volt, 50 Hz, 1PH, (TS4E)

**Weight:** 375 Lbs

**Dimensions:** 55" L x 27" W x 40" H

Unit is supplied with four 3' x 3/8" hoses and one 8' x 3/8" hose.

The most practical transfer station for the wholesaler. Practical participation in reclamation programs can begin in the warehouse. NRP's TS4 unit allows the wholesaler or contractor to consolidate small cylinders of refrigerant into large reclamation cylinders.

The TS4 unit consists of two 1-1/2 HP compressors, a condenser coil and a fan. It is supplied with four 3' x 3/8" hoses and one 8' x 3/8" hose. All the components are mounted on a rugged steel cart.

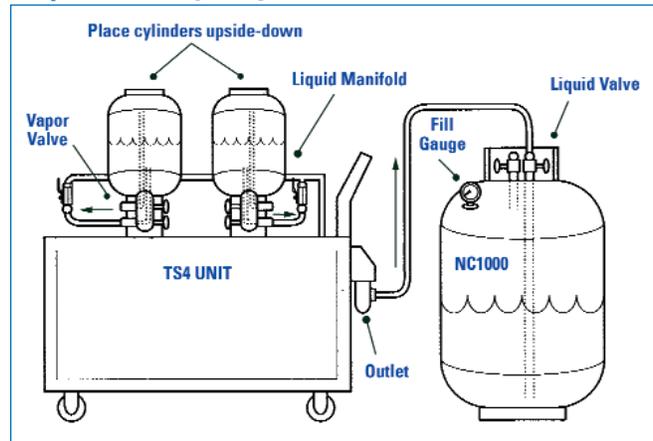
The transfer unit top holds four 50 lb cylinders. Any cylinder with one or two valves can be used.

### For use with:

- Group III** R12, R134a, R401C, R406A, R500  
**Group IV** R401A, R409A, R401B, R412A, R411A, R407D, R22, R411B, R502, R407C, R402B, R408A, R509



### Vapor Recovery Diagram



## DESICCANT

One 30 pound charge of **MS30** will remove and hold approximately 5 pounds of water.

Shipping Weight: 32 Lbs



RECOVERY EQUIPMENT



### PRACTICAL APPLICATIONS FOR LIQUID REFRIGERANT PUMPS

**Recovery - system to cylinder transfer:**

Fast, safe and portable liquid refrigerant removal without venting. Saves wear and tear on vapor recovery units. Liquid pump and small vapor recovery unit does the job of a large recovery machine at a fraction of the cost. Upgrading unsealed recovery systems to sealed units. Permanent recovery pump installations

**Charging - cylinder to system transfer:**

Fast, safe and portable filling systems, on production line or in the field. Charging system to 300 PSI differential.

**Consolidation - cylinder to large cylinder transfer:**

Permits emptying of small cylinders on the spot and reusing or returning to the customer. When the cylinder will be reused for the same refrigerant, the residual vapors (4% of cylinder capacity) can be left behind. Reduces number of cylinders required in inventory. Reduces freight and paperwork for reclaim programs.

**Distribution - large cylinder to service cylinder transfer:**

Economic purchase of refrigerant. Simplifies handling and storage for service fleet. Fill cylinder(s) in refrigerant processing plants.

**Filtration - refrigerant or oil in cylinders or systems:**

Circulate through filter/drier to clean liquids. Reduce down time by filtering with system on line. Extend service intervals and reduce maintenance.



LP11

#### LP11

This fast and trouble free 1/2 HP self-priming pump has a flow rate of 30 pounds of R11 per minute. It is well suited for large commercial applications that have a charge of several hundred pounds to sometimes more than 1000 pounds of R11 or R113.

The LP11 pump should never be run with vapors or the seals will be damaged. The LP11 pump has BUNA-N seals and a maximum discharge pressure of 40 PSI.

The LP11 must not be used with R12 or other high pressure refrigerants.

For best results use NRP Hose Kit Model HK11 and place the pump at a lower elevation than the chiller.

**Not for use with R123 which will damage the BUNA-N seals.**



LP12

#### LP12

This 1/3 HP, maintenance free, self-lubricating vane pump has a flow rate of approximately 16 pounds of R12 per minute. The LP12 has a working pressure of 200 PSI and should not be used to transfer R22 or R502.

