

# ROBINAIR

## Service Manual

**Models 34700/34701**  
**Recovery/Recycling/Recharging Unit**  
**For R-134a Only**

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## Theory of Operation and Safety Precautions

The Series 34700 recovery, recycling, evacuation and recharging units are designed for R-134A refrigerant only. These units are UL approved and meet SAE J2210 and J2099 standards.

These units began production in August of 1992. The model, serial number and manufacturing date code can be found on a white tag located on the back of the unit above the tank.

### DEPRESSURIZING THE UNIT

1. Close both the blue liquid and red vapor valves on the 50-pound recovery tank.
2. Disconnect all hoses from the 50-pound recovery tank.
3. Disconnect the red high side and blue low side hoses from a hand-held manifold gauge set.
4. Connect the blue (36") liquid hose to the low side (blue handle) of the hand-held manifold gauge set. Connect the red (36") vapor hose to the high side (red handle) of the manifold gauge set.
5. Connect the yellow hose (usually attached to the center port) of the hand-held manifold gauge set to the intake of your 34650 recovery unit.
6. Open both manifold valves on the hand-held manifold gauge set.
7. Plug in your 34650 recovery unit and press the Recovery Start button.
8. When the recovery light on your 34650 turns off, wait 10 minutes and watch your hand-held manifold gauges for a pressure rise above zero. Repeat Steps 7 and 8 until positive pressure does not develop on the hand-held gauge set.
9. Disconnect the blue (36") liquid and red (36") vapor hoses from the hand-held manifold gauge set.
10. Connect the yellow (36") air purge hose and the red (96") high side hose to the hand-held manifold gauge set. *NOTE:* The high side manifold gauge valve on the unit's control panel must be closed and the high side hose must be replaced with a specially-purchased 35396 test hose).
11. Open both the high and low side gauge valves on the control panel of the 34700.
12. Press the Recovery Start button on the 34650.
13. When the recovery light on your 34650 turns off, wait 10 minutes and watch your hand-held manifold gauges for a pressure rise above zero. Repeat Steps 12 and 13 until positive pressure does not develop on the hand held gauge set.

### ▲ WARNING!

**Always wear safety goggles when working with refrigerants. Contact with refrigerant can cause eye injury. Disconnect lines and hoses with extreme caution! Pressurized refrigerant may be present in lines and hoses. Always point lines and hoses away from you and anyone nearby.**

### ▲ WARNING!

**Always unplug the station from the power source before removing any of the shrouding or beginning any service work.**

**To order parts please call Robinair Customer Service at 1-419-485-5561. Or FAX your order to 1-419-485-4330.**

**All service related questions should be directed to the Robinair Technical Assistance Line at 1-800-822-5561.**

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## Component Description

### FLOW (RECOVERY SIDE)

*(Italics print denotes 220-volt applications.)*

1. **18190A Low Side Coupler** (blue handle, smaller i.d. actuator) — Allows access to the low side of an R-134a automotive system.  
*NOTE:* The 18190 is the old-style coupler with a blue plastic handle.  
**18246 Replacement Blue Plastic Handle**  
**RA19115 Replacement Front O-Ring Only**  
**RA19152 Rebuild Kit For 18190/18191 (Old-Style Coupler Only)**
  2. **62096 Low Side Hose** — Provides flow from the low side coupler to the low side port of the unit.  
**40083 Hose Gasket**  
**17772 O-Ring**
  3. **RA19082 (RA19129 Metric) 2<sup>3</sup>/<sub>4</sub>" Low Side Gauge** — Reads pressure and/or vacuum entering the low side hose. *NOTE:* The gauge will read pressure and/or vacuum in the low side hose with the low side valve closed.  
**RA19257 2<sup>3</sup>/<sub>4</sub>" Replacement Gauge Lens**
  4. **RA19044 Low Side Manifold Valve** — Allows flow from the low side hose into the center manifold tube (suction line strainer).  
**RA19199 Manifold Stem Repair Kit**
  5. **18191A High Side Coupler** (red handle, larger i.d. actuator) — Allows access to the high side of an R-134a automotive system. *NOTE:* The 18191 is the old-style coupler with a red plastic handle.  
**18247 Replacement Red Plastic Handle**  
**RA19115 Replacement Front O-Ring Only**  
**RA19152 Rebuild Kit For 18190/18191 (Old-Style Coupler Only)**
  6. **63096 High Side Hose** — Provides flow from the high side coupler to the high side port of the unit.  
**40083 Hose Gasket**  
**17772 O-Ring**
  7. **RA19081 (RA19128 Metric) 2<sup>3</sup>/<sub>4</sub>" High Side Gauge** — Reads pressure entering the high side hose. *NOTE:* The gauge will read pressure in the high side hose with the high side valve closed.  
**RA19257 2<sup>3</sup>/<sub>4</sub>" Replacement Gauge Lens**
  8. **RA19044 High Side Manifold Valve** — Allows flow from the high side hose into the center manifold tube (suction line strainer).  
**RA19199 Manifold Stem Repair Kit**
  9. **115157 Suction Line Strainer** — Filters the refrigerant coming from the high and low side manifold valves before entering into the inlet check valve. *NOTE:* Units produced after October 1993 came equipped from the factory with the strainer already installed.
  10. **RA17112 Inlet Check Valve** — Allows flow in one direction only, towards the recovery solenoid, and prevents refrigerant from escaping out of inlet during shutdown, evacuation or recycling.
  11. **RA19006 Recovery Solenoid** — A normally closed solenoid that prevents the flow of refrigerant into the system oil separator while the unit is off or in any mode other than recovery. *NOTE:* The control voltage is 120 volts.  
**RA19258 Solenoid Rebuild Kit**
  12. **RA17328 Vacuum Sensor** — A normally closed sensor that opens when a 17" vacuum rating ( $\pm 2$ "") is reached in the inlet manifold. *NOTE:* This switch has orange wires attached to it.
  13. **RA18760 System Oil Separator** — Performs three functions. Internal heat causes incoming saturated vapor to evaporate. This is important to be sure no liquid enters the compressor and that oil droplets contained in the incoming refrigerant will drop out in the separator. The third function will be discussed later.
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## Component Description

14. **40460 Oil Drain Valve** — Allows the oil that has been removed from the system to be drained when the recovery process is complete. The oil removed from the system should be replaced with new oil during recharging. *NOTE:* It is important that the oil drain procedure be done after each recovery.  
**18429 Replacement Valve Stem**
15. **RA17419 Oil Drain Bottle** — Measures the amount of used oil recovered from the vehicle being serviced.
16. **34430 Filter Drier** — Removes moisture, acid and oil from refrigerant being circulated through it during recovery and recycling.  
**40084 Replacement Hose Gasket**
17. **RA19083/RA19127 Compressor** — Converts a low pressure, low temperature entering gas into a high pressure, high temperature discharge gas. *NOTE:* See “Compressor Specifications and Troubleshooting” on page 26.
18. **RA19067 Compressor Oil Separator** — Traps compressor oil that has migrated out with refrigerant while passing through the compressor. Heat is added to the incoming refrigerant to promote vaporization through a series of coils that are wrapped around the outside of the separator. The hot refrigerant contained in the coils is then allowed to cool, promoting the condensing of the refrigerant. The oil is stored in the separator until the equalization solenoid loses power and allows the oil to be returned. *NOTE:* Some units have an automatic oil return controlled through the main board. When the compressor runs continuously for 10 minutes, the main board drops power to the equalization solenoid for 3 seconds and then repowers it.
19. **RA17522 Equalization Solenoid** — A normally open solenoid that allows oil trapped in the compressor oil separator to be forced back into the suction side of the compressor, equalizes the pressure on the high and low side of the compressor, and pressurizes the system oil separator when power is dropped to the solenoid.
20. **RA17529 High Pressure Cut Out** — A normally closed sensor that shuts off the unit when the discharge pressure reaches 405 psi. *NOTE:* This switch has three contacts; the outer two contacts (numbered 1 and 3) are normally closed and have two solid red wires attached to them.
21. **RA17112 Recovery Check Valve** — Allows flow in one direction only and prevents refrigerant in the tank from coming back into the unit during shutdown.
13. **RA18760 System Oil Separator** — At this point high pressure, high temperature vapor enters the separator and passes through a condensing coil. The vapor gives up heat to the incoming refrigerant surrounding the coil which causes the refrigerant in the coils to cool and condense.
22. **RA19143 (Old-Style)/RA19242 (New-Style) Automatic Air Purge Device** — Circulates liquid refrigerant through the upper section during recycling to establish a reference pressure. (See page 22 for diagram.)
23. **RA19077 Red (36”) Vapor Tank Hose** — Delivers refrigerant that is being recovered or recycled to the vapor side of the 50-pound recovery tank.  
**40083 Hose Gasket**  
**17773 Replacement Quick Seal O-Ring**
24. **34750 Recovery Tank** — Stores refrigerant so that it may be recycled at a later time. The tank has two valves: the vapor is an open fitting to the tank; the liquid valve has a draw tube extending to within two inches of the bottom of the tank.

## Component Description

### FLOW (RECYCLE SIDE)

*(Italics print denotes 220-volt applications.)*

24. **34750 Recovery Tank** — Stores refrigerant so that it may be recycled at a later time. The tank has two valves: the vapor valve is an open fitting to the tank; the liquid valve has a draw tube extending to within two inches of the bottom of the tank.
25. **RA19079 Blue (36") Liquid Tank Hose** — Allows flow from the liquid side of the tank to the charging solenoid and expansion valve.  
**40083 Hose Gasket**  
**17773 Replacement Quick Seal O-Ring**
26. **113809 Liquid Line Strainer** — Filters liquid coming in from the blue liquid hose before going to the charging solenoid or expansion valve.
27. **RA17577 Moisture Indicator** — References the moisture content of the refrigerant being recycled. Pale yellow indicates wet and light mint green indicates dry. During recycling the moisture indicator is normally filled with liquid refrigerant and warm to the touch.
28. **RA17424 Automatic Expansion Valve** — Converts incoming liquid refrigerant into a low pressure saturated vapor. The calibration of the expansion valve can be checked at the service port with a pressure gauge. The allowable tolerance of the valve is 30 to 40 psi while recycling. *NOTE:* Allow the unit to recycle 10 minutes with a minimum of 10 pounds of refrigerant in the tank before checking or adjusting the pressure.
29. **RA19006 Recycling Solenoid** — A normally closed solenoid that prevents the flow of refrigerant into the system oil separator when the unit is not running in the recycling mode.  
*NOTE:* The control voltage is 120 volts.  
**RA19258 Solenoid Rebuild Kit**
12. **RA17328 Vacuum Sensor** — A normally closed sensor that opens when a 17" vacuum rating ( $\pm 2$ ") is reached in the inlet manifold. *NOTE:* This switch has orange wires attached to it.
13. **RA18760 System Oil Separator** — Performs three functions. Internal heat causes incoming saturated vapor to evaporate. This is important to be sure no liquid enters the compressor and that the oil droplets contained in the incoming refrigerant will drop out in the separator. The third function will be discussed later.
14. **40460 Oil Drain Valve** — Allows the oil that has been removed from the system to be drained when the recovery process is complete. The oil removed from the system should be replaced with new oil during recharging. *NOTE:* It is important that the oil drain procedure be done after each recovery.  
**18429 Replacement Valve Stem**
15. **RA17419 Oil Drain Bottle** — Measures the amount of used oil recovered from the vehicle being serviced.
16. **34430 Filter Drier** — Removes moisture, acid and oil from refrigerant being circulated through it during recovery and recycling.  
**40084 Replacement Hose Gasket**
17. **RA19083/RA19127 Compressor** — Converts a low pressure, low temperature entering gas into a high pressure, high temperature discharge gas. *NOTE:* See "Compressor Specifications and Troubleshooting" on page 26.
18. **RA19067 Compressor Oil Separator** — Traps compressor oil that has migrated out with refrigerant while passing through the compressor. Heat is added to the incoming refrigerant to promote vaporization through a series of coils that are wrapped around the outside of the separator. The hot refrigerant contained in the coils is then allowed to cool, promoting the condensing of the refrigerant. The oil is stored in the separator until the equalization solenoid loses power and allows the oil to be returned. *NOTE:* Some units have an automatic oil return controlled through the main board. When the compressor runs continuously for 10 minutes, the main board drops power to the equalization solenoid for 3 seconds and then repowers it.

