STARCOOL II

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OWNERS MANUAL

SERVICE MANUAL

The Starcool is a unique Air Conditioner that has been engineered for van motorhomes. It is available exclusively to Sportsmobile. The Starcool has become a very popular option since its introduction in 1989

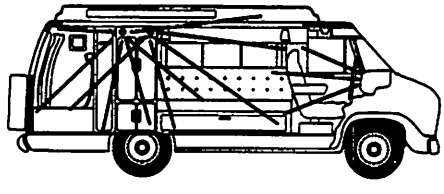
EXCLUSIVE STARCOOL FEATURES:

1. **COOLS DRIVING (12V) & PARKED (110V)** - from a single system using ozone friendly R-134A refrigerant.
2. **SWITCHES AUTOMATICALLY** - from 12 volt to 110 volt operation.
3. **CENTRAL LOCATION, WITH DUCTS TO FRONT & REAR** - Provides uniform cooling even when a Bifold door or Partition Curtain is used. Individual Air Duct Vents (4) can be adjusted to concentrate cool air to front or rear.
4. **FLEXIBLE INTERIOR LOCATION** - The Starcool Evaporator/Blower assembly can be mounted almost anywhere in the Sportsmobile. The cold air discharge ducts can also be located for the best cooling locations.
5. **ONLY 1 CF OF INTERIOR SPACE** - is required for the Starcool Evaporator/Blower. Some additional space is also required for the Air Ducts.
6. **REDUCED A/C NOISE IN CAB WHILE DRIVING** - You can turn your dash A/C to low and your Starcool A/C to low for quiet operation and efficient cooling.
7. **SPECIALLY ENGINEERED FOR VAN MOTORHOMES** - Starcool A/C lines attach at factory dash air conditioner connection points for greater reliability. No factory A/C lines are "cut". The 110V compressor has been engineered to ensure proper oil circulation (patent pending). Pressure switches, relays and fuses protect the van's A/C and the Starcool. All StarCool parts are heavy duty and rated for continuous operation.
8. **INTEGRATED TO VANS A/C** - Starcool is installed like the factory dash A/C and other rear A/C systems.
9. **LOWERS VANS ENGINE OPERATING TEMPERATURES** - This is accomplished by a condenser fan mounted behind the vans grill. This fan moves approximately 1,400 to 1,800 CFM of additional air flow over the condenser. This additional air flow lowers the vans engine operating temperature when driving, or parked.
10. **COLDER AIR FROM THE VANS DASH A/C** - while the vans engine is idling. This is the result of the above increased air flow over the vans condenser.
11. **KEEPS WEIGHT LOW** - The heaviest component of an air conditioner is the compressor. Starcools hermetically sealed compressor is located safely up under the vans floor.
12. **COMPLETELY CONCEALED** - Nothing shows from the outside of the Sportsmobile, not even a rear vent in the rear of the top. U. S. Patent 4,947,657. Other patents pending.

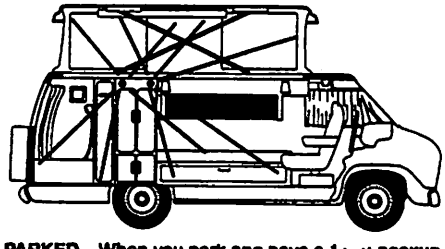
ADDITIONAL FEATURES:

1. **THREE BLOWER SPEEDS** - For maximum cooling or quiet cooling. Continuously recirculate interior air.
2. **REMOTE THERMOSTAT** - cycles the Starcool 110 volt compressor while allowing continuous air circulation.
3. **PROVEN DESIGN** - In production since 1989. In use throughout the U.S.
4. **STARCOOL USES R-134A** - Ozone friendly. Roof A/C's use R-22 (not ozone friendly).
5. **SERVICE** - If there is ever a problem, any independent automotive A/C service center or Sportsmobile plant can service it. Please call for an appointment in advance. A detailed easy to read service manual is available.
6. **WARRANTY** - Industry standard limited warranty 12 months or 12,000 miles.

COOLING . . .
DRIVING & PARKED

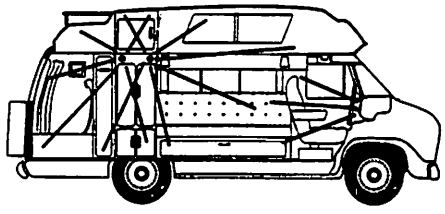


DRIVING—The van's dash A/C will cool the Sportsmobile's cab area. The Starcool will cool the Sportsmobile's interior; with 18,000 BTU (nominal). Most driving is done during the day when more cooling BTU is required for comfort.

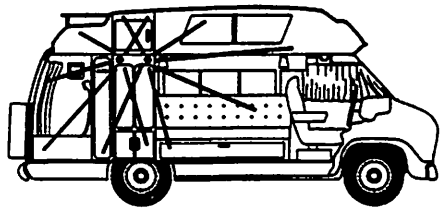


PARKED—When you park and have a 110V hookup, or a Generator, the Starcool will cool the Sportsmobile's interior with 12,000 BTU (nominal). Starcool's 3 speed, high volume blower fan provides excellent interior air circulation, driving or parked.

HOW THE STARCOOL WORKS . . .
DRIVING & PARKED



DRIVING—HOW THE STARCOOL WORKS
While driving, the vehicle's compressor will supply compressed refrigerant to both the dash evaporator and the Starcool evaporator. For additional cooling, the Starcool condenser fan will operate whenever the Starcool evaporator fan is on. When running the Starcool evaporator with dash A/C, you will receive substantially quicker interior cool-down with less strain on the vans factory compressor.



PARKED—HOW THE STARCOOL WORKS
When parked and 110 volt power is available, the Starcool compressor will supply compressed refrigerant to the Starcool evaporator. Whenever the thermostat calls for cooling, the refrigerant will flow through the factory condenser. The Starcool evaporator fan and condenser fan will operate whenever the fan switch is on, regardless of thermostat setting.

FOR MORE INFO PLEASE SEE SERVICE MANUAL SECTION

DRIVING, 12V

1. The vehicle's cab area will be cooled by 12V in-dash air conditioner.
2. The Starcool, running on 12V, will help cool the rest of the vehicle's interior.

PARKED, 110V

1. The Starcool, running on 110V, will help cool your vehicles interior when you have an outside 110V hook-up, or a generator.
2. The 110V Power Converter/Battery charger will keep your Extra Battery charged to operate the three speed Starcool 12V blower and condenser fan that is located behind the vans grill.

OPERATION DRIVING, 12V

1. Please see your vehicle's operating manual for the vehicle's in-dash air conditioner.
2. Set the Starcool dash fan switch to the desired speed - low, medium, or high.
3. The Starcool thermostat does not work when you are driving. It only works when you are parked, and on 110V power.
   The heat selector on the Starcool thermostat will operate the optional furnace when parked or driving.
4. Cab noise can be reduced by switching the dash A/C fan to low and Starcool to low, medium, or high. The temperature of the air blowing out of the vents is actually colder when the fan is switched to a lower speed.

