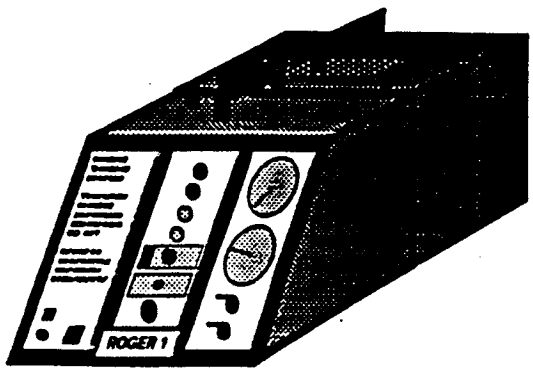
ROGER™ 1

MANUAL



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THE SAFE WAY IS THE ONLY WAY!

NOTE! IF YOU ARE NOT A QUALIFIED REFRIGERATION SERVICE TECHNICIAN - DO NOT OPERATE THIS EQUIPMENT.

1. Always wear goggles and gloves when working on refrigeration systems.

2. The room where you are working should be thoroughly ventilated. This is especially true if a leak is suspected. Refrigerant vapor is hazardous to your health.

3. Always think before acting. Familiarity breeds carelessness and carelessness can be harmful to your health, or worse – deadly.

4. Read Material Safety Data Sheets (MSDS) on all compounds with which you are likely to come in contact. Read MSDS on refrigerants 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. Refrigeration systems are generally electrically driven and controlled. Be sure to disconnect the unit being worked on from its power source.

7. Always store refrigerant cylinders in a cool, dry place.

8. Always open service valves and cylinder valves just a crack at first. This gives quick control of the flow of gases if there is any danger. Once it is determined that there is no danger, the valves may be opened fully.

9. Do not mix refrigerants in a system, a tank or anywhere else. Each type of refrigerant must have its own tanks, filters, etc.

10. If moisture enters a refrigeration system, it is likely to cause considerable damage. Keep everything connected with a refrigeration system thoroughly dry and absolutely clean.

11. This equipment should be used in locations with mechanical ventilation providing at least four (4) air changes per hour, *or* the equipment should be located at least 18 inches above the floor.

12. Do NOT use this equipment in the vicinity of spilled or open containers of gasoline.

ROGER 1™ REFRIGERANT RECYCLING & SERVICE PROCEDURES

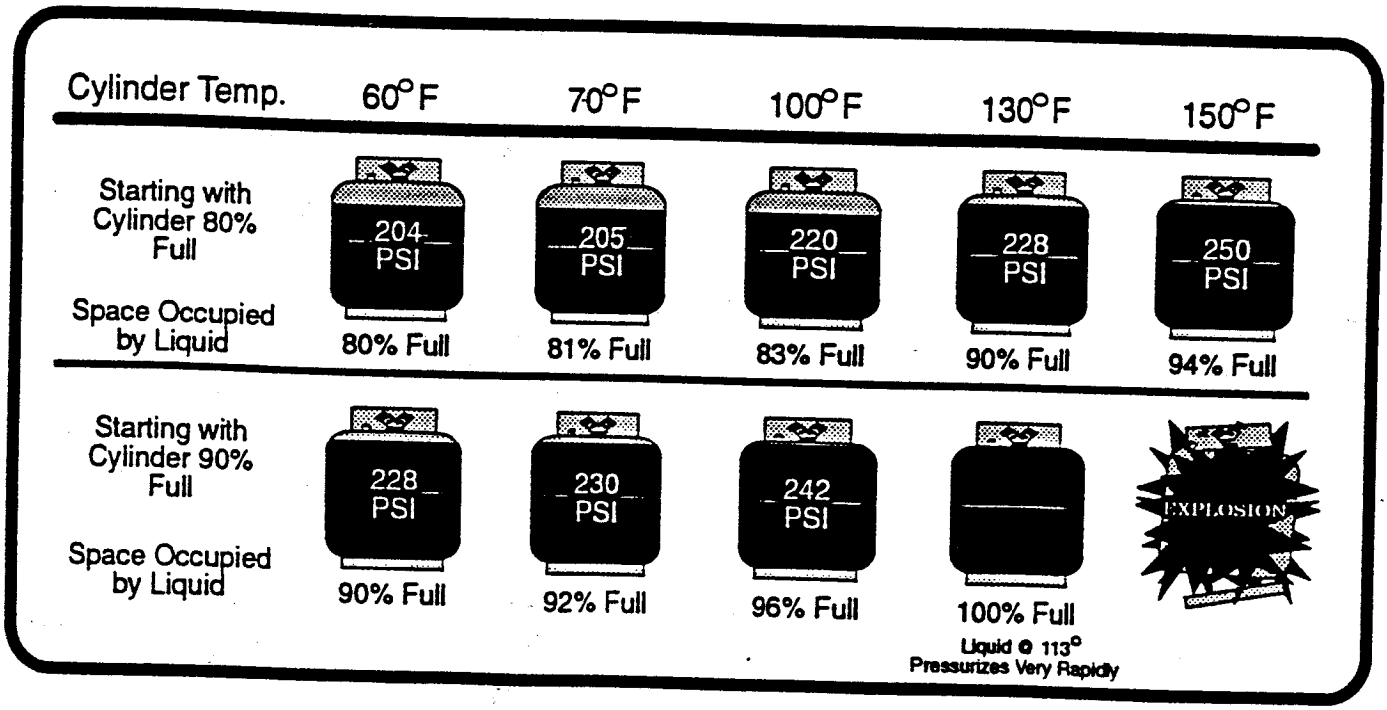
Safety comes first. Read all safety information for the safe handling of refirgerant including the Material Safety Data Sheet provided by your refrigerant supplier. Never operate unit in an explosive environment. Wear safety glasses and protective gloves. Work area must be well ventilated. This unit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

REFRIGERANT STORAGE CONTAINERS: *** HANDLE WITH CARE ***

CAUTION: Never use a standard disposable 30 lb. tank (the type of container in which virgin refrigerant is sold) to reclaim refrigerant. Use only DOT CFR Title 49 or UL approved storage containers for recycled refrigerant.

