# Air Conditioner

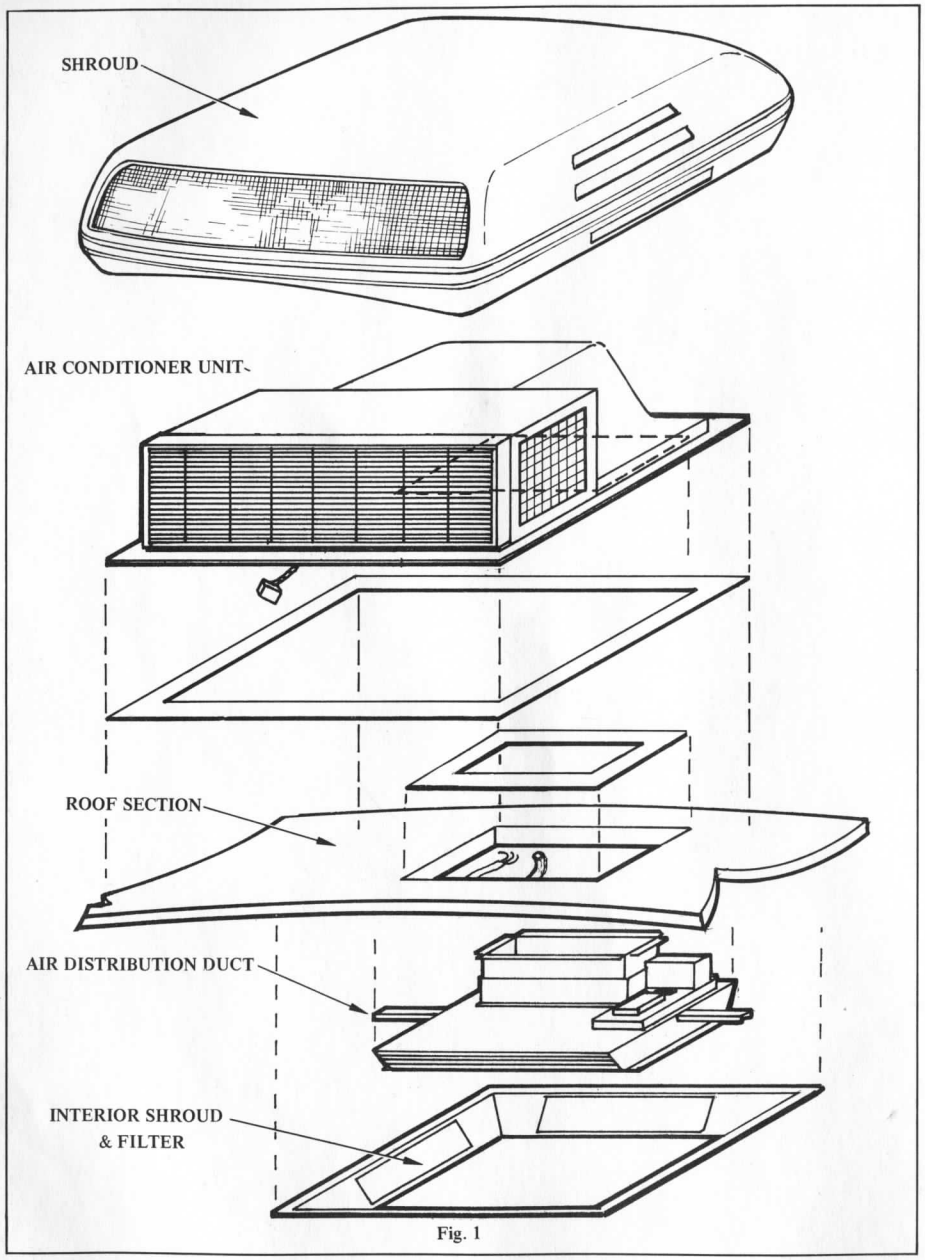


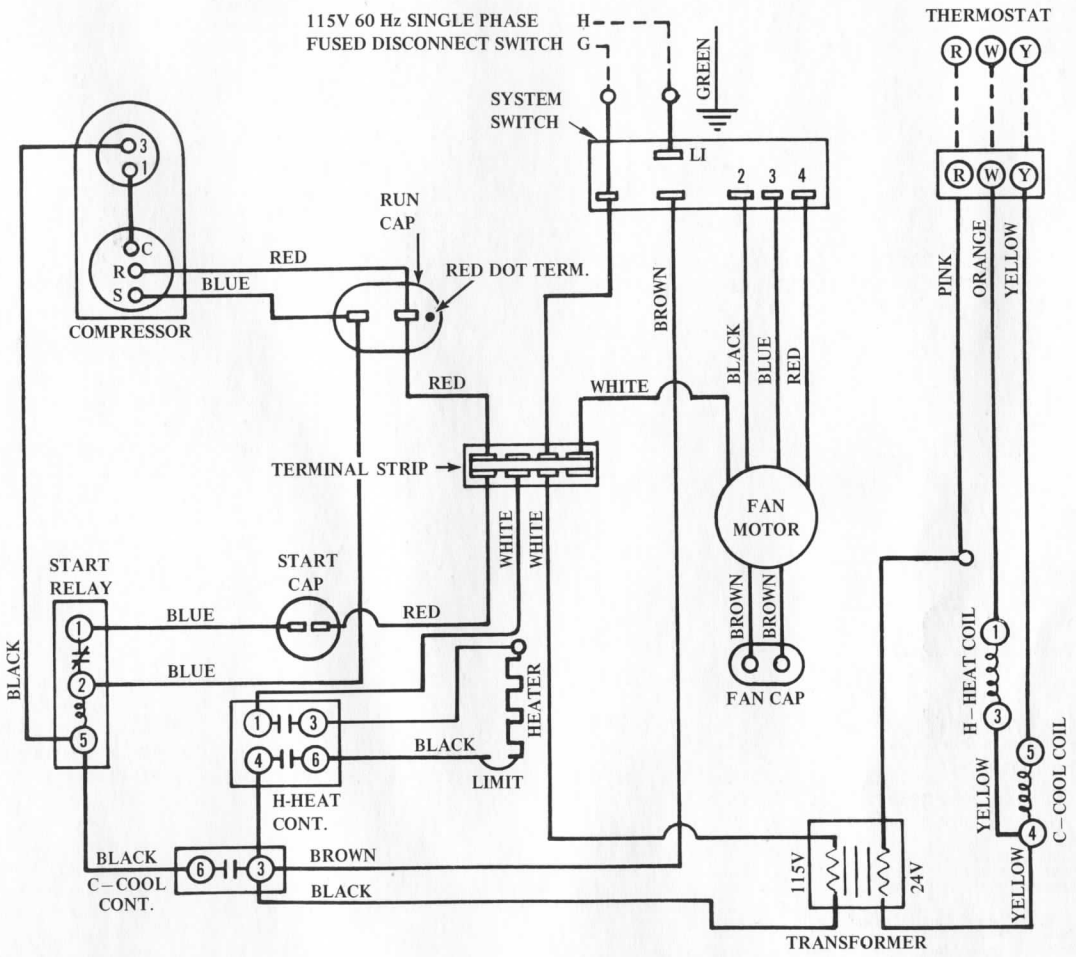

Fig. 1

## Air Conditioner

| Part No. | | Description |
|---|---|---|
| 277C55 | Tecumseh | Compressor (TR25 and TRH25-14) |
| 314B42 | | Compressor Overload |
| 277C56 | Copeland | Compressor (TR25 and TRH25-14) |
| 314B43 | | Compressor Overload |
| 277C57 | | Compressor (TR25 and TRH25-12) |
| 314B44 | | Compressor Overload |
| 26352B14 | G.E. | Motor – Fan |
| 26553B13 | Marathon | Motor – Fan (Alternate) |
| 26351B9 | Franklin | Motor – Fan (Alternate) |
| 275B18 | | Start Relay |
| 26349B5 | | Capacitor – Run |
| 26349B13 | | Capacitor – Fan |
| 269A14 | | Capacitor – Start |
| 1775A4 | | Refrigerant Strainer |
| 28712C | | Capillary Tube |
| 28663C | | Filter (2 required) |
| 96-66 | | Thermostat w/cooling sub-base |
| 96-66 | | Sub-Base (TRH25-12 and 14) |
| 463B21 | | Condenser Fan Blade |
| 202A21 | | Evaporator Blower Wheel |
| 202A22 | | Evaporator Blower Wheel (Alternate) |
| 179C47 | | Condenser Coil |
| 179C46 | | Evaporator Coil |
| 28840A | | Switch – Rotary |
| 28004C | | Support Bracket – Motor |
| 28665C | | Heater (TRH25-12 and 14) |
| 74B27 | | Limit – Heater |
| 201273 | | Air conditioner shroud – exterior 2 piece |
| 513138 | | Transformer |
| 237A11 | | Compressor relay |
| 7489B3 | | Heat relay |

When ordering replacement parts, always give air conditioner model number, series and serial number. For parts not listed, supply description in addition to model number, series and serial number.

## Air Conditioner Wiring Diagram




NOTE: IF ANY OF THE ORIGINAL WIRE IS REPLACED, SAME SIZE AND TYPE WIRE MUST BE USED.

Fig. 2

## Air Conditioner Installation (SEE FIG. 1)

1. Determine location of air conditioner installation. See chart. These measurements must be used for installation wiring as both the air conditioner and thermostat are located in these areas.

2. When using measurements for roof location of air conditioner, all measurements refer to station 'O' which is the front rib of the trailer. Measure from this seam toward the rear of the trailer using the measurement given. This will locate the center of the 14" x 14" cut out.

3. Before cutting the 14" x 14" opening, check to make sure it will not interfere with anything such as TV antenna, vent operation, or cutting of a rib. Should this happen, adjust the location slightly to allow proper installation.