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## Component Description

19. **RA17522 Equalization Solenoid** — A normally open solenoid that allows oil trapped in the compressor oil separator to be forced back into the suction side of the compressor, equalizes the pressure on the high and low side of the compressor, and pressurizes the system oil separator when power is dropped to the solenoid.
20. **RA17529 High Pressure Cut Out** — A normally closed sensor that shuts off the unit when the discharge pressure reaches 405 psi. *NOTE:* This switch has three contacts: the outer two contacts (numbered 1 and 3) are normally closed and have two solid red wires attached to them.
21. **RA17112 Recovery Check Valve** — Allows flow in one direction only and prevents refrigerant in the tank from coming back into the unit during shutdown.
13. **RA18760 System Oil Separator** — At this point high pressure, high temperature vapor enters the separator and passes through a condensing coil. The vapor gives up heat to the incoming refrigerant surrounding the coil which causes the refrigerant in the coils to cool and condense.
22. **RA19143 (Old-Style)/RA19242 (New-Style) Automatic Air Purge Device** — Circulates liquid refrigerant through the upper section during recycling to establish a reference pressure. (See page 22 for diagram.)
23. **RA19077 Red (36") Vapor Tank Hose** — Delivers refrigerant that is being recovered or recycled to the vapor side of the 50-pound recovery tank.  
**40083 Hose Gasket**  
**17773 Replacement Quick Seal O-Ring**
30. **RA19006 Air Purge Solenoid** — Prevents the flow of refrigerant into the lower cavity of the air purge device until energized by the main board 30 seconds after the recycling process has been engaged. *Note:* Power is dropped from the solenoid after 10 minutes of purging.  
**RA19258 Solenoid Rebuild Kit**
22. **RA19143 (Old-Style)/RA19242 (New-Style) Automatic Air Purge Device** — After the recycling sequence has been running for 30 seconds, a timer (programmed into the main board) opens a normally closed solenoid (#30) allowing pressure to enter the lower cavity of the air purge device. When the pressure on the lower cavity exceeds the pressure of the upper cavity by 7 psi or more, a valve inside opens to release the air pressure out of the lower cavity. When the pressures come within 3 psi of each other, the device stops purging.

## Component Description

### FLOW (EVACUATION)

*(Italics print denotes 220-volt applications.)*

1. **18190A Low Side Coupler** (blue handle, smaller i.d. actuator) — Allows access to the low side of an R-134a automotive system. *NOTE:* The 18190 is the old-style coupler with a blue plastic handle.  
**18246 Replacement Blue Plastic Handle**  
**RA19115 Replacement Front O-Ring Only**  
**RA19152 Rebuild Kit For 18190/18191**  
**(Old-Style Coupler Only)**
2. **62096 Low Side Hose** — Provides flow from the low side coupler to the low side port of the unit.  
**40083 Hose Gasket**  
**17772 O-Ring**
3. **RA19082 (RA19129 2<sup>3</sup>/<sub>4</sub>" Metric) 2<sup>3</sup>/<sub>4</sub>" Low Side Gauge** — Reads pressure and/or vacuum entering the low side hose. *NOTE:* The gauge will read pressure and/or vacuum in the low side hose with the low side valve closed.  
**RA19257 2<sup>3</sup>/<sub>4</sub>" Replacement Gauge Lens**
4. **RA19044 Low Side Manifold Valve** — Allows flow from the low side hose into the center manifold tube (suction line strainer).  
**RA19199 Manifold Stem Repair Kit**
5. **18191A High Side Coupler** (red handle, larger i.d. actuator) — Allows access to the high side of an R-134a automotive system. *NOTE:* The 18191 is the old-style coupler with a red plastic handle.  
**18247 Replacement Red Plastic Handle**  
**RA19115 Replacement Front O-Ring Only**  
**RA19152 Rebuild Kit For 18190/18191**  
**(Old-Style Coupler Only)**
6. **63096 High Side Hose** — Provides flow from the high side coupler to the high side port of the unit.  
**40083 Hose Gasket**  
**17772 O-Ring**
7. **RA19081 (RA19128 Metric) 2<sup>3</sup>/<sub>4</sub>" High Side Gauge** — Reads pressure entering the high side hose. *NOTE:* The gauge will read pressure in the high side hose with the high side valve closed.  
**RA19257 2<sup>3</sup>/<sub>4</sub>" Replacement Gauge Lens**
8. **RA19044 High Side Manifold Valve** — Allows flow from the high side hose into the center manifold tube (suction line strainer).  
**RA19199 Manifold Stem Repair Kit**
9. **115157 Suction Line Strainer** — Filters the refrigerant coming from the high and low side manifold valves before entering into the inlet check valve. *NOTE:* Units produced after October 1993 came equipped from the factory with the strainer already installed.
31. **RA17329 (Old-Style)/RA19266 (New-Style) Vacuum Pump Protection Switch** — A normally open sensor that closes if pressure greater than 25 psi is present at the vacuum solenoids. If pressure is greater than 25 psi, it prevents the vacuum pump from starting and the vacuum solenoids from opening, which prevents damage to the vacuum pump. The switch has two light blue wires attached to it.
32. **RA19006 (x2) Vacuum Solenoids** — Normally closed solenoids that prevent flow to the vacuum pump while recovering or charging (upper solenoid) and that hold the vacuum on a system when the evacuation is complete (lower solenoid).  
**RA19258 Solenoid Rebuild Kit**
33. **111877 Vacuum Hose** — Provides flow from the lower vacuum solenoid to the intake of the vacuum pump.  
**40084 Replacement Hose Gasket**
34. **RA15425/RA15428 Vacuum Pump** — A 6 cfm, two-stage rotary vane pump that pulls moisture and air from the system to which the unit is attached.  
**13203 Vacuum Pump Oil**  
**15369 Base and Foot Assembly**
35. **RA19026 Oil Injector** — Controls and regulates the flow of oil from the injector bottle to the inlet manifold.  
**RA19141 Oil Injector Bottle**  
**RA19199 Valve Stem Repair Kit**
36. **RA17112 Oil Injector Check Valve** — Prevents positive pressure from flowing into the oil injector whenever the inlet of the unit has positive pressure in it.

## Component Description

### FLOW (CHARGING)

*(Italics print denotes 220-volt applications.)*

24. **34750 Recovery Tank** — Stores refrigerant so that it may be recycled at a later time. The tank has two valves: the vapor valve is an open fitting to the tank; the liquid valve has a draw tube extending to within two inches of the bottom of the tank.
25. **RA19079 Blue (36") Liquid Tank Hose** — Allows flow from the liquid side of the tank to the charging solenoid and expansion valve.  
**40083 Hose Gasket**  
**17773 Replacement Quick Seal O-Ring**
26. **113809 Liquid Line Strainer** — Filters liquid coming in from the blue liquid hose before going to the charging solenoid or expansion valve.
27. **RA17577 Moisture Indicator** — References the moisture content of the refrigerant being recycled. Pale yellow indicates wet and light mint green indicates dry. During recycling the moisture indicator is normally filled with liquid refrigerant and warm to the touch.
37. **RA19006 Charging Solenoid** — A normally closed solenoid that prevents the flow of refrigerant into the inlet when the unit is not charging. *NOTE:* The control voltage is 120 volts.  
**RA19258 Solenoid Rebuild Kit**
4. **RA19044 Low Side Manifold Valve** — Allows flow from the charging solenoid into the low side hose.  
**RA19199 Manifold Stem Repair Kit**
3. **RA19082 (RA19129 Metric) 2<sup>3</sup>/<sub>4</sub>" Low Side Gauge** — Reads pressure and/or vacuum entering the low side hose. *NOTE:* The gauge will read pressure and/or vacuum in the low side hose with the low side valve closed.  
**RA19257 2<sup>3</sup>/<sub>4</sub>" Replacement Gauge Lens**
2. **62096 Low Side Hose** — Provides flow from the low side coupler to the low side port of the unit.  
**40083 Hose Gasket**  
**17772 O-Ring**
1. **18190A Low Side Coupler** (blue handle, smaller i.d. actuator) — Allows access to the low side of an R-134a automotive system.  
*NOTE:* The 18190 is the old-style coupler with a blue plastic handle.  
**18246 Replacement Blue Plastic Handle**  
**RA19115 Replacement Front O-Ring Only**  
**RA19152 Rebuild Kit For 18190/18191 (Old-Style Coupler Only)**
8. **RA19044 High Side Manifold Valve** — Allows flow from the charging solenoid into the high side hose.  
**RA19199 Manifold Stem Repair Kit**
7. **RA19081 (RA19128 Metric) 2<sup>3</sup>/<sub>4</sub>" High Side Gauge** — Reads pressure entering the high side hose.  
**RA19257 2<sup>3</sup>/<sub>4</sub>" Replacement Gauge Lens**
6. **63096 High Side Hose** — Provides flow from the high side coupler to the high side port of the unit.  
**40083 Hose Gasket**  
**17772 O-Ring**
5. **18191A High Side Coupler** (red handle, larger i.d. actuator) — Allows access to the high side of an R-134a automotive system. *NOTE:* The 18191 is the old-style coupler with a red plastic handle.  
**18247 Replacement Red Plastic Handle**  
**RA19115 Replacement Front O-Ring Only**  
**RA19152 Rebuild Kit For 18190/18191 (Old-Style Coupler Only)**