#### LP22

The LP22 is a gear pump with neoprene seals and a MOP of 300 PSI with a DWP of 150 PSI. This self-lubricated pump has a flow rate of approximately 20 pounds per minute and is supplied with a 1/2 HP motor.

3/8" or 1/2" hoses are required.



LP22/LPO

#### LPO

The LPO is a gear pump which works like our LP22 model. It has a MOP of 200 PSI and a differential pressure of 100 PSI. It is supplied with a 1/2 HP motor. Transfers refrigeration oil.

Part No.	Capacity	Power	Dimensions (In.)	Connections (In.)	Use with Refrigerants	Weight (Lbs)
LP11	30 Lbs/Min	1/2 HP, 115 V, 60 Hz	10 L x 6 W x 8 H	3/4 Male Hose	R11, R113	12.5
LP12	16 Lbs/Min	1/3 HP, 115 V, 60 Hz	12 L x 6 W x 8 H	1/2 FPT	R12	18.5
LP22	20 Lbs/Min	1/2 HP, 115 V, 60 Hz	12 L x 10 W x 8 H	3/8 FPT	R11, R12, R22, R113, R123, R500, R502, R134a & Blends*	33
LP22E		1/2 HP, 220 V, 50 Hz				33
LPO	1.2 Gal/Min	1/2 HP, 115 V, 60 Hz	12 L x 10 W x 8 H	3/8 FPT	Transfers Refrigeration Oil	31
LPOE		1/2 HP, 220 V, 50 Hz				31

\* May not be available for all refrigerant blends. Consult factory for proper application.

# Liquid Refrigerant Pumps

## Flow Ratings

Liquid pumps are typically rated in gallons/min. and their capacity is determined by measurements made on water or light oils. To convert from gpm to lbs./min. multiply the gpm rating by the density (lb/gal) of the refrigerant (chart below). Since vapor is almost always present, the actual flow is often quite a lot lower. Tests have indicated that a refrigerant pump capacity is reduced by 5 to 40% due to vapor displacing the liquid in actual field conditions where restrictions have been minimized. A sub cooler on the suction side reduces vapor formation and is an effective way of increasing flow rate.

<b>Refrigerant No.</b>	114	12	502	113	500	11	22	121	123	134a	404	507
<b>Density Lb./Gal.</b>	12.0	10.8	10.2	13.0	9.5	12.2	9.8	N/A	12.3	10.2	8.9	8.9

## Maximizing Capacity

Using a larger pump often will not yield higher flow rates because a larger pump merely creates more vapor that displaces the liquid. The following chart can be used as a guide to determine the maximum practical pump size to install.

Diameter of Smallest Passage On Inlet Side of the Pump (Inches)	Hose Size I.D. (Inches)	Rated Flow Lbs./Min. Ideal Conditions <sup>1</sup>	Approx. Flow Lbs./Min. With Equalizer Line <sup>2</sup>	Approx. Flow Lbs./Min. Without Equalizer Line <sup>3</sup>
0.22	3/8	38	20	10 - 15
0.22	1/2	38	24	12 - 18
0.62	5/8	130	40	20 - 30
0.75	3/4	130	90	45 - 60

<sup>1</sup> Rated flow is with a vapor pressure equalizer line and no vaporization present

<sup>2</sup> Typical flow for average hook up using a vapor pressure equalizer line

<sup>3</sup> Without a vapor pressure equalizer line, flow will also be dependent on discharge pressure and can be less than half of rated flow.

Special pumps are available.

If an equalizer cannot be used, keep flow rates per minute to less than 2.5% of the tank's capacity. For example a 1,000 lb. cylinder can handle up to 25 lbs./min. without excessive cavitation, depending on temperature and inlet line restrictions.

## Extended Life

**Larger motors** are available for higher pressure operation, but the best method is an efficient one that reduces the line restrictions to minimize load on the pump and motor and maximizes net flow rate.

**Refrigerants** can be void of lubricants and provide very little lubrication to the pump. Modular Products Inc. liquid refrigerant pumps are designed and constructed such that the wearing components minimize the need for lubrication.

**Cavitation** is inevitable when pumping low boiling point liquids and some pump damage may occur. Cavitation damage looks like pitting erosion of the parts on the inlet side of the pump, especially on sharp edges. Many Modular Products, Inc. liquid refrigerant gear pumps that have been in service for extended periods of time show no evidence of such damage when used properly.