4. Cut the 14" x 14" opening through the exterior shell and interior skin. Frame in this cut-out area by using the proper thickness metal channel. When installing this channel, be sure to cut opening for the condensation drain tubing and electric wires (both thermostat and 110 volt lines). Allow enough length on wire and tubing leads so connections can be made with air conditioner.

5. Set unit on roof. Unit should be left on wood crating base until ready to position on 14" x 14" opening. After unit has been positioned on 14" x 14" opening (with flange on base of unit engaging opening), apply one or two strips of mastic ribbon under mounting flanges on all four sides and secure to roof. Make sure unit is square and straight with trailer; then install shroud.

6. A cover plate with two holes is provided to cover opening where the field wires and drain line extend out of 14" x 14" opening. Just insert them through the holes and fasten plate with two (2) sheet metal screws.

7. Connect 1/2" I.D. plastic drain line to drain fitting on air-conditioner. The drain fitting is furnished with a formed condensate trap, so be careful not to change the position of the drain fitting to the extent that the trap will be ineffectual.

7. Disassemble air distribution panel from ceiling plate. Reach up into unit and remove control box. Lower control box through rectangular opening in ceiling plate. At the same time insert the field wiring through opening.

8. Fasten ceiling plate to bottom of unit with four (4) sheet metal screws.

10. Insert field wiring into box through BX connector and connect with wire nuts provided – maintain black to black, white to white and green to green (ground). All wiring shall comply with the National Electric Code and local codes, if applicable. The power line shall be 115 volts, 1 phase, 60 Hz, No. 12 AWG on a separate circuit, 20 amp. time delay fuse. Connect the low voltage thermostat wires to R W & Y at the low voltage terminal strip. For cooling only models, only the R & Y connections are made at the thermostat. Remove cover from bolt bag and secure to end of control box. Using two sheet metal screws, fasten control box to ceiling assembly. To correctly position

Thermostate Low Voltage Connections
For Cooling Only Models, only the R & Y connections are made at the thermostat sub-base (the cooling sub-base is attached to the thermostat).

For Heat-Cool Models, discard the cooling sub-base (attached to thermostat) and install the heat-cool sub-base (shipped in separate package) connect low voltage wires to R W & Y on sub-base.

11. Install air distribution panel using four screws disassembled in Step #8. Top edges of distribution panel should contact ceiling all around.