OPERATION PARKED, 110V

1. Turn vehicle ignition switch to "Off", not to accessory.
2. Connect the 110V power cord to an outside 110V hookup.
3. Set the Starcool dash fan switch to the desired speed - low, medium, or high.
4. If you have a generator, allow five to ten minutes, after you stop the vehicle engine, before proceeding.
5. Set thermostat to "Cool", and select the desired temperature range.
6. Once the interior temperature reaches the desired thermostat setting, the Starcool's 110V compressor will cycle off. The blower fan will continue to circulate the interior air - until the Starcool dash fan switch is turned off.

TO RETURN VEHICLE'S 12V A/C AND STARCOOL TO 12V OPERATION

1. Set thermostat to "off".
2. Disconnect the 110V power cord.
3. Start the vehicle's engine.
4. Turn factory dash A/C "on".
5. Turn Starcool dash van switch to low, med, or high.

MISCELLANEOUS

1. **DOES THE STARCOOL AFFECT THE VAN'S WARRANTY?**
   Starcool connects into the same existing vehicle A/C high and low pressure refrigerant lines that an auxiliary rear 12V air conditioner evaporator does. The system does not affect the van's warranty. The Starcool actually puts less strain on the vehicle's compressor, by allowing the refrigerant to pass by the Starcool auxiliary condenser fan for extra cooling. This allows the vehicle's A/C compressor to work less, and at lower refrigerant pressures.

2. **SYSTEMS PROTECTION** - Pressure switches, relays, and fuses protect the vehicle's A/C and the Starcool.

3. **SUPPOSE I HAVE A PROBLEM - HOW DO I GET PARTS, SERVICE?**
   First, the Starcool is a heavy duty unit. The parts are rated for "continuous" operation. Any A/C service facility should be able to easily service the system. Any Sportsmobile plant can also service your Starcool. Please call for an appointment date.

4. **WHICH PART IS MOST LIKELY TO FAIL?**
   It is unlikely any part will fail. Should this happen, it will probably be a relay, which is easy to replace. There are 4 relays and 5 fuses to protect and control the system. Their capacity exceeds their use.

5. **ROUTINE MAINTENANCE -** It is important to clean the reusable air filter on the Starcool Evaporator/Blower every two weeks, as poor performance will result if the filter is neglected. For access, remove the lower intake grill (2 screws).

6. **OPERATE YOUR STARCOOL PERIODICALLY -** On 12V and 110V for awhile at least every 30 days.

WHAT CAN YOU EXPECT FROM THE STARCOOL AIR CONDITIONER

1. The Starcool Air Conditioner operates the same way that a roof air conditioner operates when on 110V.

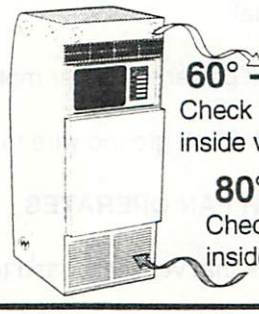
2. The *following information* is from Coleman's RV Owners Manual and applies to any RV A/C including Starcool.

   The size of RV air conditioners is generally limited to about 13,500 BTUH (approximately one ton) of cooling. This is due to the limited electrical power normally available in most trailer parks and/or economic limitations on the use of generators with enough capacity to handle large air conditioners.

   The ability of the air conditioner to maintain the desired inside temperature depends on the heat gain of the RV. This depends on the size of the vehicle, amount of window area, amount of insulation, direct exposure to the sun, outside temperature, the number of people in the RV etc. It's possible that under certain conditions the heat gain of an RV can exceed the capacity of the A/C.

   As a general rule, air entering the air conditioner will be cooled about 15 to 20 degrees, depending on the outside temperature and humidity conditions.

For example, if the air entering the return air grill in the air conditioner is 80 degrees F., the air leaving the discharge vents will be 60 degrees to 65 degrees F. As long as this temperature difference is being maintained between the return air and discharge air, the A/C is operating at its capacity. If the desired inside temperature (normally 80 degrees F) cannot be maintained, then the heat gain of the RV is too great for the capacity of the air conditioner. Larger RVs may require 2 or more roof air conditioners.



60° - 65°
Check "**Outlet**" temperature inside vent.

80°
Check "**Inlet**" temperature inside vent.

WHAT YOU CAN DO TO HELP COOL YOUR SPORTSMOBILE:

Your Sportsmobile is very well insulated, but keep in mind it has a steel body and lots of windows. Steel and glass are excellent heat conductors. Hot travels to cool, so anything you can do to keep the heat from entering your Sportsmobile is a plus.

1. **Park under shade -** whenever possible. Of course parking on grass is much better than the extreme of parking on black asphalt in the heat of day.

2. **If you park in the sun -** have the sun to the rear of the Sportsmobile when you can.

3. **Windshield and cab door windows -** The windshield and cab door windows let in a lot of solar heat gain. Especially if you are facing into the sun. Sportsmobile windshield and cab door screens are made of white fiberglass and will block 70% of this heat gain. These screens also provide daytime privacy. You can see out. They can't see in.

4. **Other windows -** Window tinting is very effective. Exterior white fiberglass screens are also available.

5. **Curtains/Shades -** Closing these also will help keep the heat out.

6. **Let the hottest air out -** Crack the upper windows or open a roof vent some. If you have a Penthouse top unzip the corners of a couple of the plastic windows. It's easier to cool 100 degree air than 120 degree.

7. **For faster cool down -** When you are parked, idle the vans engine for 30 minutes or so. Turn both the van's dash A/C and the Starcool blowers to high. **Warning -** never idle your van's engine when parked over grass as the catalytic converter could start a fire.

8. **Open hood -** Engines build up a lot of heat when driving. To quickly dissipate this heat and help keep it from entering the Sportsmobile, we suggest you open the van's hood when you stop at the campground.

STARCOOL, SGW (SOMETHING GONE WRONG) MODEL SERIES II. In Production 1/93

SGW - "DRIVING 12V"

1. STARCOOL BLOWER FAN DOES NOT OPERATE

A. The blower fan is connected to the evaporator and is located toward the rear of the vehicle.

B. Check Starcool fuses located under dash or at the 12V distribution center. See drawing. If new fuse blows, this indicates there is a short in the wiring or the blower motor is defective.

C. If dash blower fan does not operate, check for blown fuse at factory fuse block. See vehicle's operation manual.

*D. Check power to blower motor.

*E. Check black ground wire to blower motor. If blower still does not operate - replace blower motor.

2. BLOWER FAN OPERATES - AIR DOES NOT COOL

A. Check that vehicle's dash temperature selector is set in cool range.

B. Check air filter. See "Routine Maintenance" in Miscellaneous Section.

C. Verify that the dash air control flap is operating properly. Warm air should be present when dash temperature selector is set to warm, and cool when set in cool range. If the air control flap is not working, an automotive repair company can repair it.