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

Refrigerant expands when it gets warm and may cause a tank to explode if the tank is overfilled:



IMPORTANT GENERAL INFORMATION

BEFORE OPERATING ROGER 1, BE SURE TO READ THE FOLLOWING:

1) Always have spare filters on hand.
2) Always isolate large amounts of refrigerant and close off valves so that if a leak should ever develop anywhere in the system, the refrigerant does not escape.
3) Close tank valves when finished.
4) Do not leave refrigerant in ROGER 1, especially prior to transport, as it may escape.
5) Always operate ROGER 1 on a level surface.
6) ROGER 1 has an internal pressure shut off switch. If interconnecting valves should accidentally close during, or before, operation, the back half of ROGER 1 will turn off. It will turn back on upon opening the closed valve and reducing back pressure on the compressor.

HOW TO OPERATE ROGER™ 1

The first step to operating ROGER 1 is to determine the type of refrigerant which is to be processed. If the refrigerant you want to process now is different than the type which was processed the last time this ROGER 1 was used, you need to see the section in this manual titled **CHANGING REFRIGERANT TYPE.** Be sure to have separate filters for every type of refrigerant you will be processing to avoid cross-mixing. **DO NOT MIX REFRIGERANTS.**

First, attach the manifold gauge to the unit to be serviced. Next, attach the hose from the input valve on ROGER 1 to the center, or common, port of the manifold gauge. Then attach a hose from the output valve on ROGER 1 to the liquid valve on an approved external storage tank (TANK must be LEVEL when operating ROGER 1). Connect the hoses between the front half and back half of ROGER 1(hoses go from "A" to "A" and "B" to "B") and open those 4 valves. Also, plug the back half of ROGER 1 into the front half.

ROGER 1 processes both liquid and vapor refrigerant, but will process liquid faster (because ROGER 1 uses the energy stored in the liquid phase to help it operate faster).

Open the liquid, or high pressure side of the manifold gauge. The vapor or low pressure side of the manifold gauge should remain closed until all of the liquid has been processed. Once the liquid has been processed, the vapor or low pressure side should also be opened and the remaining vapor should be pulled out of both the high and low pressure sides of the unit being serviced. BE SURE THAT THE UNIT BEING SERVICED IS OFF AND ELECTRICALLY DISCONNECTED. BE SURE THAT THE EXTERNAL STORAGE TANK HAS BEEN APPROVED FOR USE WITH ROGER 1.

Now, open the input valve on ROGER 1 and turn it on. Monitor the pressure gauges, the lights and the sight glass. The input pressure should not exceed 250 psi. Pressures in excess of 250 psi may result in damage to the gauge, or may require that the gauge be recalibrated. ROGER 1 has a built-in throttling valve to accept these high liquid pressures (up to 250 psi.).

As ROGER 1 processes refrigerant, it may make a purring sound. This is normal. Note: Any oil that comes into ROGER 1 must be manually discharged to measuring container which is located next to filters. (See page entitled "ROGER 1, FRONT SECTION - BACK VIEW"). Be sure to replace proper amount of new oil to AC&R System being serviced.

When processing large amounts of liquid, frequent manual discharging of oil may be required. This must be done with positive pressure on input side to force oil into bottle.

As liquid passes through the moisture indicating sight glass, it needs to be visually inspected as a final quality check. CHECK TO SEE if the liquid is discolored - it should be clear as it passes through, and the moisture indicating ring should be blue. A discolored liquid may indicate that it has been chemically altered by a compressor burnout, or that there may be a leak (some leak detecting dyes may alter the color of the refrigerant). At times the sight glass may be white or pinkish in color before starting and may take several minutes of contact with liquid refrigerant to turn blue - this is normal.

IF THE COLOR RING IS WHITE OR PINK WHILE PROCESSING REFRIGERANT, the transfer process should be interrupted and the filters should be changed. Read the section in this manual titled **CHANGING THE FILTERS.**

BE SURE THAT YOU DO NOT ALLOW THE EXTERNAL TANK TO OVERFILL AT ANY TIME. IMPORTANT! THE EXTERNAL TANK IS CONSIDERED TO BE FULL WHEN IT HAS REACHED 80% OF ACTUAL CAPACITY, TO ALLOW FOR EXPANSION. IF YOU DO FILL IT PAST THE 80% POINT, AND DO NOT ALLOW FOR EXPANSION, THE TANK COULD EXPLODE!

THE TANK USED WITH ROGER 1 HAS A SENSOR WHICH TURNS ROGER 1 OFF WHEN THE TANK IS 80% FULL. IMPORTANT: The tank must be LEVEL when operating ROGER 1.