**Chemical attack** of components is possible. Elastomers must be compatible with the refrigerant being pumped and compressor oils. Acids such as HF and HCL form when water is present. Decomposition can form dangerous by-products (mostly acids) and is generally due to exposing the refrigerant to high temperatures from flames, heater or motor burnouts. The pump should be cleaned thoroughly if exposed to acids to reduce corrosion damage. If in process the pump will continuously be exposed to high concentrations of acids, consider using a Modular Products, Inc. stainless steel pump configured for liquid refrigerant pumping.

**Solids** such as rust, welding debris, dirt, wood chips etc. are an invitation to pump seizure, use a 40 mesh strainer on the inlet to protect the pump.

**Storage:** Always add some compressor oil to pump and seal and/or cap all ports and lines from atmosphere to reduce rust and corrosion between use.



# Vacuum Pumps



## GLOBESAVER™



**GVP3  
FAST!**



**GVP6  
FASTER!!**



**GVP12  
FASTEST!!**

- Dual intake connections
- Two stage design: second stage starts pump at a lower pressure to pull a deeper ultimate vacuum

- Ergonomic sure-grip handle
- High vacuum rating
- Gas ballast feature: helps keep the pump oil clean by reducing condensation of moisture

Vacuum Pump	GVP3	GVP6	GVP12
Free Air Displacement (CFM)	3	6	12
Stages	2 stage rotary vanes	2 stage rotary vanes	2 stage rotary vanes
Field Blankoff	15 microns	15 microns	15 microns
Intake Male Flare (In.)	1/4 MFL x 3/8 MFL	1/4 MFL x 3/8 MFL	3/8 MFL x 1/2 MFL
Horsepower	1/4	1/2	1/2
RPM	1720 @ 60 Hz	1440 @ 50 Hz, 1730 @ 60 Hz	1440 @ 50 Hz, 1730 @ 60 Hz
Voltage	115	115/220	115/220
Oil Capacity	14.0 Oz.	34 Oz.	34 Oz.
Length (In.)	14	16.93	18.89
Width (In.)	5.71	5.71	5.71
Height (In.)	10.5	10.43	11.81
Unit Weight (Lbs.)	23	31	39
Shipping Weight (Lbs.)	27	38	49

## TEZ8

TEZ8



TZM1PK

- Three intake connections
- 5-second oil change™
- High speed turbine fan keeps pump and oil cool
- Exhaust system vents moisture remotely (standard garden hose connection) without breaking vacuum
- Wide, low stance prevents accidental tipping

- TEZOM cartridges are available in the following quantities:

Vacuum Pump	TEZ8
Free Air Displacement (CFM)	8
Field Blankoff	<20 Microns
Intake Male Flare (In.)	1/4, 3/8, 1/2
Horsepower	1/2
Power	115 VAC, 60 Hz, 10 Amps
Oil Capacity	34 Oz.
Length (In.)	14.25
Width (In.)	9.4
Height (In.)	10.3
Unit Weight (Lbs.)	28

Part No.	Description
TZM1PK	TEZ8 Oil Cartridge (1 Cartridge)
TZM3PK	TEZ8 Oil Cartridge (3 Cartridges/Pack)
TZMCRT	TEZ8 Oil Cartridge (24 Cartridges/Carton)

TEZ8 is Manufactured by

# Recovery Cylinders

**STANDARD CYLINDERS FOR USE WITH**  
R11, R12, R22, R113, R114, R134a, R500, R502 & Blends\*

**VERY HIGH PRESSURE CYLINDERS FOR USE WITH**  
R13, R23, R503

**All NRP recovery cylinders meet ARI guidelines and DOT specifications.**

It is very important to evacuate the recovery cylinders and purge the hoses to avoid introducing non-condensables in cylinders which would increase the discharge pressure. Also, a separate cylinder must be used for each type of refrigerant to avoid cross contamination.

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

- Do not overfill cylinders. Do not fill to more than 80% of the cylinder's rated capacity.
- Do not mix different refrigerants in one cylinder. Mixtures cannot be separated.
- Always wear rubber gloves and safety goggles when transferring refrigerant.
- Always use cylinders approved for recovery.
- Cylinder for use with R410A must be DOT spec 4BA400.
- NC30, NC30U, NC50, NC50U are **approved for R410A**.