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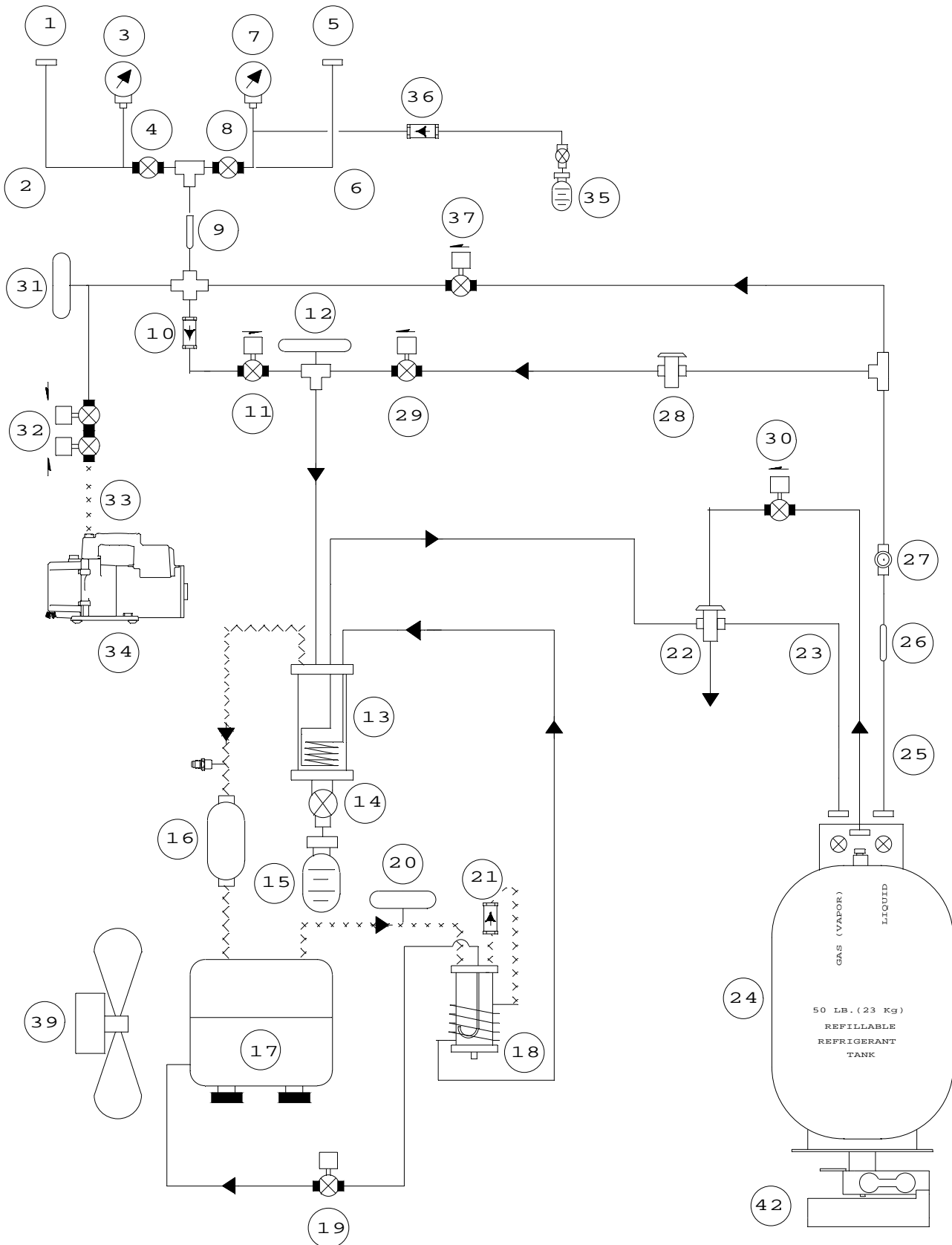
## Component Description

### ELECTRICAL COMPONENTS

*(Italics print denotes 220v applications.)*

38. **RA40994/RA17135 Main Power Switch** — Controls the power between the power cord and the main board.
39. **RA17416/RA17516 Fan** — Runs as soon as the Main Power switch is turned on and cools cabinet temperature.
40. **RA19064 Main Board** — Controls unit functions, either automatic or programmed.
41. **RA19065/(RA19253 New Style Keypad/Decal) Keypad** — Sends controlling signals to program the main board.
31. **RA17329 (Old-Style)/RA19266 (New-Style) Vacuum Pump Protection Switch** — A normally open sensor that closes and sends a signal to the main board if pressure greater than 25 psi is present at the vacuum solenoids. The display will read “U-HI.” This switch has two light blue wires attached to it.
12. **RA17328 Vacuum Sensor** — A normally closed sensor that opens when a 17” vacuum rating ( $\pm 2$ ”) is reached in the inlet manifold. *NOTE:* This switch has orange wires attached to it.
20. **RA17529 High Pressure Cut Out** — A normally closed sensor that shuts off the unit when the discharge pressure reaches 405 psi. *NOTE:* This switch has three contacts: the outer two contacts (numbered 1 and 3) are normally closed and have two solid red wires attached to them.
42. **RA19008 Scale** — Sends a signal to the main board for accurate weight readings during charging and recovery (strain gauge style).
43. **RA17459 System Relay** — Energizes the compressor and/or vacuum pump. This relay has two sets of contacts which close when the coil is energized.  
*NOTE:* One set of contacts are only used in this application; if one set gets burned the other set could be used. See page 23 for troubleshooting and wiring details.
44. **RA19066 Sonalert** — Sounds an audible tone when commands are programmed through the keypad.
45. **RA19025 LBS/KG Switch** — Selects pounds or kilograms for scale function. *NOTE:* This selector switch can only be changed when the unit is turned off.

### Flow Diagram

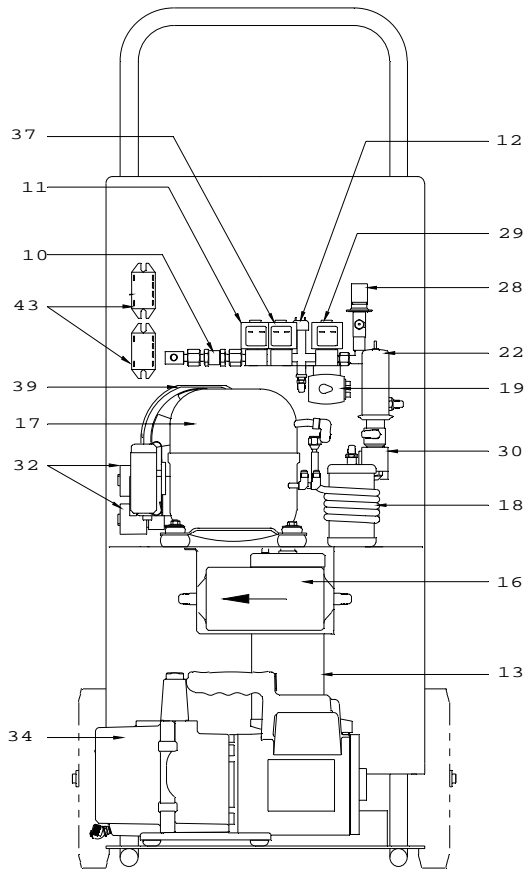


## Flow Diagram

*(Italics print denotes 220-volt applications)*

1. **18190A** Low Side Coupler  
**18246** Replacement Blue Plastic Handle  
**RA19115** Replacement Front O-Ring Only  
**RA19152** Rebuild Kit For 18190/18191  
(Old-Style Coupler Only)
2. **62096** Low Side Hose  
**40083** Hose Gasket  
**17772** O-Ring
3. **RA19082** 2¾" (**RA19129** 2¾" *Metric*)  
Low Side Gauge  
**RA19257** 2¾" Replacement Gauge Lens
4. **RA19044** Low Side Manifold Valve  
**RA19199** Manifold Stem Repair Kit
5. **18191A** High Side Coupler  
**18247** Replacement Red Plastic Handle  
**RA19115** Replacement Front O-Ring Only  
**RA19152** Rebuild Kit For 18190/18191  
(Old-Style Coupler Only)
6. **63096** High Side Hose  
**40083** Hose Gasket  
**17772** O-Ring
7. **RA19081** 2¾" (**RA19128** 2¾" *Metric*)  
High Side Gauge  
**RA19257** 2¾" Replacement Gauge Lens
8. **RA19044** High Side Manifold Valve  
**RA19199** Manifold Stem Repair Kit
9. **115157** Suction Line Strainer
10. **RA17112** Inlet Check Valve
11. **RA19006** Recovery Solenoid  
**RA19258** Solenoid Rebuild Kit
12. **RA17328** Vacuum Sensor
13. **RA18760** System Oil Separator
14. **40460** Oil Drain Valve  
**18429** Replacement Valve Stem
15. **RA17419** Oil Drain Bottle
16. **34430** Filter  
**40084** Replacement Hose Gasket
17. **RA19083/RA19127** Compressor
18. **RA19067** Compressor Oil Separator
19. **RA17522** Equalization Solenoid
20. **RA17529** High Pressure Cut Out
21. **RA17112** Recovery Check Valve
22. **RA19143** (Old-Style)/**RA19242** (New-Style)  
Automatic Air Purge Device
23. **RA19077** Red (36") Vapor Tank Hose  
**17773** Replacement O-Rings  
**40083** Standard Hose Gasket
24. **34750** Recovery Tank
25. **RA19079** Blue (36") Liquid Tank Hose  
**17773** Replacement O-Rings  
**40083** Standard Hose Gasket
26. **113809** Liquid Line Strainer
27. **RA17577** Moisture Indicator
28. **RA17424** Automatic Expansion Valve
29. **RA19006** Recycling Solenoid  
**RA19258** Solenoid Rebuild Kit
30. **RA19006** Air Purge Solenoid  
**RA19258** Solenoid Rebuild Kit
31. **RA17329** (Old-Style)/**RA19266** (New-Style)  
Vacuum Pump Protection Switch
32. **RA19006** (x2) Vacuum Solenoids  
**RA19258** Solenoid Rebuild Kit
33. **111877** Vacuum Hose
34. **RA15425/RA15428** Vacuum Pump
35. **RA19026** Oil Injector  
**RA19141** Oil Injector Bottle  
**RA19199** Valve Stem Repair Kit
36. **RA17112** Oil Injector Check Valve
37. **RA19006** Charging Solenoid  
**RA19258** Solenoid Rebuild Kit
39. **RA17416/RA17516** Fan
42. **RA19008** Scale

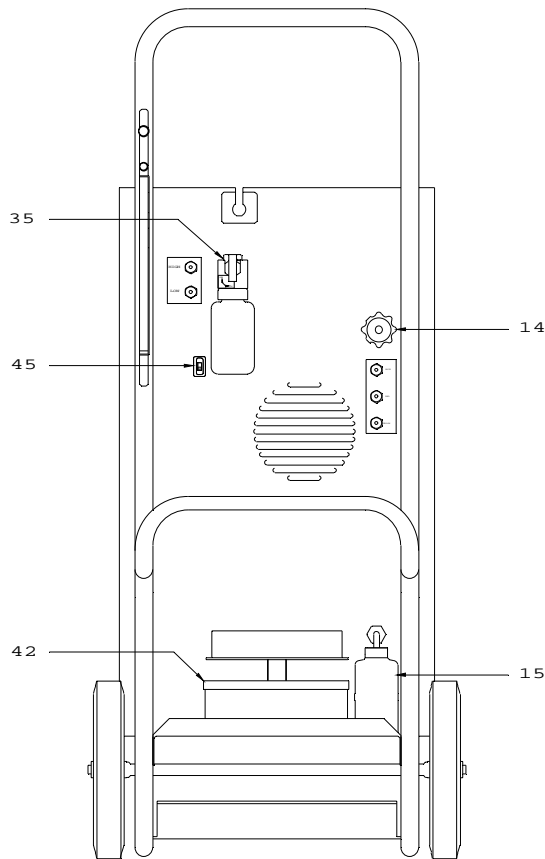
## Pictorial Views



*(Italics print denotes 220-volt applications.)*

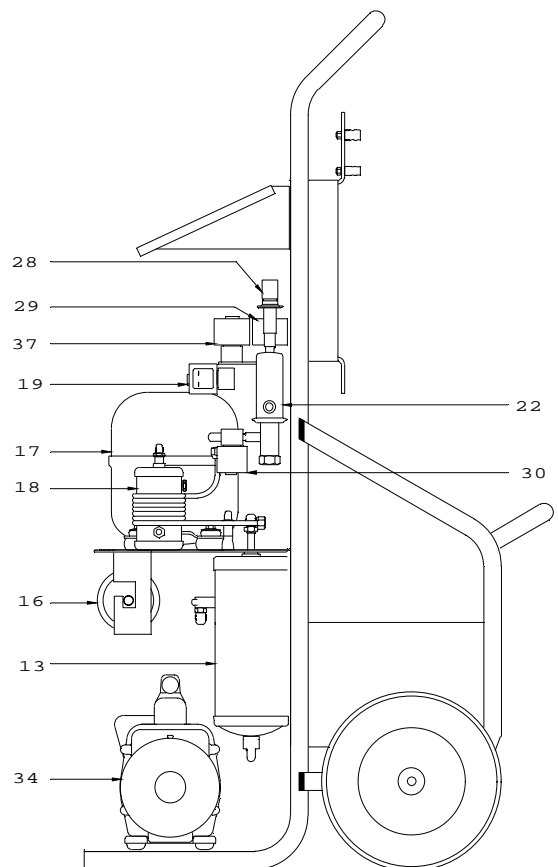
- 10. RA17112 Inlet Check Valve
- 11. RA19006 Recovery Solenoid  
RA19258 Solenoid Rebuild Kit
- 12. RA17328 Vacuum Sensor
- 13. RA18760 System Oil Separator
- 16. 34430 Filter  
40084 Replacement Hose Gasket
- 17. RA19083/RA19127 Compressor
- 18. RA19067 Compressor Oil Separator
- 19. RA17522 Equalization Solenoid
- 22. RA19143 (Old-Style)/RA19242 (New-Style)  
Automatic Air Purge Device
- 28. RA17424 Automatic Expansion Valve
- 29. RA19006 Recycling Solenoid  
RA19258 Solenoid Rebuild Kit
- 30. RA19006 Air Purge Solenoid  
RA19258 Solenoid Rebuild Kit
- 32. RA19006 (x2) Vacuum Solenoids  
RA19258 Solenoid Rebuild Kit
- 34. RA15425/RA15428 Vacuum Pump
- 37. RA19006 Charging Solenoid  
RA19258 Solenoid Rebuild Kit
- 39. RA17416/RA17516 Fan
- 43. RA17459 System Relay