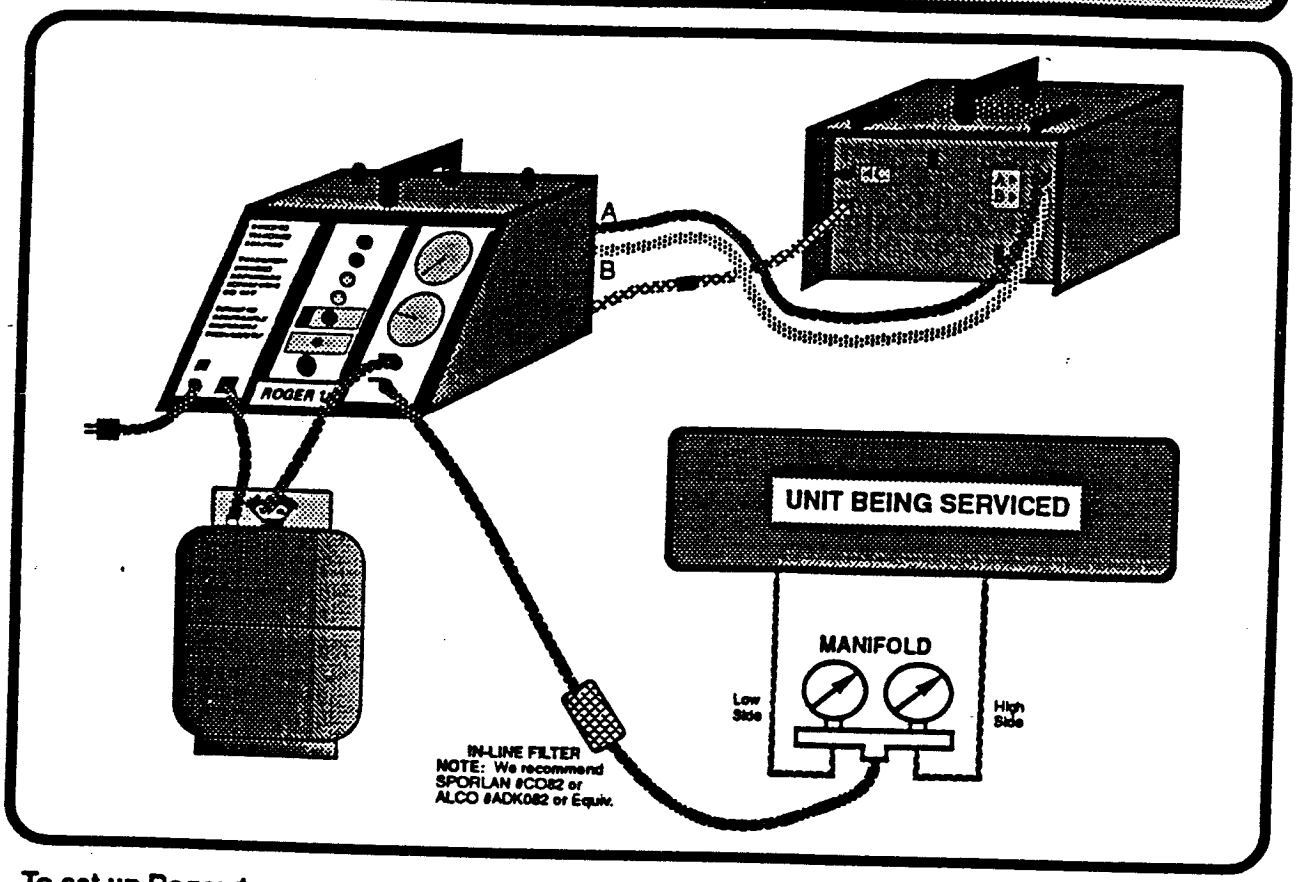
After the liquid has been transferred, the vapor, or low pressure, side should also be opened and the vapor remaining in the unit should be transferred out of both sides of the manifold gauge until the gauges on both sides read ZERO (The liquid transfers first because it processes faster). ROGER 1 shuts itself off automatically when the input pressure reaches minus 5 in. Hg.

Many times some residual refrigerant will remain in a system and, after 5 or 10 minutes, the input pressure gauge on ROGER 1 may indicate significant pressure again. When this happens, ROGER 1 should remain connected and may turn on automatically each time additional pressure builds above 6 psi.

NOTE! IT IS POSSIBLE FOR THE GAUGES TO READ LESS THAN ZERO, IF THE UNIT BEING SERVICED HAS BEEN COMPLETELY EVACUATED. HOWEVER, WHEN THE GAUGES READ LESS THAN ZERO, YOU HAVE CREATED A VACUUM IN THE LINES AND SYSTEM. IF CARE IS NOT TAKEN WHEN DISCONNECTING THE HOSES, OUTSIDE AIR MAY BE SUCKED INTO THE SYSTEM. IF THE UNIT BEING SERVICED HAS A LARGE STORAGE TANK FOR REFRIGERANT, THE HIGH AND LOW PRESSURE HOSES OF THE MANIFOLD GAUGE UNIT SHOULD BE CONNECTED TO THIS STORAGE TANK FIRST. IT IS EASIER TO TRANSFER OUT OF THIS TANK DIRECTLY THAN TO ATTEMPT TO DRAW ALL OF THE LIQUID IN THE TANK THROUGH THE UNIT YOU ARE SERVICING.

HIGH AMBIENT LIGHT - If the high ambient light comes on, you may continue processing, however, the speed of processing will be greatly reduced. You may increase your process speed by putting a cooling device, or subcooler, in line between the "A" valves (in between the front and back sections of ROGER 1). Call Promax Industries at 1-(303)-937-1400 to obtain a sub-cooler.

ROGER™1 SETUP DIAGRAM



To set up Roger 1:

READ ALL SAFETY INFORMATION AND MANUAL BEFORE STARTING.

1. Attach hoses between front and back sections of ROGER 1. (A to A, B to B), and open the four valves. Make electrical connection between front and back.
2. Attach the tank sensor cord to the tank and the output hose to the liquid tank valve.
3. Attach manifold gauge to input valve and then to AC&R system to be serviced. Use of an in-line filter is recommended here.
4. Plug ROGER 1 into an electrical outlet. Avoid the use of an extension cord because the extension cord may overheat. If you must use an extension cord use the shortest possible length and a minimum of 12 Gauge cord 3 conductor. Never use an extension cord longer than 100 feet.

