

RG5410HP

REFRIGERANT RECOVERY UNIT



USERS OPERATING MANUAL



AMPROBE/PROMAX

A United Dominion Company

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AMPROBE/PROMAX • 630 Merrick Rd., Lynbrook, NY. 11563 • Phone: (516) 593-5600 • Fax: (516) 593-5682

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IMPORTANT SAFETY INFORMATION

NOTE: IF YOU ARE NOT A QUALIFIED REFRIGERANT SERVICE TECHNICIAN, DO NOT USE THIS EQUIPMENT.

1. The technician should always wear goggles and gloves when working on refrigeration systems.
2. Be sure that any room where you are working is thoroughly ventilated, especially if a leak is suspected. Refrigerant vapor is hazardous to your health and can cause death.
3. Always think before acting. Familiarity breeds carelessness and carelessness can be harmful to your health or, worse, result in death.
4. Read the Material Safety Data Sheets (MSDS) on all compounds with which you are likely to come in contact. Read MSDS on refrigerant and refrigerant oil. Obtain MSDS sheets from your refrigerant supplier.
5. Never use oxygen when testing for leaks. Any oil in contact with oxygen under pressure will form an explosive mixture.
6. Refrigerant systems are generally electrically driven and controlled. Be sure to disconnect the unit from the power source before servicing it.
7. Always store refrigerant containers in a cool, dry place.
8. Always open service and cylinder valves slowly. This allows quick control of the flow of gasses if there is any danger. Once it is determined that there is no danger, the valves may be opened fully.
9. Do not mix refrigerant in a system, a tank or anywhere else. Each type of refrigerant must have its own tank, filters, etc.
10. If moisture enters the refrigerant system, it is likely to cause considerable damage. Keep everything connected with the refrigeration system thoroughly dry and clean.
11. To reduce the risk of fire, avoid the use of extension cords as they may overheat. If you must use an extension cord it should be a minimum of 12AWG and not longer than 15 ft. This equipment should be used in locations with mechanical ventilation providing at least four air changes per hour, or the equipment should be located at least 18" above the floor. Do not use this equipment in the vicinity of spilled or open containers of gasoline or any other flammable liquid.

GENERAL INFORMATION

BEFORE OPERATING THE RG5410HP RECOVERY UNIT, READ THE FOLLOWING

1. Always isolate large amounts of refrigerant and close off valves after use so if a leak should develop anywhere in the system the refrigerant does not escape.
2. Storage cylinders sometimes have valves that are not properly seated when manufactured. Keeping caps on these valves will guard against refrigerant leakage.
3. Always operate the unit on a flat level surface.
4. Your RG5410HP has an internal pressure shut off switch. If the pressure inside the system should go above 400/550 psi, the system will automatically shut itself off.

CAUTION

The 400/550 psi switch does not prevent tank overfill. If your system shuts off on high pressure and is connected to your tank, you may have overfilled your tank and created a very dangerous situation! Take immediate measures to relieve any high pressure and/or tank overfill.

5. **WARNING:** Never overfill storage tanks. Overfilling may cause tanks to explode.
6. Tanks and filters should be designated for one refrigerant only. Before using a tank previously used for another refrigerant, completely empty the tank, evacuate it, purge the tank using dry nitrogen, and re-evacuate it.

GENERAL INFORMATION - cont.

Use only Amprobe/Promax storage tank Part No. RGT30 or RGT50 with this refrigerant recovery equipment.

7. Special care should be taken when recovering from a burned-out system. Use two high acid capacity filters, in series. Alco type EK-162-F or Sporlan type C-162-F are recommended. When you have finished recovering from the system, flush your

RG5410HP with a small amount of refrigerant oil and a small amount of clean refrigerant to purge off any foreign substances left in the unit.

8. Always empty refrigerant from the unit into a storage tank; see Self Purge/Auto Evacuate procedure. Liquid refrigerant left in the condenser may expand, causing damage to components.

REFRIGERANT GAS RECOVERY AND CONTAINMENT

Safety comes first. Read all safety information for the safe handling of refrigerant including the Material Safety Data Sheet provided by your refrigerant supplier. Never operate unit in an explosive environment. Wear safety glasses and protective gloves. Work area must be well ventilated. This unit should only be operated by a qualified technician.

STORAGE CONTAINERS

CAUTION: Never use a standard disposable 30 lb. tank (the type of container in which virgin refrigerant is sold) to recover refrigerant. Use only DOT CFR Title

49 or UL approved storage containers for recovered refrigerant.

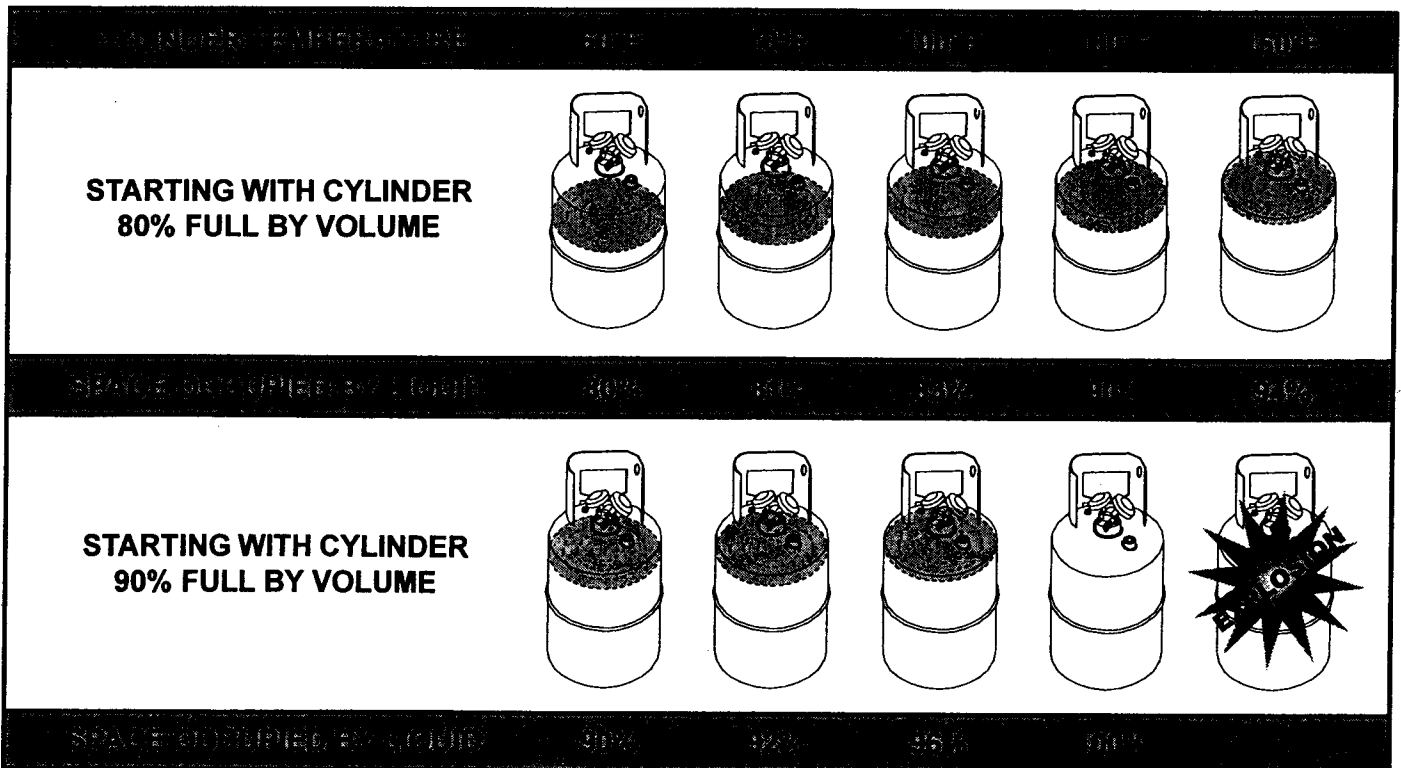
NOTE: Recovery cylinders are designed for different pressures.