### Pictorial Views

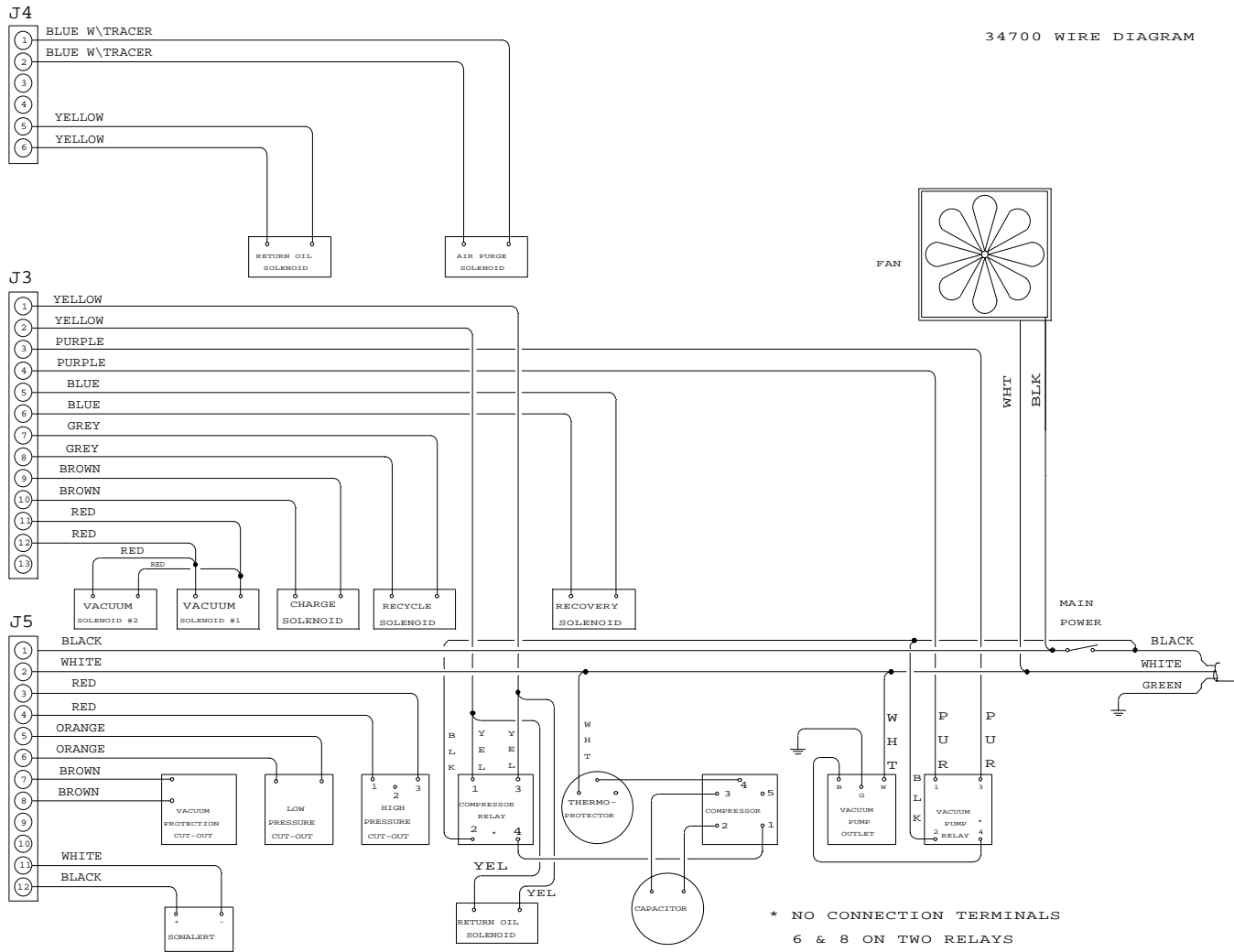


- 14. **40460** Oil Drain Valve  
**18429** Replacement Valve Stem
- 15. **RA17419** Oil Drain Bottle
- 35. **RA19026** Oil Injector  
**RA19141** Oil Injector Bottle  
**RA19199** Valve Stem Repair Kit
- 42. **RA19008** Scale  
**RA14979** Scale Platform
- 45. **RA19025** LBS/KG Switch

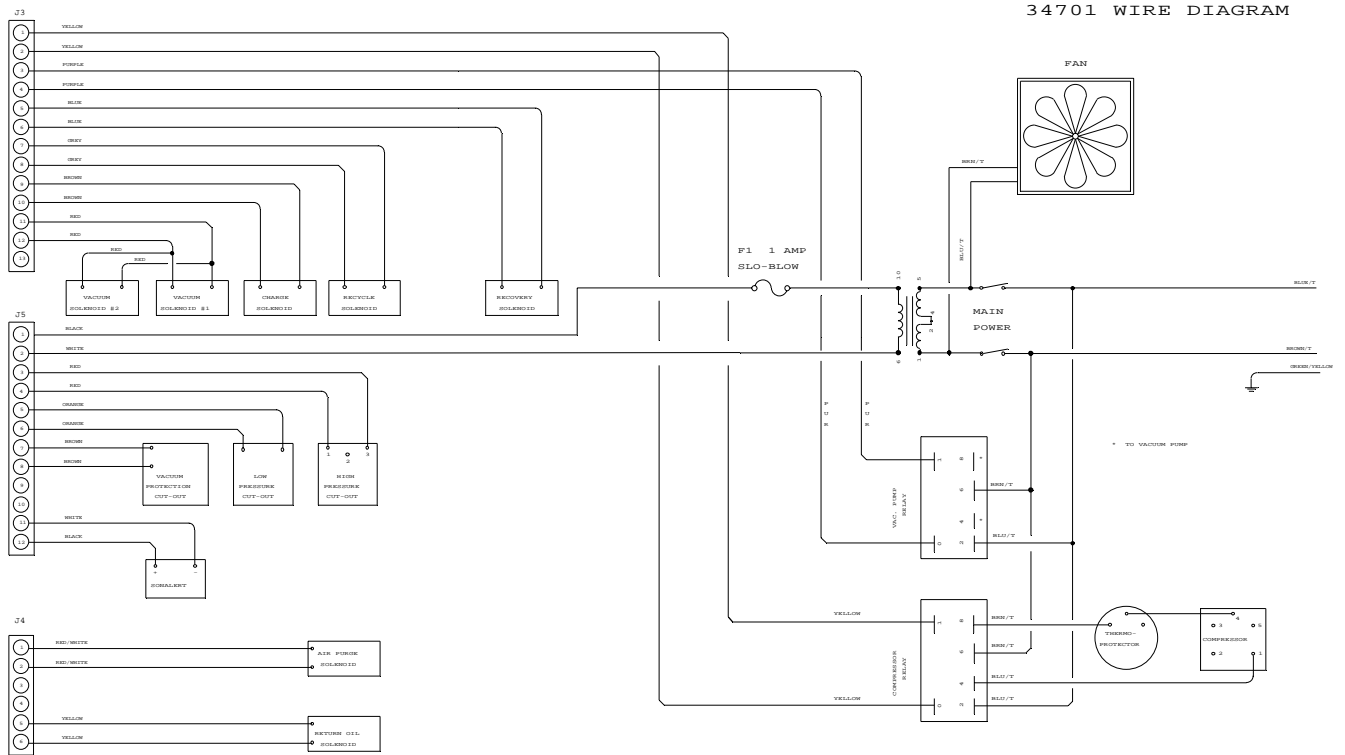
- 13. **RA18760** System Oil Separator
- 16. **34430** Filter  
**40084** Replacement Hose Gasket
- 17. **RA19083/RA19127** Compressor
- 18. **RA19067** Compressor Oil Separator
- 19. **RA17522** Equalization Solenoid
- 22. **RA19143** (Old-Style)/**RA19242** (New-Style)  
Automatic Air Purge Device
- 28. **RA17424** Automatic Expansion Valve
- 29. **RA19006** Recycling Solenoid  
**RA19258** Solenoid Rebuild Kit
- 30. **RA19006** Air Purge Solenoid  
**RA19258** Solenoid Rebuild Kit
- 34. **RA15425/RA15428** Vacuum Pump
- 37. **RA19006** Charging Solenoid  
**RA19258** Solenoid Rebuild Kit