To operate ROGER 1:

1. Open the manifold gauge set to the liquid side of the system being serviced. Check the pressure. If it is over 250 psi you will need to partially open the input valve on ROGER 1. If the pressure is under 250 psi then open the input valve all the way on ROGER 1.
2. Open the output valve on ROGER 1 that is connected to the tank.
3. Turn on the main power switch.
4. Monitor the sight glass for dryness and refrigerant clarity. If refrigerant is discolored or the sight glass indicates moisture then change both filters before continuing the recycle operation.
5. Process the liquid first, then the vapor. ROGER 1 will turn off automatically when the input pressure falls below minus 5" HG. ROGER 1 will also shut off when tank becomes 80% full.

ROGER 1
PURGING THE NON-CONDENSABLE GASES

Once the tank full light comes on, showing a "tank full" condition, or the Air Purge light comes on, indicating a high presure condition, you will need to purge the non-condensable gases, or air, from the tank. To do so:

1. Allow the tank to sit undisturbed for 24 hours - this allows the air to rise to the top of the tank.
2. Read the amount of pressure on the tank by looking at the output pressure gauge on the front panel of the machine.
3. Determine the ambient temperature in the room.
4. Refer to the chart below. Find that temperature on the chart and look across to the corresponding pressure. Determine how that relates to the pressure reading on the gauge.
5. If the pressure on the gauge is higher than the pressure on the chart, very slowly crack open the vapor valve until the pressure on the gauge corresponds to the pressure on the chart at the current room temperature.
6. Allow the tank to sit for 10 minutes, and check the pressure again.
7. Repeat the process again if necessary.

EXCESSIVE AIR CHART

ROOM TEMP (F)	R-12 MAX GAUGE (PSI)	R-22 MAX GAUGE (PSI)	ROOM TEMP (F)	R-12 MAX GAUGE (PSI)	R-22 MAX GAUGE (PSI)
50	57	93	88	107	172
52	59	97	90	110	177
54	61	101	92	113	182
56	63	104	94	117	187
58	65	107	96	120	192
60	68	112	98	123	197
62	70	116	100	127	203
64	73	120	102	130	209
66	75	123	104	133	217
68	78	127	106	139	224
70	80	132	108	142	230
72	83	136	110	146	237
74	86	140	112	150	243
76	88	144	114	155	248
78	91	148	116	159	255
80	94	152	118	163	262
82	97	157	120	168	269
84	100	162	122	172	278
86	103	167	124	177	287

ROGER™ 1
CHANGING REFRIGERANT

DO NOT MIX REFRIGERANTS! Filters and external storage tanks need to be used with one refrigerant only. When you change refrigerants, you also need to change the filter and the external storage tank.

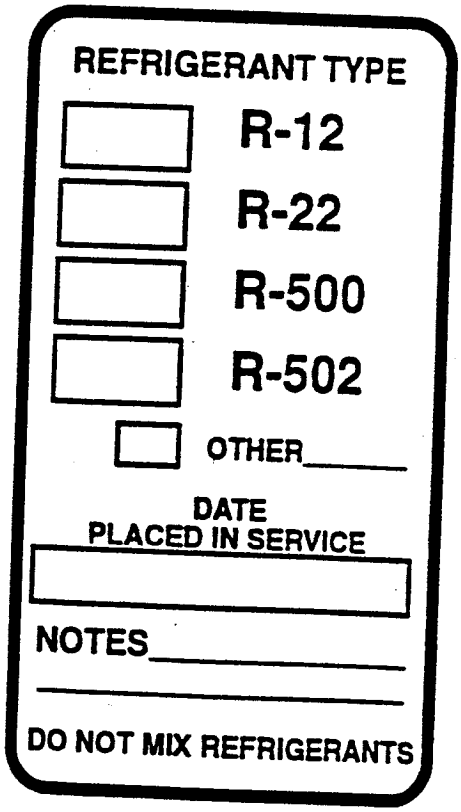
Filters should be designated for one refrigerant only. After changing filters for the correct refrigerant (see CHANGING THE FILTERS for filter change process), purge Roger 1 with a small amount of new refrigerant, or with dry nitrogen gas, and then evacuate Roger 1.

Tanks should also be designated for one refrigerant only. If using a tank which was previously used for another refrigerant, completely empty the tank, evacuate it, purge the tank using dry nitrogen, then re-evacuate.

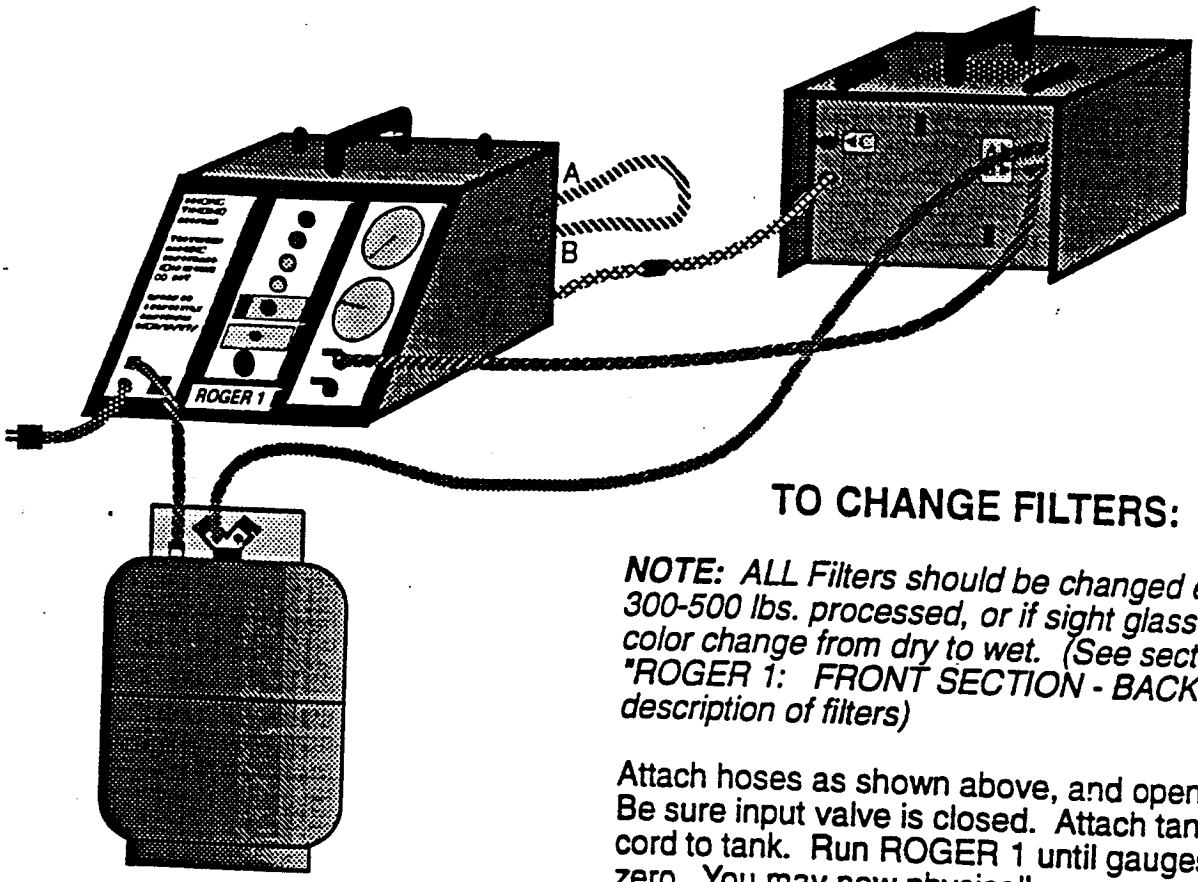
Set the refrigerant selector to the new type of refrigerant. Roger 1 is now ready to operate.