12. To remove, reverse above procedures.

| Trailer Length | Air Conditioner Distance from Sta. 'O'* | Thermostat (Roadside) Location Station |
|---|---|---|
| 21' | 73½" Aft of 'O' | 116" Aft of 'O'* |
| 23' T | 96" Aft of 'O' | 24" Aft of 'O'* |
| 23' D | 96" Aft of 'O' | 24" Aft of 'O'* |
| 25' T | 106" Aft of 'O' | 36" Aft of 'O'* |
| 25' D | 106" Aft of 'O' | 48" Aft of 'O'* |
| 27' T | 101" Aft of 'O' | 49" Aft of 'O'* |
| 27' D | 101" Aft of 'O' | 69" Aft of 'O'* |
| 29' T | 101" Aft of 'O' | 76" Aft of 'O'* |
| 29' D | 118" Aft of 'O' | 84" Aft of 'O'* |
| 31' T | 113" Aft of 'O' | 84" Aft of 'O'* |
| 31' D | 113" Aft of 'O' | 84" Aft of 'O'* |
| 29' TCB | 102" Aft of 'O' | 59" Aft of 'O'* |
| 29' DCB | 102" Aft of 'O' | 59" Aft of 'O'* |
| 31' TCB | 121" Aft of 'O' | 84" Aft of 'O'* |
| 31' DCB | 121" Aft of 'O' | 84" Aft of 'O'* |

*Station 'O' refers to first forward rib in trailer structure.

## Operation

Check operation before unit is released to customer.

### Cooling

1. Set wall thermostat to "Cool" position and thermostat indicator below room temperature.
2. Set system switch (located at ceiling cover of air conditioner) to "Hi Fan", "Med Fan" and "Lo Fan" and observe for changes in fan speed and for compressor operation.
   Note: The compressor will not operate until speed selection is made.

### Heating

1. Set wall thermostat to "Heat" position and thermostat indicator above room temperature.
2. Set system switch to any of the three speed positions and observe for changes in fan speed and for heater operation.
   Note: The heater will not operate until speed selection is made.

### Fan Only

Set wall thermostat to "off" position and system switch to any of the three speed selections.

### To Shut Unit Off

Set system switch to "off" position.

### Normal Maintenance

1. Clean air filters regularly. See procedures on operating instruction sticker. Never operate air conditioner without the air filters in place.

2. Keep evaporator coil clean. This is the inside unit cooling coil. Set system switch to "OFF" position and inspect coil by removing the air distribution panel and looking at the inside of the coil with a flashlight. For a complete inspection, it may be necessary to remove shroud and evaporator cover on the outside of the unit. If the passageways between the fins are plugged, carefully brush down the inner surface with a fiber brush or cloth to remove surface lint, taking care not to flatten or damage the fins.

3. Water leak when air conditioner is operating
   The air conditioner is equipped with two overflow drain lines that direct the water to the outside of the unit. If water is observed coming from either of these lines the following checks can be made.
   a. Plugged or kinked drain line
   b. Drain line not straight and may be bowed.
   c. Trailer not level.

   If water is leaking inside the trailer:
   a. Check for damaged fins or evaporator coil. Fins can be straightened.
   b. Check corners of drain pan for leaks. A leak in this area can be repaired by drying the surface and applying a sealant.
   c. Check for split in drain hose or for poor connection.

4. Keep the shroud louvers (these are the openings in the rear and sides of the cover over the outside unit) and the condenser coil inside the shroud clean at all times. Brush off any accumulation of leaves, tree seeds, etc. If, in looking through the shroud louvers, it appears there is foreign matter on the outer coil surfaces, remove the shroud and

carefully brush off the fins. If they are clogged in depth, remove the condensing unit top. The coil may be flushed by using a hose.

## System Operation

Before undertaking corrective measures, become familiar with operation of system.

**Run Capacitor, Start Capacitor, Start Relay**

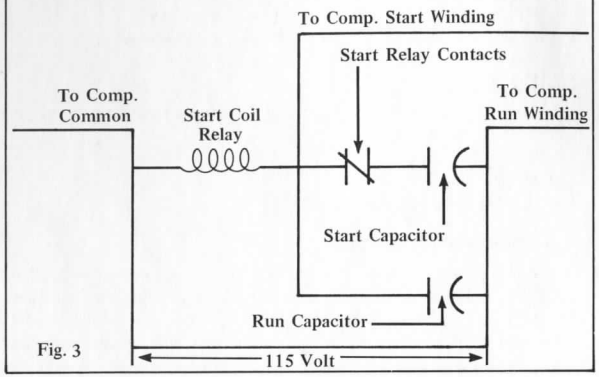
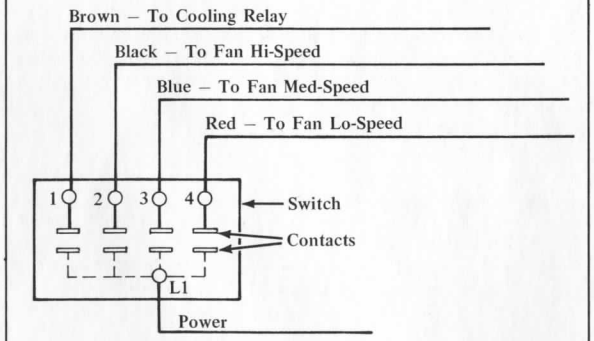


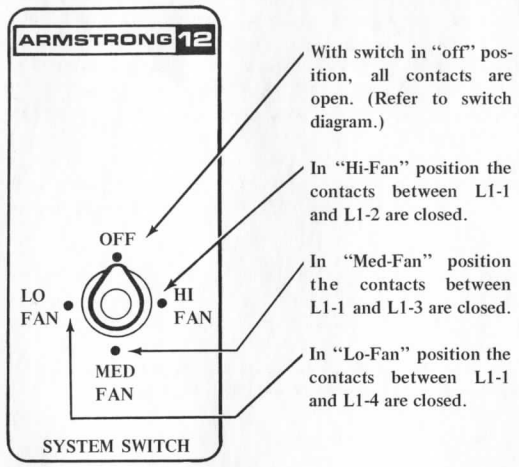

Fig. 3

**Rotary (System) Switch Diagram**




Legend: Off Position Shown
_____ Internal Wiring
_____ External Wiring to Switch

Fig. 4




## Run Capacitor

Its function is to start and maintain the operation of the compressor at peak efficiency.

## Start Capacitor

The start capacitor is only in the circuit momentarily. Its function is to give assistance to the run capacitor when starting at lower voltages or higher pressures.