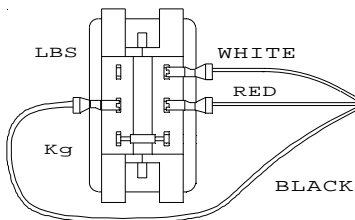
# Wiring Diagram — 34700



# Wiring Diagram — 34701

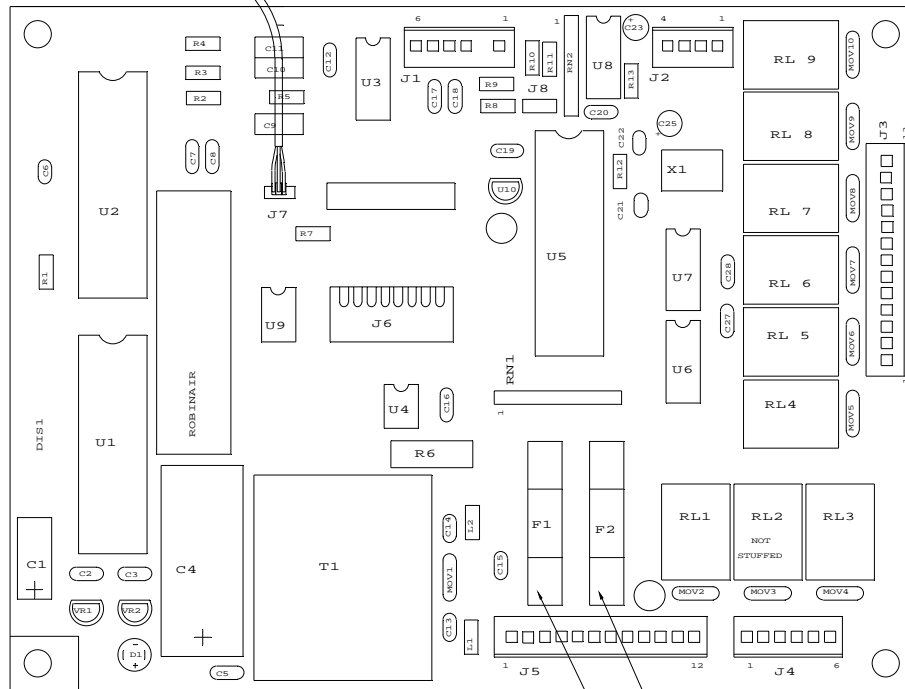


### Component Specifications



SWITCH LOCATED ON  
BACK PANEL RA19025

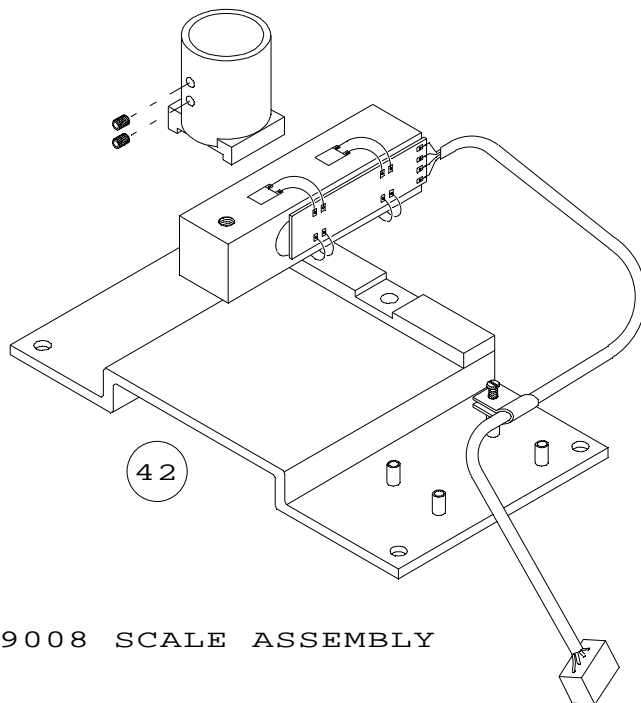
45



40 RA19064 MAIN BOARD

1 AMP. FUSE

.5 AMP. FUSE

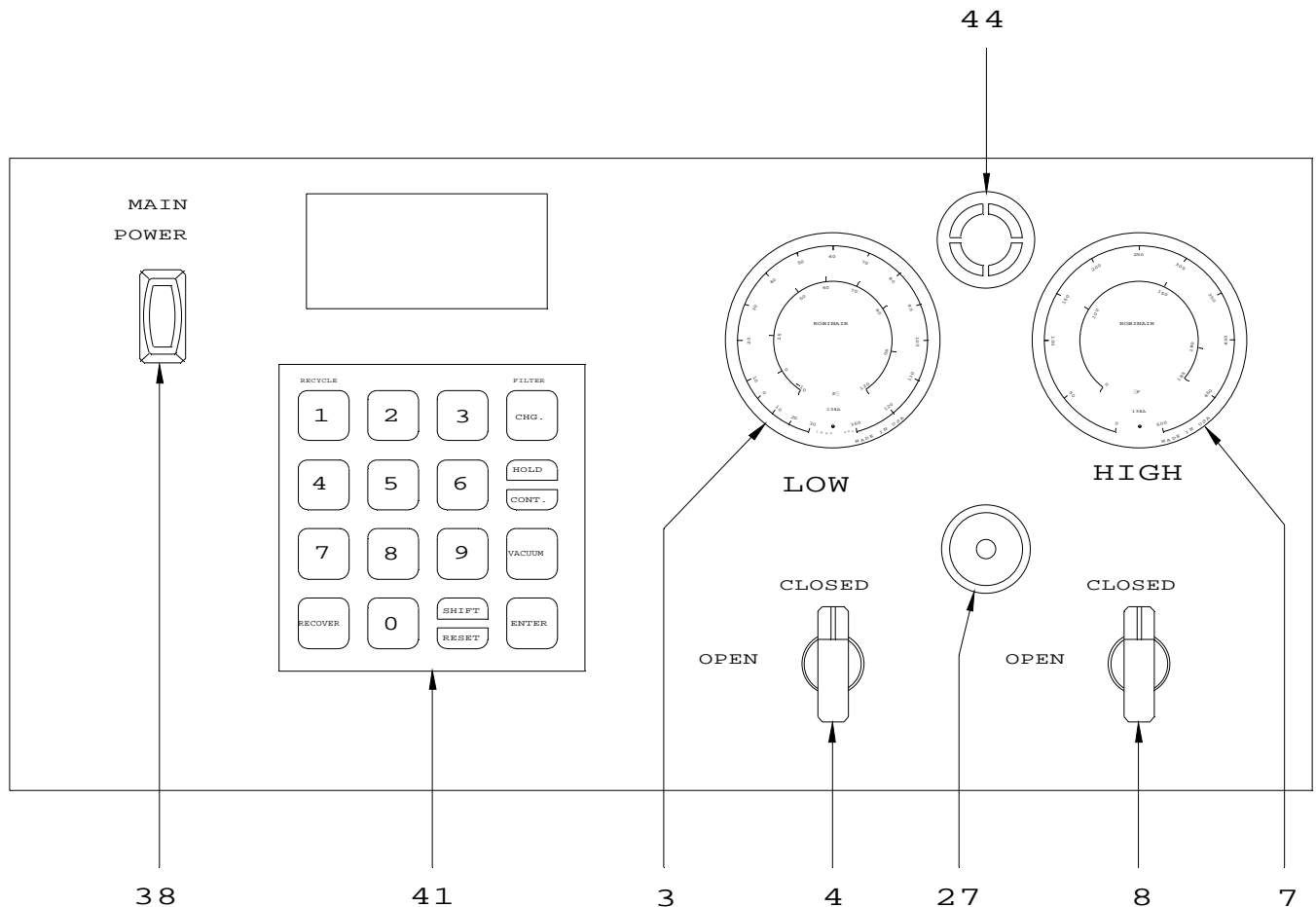


42

RA19008 SCALE ASSEMBLY



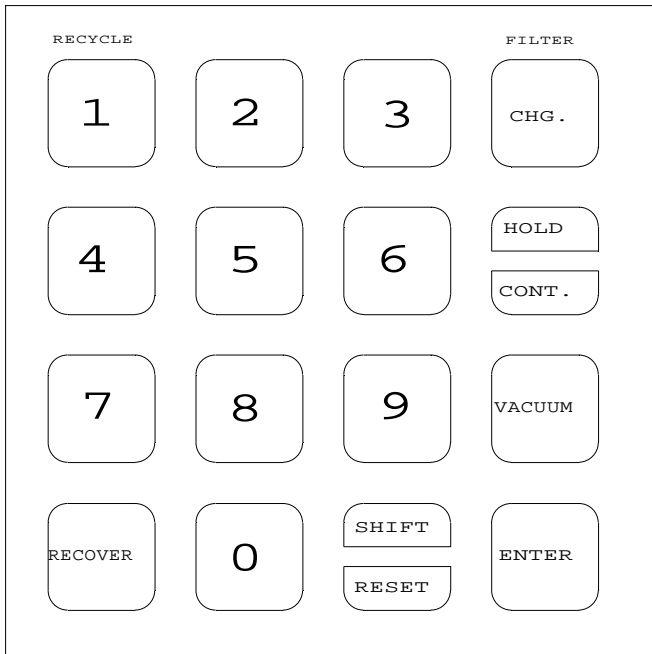
## Component Specifications



34700 CONTROL PANEL

- |  |   |
|--|---|
| <p><b>3. RA19082 2<math>\frac{3}{4}</math>" (RA19129 2<math>\frac{3}{4}</math>" Metric)</b><br/>           Low Side Gauge<br/> <b>RA19257 2<math>\frac{3}{4}</math>" Replacement Gauge Lens</b></p> <p><b>4. RA19044 Low Side Manifold Valve</b><br/> <b>RA19199 Manifold Stem Repair Kit</b></p> <p><b>7. RA19081 2<math>\frac{3}{4}</math>" (RA19128 2<math>\frac{3}{4}</math>" Metric)</b><br/>           High Side Gauge<br/> <b>RA19257 2<math>\frac{3}{4}</math>" Replacement Gauge Lens</b></p> | <p><b>8. RA19044 High Side Manifold Valve</b><br/> <b>RA19199 Manifold Stem Repair Kit</b></p> <p><b>27. RA17577 Moisture Indicator</b></p> <p><b>38. RA40994/RA17135 Main Power Switch</b></p> <p><b>41. RA19065/(RA19253 New Style Keypad/Decal)</b><br/>           Keypad</p> <p><b>44. RA19066 Sonalert</b></p> |
|--|---|

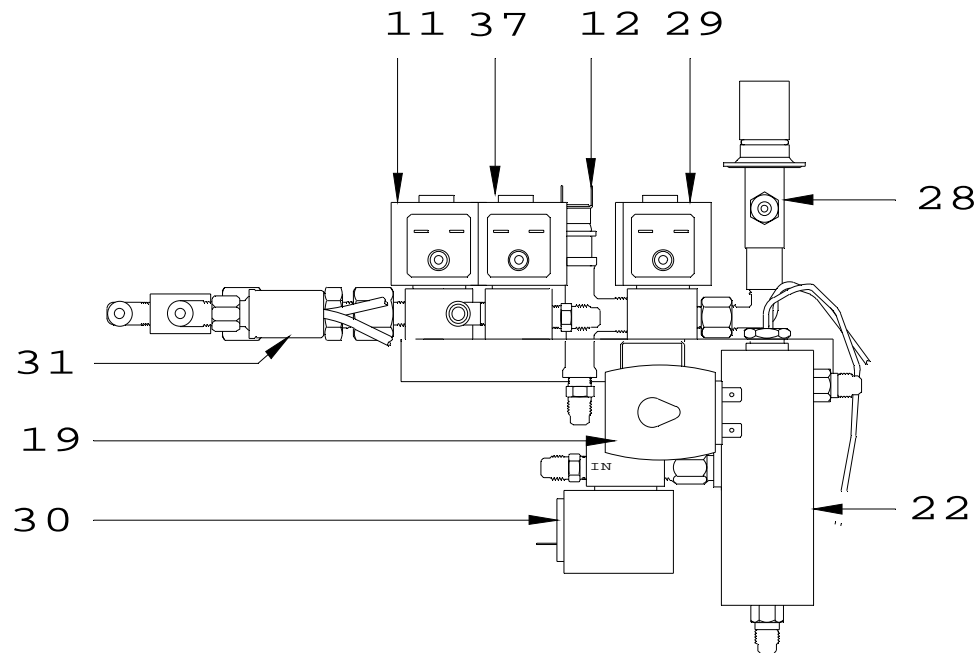
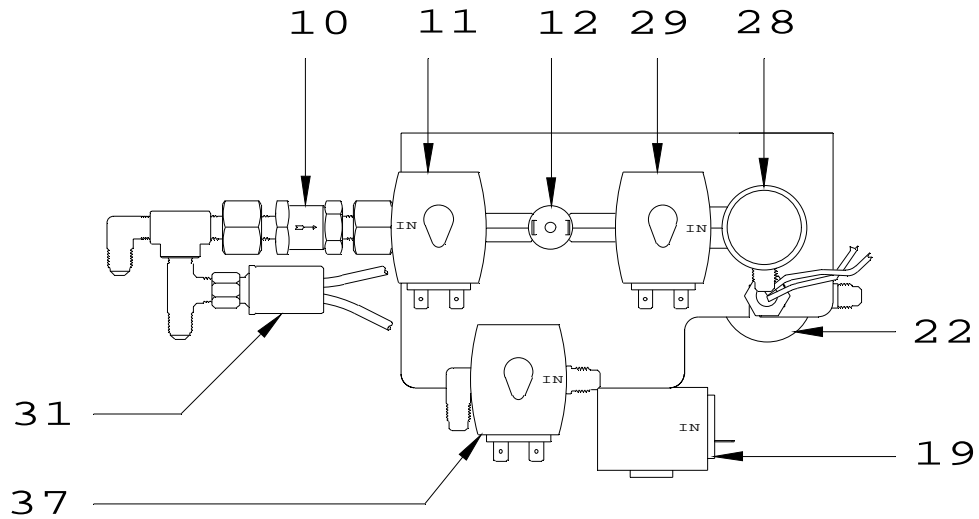
## Component Specifications