USE THESE STICKERS ON ALL FILTERS AND TANKS FOR IDENTIFICATION!

For additional stickers please write us at:
1930 S. Navajo Street.
Denver, CO. 80223



ROGER™ 1
CHECKING & CHANGING FILTERS

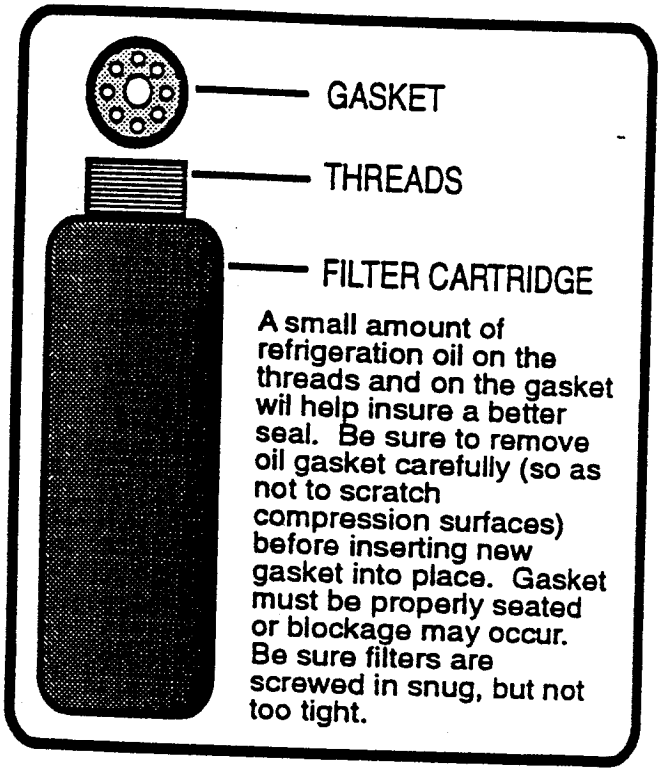


TO CHANGE FILTERS:

NOTE: *ALL Filters should be changed every 300-500 lbs. processed, or if sight glass indicates color change from dry to wet. (See section entitled "ROGER 1: FRONT SECTION - BACK VIEW" for description of filters)*

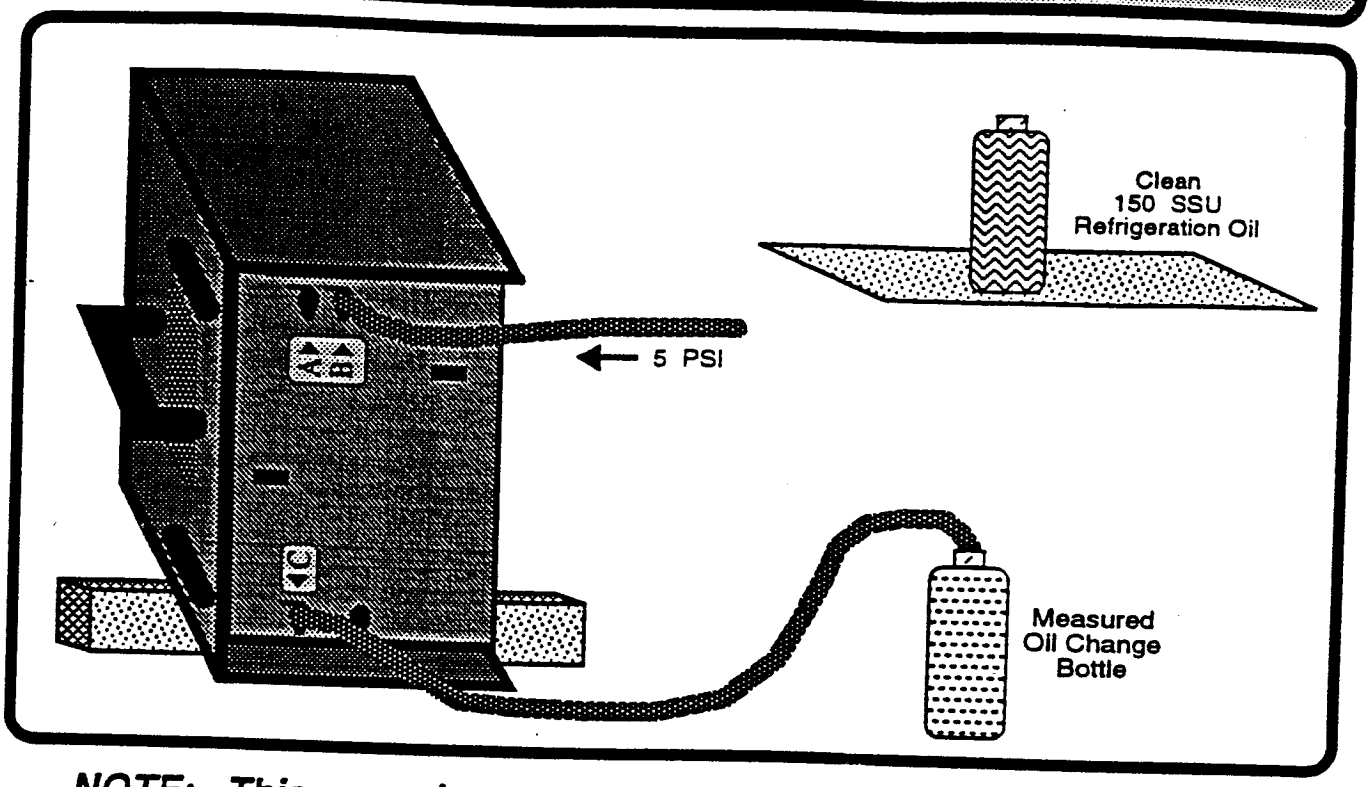
Attach hoses as shown above, and open all valves. Be sure input valve is closed. Attach tank sensor cord to tank. Run ROGER 1 until gauges read zero. You may now physically remove and replace the filters.