## Start Relay

The function of the start relay is to disconnect the start capacitor from the circuit within a second after power is applied. When the thermostat breaks the electrical circuit, the start relay coil becomes de-energized, allowing the start relay contacts to close again in preparation for the next start.

# Service Hints, Diagnosis and Corrective Measures

## Unit Will not Run – Including Fan and Compressor

1. Check that supply voltage is 115 volts (103 volts is absolute minimum).

2. Check main circuit breaker and circuit breaker for air conditioner and make sure they are on. Make sure system switch is on for air conditioner and the thermostat is set below room temperature for cooling and above room temperature for heating.

3. Check for loose wiring connections in both the main circuit breaker and the A/C circuit breaker in the trailer.

4. Check air conditioner junction box connections: Drop the plastic cover of the air distribution grille (inside the trailer) by removing the four screws visible on the bottom. The rectangular control box now exposed can be removed by removing a screw at either end. You can now pull the control box down for inspection of the wiring connections by removing the end plate from the control box. After removing the box cover, you can also check all connections beside the control box.

5. Check rotary system switch. Refer to preceding paragraph "System Operation".
   Note: The switch must be positioned to one of the fan speeds before unit will operate.
   Remove wires from switch and check continuity in manner outlined below: (Use ohmeter or suitable continuity tester for making these checks.)

| POSITION | CONNECTIONS |
|---|---|
| Off | All Contacts Open |
| Hi-Fan | L1-1 & 2 |
| Med-Fan | L1-1 & 3 |
| Lo-Fan | L1-1 & 4 |

## Fan Motor Runs, but Compressor Will Not

1. Check voltage at "load" side of main switch. The compressor is intended to operate on 115 volt, 60 cycle current. If voltage is under 103 volts, it is doubtful if the unit will start and it may shorten the life of the compressor motor if it does run at reduced voltages.

2. Make sure thermostat is set below room temperature. The compressor relay should be energized. If not, short between Y and R terminals. If compressor relay closes, thermostat is defective or circuit to transformer is faulty. Make sure thermostat wires are correctly connected to terminals on control box and thermostat. Short Y and R terminals at thermostat. If relay closes, thermostat is defective. Remove cover from thermostat and see if contacts are closed.

3. Check Rotary Selector Switch
   Refer to paragraph "Unit Will Not Run – Neither Fan Nor Compressor". If thermostat and switch prove okay, check outside section on top of trailer. Remove top cover. Check wiring connections in capacitor box.

4. Measure for 24V across transformer secondary and 115 across its primary. If 115V are measured but not 24V, replace transformer.

5. Check Cooling Relay
   Check to see if there is 24 volts across terminals 4 and 5 then jumper between terminals 3 and 6. If compressor starts and operates normally, replace relay.

6. Remove compressor terminal box cover and jumper across compressor overload with power on. If compressor runs, replace overload. If compressor hums periodically and does not start, the compressor overload is functioning properly, and the trouble may be in the start relay, the start capacitor, the run capacitor, or the compressor itself could be faulty. Be certain there is a minimum of 103 volts across compressor terminals C and R.

The following checks must be made with a good, reliable ohmmeter.

7. Check Compressor
   Disconnect power from unit and remove the three leads from the compressor terminals. Set the ohmmeter on the R X 10,000 scale and check from each terminal to the compressor tubing. If a needle deflection is noted, the compressor windings are grounded. If no grounds are evident, check the compressor for shorted or open windings. Set the ohmmeter to the R X 1 scale and adjust the zero setting carefully. Measure across terminals C-R and C-S. No needle deflection would indicate an open winding, full needle deflection to zero would indicate a shorted winding.

   The cold winding ($77^{o}$F) resistance readings in ohms are tabulated below: The resistances will be greater with an increase in winding temperature.

| Model | Compressor | Run Winding (C – R) | Start Winding (C – S) | Start & Run (S – R) |
|---|---|---|---|---|
| -12 | Tecumseh | 0.7 | 7.0 | 7.7 |
| -14 | Copeland | 0.4 | 4.8 | 5.2 |
| -14 | Tecumseh | 0.5 | 8.0 | 8.5 |

Note that the sum of the run winding resistance and the start winding resistance equals the start and run reading.

Any significant variation from the above readings would indicate a defective motor in which case the compressor must be replaced.

8. Check Run Capacitor
   Use a screwdriver or jumper wire to discharge the capacitor by shorting between posts. Disconnect lines. Set ohmmeter at R X 10,000 scale, connect between same two posts. The meter pointer should move rapidly over almost to zero, then slowly fall back to its original position. If repeating checks, short out capacitor each time, since the ohmmeter will build up charge in capacitor and prevent repetition of readings. Replace capacitor if no reading or continuity is shown. Check continuity between each post and case of capacitor. If capacitor is okay, replace in unit. Make sure all wires are connected as designated on the wiring diagram.

9. Check Start Capacitor
   Using ohmmeter set on R X 10,000 scale, disconnect wiring from both terminals and check continuity across terminals. The capacitor has a 12,000 ohm resistor across the two posts to prevent arcing at the relay contacts. When making checks, the meter pointer will deflect all the way to zero then settle out at 12,000 ohms. If complete continuity or an open circuit is shown, replace capacitor. Normally, it is quicker to replace start capacitor with a new one when making the check. If compressor does not start, leave the new capacitor in place until problem is corrected; then place old one back in place and repeat check. If the compressor starts, the original start capacitor is good and can be left in the unit.

10. Check Start Relay
    Remove wires from start relay. Check continuity across terminals 1 and 2 with ohmmeter. Points should be closed and show continuity. If points are open showing no continuity, replace start relay. If points are closed, check continuity across coil terminals 2 and 5. The resistance reading should be approximately 5800 ohms. If complete continuity or no reading is obtained, replace start relay.

11. Check to determine if relay contacts are welded together by removing screw(s) from in back of relay. Pull control from case to expose contacts and coil. Push lever down against coil. If contacts do not open or if they are burned, replace relay.

    To determine if relay is operating place amprobe around blue wire from #1 terminal of relay to start capacitor. If current reading is measured with compressor running, the start relay is not opening the circuit to the start capacitor and the relay should be replaced.