41 KEYPAD

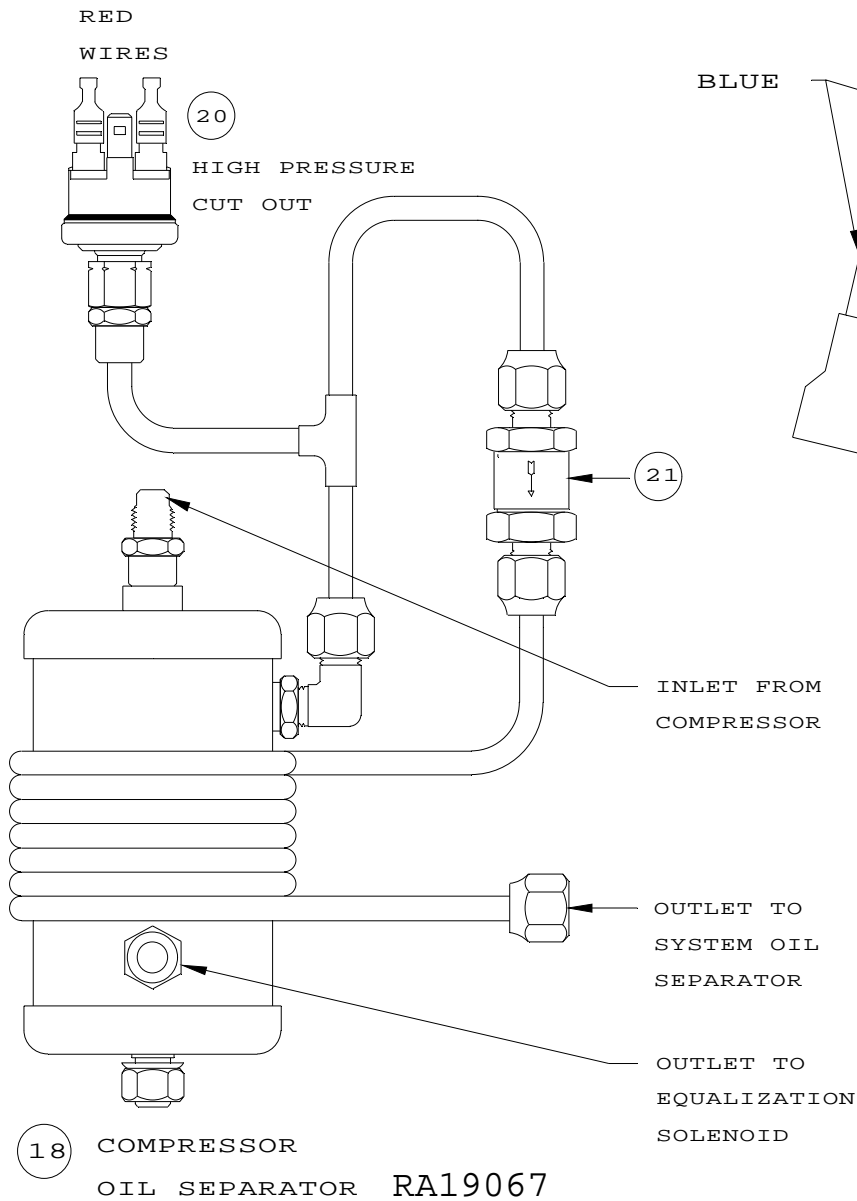
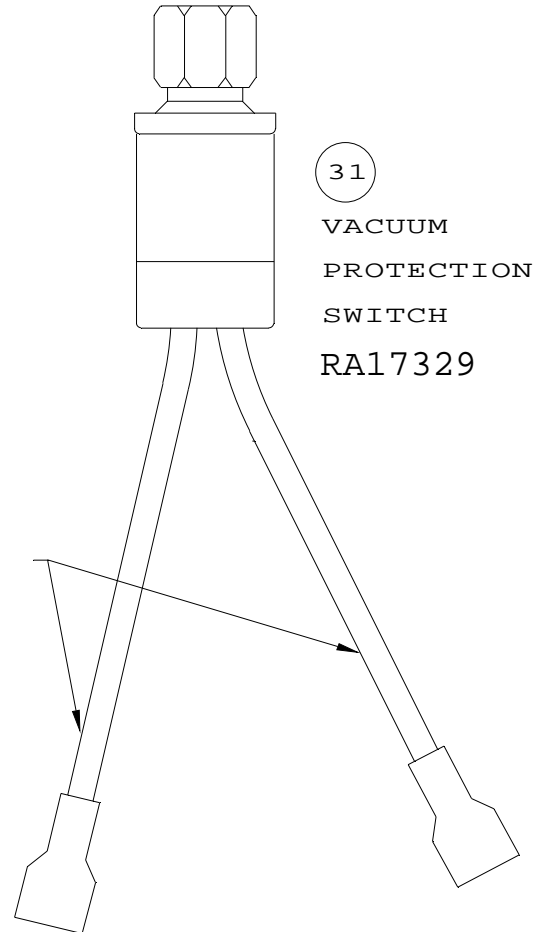
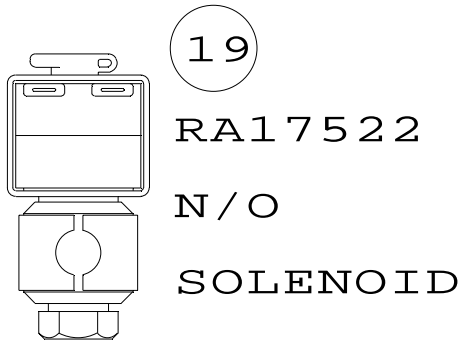
- ADD** Add refrigerant; the recovery tank has less than 8 pounds of refrigerant remaining or is beginning the add process.
- CAL** Calibrate the scale.
- CH-F** Change the filter-drier.
- CH-P** Check the pressure; there is less than 25 psi at inlet of the unit.
- CL-L** Clearing; the low side clearing routine is in progress.
- CON** Continuous; the vacuum pump will run continuously.
- CPL** Complete; the cycle process is finished.
- FIL** The filter-drier changeout is in process.
- FULL** The refrigerant tank is full.
- HI-P** High pressure; the internal unit pressure is above 405 psi.
- OIL** Change the vacuum pump oil; to reset press Shift/Reset and Enter at the same time while "OIL" is being displayed.
- U-HI** High pressure to vacuum pump.
- SCAL** Scale problem; scale may be broken or disconnected, or tank weight has exceeded 80 pounds (36 kilograms).
- 99LB** The maximum amount displayed during recovery is 99 pounds (or 99 kilograms); reset the unit.

### Component Specifications

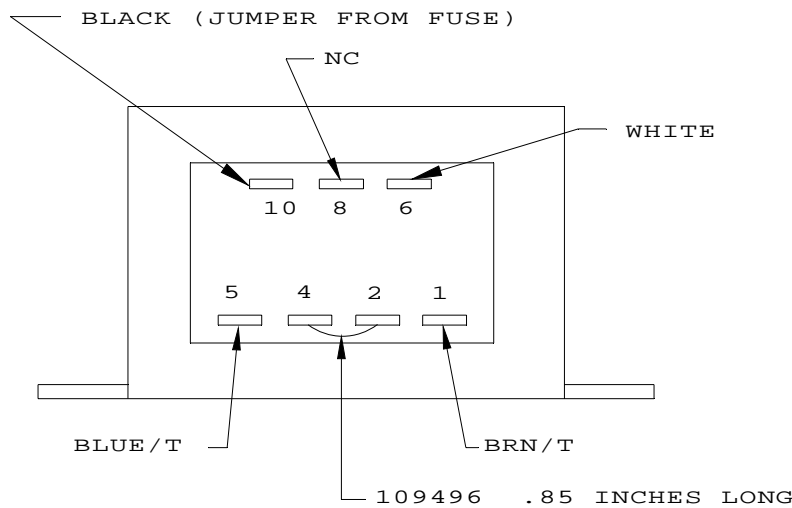
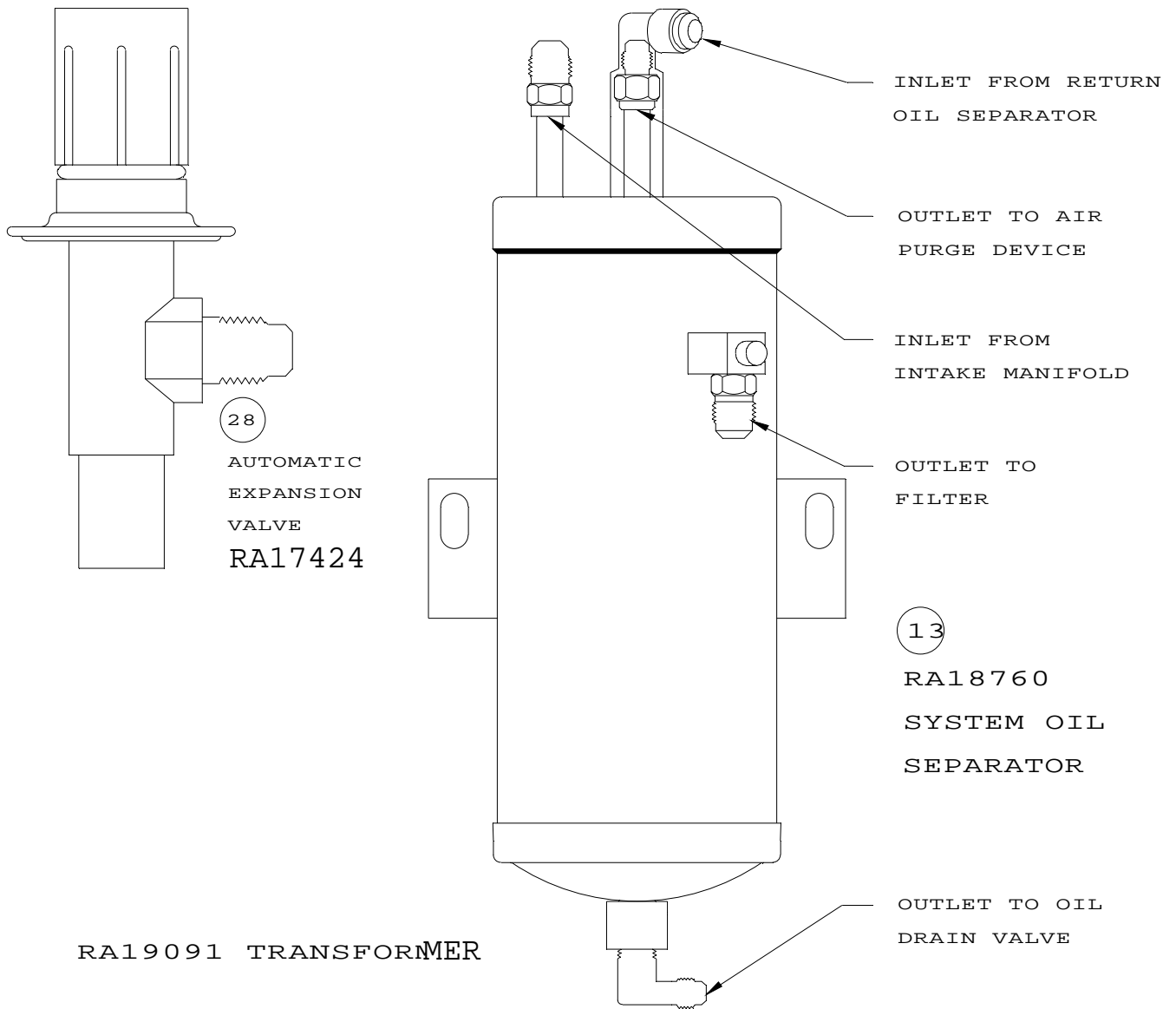