D. Verify that the compressor clutch on vehicle compressor is engaging. When the dash control is set to normal or maximum position, you should hear a click noise and hear a change in the engine RPM.

*E. With Starcool fan switch on, check sight glass for bubbles to determine if adequate charge of refrigerant is present. The sight glass is located on the Receiver Drier. See Drawing. If bubbles are present this indicates the refrigerant is low.

*F. Check for blockage in high pressure line to orifice tube or expansion valve. Frosting or sharp temperature difference on line will occur at point of blockage.

3. VEHICLE COMPRESSOR CYCLES RAPIDLY WHILE DRIVING AND/OR A LOSS OF COOLING

A. Most likely indicates a loss of refrigerant, which is not uncommon. Note - <u>if the vehicle's refrigerant level is okay, the Starcool's refrigerant level is also okay</u>.

B. Check for a leak at a hose connector or a loose hose clamp.

C. *After* a leak is fixed, a re-charge of refrigerant is typically all that is required.

*D. When having a leak repaired, it is important that a sufficient vacuum be pulled. A maximum level of 400 microns must be obtained. Lower levels are not desirable

*E. The system should be recharged like any typical automotive A/C system. The refrigerant capacity is indicated on a label under the hood. Use of the sight glass will confirm a proper level. The sight glass is located on the Receiver Drier.

*F. Check vehicle fuse panel for blown fuse, replace as needed

*** IT IS RECOMMENDED THAT A QUALIFIED A/C PERSON CHECK THESE ITEMS.**

SGW - "PARKED, 110V"

1. STARCOOL BLOWER FAN DOES NOT OPERATE

A. The blower fan is connected to the evaporator and is one assembly. This component is located in a cabinet behind the return air vent.

B. Check Starcool fuses located under dash, or at the I2V distribution center. See drawing. If new fuse blows, this indicates either there is a short in the wiring or the blower motor is defective.

*C. Check power to blower motor.

*D. Check black ground wire to blower motor. If blower still does not operate - replace blower motor.

2. BLOWER FAN OPERATES - AIR IS NOT COOL

A. Verify that vehicle ignition is "off".

B. Check that thermostat switch is set to "Cool" and temperature selector is set below vehicle interior temp.

C. Check 110V power cord connections to ensure power is entering vehicle

D. Check 110V circuit breakers. Verify 110V compressor is operating. The compressor is located under the vehicle. When it cycles on, you can hear it running.

E. Check return air filter. See "Routine Maintenance" in Miscellaneous Section.

*F. Check for bubbles in sight glass to determine adequate charge of refrigerant.

*G. Check for blockage in high pressure line to expansion valve. Frosting or sharp temperature difference will occur at point of blockage.

*H. Verify that solenoid valve is operating. A "click" can be heard initially when the Starcool fan switch is turned to "low", "med." or "high".

3. STARCOOL CONDENSER FAN DOES NOT OPERATE

A. Fan is located in front of the factory condenser behind the vans grill.

B. If no power is present, check fuse located under dash.

*C. Check power to fan. If power is present, check ground wire or replace fan motor.

4. STARCOOL COMPRESSOR CYCLES.

A. The Starcool 110V compressor is located under the vehicle.

B. When the ambient temperature is not very high, the compressor will cycle.

C. If the compressor cycles rapidly, it may indicate a low refrigerant level. This is not an uncommon problem with any A/C.

*D. Check for bubbles in sight glass to determine adequate charge of refrigerant.

*** IT IS RECOMMENDED THAT A QUALIFIED A/C PERSON CHECK THESE ITEMS.**

5. STARCOOL COMPRESSOR DOES NOT OPERATE

A. Compressor failure? Highly unlikely. There has been only one in 5 years. If the compressor does not operate, it's most likely some other part that is defective

B. Verify that vehicle's ignition is "off".

C. Turn blower fan control switch to desired speed.

D. Check that thermostat switch is set to "cool", and temperature selector is set below vehicle's interior temperature.

E. Verify that 110- volt power is present.

F. If 20 amp 110 volt circuit breaker is tripped, wait 5 minutes then reset breaker, and restart A/C system. If breaker trips again, have a qualified repair person check for a failed motor or capacitor.

*G. Check 12 volt power at thermostat. 12 volt power should be entering and leaving thermostat.

*H. Check low pressure switch at compressor. 12 volt power should be entering and leaving the switch if an adequate charge of refrigerant is present.

*I. Check small relay inside compressor panel, 110 volt power should be present on "com" terminal and on "no" terminal whenever 12 volt power energizes the relay coil (from low pressure switch). If not, disconnect 110 volt power to van, replace relay.

*J. 110 volt power should be present at the compressor start/run (large) relay on terminal #5. If compressor still does not operate, disconnect 110 volt power to van and replace start/run (large) relay.

* **IT IS RECO*MMENDED* THAT A QUALIFIED A/C PERSON CHECK THESE ITEMS.**

STARCOOL AIR CONDITIONER LIMITED POLICY

1. Starcool warrants the air conditioners sold to the original retail purchaser to be free from defects in material and workmanship under normal use for a period of twelve months or 12,000 miles, whichever comes first.

2. If a repair or adjustment is required, the Starcool may be taken to a Sportsmobile plant for repair. Please call for an appointment date.

3. If you are too far from a Sportsmobile plant please feel free to take your Starcool to an independent air conditioner repair company. See the yellow pages under "Automobile Air Conditioning Service". The repairing service center must contact Starcool for authorization, prior to any work being done. If warranty parts are needed, Starcool reserves the right to replace them. No warranty claims will be paid without the defective parts being returned to Sportsmobile.

4. This warranty does not cover any product which has been subject to misuse, neglect, alteration, accident, or improper maintenance, or which has been repaired without Starcool authorization in any way so as to affect adversely its performance or reliability.

5. This warranty does not cover material or labor used in normal maintenance services or the replacement of service items. This warranty does not cover loss of refrigerant unless the loss is a direct result of a defect covered by this warranty. This warranty does not cover customer lost time, vehicle towing, rental vehicles or lodging.

6. This warranty does not include consequential damages. Starcool shall not authorize any person to make for it, any warranty other than the foregoing warranty. Such other warranties, if any as may be imposed or implied by law are limited in duration to the duration of this written warranty.

7. Some states do not allow limitations on how long an implied warranty lasts, nor do they allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion of incidental or consequential damages may not apply.