DO NOT: Exceed the working pressure of each cylinder.

Safety codes recommend that closed tanks not be filled over 80% of volume with liquid. The remaining 20% is called head pressure room.

NEVER TRANSPORT AN OVERFILLED CYLINDER

Refrigerant expands when it gets warm and may cause a tank to explode if overfilled.



OPERATING YOUR RG5410HP

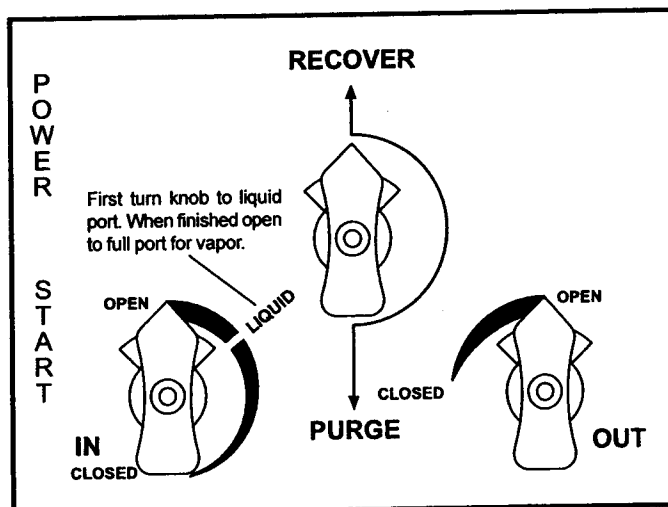
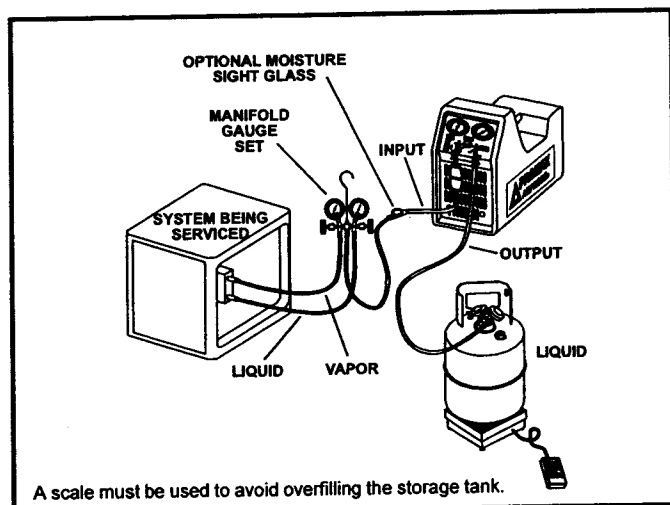
PROCEDURE FOR NORMAL SYSTEM RECOVERY

1. Inspect the RG5410HP thoroughly to insure that it is in good operating condition.
2. Make sure all connections are correct and tight (see set-up diagram below).
3. Open the liquid port of the recovery cylinder (always open valves slowly to check hoses and connections for leaks).
4. Make sure the Recover/Purge valve is set on Recover.
5. Open the output port of the RG5410HP.
6. Open the liquid port on the manifold gauge set; opening the liquid port will remove the liquid from the system first, greatly reducing the recovery time (after the liquid has been removed, open the manifold vapor port to finish evacuating the system).
7. Connect your RG5410HP to a 110 v. outlet.
 - a. Switch the main power switch to the ON position. You should hear the fan running.
 - b. Press the compressor start switch. This "momentary" switch will start the compressor. It may be necessary, under certain circumstances, to press this switch more than once to start the compressor.
8. Slowly open the input to liquid port on the RG5410HP.
 - a. If the compressor starts to knock, slowly throttle back the input valve until the knocking stops.
 - b. If the input valve was throttled back, it should be fully opened once the liquid has been removed from the system (the manifold vapor port should also be opened at this time).
9. Run until minimum EPA required vacuum is achieved.
 - a. Close the manifold vapor and liquid ports.
 - b. Close the RG5410HP input port.
 - c. Shut unit off and proceed with the Self Purge procedure on the next page.

Always purge the RG5410HP after each use (see Self Purge procedure on page 6). Failure to purge the remaining refrigerant from the RG5410HP could result in the acidic degradation of internal components, ultimately causing premature failure of the unit.

DIAGRAM FOR REFRIGERANT RECOVERY

THIS IS THE FASTEST METHOD FOR RECOVERING VAPOR REFRIGERANT



SELF PURGING YOUR RG5410HP

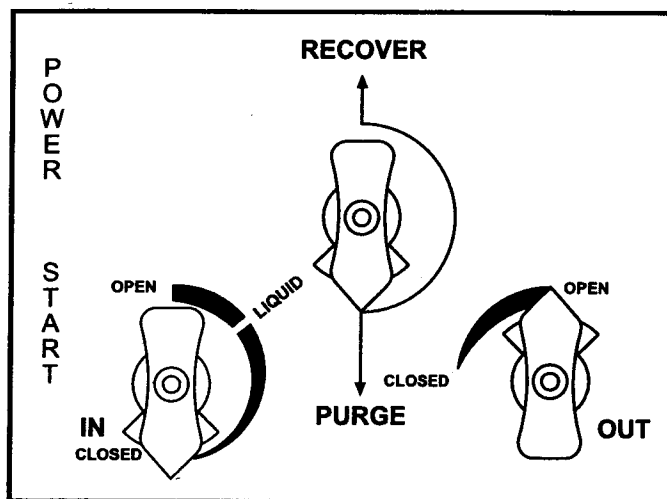
PROCEDURE FOR PURGING REMAINING REFRIGERANT FROM THE RG5410HP

1. Close the ports of the system being serviced that are connected to the input port of the RG5410HP.
2. Close the input port on the RG5410HP.
3. Turn off the RG5410HP.
4. Turn the Recover/Purge valve to the purge position.
5. Restart the RG5410HP.
6. Run until desired vacuum is achieved.
7. Close the ports on the recovery tank and the RG5410HP.
8. Turn the RG5410HP off.
9. Return the Recover/Purge valve to the recover position.
10. Disconnect and store all hoses.
11. Replace the in-line filter on your RG5410HP after every large job or any time excessive contaminant is encountered.

SELF PURGE/AUTO EVACUATE

To change from Recovery mode to Purge follow the steps below:

1. Close the Input port
2. Turn the unit off (to prevent high pressure shutoff).
3. Switch to Purge position
4. Restart the unit.



RG5410HP REFRIGERANT RECOVERY ADDITIONAL INFORMATION

To achieve the deepest final vacuum, use the tank cooling method to lower the head pressure on the recovery tank. Repeat as necessary to achieve the desired vacuum level. **NOTE:** If there is no liquid in the recovery tank, then the cooling method will not work. In this case, use an empty tank that has been fully evacuated to achieve the final vacuum level required.

To maximize recovery rates use the shortest possible length of 3/8" or larger hose. A hose no longer than

3'0" is recommend. Always remove all unnecessary hose core depressors and Schrader valves from port connections (using the proper valve core tool) for maximum throughput. Deformed rubber seals and core depressors in hoses and faulty or unnecessary Schrader valves can restrict flow by up to 90%.