The process mentioned above uses the back half of ROGER 1 (the compressor section) to pump all of the refrigerant from the front section of ROGER 1 to the external storage tank, OR back into the system being serviced. WHY? Because the front section of ROGER 1 needs to have *zero* pressure inside in order to change the filters. Even so, the filters will "out-gas" for several minutes - so be sure that the pressure remains at *zero* before physically removing the filters.



Used filters should be disposed of in an environmentally safe manner. If you work with different refrigerants regularly, and must therefore change filters often, **you may store the filters you are not using.** To re-use these partly used filters, you must cap and seal them immediately after they are removed from ROGER 1, and must store them in a dry place. It is likewise EXTREMELY IMPORTANT that new filters are installed ***immediately after*** being uncapped. DO NOT allow filters to sit uncapped and exposed to the atmosphere for more than one (1) minute.

ROGER™ 1
CHECKING & CHANGING THE OIL



NOTE: This procedure must be done every two weeks on heavily used systems, once every month with normal use.

TO CHECK OIL IN COMPRESSOR:

1) Tip rear section of ROGER 1 onto left side as shown in diagram, raising it forward to a 45 angle. (A 2"x4" board works well for establishing the angle)

2) Attach hose to "C" valve. A clear PVC hose works well.

3) Apply 5 psi to "B" valve momentarily, then close it.

4) Open "C" valve and drain oil into a spare measured container.

TO ADD NEW OIL:

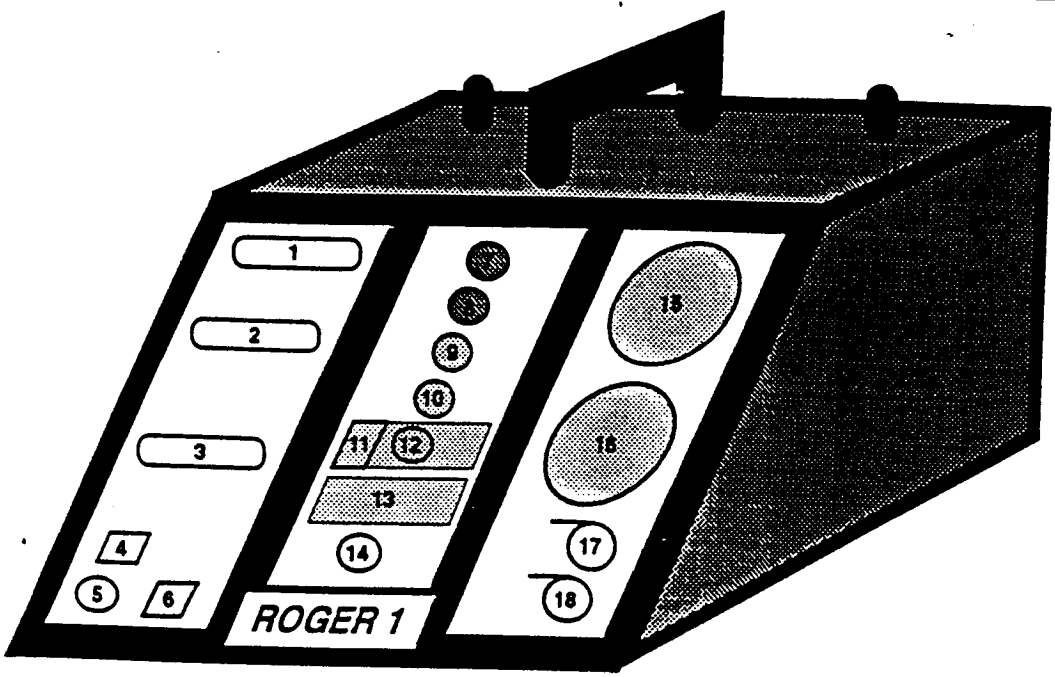
1) Close "B" and "C" valves, then open the "A" valve.

2) Plug unit in and wait between 5-10 seconds while it runs, closing the "A" valve quickly after. (Note: this action puts a vacuum into the compresor)

3) Put the hose from the "C" valve into a container with 15oz of clean 150ssu refrigeration oil while opening the "C" valve. When all of the oil is drawn into the unit, close the valve.