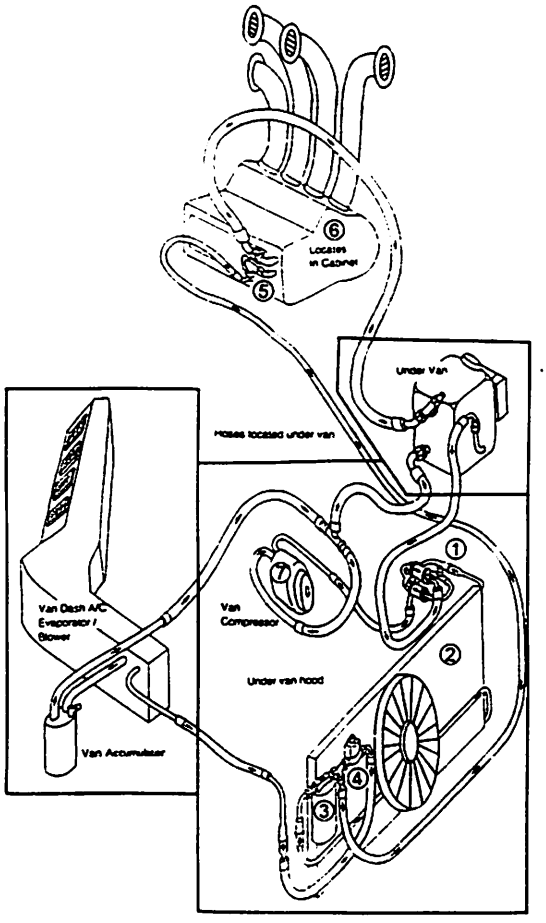
8. This warranty gives specific legal rights, and other rights, which vary from state to state.

STARCOOL
1-800-344-8154

STARCOOL II SERVICE MANUAL

STARCOOL II OPERATION

DRAWINGS ILLUSTRATE FORD INSTALLATION
"BASIC" PLUMBING SAME ALL VANS



HOW DOES THE STARCOOL WORK WHEN DRIVING? (12V)

① The vehicle compressor pushes refrigerant vapor through a check-valve to the factory condenser. An additional check-valve prevents refrigerant vapor from traveling to the 110 volt compressor.

② The factory condenser lowers the temperature of the compressed refrigerant vapor and condenses it into liquid refrigerant by means of air traveling across the condenser. An auxiliary 12 volt condenser fan operates whenever the Starcool fan switch is on low, medium or high.

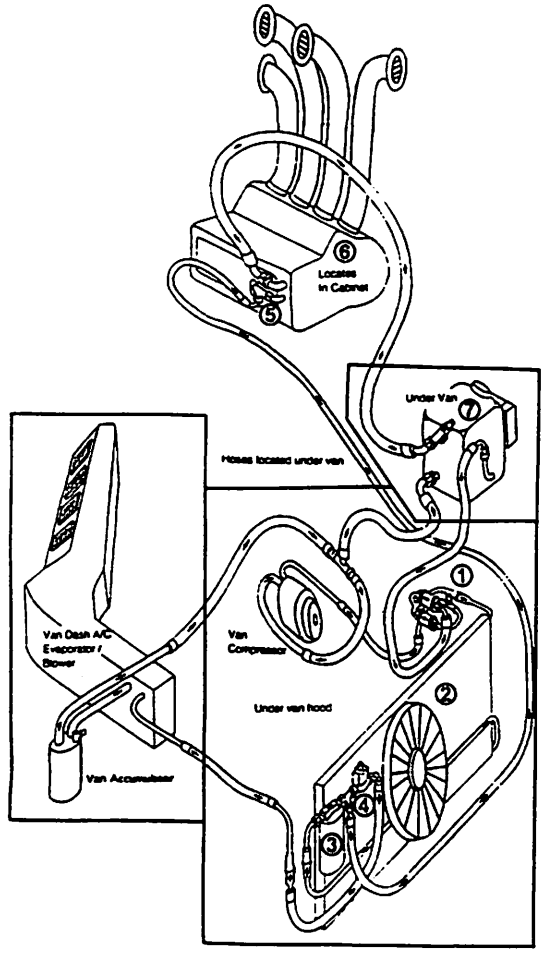
③ The liquid refrigerant then passes through the Starcool receiver drier which removes any moisture or particles from the system.

④ A "tee" fitting after the receiver drier allows liquid refrigerant to flow to the Starcool expansion valve and through a normally open solenoid valve to the factory expansion valve or orifice tube. An additional factory receiver drier may be in the system.

⑤ The expansion valve, or orifice tube, will regulate the flow of liquid refrigerant into the Starcool or factory evaporator.

⑥ In the evaporators, liquid refrigerant is vaporized and absorbs the interior heat of the blower fans are operating.

⑦ The refrigerant vapor carries the absorbed heat to the factory compressor to complete the cycle. An accumulator may be in the system before the compressor to remove moisture.



HOW DOES THE STARCOOL WORK WHEN PARKED? (110V)

① The 110 volt compressor pushes refrigerant vapor through a check-valve to the factory condenser. An additional check-valve prevents refrigerant vapor traveling to the factory compressor.

② The factory condenser lowers the temperatures of the compressed refrigerant vapor and condenses it into liquid refrigerant by means of air traveling across the condenser. The auxiliary 12 volt condenser fan operates whenever the Starcool fan switch is on low, medium or high.

③ The liquid refrigerant then passes through the Starcool receiver drier, which removes any moisture or particles in the system.

④ A "tee" fitting after the receiver drier allows liquid refrigerant to flow to the Starcool expansion valve. The normally open solenoid valve will close whenever the Starcool thermostat is set to cool and the temperature selector is set below the interior temperature of the vehicle.