If the tank pressure exceeds 300 psi, use the tank cooling procedure to reduce the tank pressure. When recovering large amounts of liquid, use the "PUSH/

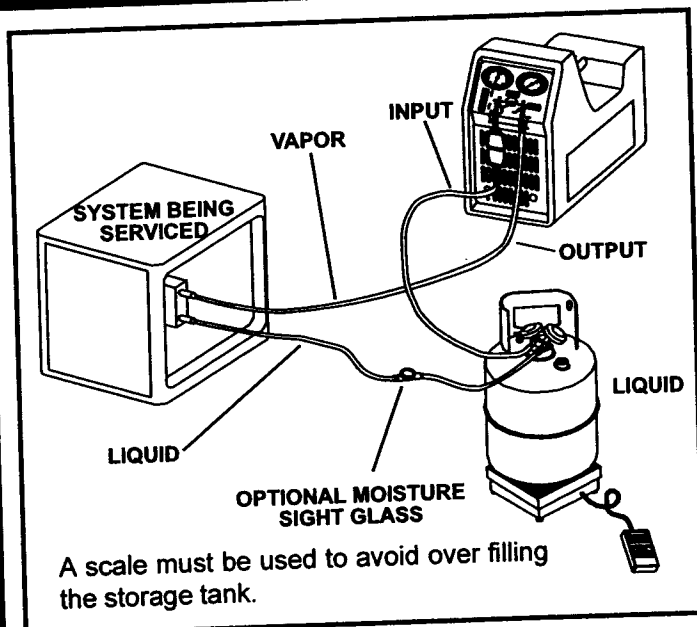
RG5410HP REFRIGERANT RECOVERY ADDITIONAL INFORMATION - cont.

PULL" method of recovery (see diagram below).

CAUTION: When using the "PUSH/PULL" method, you must use a scale to prevent overfilling the storage tank. Once the "PUSH/PULL" siphon is started, it

can continue and overfill the storage tank even if the tank is equipped with a float level sensor. The siphon can continue even when the machine is turned off. You must manually close the valves on the tank and the unit to prevent overfilling the recovery tank.

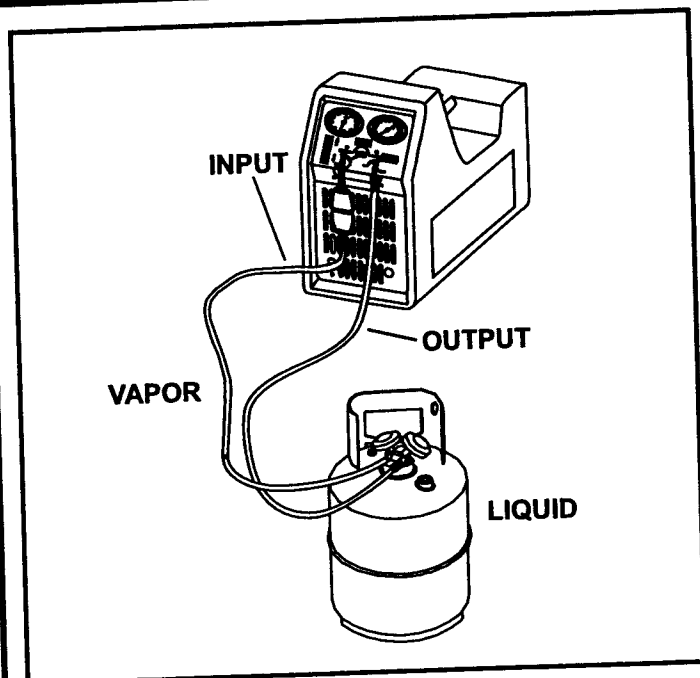
DIAGRAM FOR "PUSH / PULL" METHOD



Push/pull method only works with large systems where the liquid is readily accessible. **Do not use this method on systems that contain less than 15 lbs. as it may not work.**

The sight glass is used to provide a method of determining the moisture content and quality of a system's refrigerant.

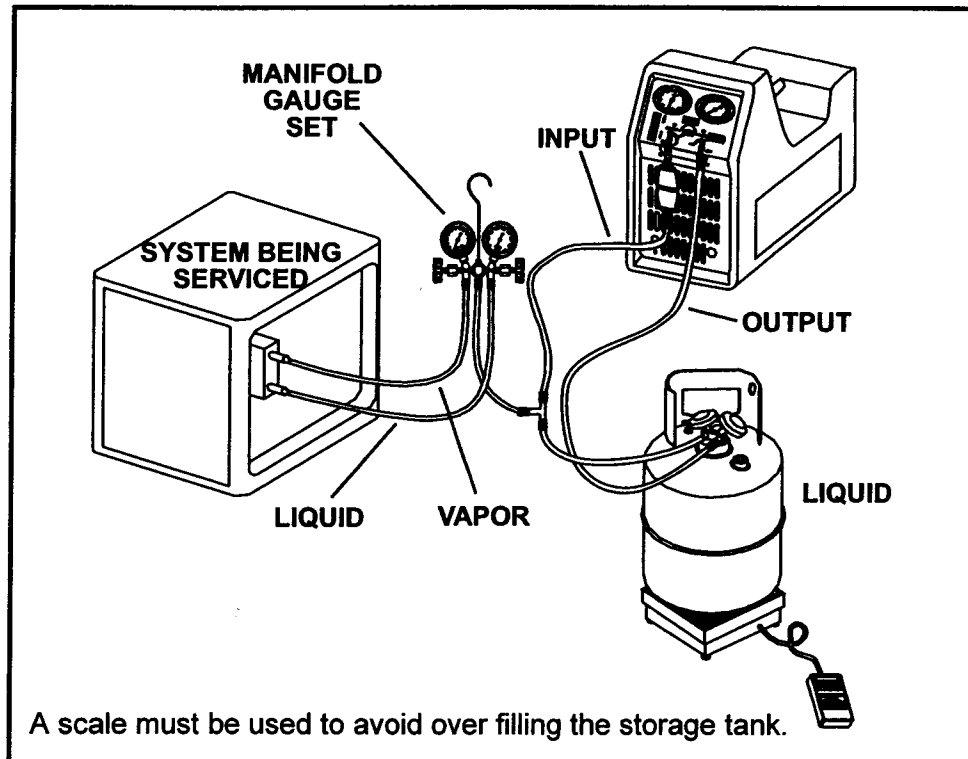
SET-UP DIAGRAM FOR TANK PRE OR SUB COOLING PROCEDURE



1. To start you must have a minimum of 5 lbs. of liquid refrigerant in the tank.
2. Throttle the output valve so that the output pressure is 100 psi greater than the input pressure, but never more than 300 psi.
3. Run until the tank is cold

See page 18 on this manual for more information

OPTIONAL RECOVERY / TANK PRE OR SUB COOLING FOR FIXED HOSE SET-UP



NORMAL RECOVERY:

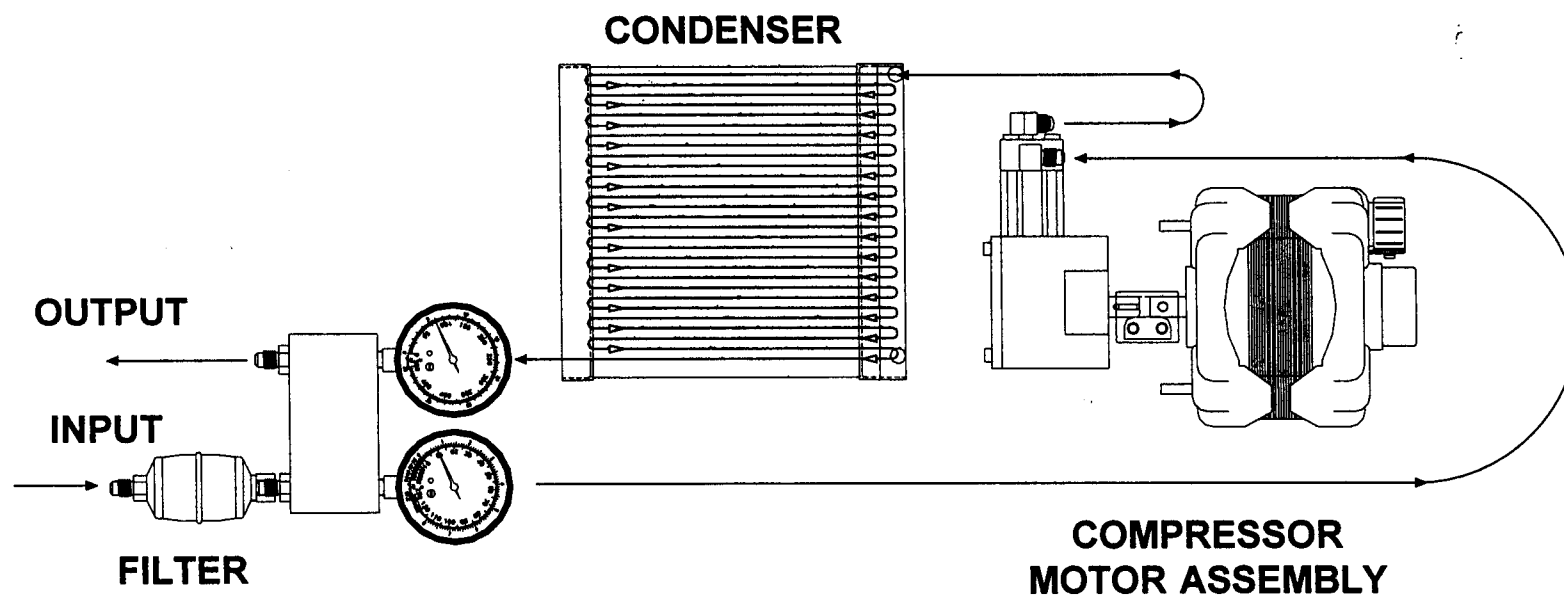
Tank Vapor valve is closed

TANK PRE OR SUB COOLING:

Tank Vapor valve is open and both manifold gauge set valves are closed.

PURGING NON-CONDENSABLE GASSES FROM REFRIGERANT TANK

1. Allow the tank to sit undisturbed for 24 hours. This allows the air to rise to the top.
2. Connect a manifold to the tank and read the amount of pressure in the tank by looking at the output pressure gauge.
3. Determine the ambient temperature in the room.
4. Refer to a Refrigerant pressure/temperature chart. Find the temperature on the chart and look across to the corresponding pressure for the type of refrigerant in the tank. Determine how that relates to the reading on the gauge.
5. If the pressure reading is higher than the pressure shown on the chart, very slowly (so as not to cause turbulence inside the tank) crack open the vapor port valve. Watch the pressure on the gauge decrease. To prevent venting, add 4 - 5 psi to the pressure shown on the chart. When the gauge corresponds to that pressure, close the vapor port valve.
6. Allow the tank to sit for 10 minutes and check the pressure again.
7. Repeat the process again if necessary.

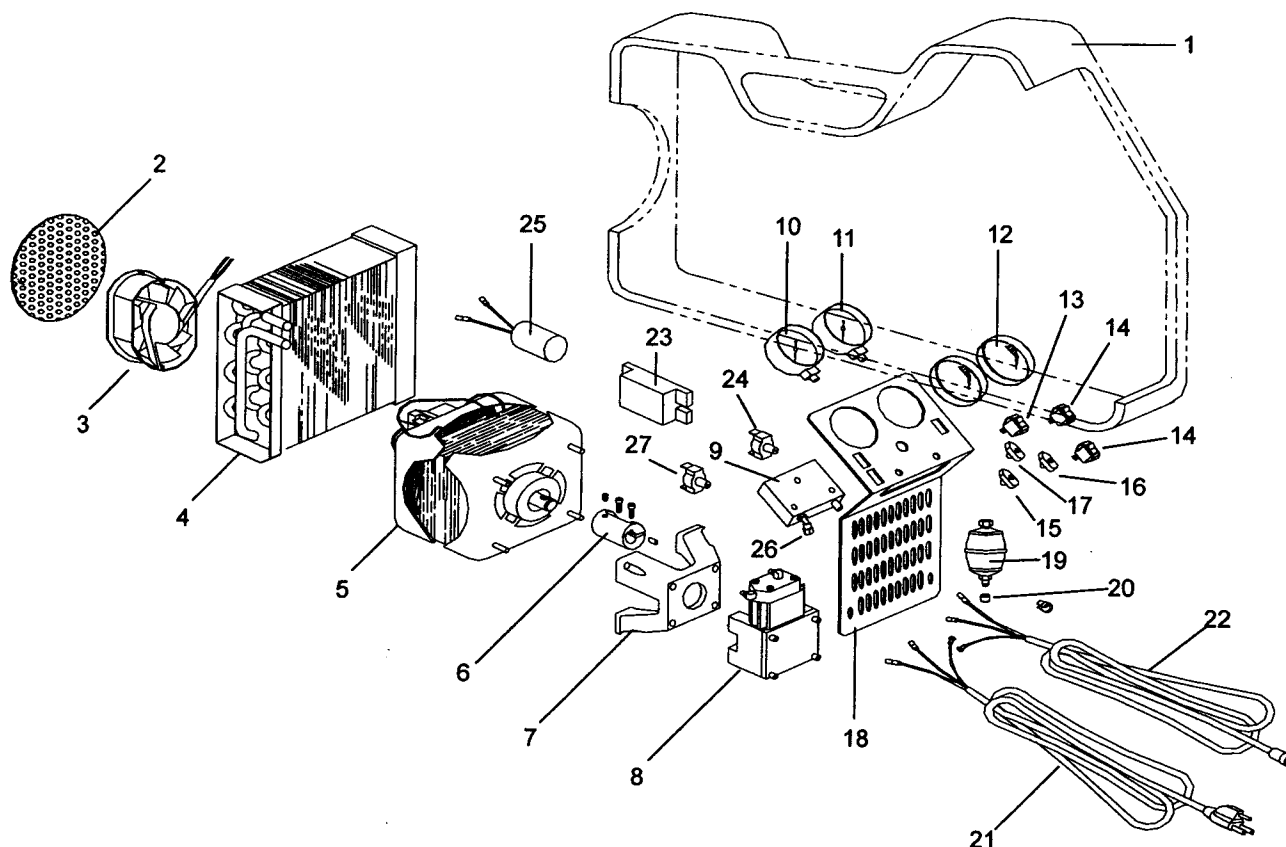


NOTE: A filter must always be used. **Failure to use a filter will invalidate your warranty.**

The use of a filter will greatly reduce the risk of damage to your **RG5410HP** by preventing foreign material from entering the unit.

Special consideration for filtration must be given when you know you are servicing a machine that has "Burned Out". We recommend the use of two size 162 filter driers, in line, to be used for that job and that job only.