    The relay contacts can be bypassed in order to determine if the compressor will start with the relay out of the circuit. Remove the wire from the #1 terminal and hold against the #2 terminal with insulated pliers. Start unit and immediately remove wire from #2 terminal. If compressor starts and operates normally, replace relay.

    Important: The position and electrical rating of the relay is designed specifically for the compressor in service. Do not replace with one of different rating.

12. If frequent tripping of circuit breakers occurs when all electrical components have been checked and found to be good, check for low voltage. Low voltage will cause high amperage. Minimum voltage is 103 when unit is in operation. To eliminate possible faulty circuit breaker, connect separate power supply directly to unit. If amps are not excessive and compressor continues to run, circuit breaker should be replaced. Use the following table as a guide for compressor amperage at various voltages at $95^{o}$ outside temperature and "Hi-Cool" operation. If operating at an outdoor temperature other than $95^{o}$ refer to pressure temperature chart and apply correction.

| Compressor Volts | -12 Compressor Amps. (Hi-Cool) | -14 Compressor Amps. (Hi-Cool) |
|---|---|---|
| 100 | 13.5 | 15.5 |
| 105 | 13.0 | 14.5 |
| 110 | 12.5 | 13.7 |
| 115 | 12.0 | 13.3 |
| 120 | 11.5 | 13.2 |
| 125 | 11.0 | 13.1 |

    Measure compressor amps. on the black lead to compressor. If more amps. are indicated at 115 volts refer to trouble shooting section for possible causes and remedies. Compressor could have excessive rotor drag or scored bearings which will cause high amperage. If an expert refrigeration technician can confirm this condition, the compressor should be replaced.

## Fan Runs – Compressor Tries To Start

Changing thermostat setting too quickly or excessive vibration in trailer will cause this and is not a malfunctioning system. The compressor may not start until it has been off three minutes or longer. The normal thermostat cycles will provide for this. If it is started before this time, the compressor overload protector will open. It is possible, while the compressor is trying to start under the above conditions, to blow the main time delay fuse, particularly in hot weather. It is best, when the unit attempts to start and does not, to shut the unit off for a period of three to five minutes before restarting.

## Fan or Blower Does Not Run, Compressor Does

If the fan motor does not run, the compressor will cut out on its overload protective device and may be off for a long period of time, giving the appearance of a compressor malfunction.

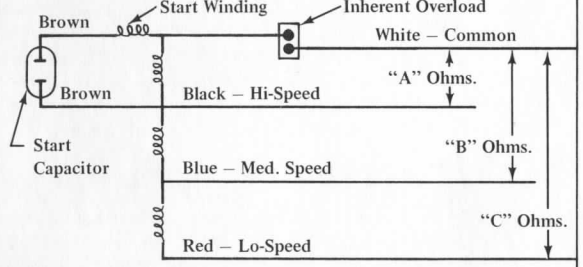
1. Check the fan blade or blower wheel to determine if they are moving freely without mechanical interference.

2. Check the Fan Capacitor
   Follow the same procedure used when checking run capacitor, Paragraph 8 under Section FAN MOTOR RUNS, BUT COMPRESSOR WILL NOT. The meter pointed will deflect to the mid-scale position, then slowly fall back to its original position. Replace capacitor if no reading or continuous continuity is shown. Check continuity between each post and case of capacitor. If continuity is shown, capacitor is grounded and should be replaced. Make sure all wires are connected as designated on the wiring diagram.

3. Check Rotary Selector Switch
   Follow same procedure, Paragraph 5 under Section 6, UNIT WILL NOT RUN – NEITHER FAN NOR COMPRESSOR.

4. Check for voltage at motor.

5. Check Continuity of Motor Windings
   With ohmmeter set on R X 1 scale, disconnect motor leads and measure across windings as shown below:




| Motor Mfgr. | "A" | "B" | "C" |
|---|---|---|---|
| Marathon | 5.2 | 7.6 | 10.0 |
| G.E. | 7.0 | 9.5 | 12.0 |
| Franklin | 5.4 | 8.4 | 10.0 |

Fig. 5

6. Check Motor for Ground
   Connect ohmmeter between motor leads and shell of motor. If reading is evident, motor is grounded and should be replaced.

## Compressor and Fan Run – Unit Does Not Cool

1. Unit may be low on refrigerant charge. Check pressures with service gauge and compare with Pressure Temperature Table to Pressure Temperature Chart. If low on refrigerant or no refrigerant is in evidence, pressurize system and check for leaks. (See Section , Evacuation-Field Charging). If 100 psig to 150 psig is evident when service gauges are attached and little or no change in pressure takes place when the compressor runs and is pulling low amps. the internal valves or lines in the compressor are broken and the compressor should be replaced.

2. Check for dirty filters.

3. Check for icing of coil.

## Evaporator or Cooling Coils Collect Ice

1. A dirty filter.

2. Operating with the directional louvers at the evaporator outlets closed too much.

3. Dirty evaporator coils.

4. Operating on low fan speed partially under the above conditions.

5. Maintaining too low a temperature in the trailer.

Correct conditions causing icing.

To de-ice, set thermostat to a high temperature reading, open a door or window to raise temperature and operate air conditioner fan at the "HI" setting.

For operating troubles not described above, it is suggested that the nearest factory service center or recreational vehicle dealer be contacted.

## Compressor Runs For a Long Interval

1. The system may be low on refrigerant charge. Measure system pressure and compare reading against Pressure Temperature Chart.

2. The thermostat may be affected by the heat given off of television set, range or refrigerator vent.

## Compressor Short Cycles on Thermostat

If cycling continues, then check thermostat differential by moving thermostat dial slowly to the right until compressor cuts out. Then slowly move the dial to the left. If compressor comes on before dial is moved less than 2°F then thermostat differential is too low and the thermostat should be replaced.

## Compressor Removal and Replacement

1. Remove defective compressor from system by first removing wiring and hold down nuts. Allow refrigerant charge to escape through service port by depressing valve core. See Section under "Evacuation–Field Charging". Sweat loose the line connections at the compressor, keeping service port open. Take care not to overheat. Smell the defective compressor at the tubing openings and pour out oil sample to observe it if compressor is a "burn-out". Acid test kits are available for this purpose and are recommended in order to eliminate some of the guess work in determining compressor "burn-outs". Generally, dark dirty oil indicates possible "burn-outs", and should be checked further.