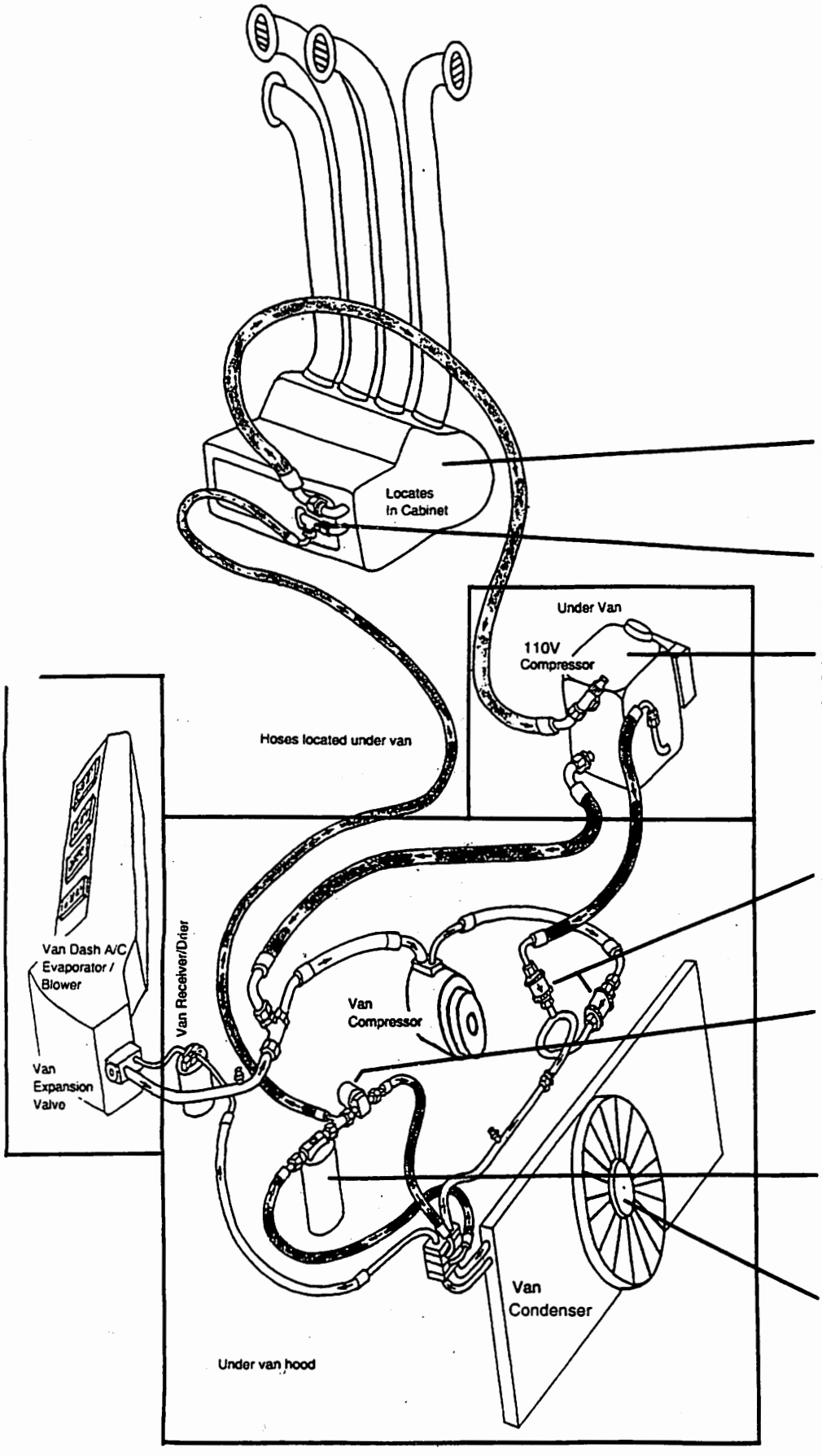
⑤ The Closing of the solenoid valve prevents liquid refrigerant traveling to the factory evaporator. The expansion valve will regulate the flow of liquid refrigerant into the Starcool evaporator

⑥ In the Starcool evaporator, liquid refrigerant is vaporized and absorbs the interior heat of the vehicle when the blower fan is operating.

⑦ The refrigerant vapor carries the absorbed heat to the Starcool 110 volt compressor to complete the cycle.

STARCOOL II COMPONENTS / PLUMBING

DRAWING ILLUSTRATES DODGE INSTALLATION
"BASIC" PLUMBING SAME ALL VANS



DODGE INSTALLATION

(S) - This component same for all vans

EVAPORATOR / BLOWER (S)
Pulls warm interior air across coil, where refrigerant vapor absorbs heat in air and discharges cold air at vents.

EXPANSION VALVE (S)
Regulates the flow of refrigerant into the evaporator coil

COMPRESSOR (S)
Compresses refrigerant vapor from evaporator and pushes refrigerant vapor to condenser.

CHECK VALVES (S)
Prevents flow of hot refrigerant vapor to the compressor which is not operating

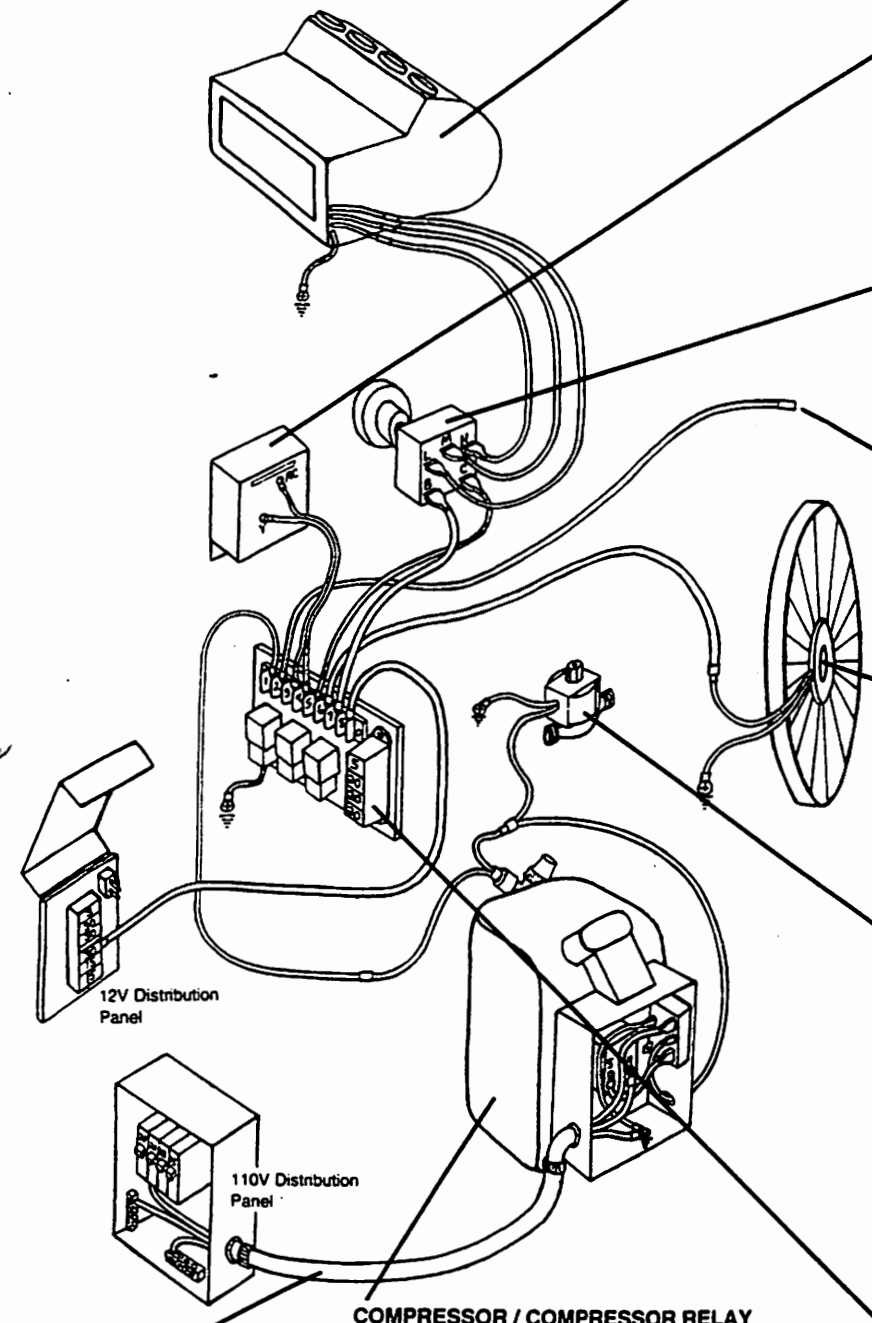
SOLENOID VALVE (S)
Controls flow of refrigerant to vehicle dash evaporator. Closes when Starcool is operated on 110 volt power. Open whenever vehicle A/C is operated

RECEIVER DRIER (S)
All liquid refrigerant passes through receiver drier where moisture and particles are removed from refrigerant.