- |  |   |
|--|---|
| 10. RA17112 Inlet Check Valve  | 29. RA19006 Recycling Solenoid<br>RA19258 Solenoid Rebuild Kit            |
| 11. RA19006 Recovery Solenoid<br>RA19258 Solenoid Rebuild Kit          | 30. RA19006 Air Purge Solenoid<br>RA19258 Solenoid Rebuild Kit            |
| 12. RA17328 Vacuum Sensor  | 31. RA17329 (Old-Style)/RA19266 (New-Style) Vacuum Pump Protection Switch |
| 19. RA17522 Equalization Solenoid                                      | 37. RA19006 Charging Solenoid<br>RA19258 Solenoid Rebuild Kit             |
| 22. RA19143 (Old-Style)/RA19242 (New-Style) Automatic Air Purge Device |   |
| 28. RA17424 Automatic Expansion Valve                                  |   |

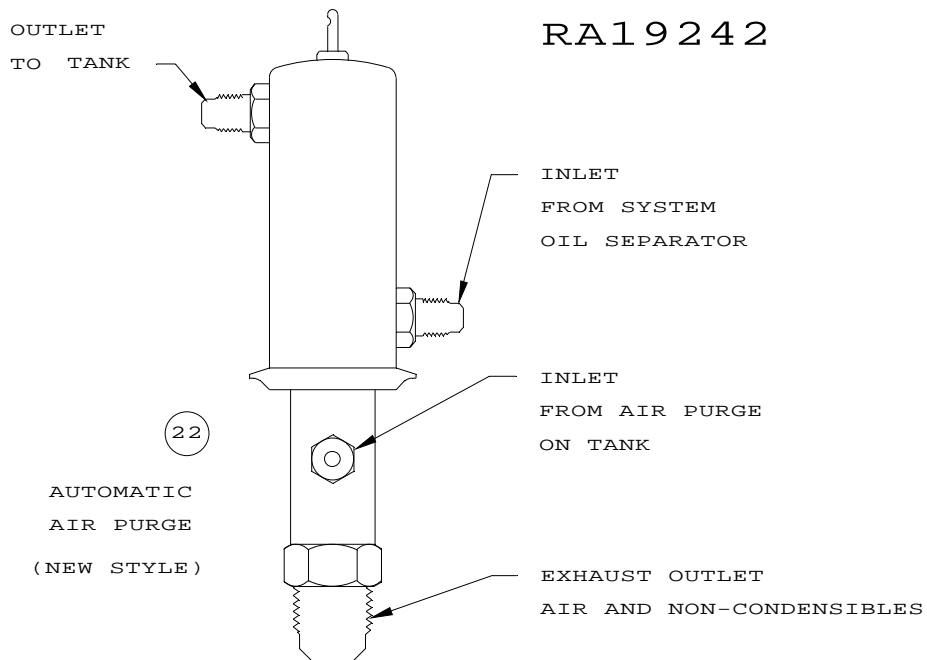
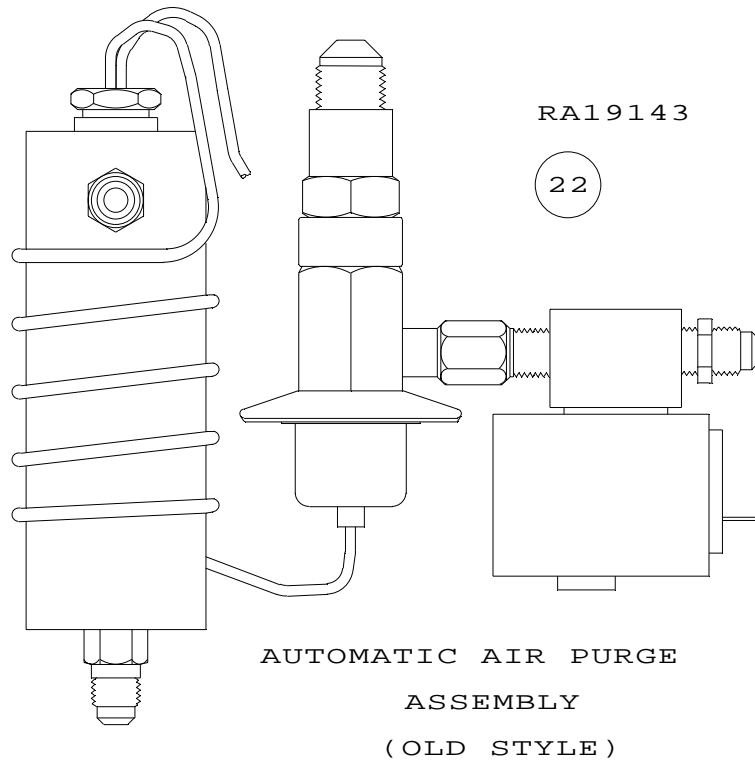
### Component Specifications



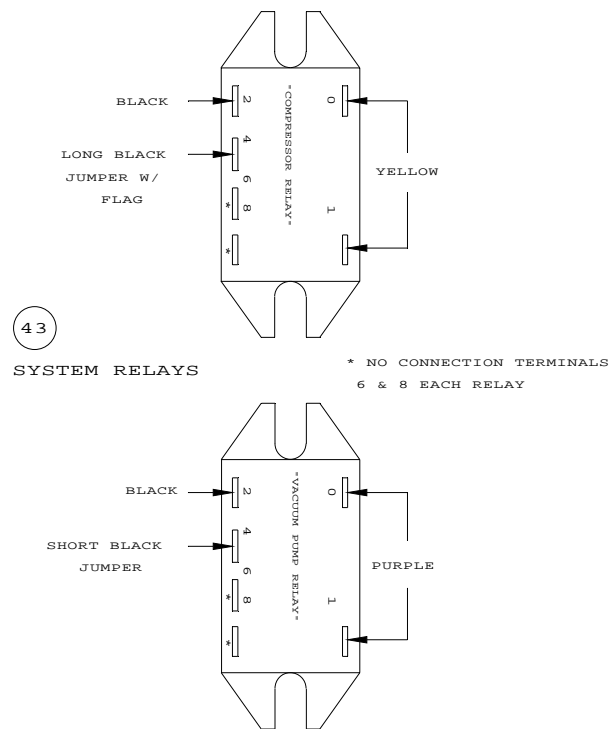
### Component Specifications



### Component Specifications



## Component Specifications



### RA17459 RELAY

The system relay energizes the compressor and allows the sensors to shut off the unit. The relay has two sets of contacts which close when the coil is energized.

Coil contacts 0 and 1, when energized, should have 110 volts across the terminals. While voltage is applied, the coil forms a magnetic field pulling the 2 and 4 and the 6 and 8 contacts together.

The 2 and 4 and the 6 and 8 contacts have power supplied to one terminal of the pair. When the coil is energized, it closes the contacts and supplies power to the mating contact.

### TROUBLESHOOTING

#### **Manual Override Ear Not Pulled In**

1. Check for proper voltage to the 0 and 1 contacts. If there is voltage, replace the relay. If there is no voltage, replace the main board.

#### **Manual Override Ear Pulled In**

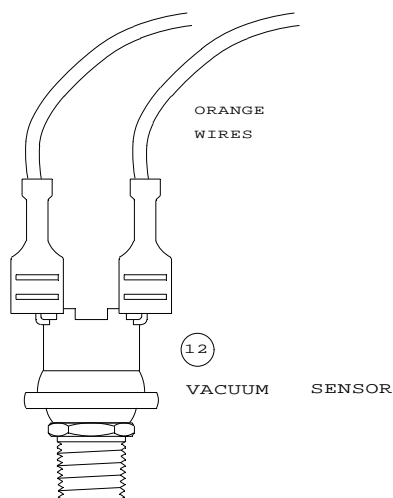
1. Check for proper voltage from the power supply contact to ground. If there is no voltage, check the voltage supply source.
2. Check for proper voltage from the mating supply contact to ground. If there is no voltage, replace the relay. **NOTE: Use of improper extension cord size can damage contact points.**

### RA17328 VACUUM SENSOR

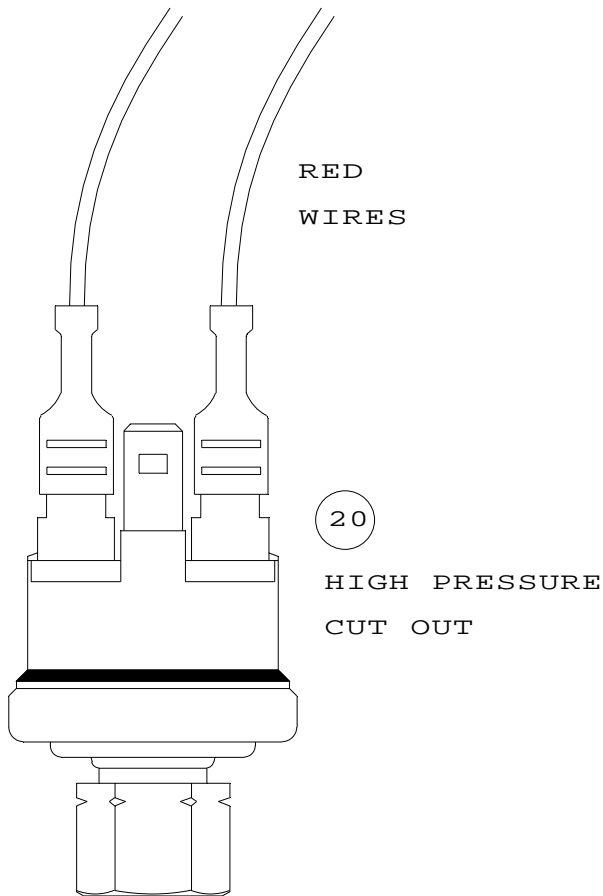
The vacuum sensor is a normally closed sensor. If a 17" ( $\pm 2$ ") rating is reached at the intake, the switch opens and breaks the coil contacts, shutting off the unit. The contacts are closed when anything above a 17" vacuum is present in the lower cavity. When a 17" vacuum is achieved in the lower cavity, the spring contact has room to force away from the mating contact.

### TROUBLESHOOTING

With pressure in the accumulator (open oil drain valve to be sure pressure is present), the switch should have continuity. If it does not, replace the switch. If the unit is shutting off before reaching a 17" vacuum, check the inlet for obstructions before replacing the switch.



## Component Specifications



### RA17529 HIGH PRESSURE CUT OUT

The high pressure cut out is a normally closed sensor designed to shut off the unit if the discharge pressure reaches 405 psi.

The pressure is detected through an orifice in the base of the sensor. In the normal setting (less than 405 psi on the orifice) the 1 and 3 contacts are closed. When 405 psi is introduced to the orifice, the pressure forces up on the drive pin. The drive pin forces the center contactor to disengage the 1 and 3 contacts and engage the 1 and 2 contacts. When this happens, the unit shuts off and turns on the high pressure light.