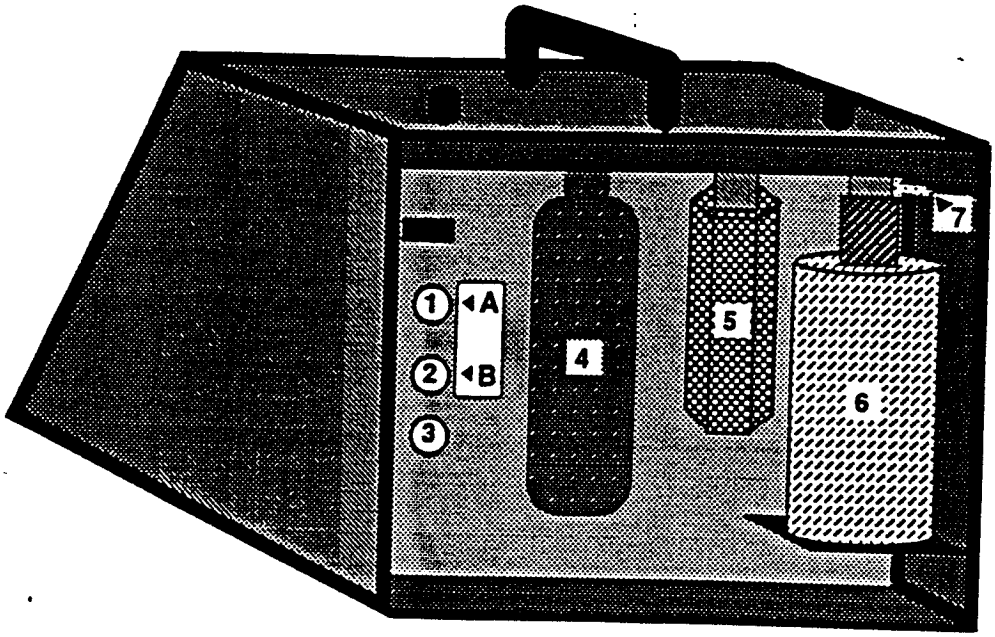
NOTE: Always keep the rear section (compressor) on a level surface *except* when changing or checking the oil. This helps minimize the oil migration.

ROGER™ 1
FRONT SECTION - FRONT VIEW



1) SAFETY INSTRUCTIONS
2) HOW TO OPERATE ROGER 1
3) EXPLANATION OF LIGHTS
4) CIRCUIT BREAKER - 15amp.
5) POWER INPUT- 110 VOLT, 12 amp., 60 HZ
6) TANK SENSOR - Connects to external tank
7) TANK FULL LIGHT - Indicates external tank is 80% full (maximum allowable).
8) VACUUM SHUT OFF - Indicates input pressure is below 5" Hg. Roger 1 will not turn on until input pressure is 6 psi. or more.
9) HIGH AMBIENT - This light will come on when conditions are too hot for Roger 1 to process refrigerant as quickly as possible.
10) AIR PURGE - If light comes on, vent air out of tank (see section on Air Purge).
11) MAIN POWER SWITCH
12) MAIN POWER LIGHT
13) REFRIGERANT TYPE SELECTOR - Sets the proper process conditions for the selected refrigerant.
14) SIGHT GLASS DRYNESS CHECK - Indicates condition of recycled refrigerant and its moisture content.
15) OUTPUT PRESSURE - Displays pressure at the output valve.
16) INPUT PRESSURE - Displays pressure at the input valve.
17) OUTPUT VALVE - For transferring recycled refrigerant from Roger 1 to an external tank.
18) INPUT VALVE - For inputting refrigerant from the unit you are working on.

ROGER 1
FRONT SECTION - BACK VIEW



1) "A" PORT: Connects to "A" Port on back section.

2) "B" PORT: Connects to "B" Port on back section.

3) POWER OUT: Back section connects here.

4) HIGH CAPACITY INPUT FILTER

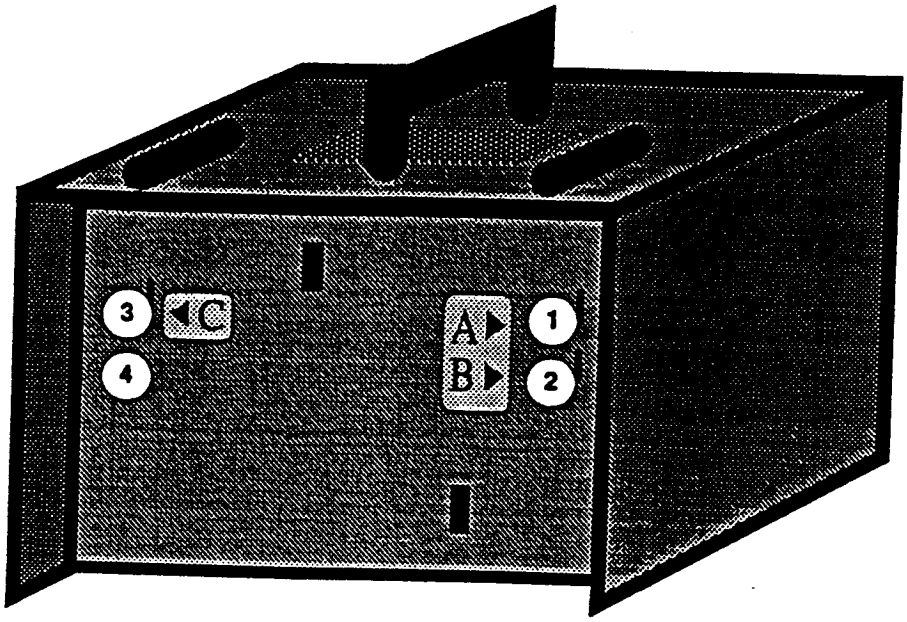
5) HEX-MOLECULAR LIQUID OUTPUT FILTER

6) OIL PURGE & MEASURING BOTTLE: Any oil that enters into ROGER 1 will be captured in this bottle for measurement and analysis. Foul smelling oil will indicate possible compressor burnout, or component failure. High acid oil indicates high moisture in system or other problems - use litmus paper to determine the acicidy of the oil.