RG5410HP PARTS DIAGRAM



RG5410HP PARTS LIST

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	PLASTIC CASE	10	INPUT GAUGE	19	FILTER
2	FAN GRILL	11	OUTPUT GAUGE	20	FLARE CAP
3	AXIAL FAN	12	GAUGE LENS	21	CORD SET
4	CONDENSER	13	ON/OFF SWITCH	22	*SENSOR CORD
5	MOTOR	14	START SWITCH	23	*RELAY
6	COUPLER	15	BLUE KNOB	24	PRESSURE SWITCH
7	BELL HOUSING	16	RED KNOB	25	CAPACITOR
8	COMPRESSOR	17	BLACK KNOB	26	SWIVEL-TEK COUPLER
9	MANIFOLD	18	FRONT PANEL	27	PRESSURE SWITCH

*OPTIONAL COMPONENTS FOR KIT KT5001

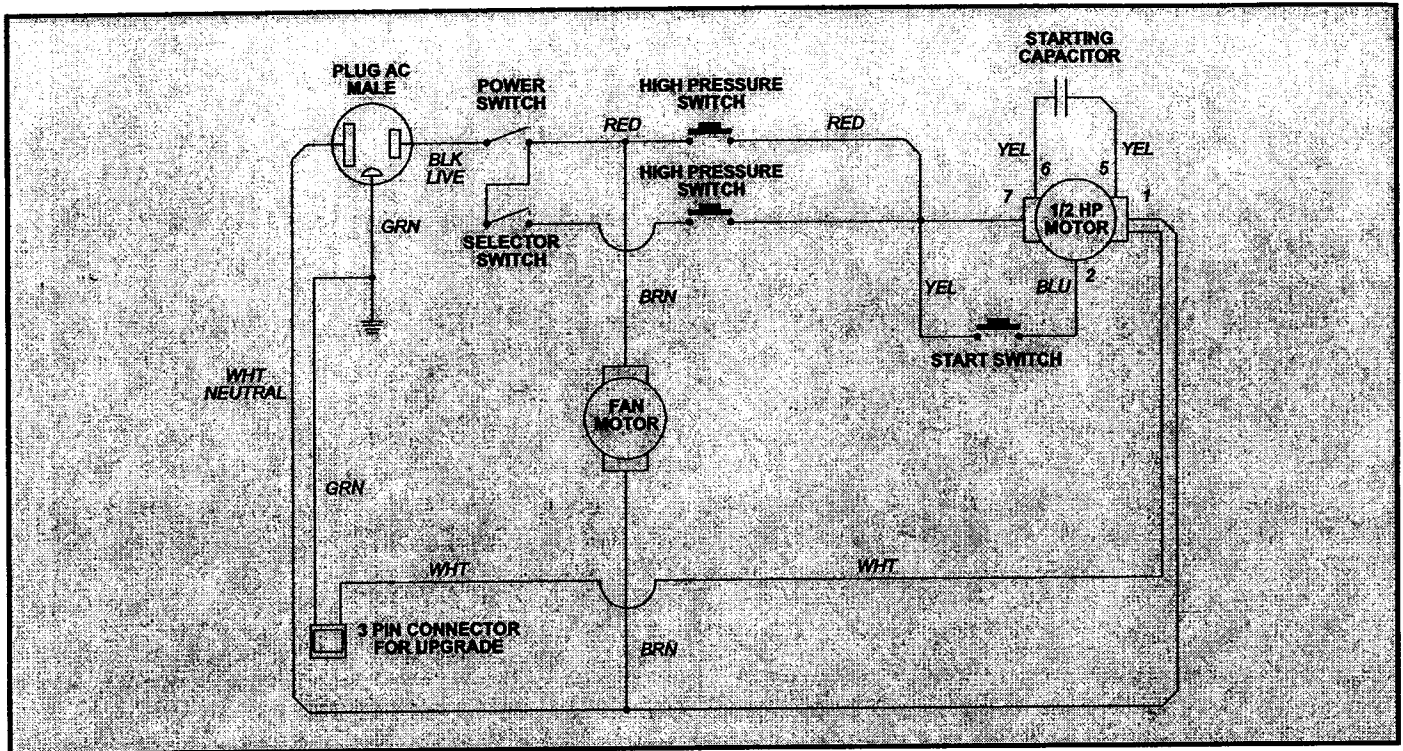
*AMPROBE RESERVES THE RIGHT TO MAKE CHANGES TO PARTS AND ASSEMBLIES FOR THIS MODEL. CONSULT THE FACTORY FOR PART No.'s AT 1-800-477-8658 WHEN ORDERING.

REPLACEMENT KITS & ACCESSORIES

PART#	DESCRIPTION
KT3302	PISTON SEAL REPLACEMENT (middle section of compressor)
KT3303	VALVE REPLACEMENT KIT (top section of compressor)
KT3307	COMPRESSOR REPAIR KIT (all three sections of compressor)
KT3308	SHAFT REPLACEMENT KIT (bottom section of compressor)
KT5001	80% CAPACITY TANK SENSING KIT

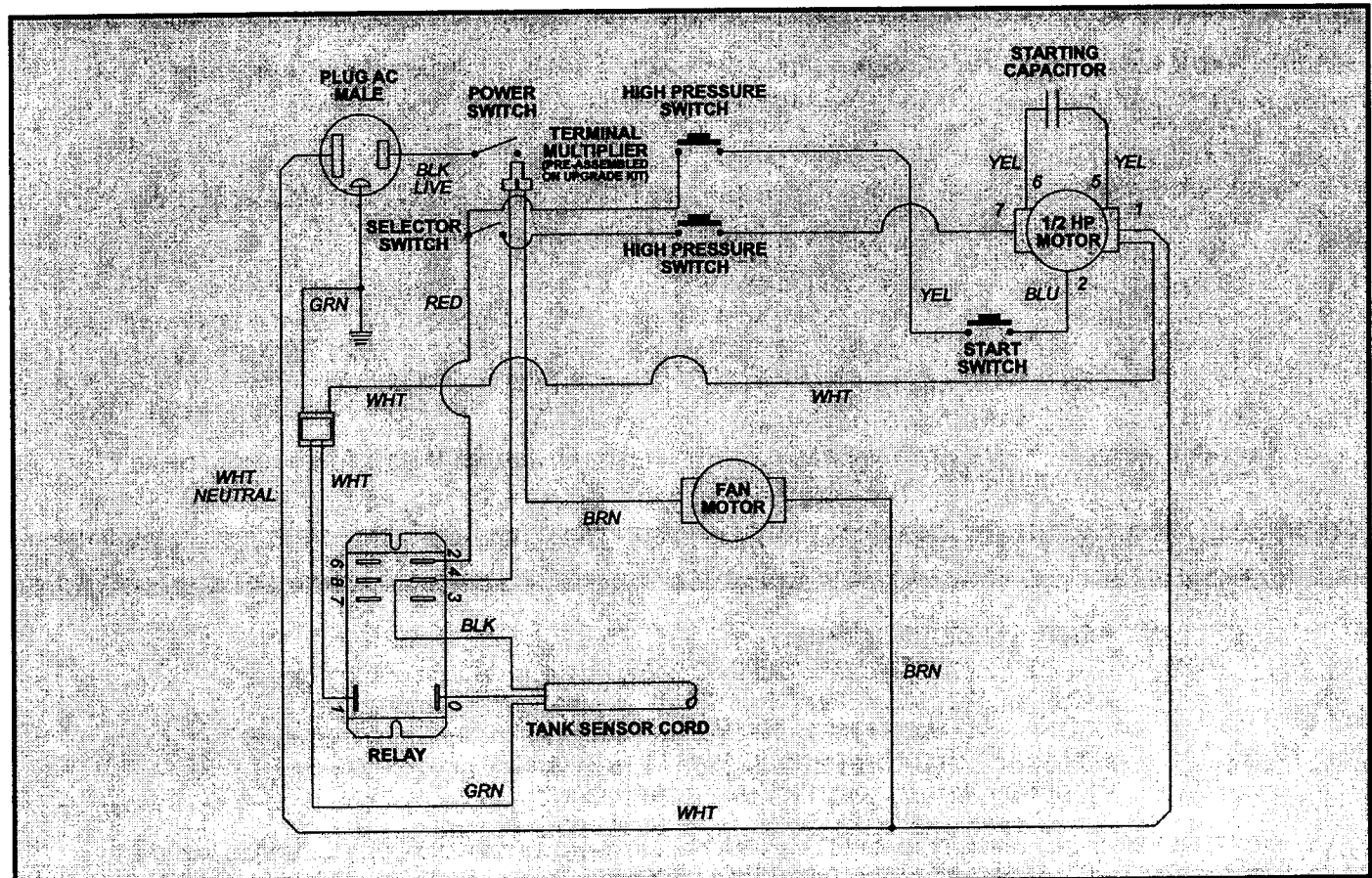
*AMPROBE RESERVES THE RIGHT TO MAKE CHANGES TO PARTS AND ASSEMBLIES FOR THIS MODEL. CONSULT THE FACTORY FOR PART No.'s AT 1-800-477-8658 WHEN ORDERING.