CONDENSER FAN - Different fan for each van
Blows ambient temperature air across vehicle condenser so that condensed refrigerant vapor will change to a liquid state before entering expansion valve

STARCOOL II ELECTRICAL SYSTEM

SAME ALL VANS



110V Wiring
(All other wiring 12V)

EVAPORATOR/BLOWER
Pulls warm interior air across coil, where refrigerant vapor absorbs heat in air and discharges cold air at vents.

WILL ONLY OPERATE WHEN:
- Starcool blower switch set to low, medium, or high.

PROTECTION INCLUDES:
- 20 amp 12 volt fuse

THERMOSTAT
Controls operation of 110 volt compressor

WILL ONLY OPERATE WHEN:
- Starcool blower switch set to low, medium or high
- Vehicle ignition is "off"

PROTECTION INCLUDES:
- 5 amp 12 volt fuse on relay plate

BLOWER SWITCH - Locates in van dash

WILL ONLY OPERATE WHEN:
- Set to low, medium or high

PROTECTION INCLUDES
- 20 amp 12 volt fuse on relay plate

IGNITION "ON" SOURCE

WILL ONLY OPERATE WHEN:
- Ignition switch is turned "on"

PROTECTION INCLUDES
- Wire should connect to fused 15 amp, 12 volt ignition "on" source

CONDENSER FAN - Locates behind van grill
Blows ambient temperature air across vehicle condenser so that compressed refrigerant vapor will change to a liquid state before entering expansion valve

WILL ONLY OPERATE WHEN:
- Starcool blower switch set to low, medium, or high

PROTECTION INCLUDES:
- 20 amp 12 volt fuse on relay plate

SOLENOID VALVE
Controls flow of refrigerant to vehicle dash evaporator. Closes when Starcool is operated on 110 volt power. Open whenever vehicle A/C is operated

WILL ONLY OPERATE WHEN:
- Starcool blower switch set to low, medium, or high
- Thermostat set to "cool" and temperature selector set below interior temperature
- Vehicle ignition is "off"
- Refrigerant pressure is high enough to activate low pressure switch

PROTECTION INCLUDES:
- 5 amp 12 volt fuse on relay plate

COMPRESSOR / COMPRESSOR RELAY
Compresses refrigerant vapor from evaporator and pushes refrigerant vapor to condenser.

WILL ONLY OPERATE WHEN:
- 110 volt power is available (110V hookup or generator)
- Starcool blower switch set to low, medium or high
- Thermostat set to "cool" and temperature selector set below interior temp.
- Vehicle ignition is "off"
- Refrigerant pressure is high enough to activate low pressure switch

PROTECTION INCLUDES:
- 20 amp 110 volt circuit breaker on 30 amp center
- High temperature cut-out switch
- Low pressure cut-out switch
- Ignition "on" cut-out relay
- Check valve,
- 12 volt fuses on relay plate and on 12 volt center

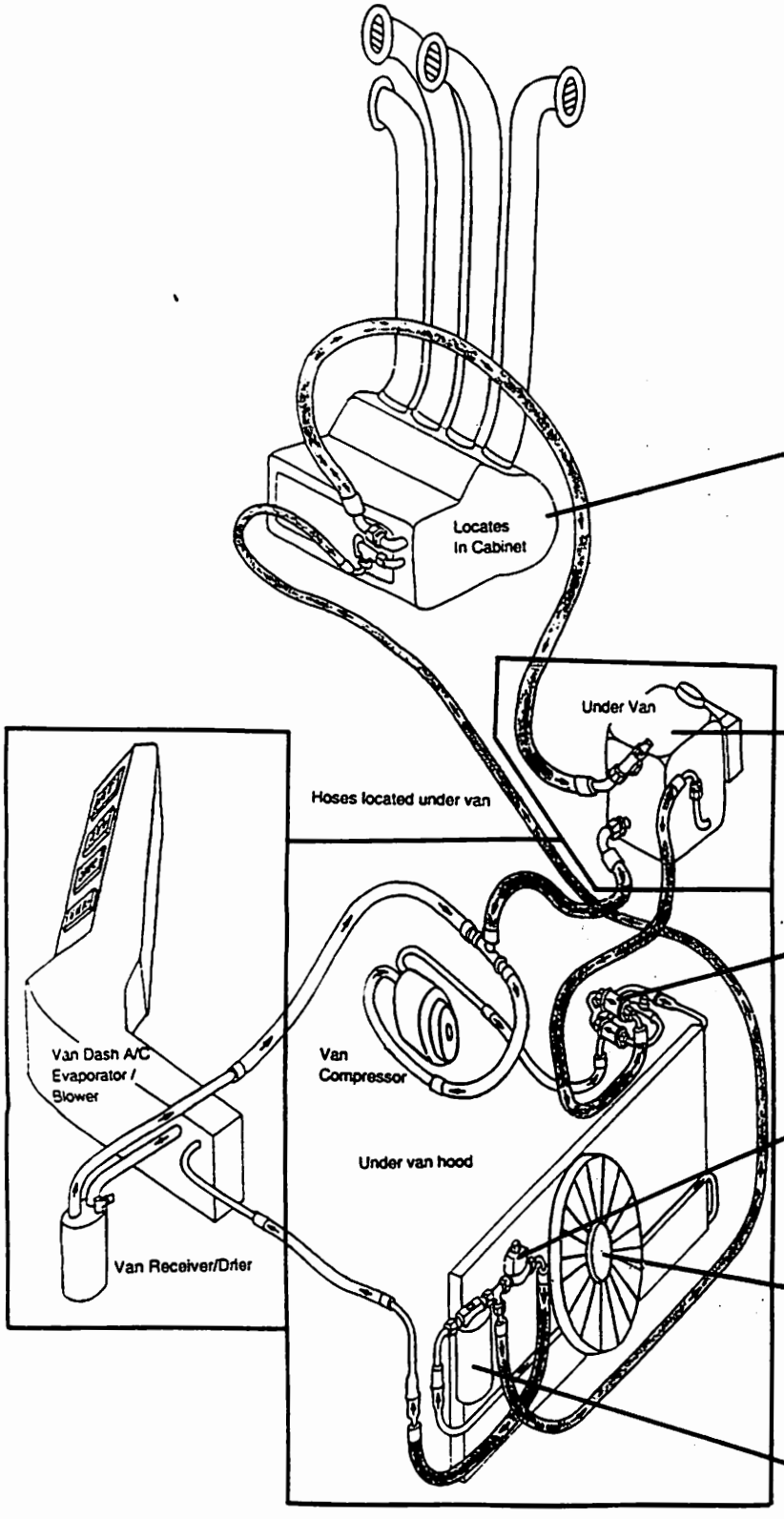
RELAY PLATE - Located under van dash
Controls operation of Starcool A/C. Also contains 12 volt fuse for blower fan, condenser fan and solenoid valve.