2. If the compressor has been analyzed as being a "burn-out", a core type suction line filter drier, either an Alco ADK-083S or Sporlan CO83S obtained from a refrigeration supply house, must be installed in the suction line during the installation of the new compressor. The purpose of the suction line filter drier is to prevent the acid oil remaining in the lines and coils from entering the new compressor and consequently causing damage.

   Before adding the suction drier, purge as much contaminated oil out of the system as possible in the following manner.

   a. Remove liquid line strainer.

   b. Press service hose from refrigerant cylinder to end of discharge line and purge oil from outlet of condenser coil with R-22 vapor.

   c. Press hose at end of suction line and purge oil out of evaporator through capillary tube. If capillary tube offers too much restriction for purging the oil, then remove it. Check capillary tube to make sure it is not restricted. If it must be replaced, order the capillary tube by part number as shown in the Replacement Parts List of these instructions. Proceed to install the new compressor and suction line drier. The suction line will have to be altered. Support drier to prevent suction line from breaking due to weight of drier.

      Install the liquid line drier shipped with the replacement compressor in place of the strainer that was removed during Step 1.

      After leak testing and evacuation, weigh in the correct charge as shown on unit rating plate.

Normally the suction drier can remain in the system. If, however, after a one hour running period the suction pressure measured at the service port is more than 5 psi below that which is shown in the Pressure-Temperature Chart of these instructions, remove suction drier and replace with new one.

An alternate method for cleaning the system after a "burn-out" is to flush the system with R-11 solvent. See procedure for flushing system.

## Procedure for Flushing System

Caution: Use safety goggles to protect eyes

1. To flush out condenser coil
   a. Unsweat discharge line from discharge header.
   b. Remove "pencil strainer" by unsweating from liquid header and capillary tube. Discard strainer.
   c. Insert hose, with funnel attached, in discharge header and pour in 1/2 pint of R-11.
   d. Remove fill line and connect your service gauge line with R-22 cylinder. Press against end of discharge header. Wrap a rag around hose and header and hold steadily in place. Keep refrigerant cylinder in upright position and open cylinder valve. The refrigerant gas in the cylinder will force the R-11 solvent through the tubing and flush it of contaminants.

Repeat Steps c and d until solvent is clear.

Note: A rag or container held at outlet of coil can be used to collect residue.

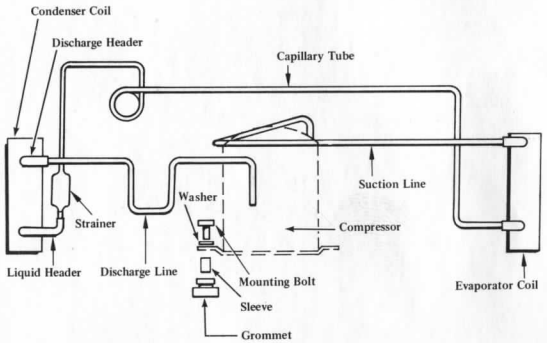



Fig. 6

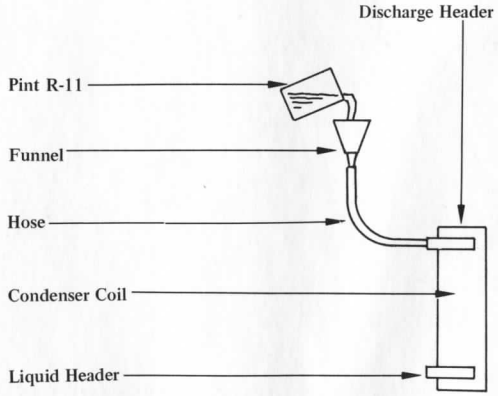



Fig. 7

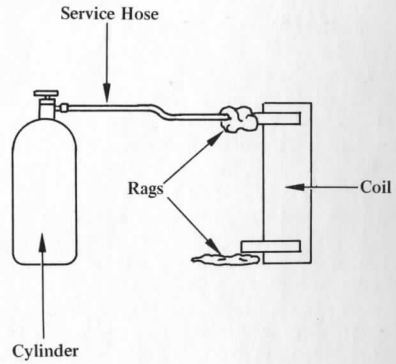



Fig. 8

2. To flush evaporator coil

Flushing out the evaporator coil is very similar to Steps 3 and 4 when cleaning the condenser coil. Pour 1/2 pint of R-11 into the suction line leading to evaporator coil. Force solvent through coil as was done when the condenser coil was flushed out. The flushing operation through the evaporator coil is completed through the capillary tube. Since the capillary tube is of a very small diameter it will retard the flushing operation. On very severe burnouts, flushing will be almost impossible, therefore, it will be necessary to remove the cap tube and replace with a new one when cleaning is complete.

3. Puting system back in operation by brazing tubing

Braze discharge line to new compressor and bolt compressor back in place. Make sure the four (4) compressor mounting sleeves are in place before bolting. Braze discharge line to condenser coil. Add drier, shipped with new compressor, in place of pencil strainer.

Braze suction line to compressor.

## Evacuation—Field Charging

1. This unit has been provided with a suction service gauge port which extends out to the rear of the unit. Connect gauge manifold on suction gauge port. The service hose must be provided with a special valve depressor (Superior No. 895 or equiv. to open the valve when service hose is attached to gauge port. Before the system is evacuated, it must be pressurized to a minimum of 75 psig with R-22. Check for leaks with a Halide Torch or an electronic leak detector.

   a. Carefully and slowly check for leaks at all braze joints. Include gauge lines during the leak test.

   b. Allow refrigerant in system to slowly bleed off through suction side of gauge manifold so as not to lose any oil. After pressure on system has reached zero, attach vacuum pump and draw a deep vacuum of 500 microns and maintain for ten minutes. Break vacuum with R-22 and pump down again. Repeat procedure three times. (Triple evacuation method.)

3. After achieving final vacuum, the system should be charged with vapor refrigerant by weighing in charge with scale having at least one (1) ounce graduations.