RG5410HP WIRING DIAGRAM



RG5410HP WIRING DIAGRAM

INCLUDING OPTIONAL TANK CAPACITY SENSING CIRCUITRY (KIT: KT5001)



INSTALLATION OF OPTIONAL 80% TANK CAPACITY SENSING COMPONENTS (KIT: KT5001)

1. Disconnect your RG5410HP from the power source.
2. Looking at the front of your RG5410HP lay the machine on it's right hand side (power cord side down).
3. Remove the top side half of the durable molded case to reveal the interior.
4. Remove the "pry out plug" from the hole opposite the power cord hole in the front panel, and pass the tank sensor cord through it.
5. Press the relay into the pre-molded slot inside the case.
6. Disconnect the red wire from the high pressure switch (nearest to you) and connect it to the terminal multiplier on relay terminal #4. The black wire from the sensor cord is already connected to one side of the multiplier.
7. Connect the red wire, from terminal #2 on the relay, to the high pressure switch.
8. Connect the two way connector blocks. The female end is an existing part of the RG5410HP's harness the male part is in your KT5001.
9. Secure the tank sensor cord, into the hole with the strain relief grommet, provided.
10. Replace the side of the case. Be sure to replace all the peripheral fasteners.
11. You are now ready to test the installation.

CARE AND MAINTENANCE OF YOUR RG5410HP

A filter must always be used and should be replaced frequently. **Failure to use a filter will invalidate your warranty.** The use of a filter will greatly reduce the risk of damage to your **RG5410HP** by preventing foreign material from entering the unit.

Special consideration for filtration must be given when you know the machine you are servicing has "burned out". We recommend the use of two size 162 filter driers, in line, to be used for that job and that job only. We also recommend that a clean filter be used for every service job. Each filter should be labeled and used exclusively for one type of refrigerant only.

Do not use this unit in the vicinity of spilled or open containers of gasoline or other combustible liquids

Avoid the use of extension cords. If you must use an extension cord it should be a minimum of 12 AWG and not longer than 15 ft. Not using an extension cord will greatly reduce the risk of fire.

Always purge the unit of any refrigerant left after completing a service job. Refrigerant left in the machine can expand and may cause damage to components.

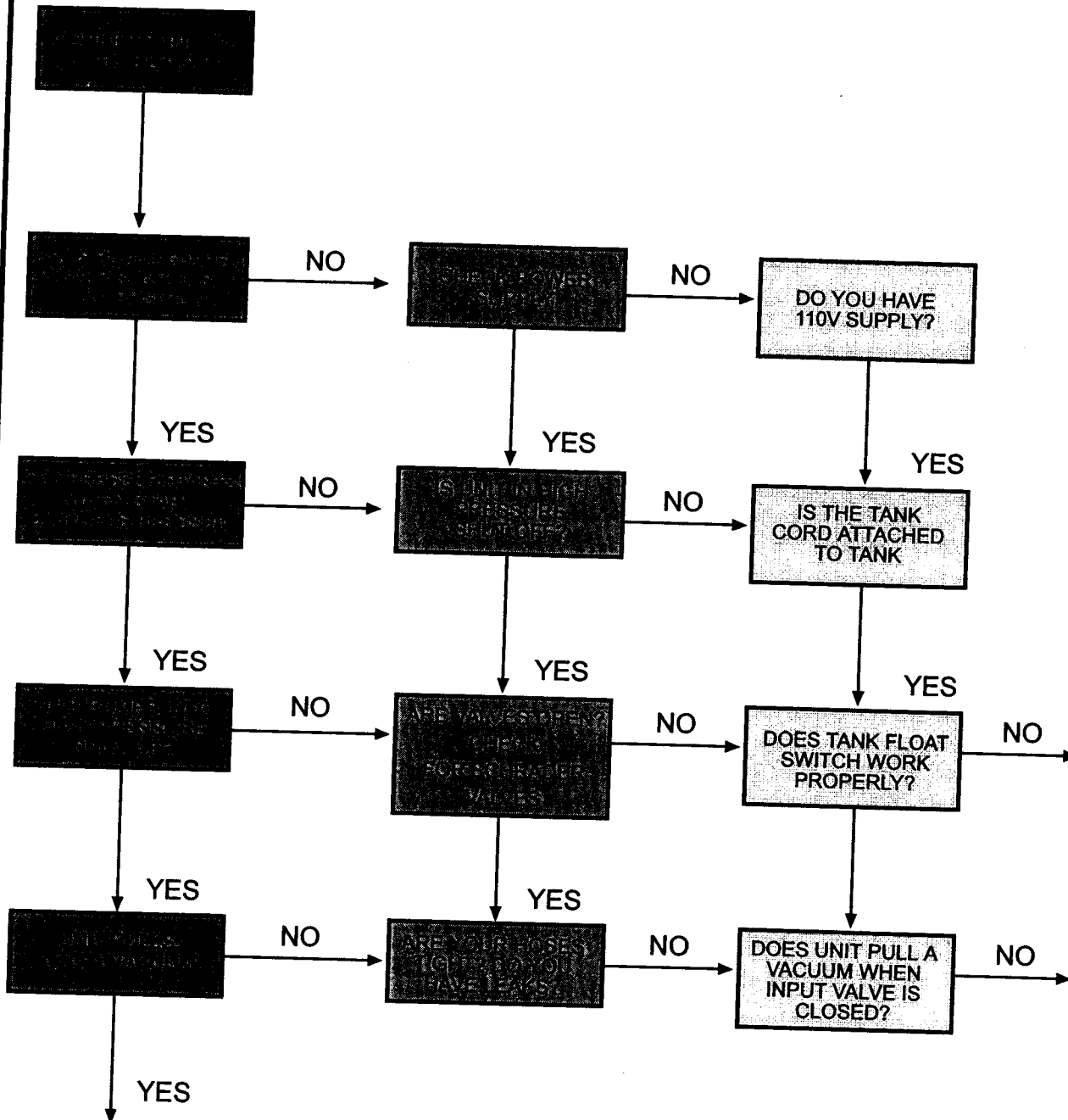
If the unit is to be stored or not used for any length of time, we recommend that it be completely evacuated of any residual refrigerant and purged with dry nitrogen.

Whenever you perform any type of maintenance work on your **RG5410HP**, insure that it is disconnected from the power supply before you begin.

TROUBLE SHOOTING YOUR RG5410HP

SAFETY FIRST

Read and understand all safety information contained in this manual before servicing the unit.



FULL ONE YEAR WARRANTY

MFG # _____

Amprobe Promax products are warranted to be free from defects in workmanship and materials for a period of one year from date of purchase.

THE FOLLOWING RESTRICTIONS APPLY:

1. The warranty applies to products in normal use only, as described in the operating manual. The product must also be serviced and maintained as described therein.
2. If the product fails, it will be repaired or replaced at the option of Amprobe Promax.
3. All shipment/delivery charges are the responsibility of the purchaser.
4. Warranty service claims are subject to factory inspection for product defect(s). If during the warranty evaluation it is determined that a filter has not been used or that the filter was not properly maintained or that the machine has been used in any way other than the purpose for which it was designed, Amprobe Promax reserves the right to void the warranty.
5. All warranty claims must be made within the warranty period. Proof of purchase must be supplied to Amprobe Promax. This warranty is non-transferable.
6. Please note that the warranty does not apply if the product or product part is damaged by accident, misuse, tampered with or modified in any way.
7. Normal wear items (seals, filters, etc.) are specifically excluded from warranty unless found by Amprobe Promax to be defective.
8. This warranty is exclusive and shall be in lieu of any other warranty, express or implied, which may be available to the purchaser.