WILL ONLY OPERATE WHEN:
- Starcool blower switch is set to low, medium, or high
- Thermostat is set to "cool," temperature selector is set below interior temperature
- Vehicle ignition is "off"
- Refrigerant pressure is high enough to activate low pressure switch
- Ground wire is connected to chassis ground

PROTECTION INCLUDES:
- 30 amp 12 volt fuse on 12 volt center
- 12 volt fuses on relay plate

STARCOOL II COMPONENTS / PLUMBING

DRAWING ILLUSTRATES FORD INSTALLATION
"BASIC" PLUMBING SAME ALL VANS



FORD INSTALLATION

(S) - This component same for all vans

EVAPORATOR / BLOWER (S)
Pulls warm interior air across coil, where refrigerant vapor absorbs heat in air and discharges cold air at vents.

EXPANSION VALVE (S)
Regulates the flow of refrigerant into the evaporator coil

COMPRESSOR (S)
Compresses refrigerant vapor from evaporator and pushes refrigerant vapor to condenser.

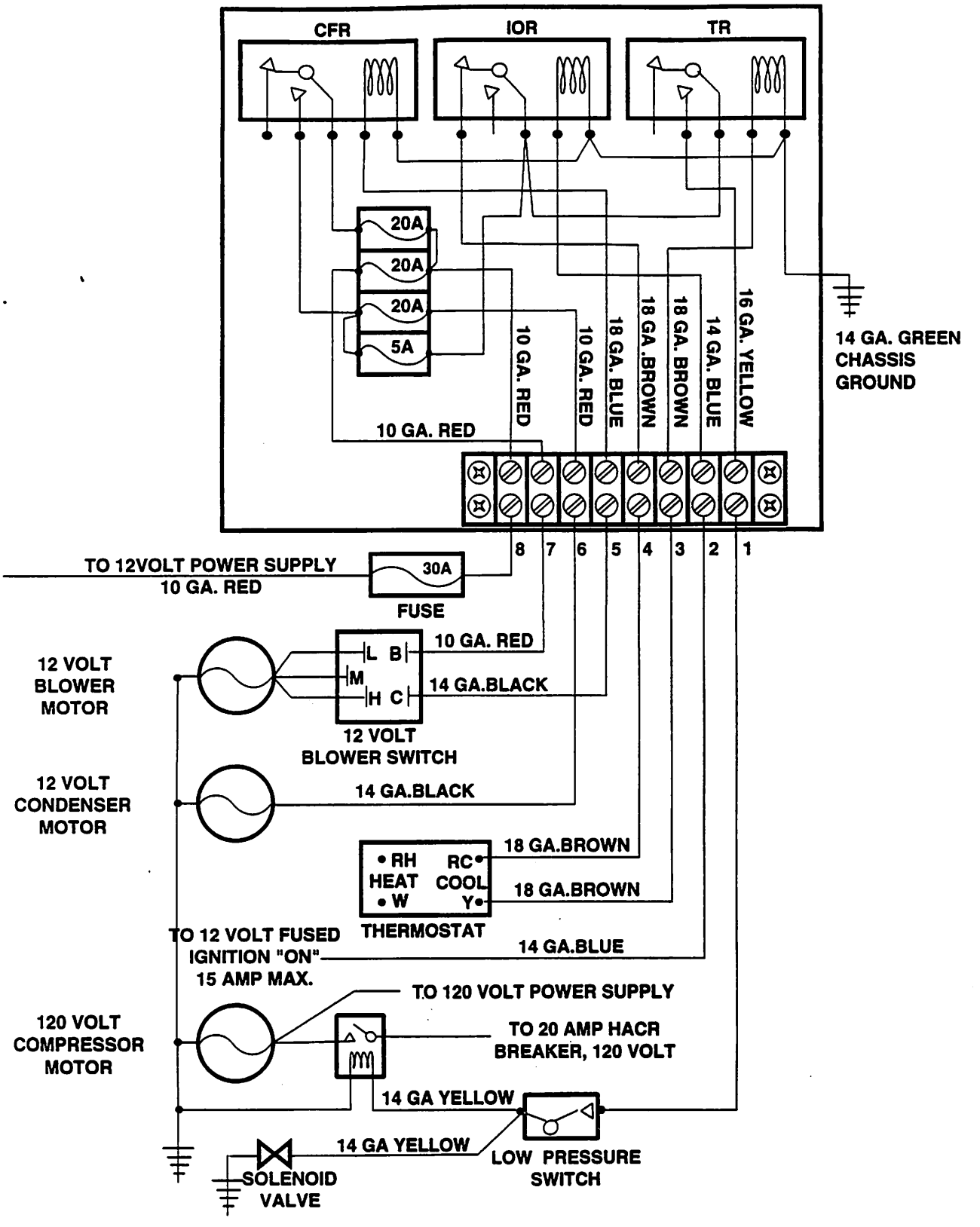
CHECK VALVES (S)
Prevents flow of hot refrigerant vapor to the compressor which is not operating

SOLENOID VALVE (S)
Controls flow of refrigerant to vehicle dash evaporator. Closes when Starcool is operated on 110 volt power. Open whenever vehicle A/C is operated

CONDENSER FAN - Different fan for each van
Blows ambient temperature air across vehicle condenser so that compressed refrigerant vapor will change to a liquid state before entering expansion valve