ARI  
Air Conditioning &  
Refrigeration Institute



## STANDARD RECOVERY CYLINDERS

Model	Nominal Cap (Lbs.)	Water Cap (Lbs.)	PSI	Max. Recovery Cap @ 80% (Lbs.)	Valves	Weight (Lbs.)
NC30	30	26.2	400	24	One 2 Port	16
NC30U <sup>1</sup>	30	26.2	400	24	One 2 Port	17
NC50	50	47.7	400	40	One 2 Port	28
NC50U <sup>1</sup>	50	47.7	400	40	One 2 Port	29
NC100	125 <sup>3</sup>	122	300	100	One 2 Port	51
NC100U <sup>1</sup>	125 <sup>3</sup>	122	300	100	One 2 Port	52
NC240	240 <sup>3</sup>	240	250	192	Two 1 Port	80
NC240U <sup>1</sup>	240 <sup>3</sup>	240	250	192	Two 1 Port	81
NC1000 <sup>2</sup>	1000 <sup>3</sup>	1000	260	800	Two 1 Port	391

<sup>1</sup>With float switch    <sup>2</sup>With float gauge    <sup>3</sup>Available in 400 Lb. pressure

## R11 LARGE RECOVERY CYLINDERS

Models N250T and N665T are supplied with protective collars (top and bottom), 0-100 PSIG gauge, pressure relief valve, sight glass @ 1/3 and 2/3 levels, non-condensable purge tap, float switch.

Model	Nominal Cap (Lbs.)	Water Cap (Lbs.)	PSI	Max. Recovery Cap @ 80% (Lbs.)	Valves	Weight (Lbs.)	Use With
N250T	250	250	165	200	Two 1 Port	107	VR11
N665T	665	665	200	532	Two 1 Port	265	VR11

## VERY HIGH PRESSURE RECOVERY CYLINDERS

Model	Nominal Cap (Lbs.)	Water Cap (Lbs.)	Max. Recovery Cap @ 80% (Lbs.)	Valves	Weight (Lbs.)	Use With
NC23	28	23.8	23	One 1 Port	43	R13, R23, R503 — LP13, VR13
NC80	106	89	84	One 1 Port	113	R13, R23, R503 — LP13, VR13



# Accessories

## TANK ALARM



Provides positive shut-off for recovery units without tank overflow protection. With power cord-to-tank adapters (see below), the TA1 can be used on any tank utilizing a float. The TA1 comes with 5 feet of float cord and a velcro strap for easy mounting.

Part No.	Power	Dimensions L x W x H (In.)
TA1	120 Volt, 15 Amps, 60 Hz	1.74 x 2.33 x 4.33

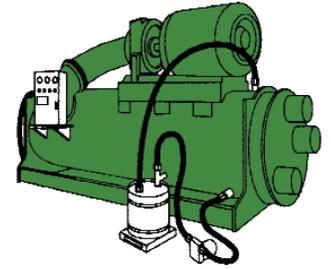
## TANK ADAPTERS



Part No.	Description
NC50FLOAT	Replacement float mechanism for positive shut-off cylinders (30 lb, 50 lb)
NULVTANK P	4 Pin male amp x 3 pin female Brad Harrison connectors. Adapts NRP 30 Lb and 50 Lb tanks to an OZ, Thermal, Reklame, Aes-Ntron and CPS unit cords.
NOZTANK P	4 Pin female amp x 3 pin male Brad Harrison connectors Adapts an OZ, Thermal, Reklame, Aes-Ntron and CPS
NULVP	Completes wiring for an 80% fill protective circuit. Compatible with Robinair, Sercon, Trane, Katy, CFC-TEK, Dupont and other manufacturers' units

## HOSE KIT

FOR USE WITH  
R11 & R113



Part No.	Description	Unit Weight (Lbs.)
HK11	3/4" Hoses (3), with accessories for use with LP11	20

## SIGHT GLASS

Flow indication and moisture sensing



Part No.	Connection (In.)	Length (In.)
SG14	1/4 MFL x 1/4 FFL	3.06
SG38	3/8 MFL x 3/8 FFL	3.25

## FILTER/DRIER



Part No.	Connection (In.)	Length (In.)	Master Carton
052	1/4 MFL x 1/4 FFL	4.75	25
053	3/8 MFL x 3/8 FFL	5.19	25

## FILTER-DRIER CORE

Fits 48 cu. in. filter shells



Part No.	Description	Use With
RH-48	High Capacity Refrigerant Recycling Filter Drier Core	RLV700, RAD700