4. Be sure service cylinder of R-22 has enough refrigerant for more than complete charge. Install service cylinder on gauge manifold, making sure the service hose from cylinder to gauge manifold has been purged with refrigerant and valve on cylinder is open. Place service cylinder on scales in charging position (service hose free to move in all directions) and weigh cylinder to nearest half ounce. Subtract the weight of the unit charge (as shown on rating plate) from weight at the beginning and this will be the scale reading at end of charge. Set scales 5 ozs. above the end reading to break the vacuum until scales are balanced. Remember the unit has been under a vacuum and will take charge very fast. Now reset scales to correct end reading and slowly allow the last 5 ozs. of refrigerant into system until scales are at correct reading. It may be necessary to complete the charge by running the compressor.

5. After unit has been properly charged and necessary pressure readings taken, remove service hose and recap gauge port. (Be sure cap is gas tight.)

   a. After compressor is back in service, follow performance test procedure where applicable. Remember, failure of original compressor may have been caused by faulty system, so it is important to check system out to determine if it is operating correctly.

## Performance Test Procedure

1. Check for refrigerant leaks.

2. Be sure all electrical wiring has been completed.

3. Attach gauge manifold to suction service port at rear of units. Be sure to purge air out of service hoses as they are attached to the unit. Service hoses will have to be used with special valve depressors (Superior No. 894 or equivalent) in order to open the valve in the service port.

4. Connect service cable for air conditioner to power source and start unit according to operating instruction.

5. Operate until inside temperature of trailer is 75 degrees to 80 degrees. If temperature inside trailer is lower than 75 degrees, operate trailer furnace until desired temperature is obtained.

6. Compare the suction pressure and compressor amps with Pressure and Temperature Chart against the outdoor ambient at which the unit is operating. Feel the suction line for coolness.

7. After unit has been checked and found to be running at top efficiency, remove service hose, and cap the gauge port tightly. If the system is not performing correctly, refer to service guide for possible causes.

NOTE: When checking the performance of the air conditioner and comparing with the Pressure and Temperature Chart, it is important that the unit be reasonably intact. The indoor ceiling grille should be in place. The top shroud as well as one of the galvanized side screens can be left off. However, both the top galvanized covers must be in place. The compressor amps should not increase more than 0.2 when the plastic shroud is put back in place.

## TRH 25-14
## Pressure Temperature Chart

Evaporator at High Speed 80° DB, 67° WB Entering Evaporator

| Outside Ambient °F | Suction Pressure P.S.I. | Evaporator Air-Off °F | Total Watts Input at 115 V | Compressor Amps at 115 V | Compressor Amps. at 110 V | Compressor Amps. at 105 V |
|---|---|---|---|---|---|---|
| 65 | 53 | 57 | 1520 | 10.3 | 10.7 | 11.5 |
| 75 | 60.5 | 55.5 | 1645 | 11.3 | 11.7 | 12.5 |
| 85 | 66 | 56 | 1745 | 12.3 | 12.7 | 12.5 |
| 95 | 71.5 | 58 | 1870 | 13.3 | 13.7 | 13.5 |
| 105 | 76.5 | 60 | 1980 | 14.3 | 14.7 | 14.5 |
| 115 | 80 | 61 | 2080 | 15.3 | 15.7 | 15.5 |

## TRH 25-12
## Pressure Temperature Chart

Evaporator at High Speed 80° DB, 67° WB Entering Evaporator

| Outside Ambient °F | Suction Pressure P.S.I. | Evaporator Air-Off °F | Total Watts Input at 115 V | Compressor Amps at 115 V | Compressor Amps. at 110 V | Compressor Amps. at 105 V |
|---|---|---|---|---|---|---|
| 65 | 63 | 55 | 1345 | 10.3 | 10.8 | 11.3 |
| 75 | 67 | 57 | 1495 | 10.9 | 11.4 | 11.9 |
| 85 | 71 | 59 | 1595 | 11.5 | 12.0 | 12.5 |
| 95 | 74 | 60.5 | 1745 | 12.0 | 12.5 | 13.0 |
| 105 | 77 | 62 | 1845 | 12.6 | 13.1 | 13.6 |
| 115 | 80 | 63.5 | 1945 | 13.6 | 13.1 | 14.6 |

## Evaporator and Condenser Coil Maintenance

Normally no servicing of coils is required other than keeping fins of coils clean. If a leak is detected at the braze points of coil it can in most cases be repaired. Severely damaged coils should be replaced. Just unsweat lines to coil and remove screws which hold coil in place.

Follow "Evacuation – Field Charging and Performance Test Procedure" after repairs are made. If the fins of the coils are damaged, the fins can be straightened with a comb specially made for this purpose.

## Replacing Blower Wheel

Normally no servicing of blower wheel is necessary. Cleaning of blades can be done from inside the coach without removing wheel. Just remove the 4 screws that hold the ceiling grille and use a bottle brush or equivalent with a rigid handle and work sideways between blades. If removing wheel is necessary remove cover from top of unit. Remove cover from evaporator housing. Remove 4 screws that hold blower venturi in place. Loosen blower set screw and remove wheel. It will not be necessary to remove the blower housing.

## Replacing Fan Blade

It is not necessary to remove motor to replace blade. Remove top cover. Loosen fan set screw and pull blade off shaft. Remove one screw that fastens venturi to base angle. (Screw is located at capacitor box side.) Rotate venturi out approximately 2 inches at side where screw was just removed. The condenser coil is still attached to venturi so be careful not to kink tubing. Slip blade out between motor shaft and venturi opening.

With the motor centered in motor support bracket, the correct location of fan blade is:
Lau 5 bladed fan – Spider is flush with end of motor shaft.
Brookside 6 bladed fan – The stop inside of fan hub to engage end of motor shaft.

## Replacing Motor

1. Follow procedure Step REPLACING BLOWER WHEEL.
2. Loosen fan set screw and pull blade off shaft. It is not necessary to completely remove blade.
3. Disconnect motor leads.
4. Remove the three bolts that hold motor support bracket to division panel.
5. Pull motor up so that support leg of motor bracket disengages from angle on base.
6. Continue to pull motor up and towards condenser coil until shaft of motor is out of opening in division panel.
7. Remove motor from support bracket and insert new motor in place, keeping motor centered in bracket and motor leads at same location. See Figure 9.
8. Using reverse method install new motor and bracket.

Helpful Hint: It will be easier when inserting support leg through grommet on base angle to remove the top grommet from motor support leg. (This is one of the 3 grommets that is fastened to the division panel.) When the grommet is removed, it will facilitate raising the support leg that is inserted into base angle. The grommet can then be put back in place.