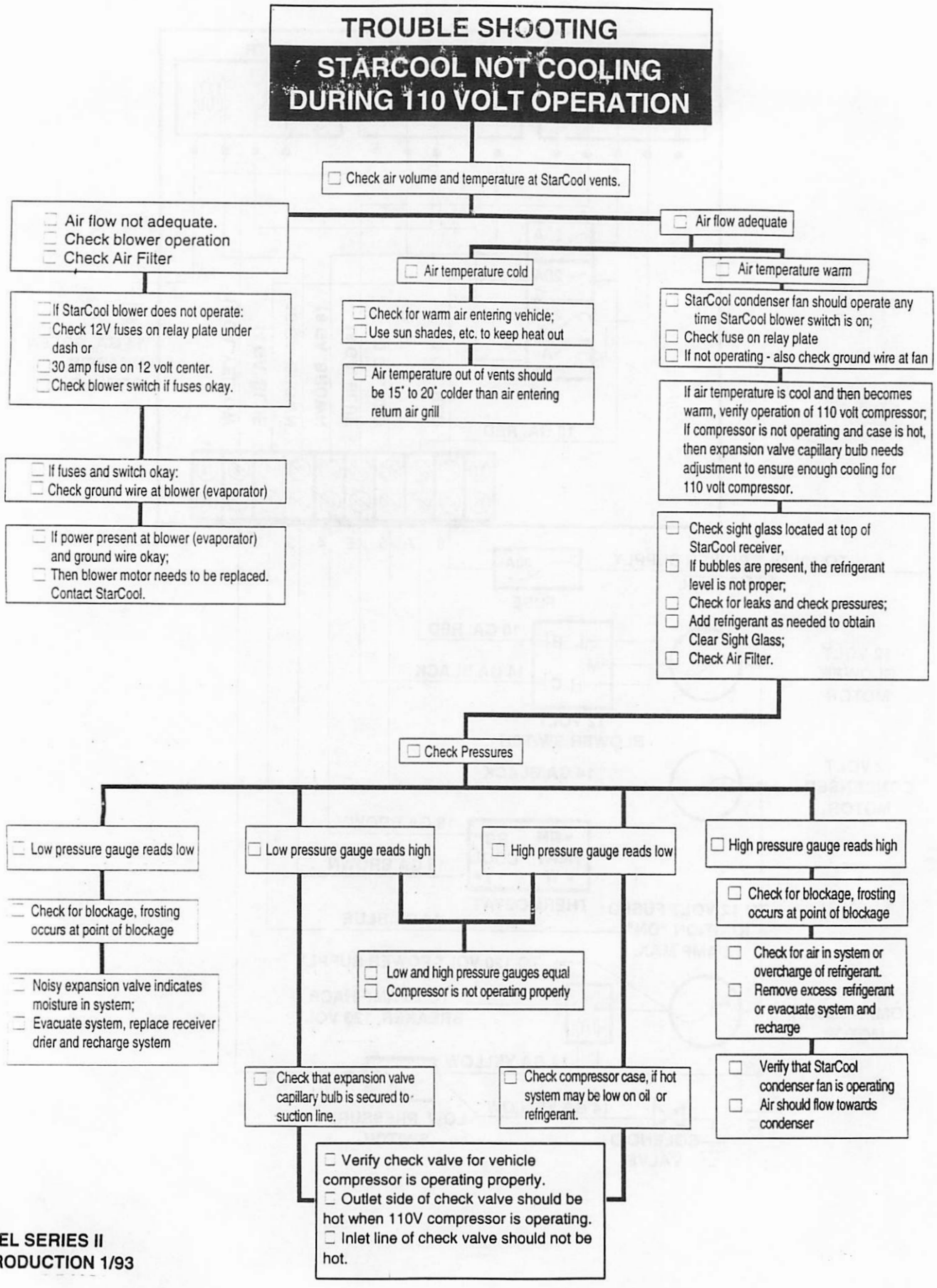
RECEIVER DRIER (S)
All liquid refrigerant passes through receiver drier where moisture and particles are removed from refrigerant.

STARCOOL II ELECTRICAL SCHEMATIC



TROUBLE SHOOTING

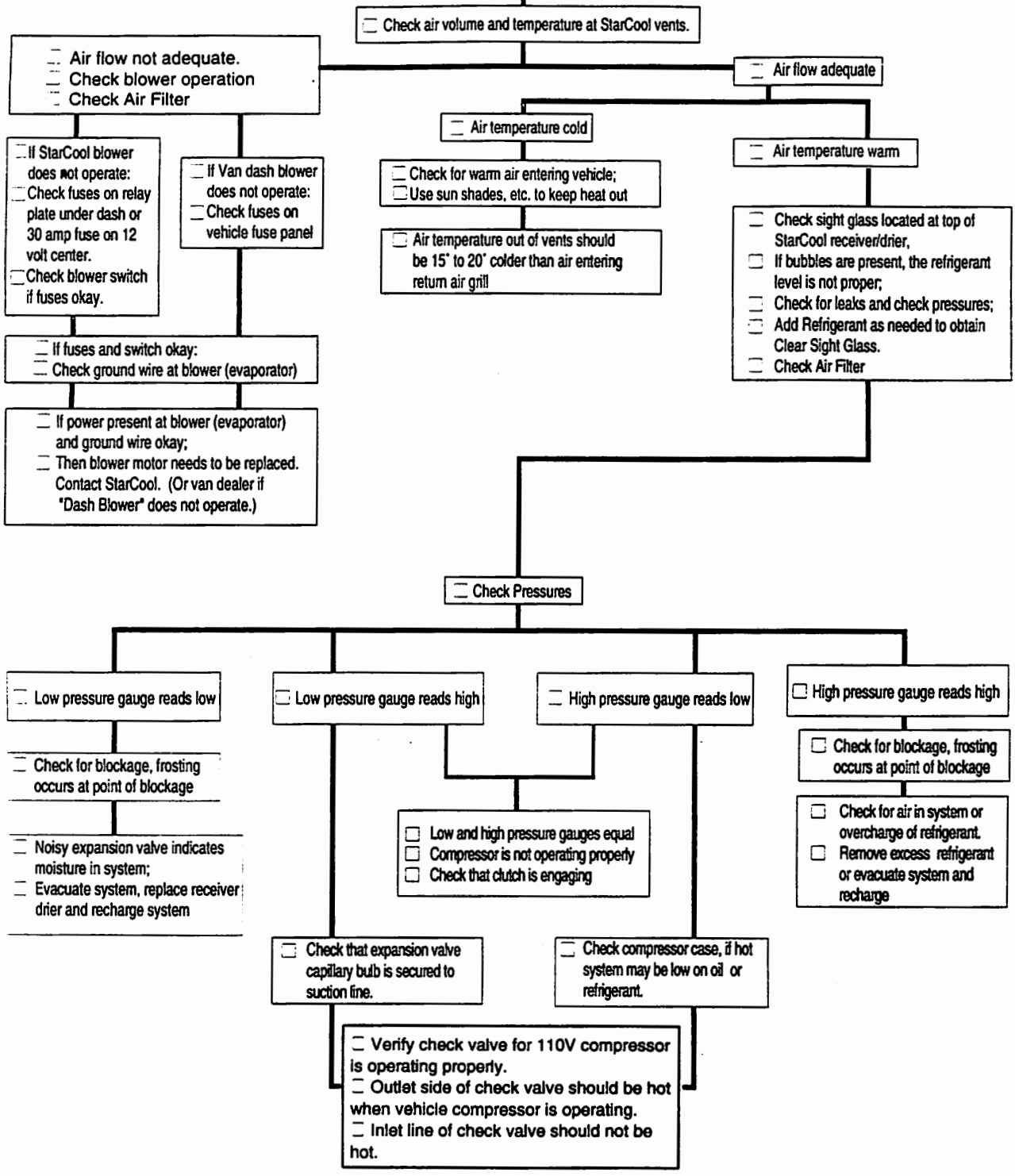
STARCOOL NOT COOLING DURING 110 VOLT OPERATION



MODEL SERIES II
IN PRODUCTION 1/93

TROUBLE SHOOTING

STARCOOL NOT COOLING WHILE VAN ENGINE IS RUNNING



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