WARRANTY SERVICE:

This warranty is given by AMPROBE PROMAX 630 Merrick Road, Lynbrook, NY. 11563
Service under this warranty must be obtained by the following steps:

1. Return the warranty card below within 10 days of purchase date with a copy of your receipt.
2. All returned goods MUST be accompanied by a Return Goods Authorization number (RGA). To obtain an RGA number contact your Wholesaler / Distributor.

WARRANTY CARD					
Please complete and return within 10 days of purchase with a copy of receipt to validate your warranty					
Name of Purchaser		Name of Company		Company Telephone	
Company Address			City, State, Zip		
Model	Mfg #	Date Purchased	Where Purchased	Salesperson	
Please circle your PRIMARY line of business. (Please circle all that apply)		How did you learn of our products? (Please circle ONE)		What features most interested you? (Please circle all that apply)	
Automobile Commercial Residential		Rental Mailing Newspaper Ad		High Production Low cost Leasing	
Service Only Install Only		Magazine Ad		Low Maintenance Quick Delivery Portability	
		Recommended by: _____		Other: _____	

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA) REFRIGERANT RECOVERY AND RECYCLING DEVICE ACQUISITION CERTIFICATION FORM

EPA regulations have required establishments that service or dispose of refrigerant or air conditioning equipment to certify that they have acquired recovery and recycling devices that meet the EPA standards for such devices since August 12, 1993. To certify that you have acquired equipment, please complete this form according to the instructions and mail it to the appropriate EPA Regional Office. BOTH THE INSTRUCTIONS AND MAILING ADDRESS CAN BE FOUND ON THE NEXT PAGE OF THIS MANUAL.

Part 1: ESTABLISHMENT INFORMATION

UNIT STORAGE ADDRESS

Name of Establishment		
Street		
City	State	County
Zip Code	(Area Code)	Telephone Number

Name of Establishment		
Street		
City	State	County
Zip Code	(Area Code)	Telephone Number

	NUMBER OF SERVICE VEHICLES BASED AT ESTABLISHMENT
--	---

Part 2: REGULATORY CLASSIFICATION

Identify the type of work performed at your establishment. Check all boxes that apply.

- ☐ Type A - Service small appliances.
- ☐ Type B - Service refrigeration or air conditioning equipment other than small appliances.
- ☐ Type C - Dispose of small appliances.
- ☐ Type D - Dispose of refrigeration or air conditioning equipment other than small appliances.

Part 3: DEVICE IDENTIFICATION

Name of Device Manufacturer	Model #	Month/Year	Mfg# (if any)	Self Contained
AMPROBE PROMAX				<input checked="" type="checkbox"/>
AMPROBE PROMAX				<input checked="" type="checkbox"/>
AMPROBE PROMAX				<input checked="" type="checkbox"/>
AMPROBE PROMAX				<input checked="" type="checkbox"/>
AMPROBE PROMAX				<input checked="" type="checkbox"/>
AMPROBE PROMAX				<input checked="" type="checkbox"/>
AMPROBE PROMAX				<input checked="" type="checkbox"/>
AMPROBE PROMAX				<input checked="" type="checkbox"/>

Part 4: SIGNATURE

I certify that the establishment named in part 1. has acquired the refrigerant recovery or recycling devices listed in part 3. and that this equipment will be properly used in service (and/or) disposing of appliances. I also certify that the information supplied herein is correct and true.

Signature of owner / Responsible Officer	Date	Name (please print)	Title
--	------	---------------------	-------

Public reporting burden for this collection of information is estimated to vary from 20 - 60 minutes per response with an average of 40 minutes per response including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to: Chief information Policy Branch EPA, 401 M St. S.W. (PM-223Y), Washington, DC 20460 and to the Office of information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503 marked Attention, Desk Officer for EPA.

DO NOT SEND THIS FORM TO THE ABOVE ADDRESSES. ONLY SEND COMMENTS TO THESE ADDRESSES

INSTRUCTIONS

EPA REGIONAL OFFICES

Part 1. Please provide the name, address and telephone number of the establishment where the refrigerant recovery or recycling device(s) is (are) located. Please complete one form for each location. State the number of vehicles based at this location that are used to transport technicians and equipment to and from service sites.

Part 2. Check the appropriate box for the type of work performed by technicians who are employees of the establishment. The term "small appliance" refers to any of the following products that are fully manufactured, charged and hermetically sealed in a factory with five or less pounds of refrigerant:

Refrigerators or freezers designed for home use, room air conditioners (including window air conditioners and packaged thermal air conditioners), packaged thermal heat pumps, dehumidifiers, under-the-counter ice makers, vending machines and drinking water coolers.

Part 3. For each recovery or recycling device acquired, please list the name of the manufacturer of the device and (if applicable) its model number and manufacturer number. If more than 8 devices have been acquired please fill out an additional form and attach it to the first one.

Recovery devices that are self-contained should be listed first and should be identified by checking the box in the last column on the right. A self-contained device is one that uses its own pump or compressor to remove refrigerant from refrigeration or air conditioning equipment. On the other hand, system-dependent recovery devices rely solely upon the compressor in the refrigeration or air conditioning equipment and/or upon the pressure of the refrigerant inside the equipment to remove the refrigerant.

If the establishment has been listed as Type B and/or Type D in Part 2, then the first device listed in Part 3 must be a self-contained device and identified as such by checking the box in the last column on the right.

If any of the devices are homemade, they should be identified by writing "homemade" in the column provided for listing the name of the device manufacturer. Homemade devices can be certified for establishments that are listed as Type A or Type B in Part 2 until (six months after promulgation of the rule). If a Type C or Type D establishment is certifying equipment after (six months after promulgation of the rule), then it must *not* use these devices for service jobs classified as Type A or Type B.

Part 4. This form must be signed by either the owner of the establishment or another responsible officer. The person who signs is certifying that the establishment has acquired the equipment, that the establishment is complying with Section 608 regulations and that the information provided is true and correct.

Send your form to the EPA office listed under the state or territory in which your establishment is located.

CONNECTICUT, MAINE, MASSACHUSETTS, NEW HAMPSHIRE, RHODE ISLAND, VERMONT

CAA 608 Enforcement Contact: EPA Region I.
Mail Code APC, JFK Federal Building, One
Congress Street, Boston, MA 02203

NEW YORK, NEW JERSEY, PUERTO RICO, VIRGIN ISLANDS

CAA 608 Enforcement Contact: EPA Region II.
Jacob K. Javits Federal Building, Room 5000, 26
Federal Plaza, New York, NY 10278

DELAWARE, DISTRICT OF COLUMBIA, MARYLAND, PENNSYLVANIA, VIRGINIA, WEST VIRGINIA

CAA 608 Enforcement Contact: EPA Region III.
Mail Code 3AT21, 841 Chestnut Building,
Philadelphia, PA 19107

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, SOUTH CAROLINA, TENNESSEE

CAA 608 Enforcement Contact: EPA Region IV.
Mail Code APT-AE, 345 Courtland Street, NE,
Atlanta, GA 30365

ILLINOIS, INDIANA, MICHIGAN, MINNESOTA, OHIO, WISCONSIN

CAA 608 Enforcement Contact: EPA Region V.
Mail Code AT18J, 77 W Jackson Blvd., Chicago,
IL 60604

ARKANSAS, LOUISIANA, NEW MEXICO, OKLAHOMA, TEXAS

CAA 608 Enforcement Contact: EPA Region VI.
Mail Code 6T-EC, First Interstate Tower at
Fountain Place, 1445 Ross Ave., Suite 1200
Dallas, TX 75202

IOWA, KANSAS, MISSOURI, NEBRASKA

CAA 608 Enforcement Contact: EPA Region VII.
Mail Code ARTX/ARBR, 726 Minnesota Ave.
Kansas City, KS 66101

COLORADO, MONTANA, NORTH DAKOTA, SOUTH DAKOTA, UTAH, WYOMING

CAA 608 Enforcement Contact: EPA Region VIII.
Mail Code 8AT-AP, 999 18 Street, Suite 500
Denver, CO 80202

AMERICA SAMOA, ARIZONA, CALIFORNIA, GUAM, HAWAII, NEVADA

CAA 608 Enforcement Contact: EPA Region IX.
Mail Code A-3, 75 Hawthorn Street,
San Francisco, CA 94105

ALASKA, IDAHO, OREGON, WASHINGTON

CAA 608 Enforcement Contact: EPA Region IX.
Mail Code AT-082, 1200 Sixth Ave.
Seattle, WA 98101

HELPFULL HINTS FOR REFRIGERANT RECOVERY

Refrigerant recovery has come a long way in a few short years. On the surface it's simply the process of taking refrigerant out of a system and putting it into a tank. However, this simple process can quickly become problematic if a few items are overlooked. The following are some tips and pointers we've accumulated over the last few years that can save you time and make the process go smoother.