7) OIL PURGE VALVE: This should be used frequently as it will allow the extraction of oils from the system that have built up over use. When applying positive pressure to the system, open this valve until all oil has been flushed from ROGER 1, then close the valve. When working with larger cooling systems, you may need to repeat this process more than once, as large amounts of oil may have built up over a period of time in the system being serviced .

NOTE: Good diagnostic practice would include determining the acidity of the recycled refrigerant by putting litmus paper into an in-line strainer on the output hose. If the acidity is higher or lower than specifications, the refrigerant may require another pass through ROGER 1 with new filters in place. If the litmus test indicates a large disparity from specifications and the oil is fouled and odorous, the refrigerant has probably been chemically altered and needs to be disposed of in an environmentally sound manner.

ROGER™ 1
BACK SECTION - FRONT VIEW



1) "A" PORT: To be connected to the "A" port on the Front Half.

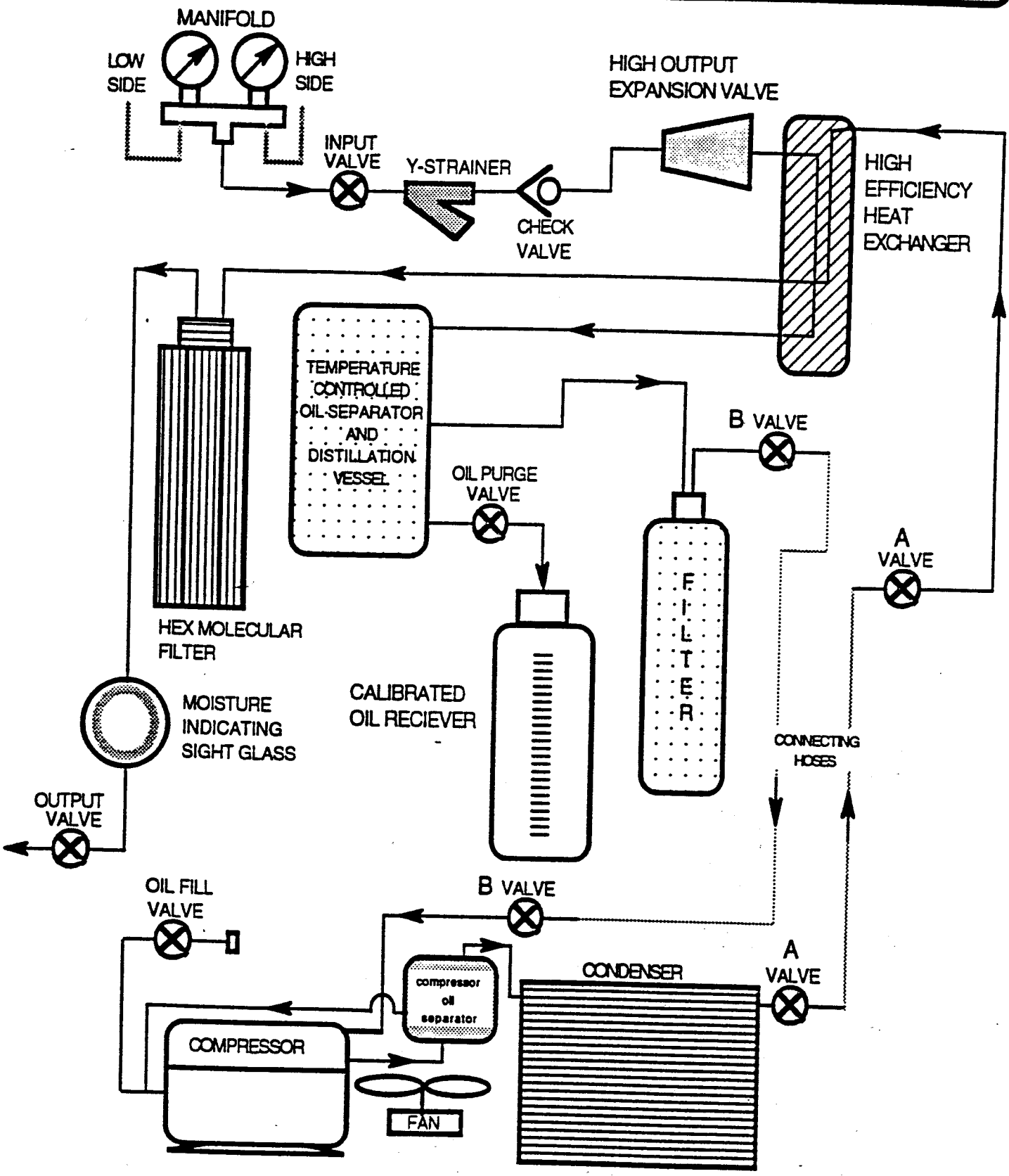
2) "B" PORT: To be connected to the "B" port on the Front Half.

3) "C" PORT: Used for checking and changing oil on ROGER 1 EVERY TWO (2) WEEKS. This port may also be used as a secondary vacuum input for drawing a vacuum on a clean system.

4) POWER IN: Plugs into "Power Out" on Front Half.

NOTE: Hoses should connect "A" to "A" and "B" to "B" at all times, unless changing filters. In addition, the four "A" and "B" valves should be left open during operation.

ROGER™ 1
REFRIGERANT SCHEMATIC



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ROGER™ 1
WIRING DIAGRAM