Note: In order to position the Franklin motor correctly, a 1/16" thick band is placed around the shell of the motor for spacing. The G.E. and Marathon motors do not require this band. See Figure 1.

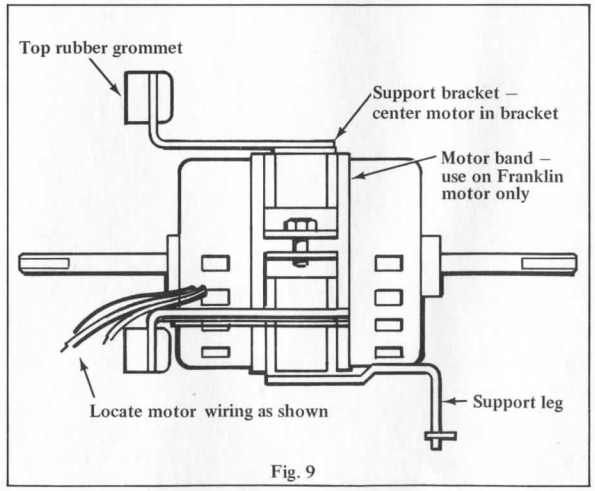


Fig. 9

## Water Leaks

Water Leak When Air Conditioner is Operating
The air conditioner is equipped with two overflow drain lines that direct the water to the outside of the unit. If water is observed coming from either of these lines the following checks can be made.

1. Plugged or kinked drain line.
2. Drain line not straight and may be bowed.
3. Trailer not level.

If water is leaking inside the trailer:

1. Check for damaged fins or evaporator coil. Fins can be straightened.
2. Check corners of drain pan for leaks. A leak in this area can be repaired by drying the surface and applying a sealant.
3. Check for split in drain hose or for poor connection.

Water Leak When Raining

1. Check caulking around the base of unit. The heads of screws that fasten the base to the roof should have sealant applied to them.
2. Water may be leaking around the collar of the blower outlet. Observation and correction can be made from the inside of the trailer by applying sealant to the base of the air conditioner where water is observed entering.

## Trouble Shooting

1. Low suction pressure

| Cause | Remedy |
|---|---|
| Dirty Filters | Clean |
| Shortage of refrigerant due to undercharge or leak. | Check for proper refrigerant charge. Warm suction and liquid lines, with partially warm evaporator, indicates undercharge. Add refrigerant in vapor form through the low side and check for leak. If leak found, repair, evacuate and recharge in vapor form into low side. |
| Air Leak through ceiling | Observation – Seal Leak |
| Insufficient air flow over evaporator | Check for dirty filters. Check blower for cleanliness and speed. |
| Evaporator coil obstructed | Clean fins or remove obstruction. |
| Return air too cold | Room temperature thermostat setting too low. |
| Restriction in liquid line | Check liquid line for possible kinks or blockage. Feel liquid line for temperature drop. |
| Blocked Strainer | Blocked strainer is determined if strainer is cold when unit is running. To correct – replace with new strainer, evacuate and weigh correct charge in low side. |
| Air by-passing discharge to intake | Seal leak. Check extension duct to make sure it is against base. |

2. Very low suction pressure.

| | |
|---|---|
| Plugged Refrigerant System | Isolate by purging. |

3. High suction pressure

| | |
|---|---|
| Insufficient condenser air | Dirt clogging coil. Obstructions on either inlet or outlet to condenser. Damaged condenser coil. Fan loose on motor shaft. Check fan speed. |
| Overcharge | Sweating back to compressor. Remove excess charge. |
| Operating at Low Fan Speed | Check pressures at Hi-Fan Operation. |
| Compressor not pumping | Check for rapid equalization of pressures. If so, replace compressor. |
| High return air temperature | Insufficient time allowed for pull down. Allow one or two hours longer, then check again. |
| Excessive Evaporator air flow | Filter not installed – replace. |
| Air leaking in from outside | Seal leak. |

4. Compressor does not run, hums intermittently, cycling on overload.

| | |
|---|---|
| Low Line Voltage | The line voltage should not be lower than 10% of rated voltage with compressor trying to start. Try "hard start kit" if not equipped. |
| Motor starting or running winding open | Disconnect power. Disconnect wiring at motor compressor terminals. Test starting and running windings for continuity. If test shows either circuit "open", motor will not start or run and compressor will have to be replaced. |
| Refrigerant pressures not equalized | Allow 3 minutes for pressures to equalize. Check for restriction in refrigerant line. |
| Motor winding grounded to compressor shell | If test shows continuity between metal shell of compressor and any one of the three compressor terminals, the motor winding is grounded and the compressor will have to be replaced. |
| Run capacitor failure | Replace run capacitor. |
| Defective start relay or start capacitor | Replace. |

5. Unit operates continuously.

| | |
|---|---|
| Control does not cut-out | Check the cut-out setting on the thermostat. |
| Dirty condenser | Clean with brush or vacuum cleaner. |
| Insufficient air through evaporator coil | Check for dirty filter. |
| Thermostat affected by heat source. | Remove cause of heat or relocate thermostat. |

6. Unit blows fuses.

| | |
|---|---|
| Low Line Voltage | (See low line voltage) |
| Refrigerant pressures not equalized when trying to start | Restriction in refrigerant lines or evaporator. Check for plugged line or kinked tubing. |
| Fuses too small or delay fuse not used. | Check wiring diagram for proper fuse size. Use only delay type or slow blowing fuses. |
| Unit shorted to ground | Check all wiring against wiring diagram. |
| Grounded | Check compressor windings with continuity checker or ohmmeter. If grounded, replace compressor. |
| Run capacitor failure | Replace run capacitor |
| Defective start relay of start capacitor | Replace. |

7. High Compressor Amps.

| | |
|---|---|
| Incorrect or faulty run capacitor | Replace with one having correct rating. |
| Overcharge | Remove excess. See Pressure Temperature Chart. |
| Condenser Air by-passing between screen and shroud. | Seal |
| Condenser air flow restricted. | Clean condenser coil. Clean screen on shroud. Increase openings if necessary. |
| Fan blade located incorrectly | Motor should be centered in mount and hub of blade flush with end of shaft. |