First you need to identify the refrigerant type and quantity in the system you are servicing. If you determine it's a burnout, you need a special tank (a tank that's identified as containing burnout or other unidentified gases), and you need to use extra filtration prior to recovery.

If, on the other hand, you know the gas in the system is relatively clean or new, then a new tank should be used. If you're planning on putting the refrigerant back into the same system after you have finished the service or if the refrigerant is going to be reclaimed, then use a tank that has the same refrigerant in it. A word of caution about the Environmental Protection Agency (EPA): If you use a variety of refrigerant gasses in your service work - as evidenced by your refrigerant purchases - and you only own one tank, you are asking for trouble. You would be well advised to own at least one tank for every refrigerant type serviced, plus an extra for burnouts and other unknowns.

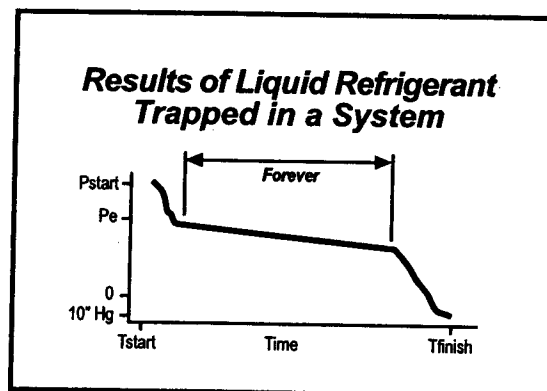
PLANNING AHEAD

Knowing the quantity of refrigerant is important for planning storage requirements, as well as planning for the actual recovery. For instance, any system with more than 5lbs. of refrigerant is likely to have areas where the liquid can get trapped.

The key to a quick recovery procedure is to get the liquid out first, and then get the remaining vapor out. However most systems are not "recovery friendly." That is they don't have access ports at their lowest points. If some units you're servicing are on maintenance contracts, you would save significant time by installing access ports at all of the lowest points in the system, where liquid is likely to accumulate.

Since most systems don't have these ports you need to be prepared to boil off the trapped liquid with a heat gun, when ever it's found. An indicator of trapped liquid in a system is frost or condensation forming on the plumbing or components where the liquid is trapped. The trapped liquid may be in an area that is not visible. In all cases trapped liquid in a system during recovery causes the recovery process to slow down, regardless of the size or type of machine (see diagram).

If you are unable to locate the trapped liquid (but you know it's there, because the recovery job is taking "forever", turn on the system compressor (if it's operable) for a few seconds. This will get the refrigerant moving to another part of the system and in the process pick up enough heat to boil off.



HOSES AND VALVES

Hoses and Schraeder valves have a large impact on recovery speed. In general, the larger the hose, the less friction on the flow of refrigerant, the quicker the recovery time. Many contractors are now using 3/8" lines for the input to the recovery machine, even if those lines originate out of 1/4" fittings.

Schraeder valves must be removed from the connection prior to an expedient recovery. Most wholesalers sell a tool for removing these cores, while keeping the connection sealed. The core depressor, in the end of the hose, should also be removed. These two items can turn a 20 minute job into one that goes on for hours. So, be sure to remove Schraeder valves and core depressors before every recovery job.

Another hose consideration is the little rubber grommet at the end of the hose that makes a seal with the flare fitting. We've seen these seals so worm and deformed that when the hose is connected to the

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flare fitting the grommet virtually seals off the connection. This is probably never noticed in charging, because the pressure opens the grommet, but during recovery (or with suction) the deformed grommet severely restricts the flow of refrigerant.

REFRIGERANT RECYCLING

Current regulations state that used refrigerant shall not be sold, or used in a different owner's equipment, unless the refrigerant has been laboratory analyzed and found to meet the requirements of ARI 700 (latest edition). As a result, recycling and verifying ARI 700 conformance isn't economically justified in most cases. It's still a great idea to do as much cleaning of refrigerant going back into the same system (or owner's system) as possible. We recommend using the largest, high-acid capacity filter that are economically feasible. Put these filters on the suction or inlet side of the recovery unit. Change filters often.

The recovery of large amounts of liquid refrigerant can sometimes carry with it large quantities of oil, if the system being serviced doesn't have an adequate oil separator installed. If this recovered refrigerant isn't going to be liquid charged back into the same system, you might want to separate the refrigerant from the oil in order to measure the oil (to know how much oil to charge back into the system). However refrigerant sent back for reclaim does not need to have the oil removed. One of the simplest and most cost effective ways to achieve this is to use a 30 or 50 lb. tank in line with your recovery machine. Connect the system to the liquid port of the tank then from the vapor port of the tank connect to the input of your recovery machine a second tank, for storing refrigerant, should then be connected to the output of the recovery machine. If you encounter large amounts of liquid you will need to put a band heater around the first tank.

When the recovery job is complete the oil can be removed, from the first tank, by applying a small amount of pressure, using nitrogen, to one of the ports and expressing the oil from the other. If you are going to remove the oil from the vapor port you will need to turn the tank upside down. Always wear safety glasses when performing this operation as the oil may be acidic and could cause severe burning.

KEEPING THE DIRT OUT

During the recovery process your recovery machine can be exposed to debris that can, potentially, damage it. Including brazing spatter and copper and brass slithers. Further contamination can be introduced from the refrigerant storage tanks. To prolong the life of your recovery machine always use an in-line filter.

Whenever you are charging a system from a recovery cylinder it is a good idea to use an in-line filter to protect the system from contamination. Again, change your in-line filters often.

GETTING THE LIQUID OUT

See diagram on page 7 of this manual

Push/pull is a method of removing bulk liquid from a system using the pressure differential created by the recovery machine. Push-pull will generally not work on smaller systems because there is no bulk liquid reservoir to create a siphon from.

Push-pull is mostly used on systems with a receiver tank or those with greater than 20 lbs. of refrigerant, or when transferring from one tank to another. The rate of liquid transfer is very much dependent on hose size, with larger hoses providing much better throughput.

Another trick is to chill the tank, if it's partially filled, prior or during recovery. This operation will lower the pressure in the storage tank and therefore speed up recovery. There must be a minimum of 5 lbs of liquid refrigerant in the tank you wish to chill. This operation can be performed prior to or during the recovery. See the two set up diagrams and procedures on page 7 of this manual.

There is nothing magic here, you are simply using your recovery machine to make a refrigerator where the tank is the evaporator. By throttling the output valve, you're effectively creating a capillary tube or an expansion device, but you need to adjust the back pressure to suit the conditions and the refrigerant. Five to ten minutes of chilling can produce some very dramatic tank cooling, depending on the conditions. If there are any non condensables in the tank this process will not work. Also the greater the quantity of refrigerant in the tank the longer the process will take.