### TROUBLESHOOTING

#### ***Cut out shuts unit off too soon.***

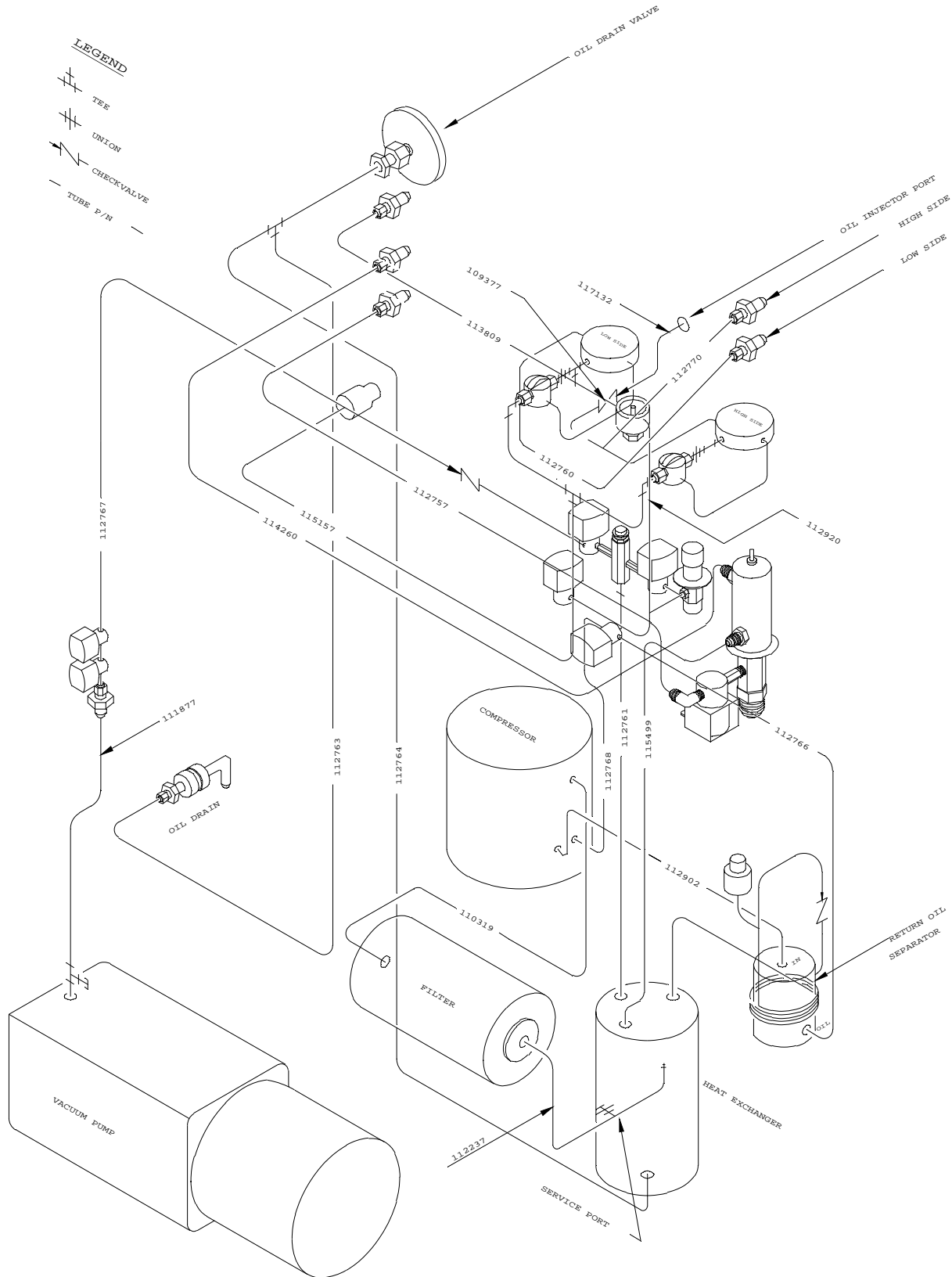
1. Verify that there are no discharge obstructions.
2. Replace the cut out.

#### ***Cut out doesn't shut off unit at or below designed pressure.***

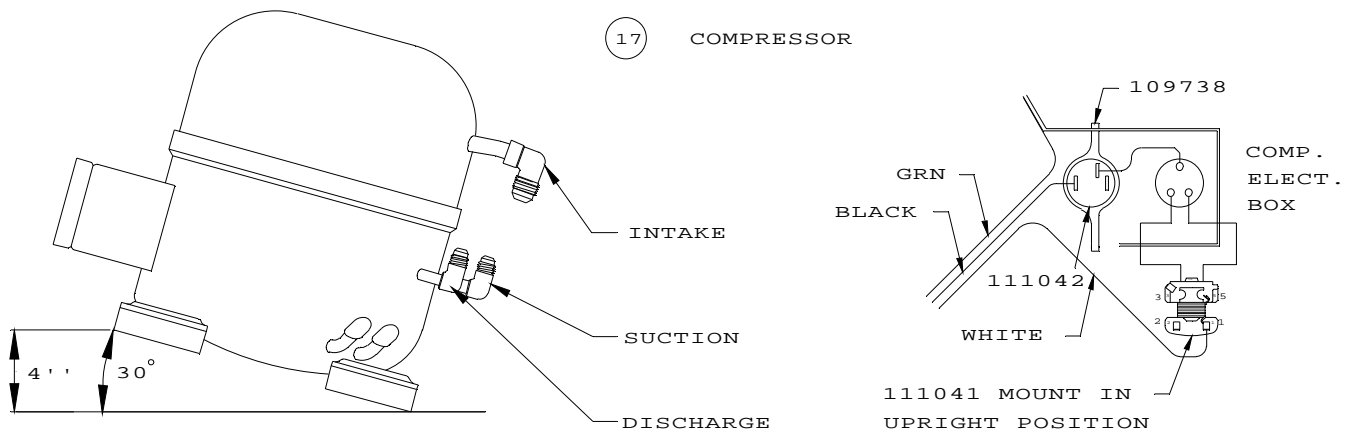
1. Check the wiring.
2. Replace the switch.



### Tubing Schematic



## Compressor Specifications and Service



### COMPRESSOR SPECIFICATIONS

<b>Type:</b>	1/3 hp hermetic (piston type) compressor
<b>Oil Capacity:</b>	11 ounces of 150 viscosity (PAG) refrigeration oil
<b>Amperage:</b>	4-6 running amperage/3-4.5 20-25 locked rotor amperage/16-19
<b>Voltage:</b>	110V/220V

### PROCEDURE FOR CHECKING OIL

1. Depressurize the unit.
2. Remove the compressor from the unit.
3. Place the compressor on a flat surface.
4. Tilt the compressor 30 degrees (see figure above). At this angle, there should be oil in the suction fitting.

### PROCEDURE FOR ADDING OIL

1. Install a hose on the suction fitting and place the loose end of the hose into a bottle containing 2 ounces of oil.
2. Start the compressor. Plug the intake fitting with a cap, but leave the discharge open. The compressor will pull the oil from the bottle.
3. Recheck the oil level. If it is still low, add 2 ounces until a proper level is achieved.

### TROUBLESHOOTING

#### **Compressor Won't Run**

1. Check for voltage to the compressor (110/220V). If there is no voltage, check the power supply for defects.

2. Jumper thermal overload. If the compressor runs, take amp draw of compressor. If it is okay, replace the thermal overload. If the compressor still doesn't run, take another amp draw. If it is drawing locked rotor amperage, replace the compressor. If there is no amp draw, inspect the start components and replace as necessary.

#### **Compressor Runs, No Suction**

1. Cap the intake fitting.
2. Install a low side gauge on the suction fitting
3. Be sure the discharge has nothing connected to it.
4. Start the compressor and monitor the suction readings (it should pull a 25" vacuum).
5. If the compressor has weak suction, check the oil level and add if necessary.
6. If the oil level is okay or oil was added with no improvement, replace the compressor.

#### **Compressor Runs, No Discharge**

1. Check the oil level and add if necessary.
2. Install a high pressure gauge on the discharge port.
3. Check the intake and suction fittings for obstructions.
4. Start the compressor.
5. Pressure should build to 350 psi in about 4 minutes. If pressure doesn't rise or reach at least 350 psi, replace the compressor.

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## Troubleshooting

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### UNIT WILL NOT COME OUT OF CL-L, COMPRESSOR RUNS (WILL NOT RECOVER)

1. If the unit is being run through an extension cord, eliminate its use.
2. Disconnect the high and low side couplers from the vehicle with the gauge valves open. If the pressure on the gauges drops while the display shows CL-L, the recovery solenoid may need to be replaced or rebuilt.
3. Check the oil drain valve. Verify that it is closed (and not bleeding through).
4. Install the low side hose (coupler) on the service port with the low side valve closed. Check the gauge. If it has positive pressure, go to Step 5. If psi is below 20" of vacuum, test the vacuum sensor for continuity. If there is continuity, replace the sensor. If there is no continuity, check the vacuum sensor wires for continuity. If the wires have continuity, replace the main board.
5. Close the tank's liquid valve. If pressure starts dropping on the gauge and the unit starts a recovery sequence, clean and rebuild the recycling solenoid.
6. Inspect the filter for flow obstructions and check for leaks around the gasket area. *NOTE:* Fittings on quick disconnects should only be hand tightened. Replace gaskets if needed. When installing gaskets, be sure to lubricate them with vacuum grease or refrigerant oil.
7. Verify that the equalization solenoid is receiving 110 volts from the main board. If it is not receiving the voltage, check the solenoid's power supply wires for continuity. If they have continuity, replace the main board.
8. If the equalization solenoid is receiving power, check the equalization solenoid for bleed through to the suction side of the compressor. Replace the solenoid if it is bleeding through while receiving power. Go to Step 9 if the solenoid is functioning properly.
9. Check the compressor discharge and suction pressure (see page 26 for detailed instructions). Replace the compressor as necessary.

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## Troubleshooting

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### UNIT WILL NOT COME OUT OF CL-L, COMPRESSOR IS OFF (WILL NOT RECOVER)

1. If the unit is being run through an extension cord, eliminate its use.
2. Remove the shroud and look for loose wires.
3. Check for voltage to the coil of the compressor relay (energized). If there is no voltage, check the wires from the main board to the compressor relay for continuity. If they have continuity, replace the main board.
4. If the compressor relay is energized (receiving 110 volts to the coil), check for voltage from the #4 contact to ground with a volt meter (it should be 110/220 volts). If there is no voltage, replace the compressor relay.
5. Check for voltage to the compressor. If there is no voltage, check the wires between the compressor and the compressor relay for continuity. Repair or replace as necessary.
6. If voltage is present at the compressor, jumper the thermal overload. If the compressor runs, check the compressor amp draw. If it is drawing higher than 6 amps or not running, replace the compressor. If the compressor is cool and drawing low amperage, replace the thermal overload.

---

### UNIT WILL NOT START OR COMPLETE RECOVERY

#### *Display Reads HI-P*

1. Check to be sure both tank valves are open.
2. Check the tank pressure (it should not exceed 300 psi). If the pressure is high, bleed the pressure down to 200 psi by recycling and allowing the automatic air purge to operate.
3. Check the red vapor tank hose for proper installation (be sure there is no obstruction at the tank fitting).
4. Check the one-amp fuse on the back of the main board for continuity and replace if necessary. If the replacement fuse also blows, check the compressor relay for shorted contacts. Replace as necessary.
5. Check the wires between the high pressure cut out and the main board for continuity. Repair or replace as necessary.

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## Troubleshooting

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### UNIT WILL NOT START OR COMPLETE RECOVERY (CONTINUED)

6. Inspect the recovery check valve for obstructions. Repair or replace as necessary.
7. Replace the high pressure cut out and retest the unit.

#### ***Display Reads FULL***

1. Check the tank weight and replace the tank if it is full.
2. Recalibrate the scale if necessary.
3. Adjustment of the P-1 pot (located on the main board, see page 16 for location) may be necessary. See "Calibrating the Scale" on pages 37 and 38. NOTE: Not all main boards have a P-1 pot, depending on the production date of the main board. If the main board does not have a P-1 pot, the main board will need to be replaced.

#### ***Display Reads SCALE***

1. Check the scale calibration and recalibrate if necessary (see pages 37 and 38).
2. Check the scale cable to be sure it is connected to the main board.  
*NOTE:* If the main board has more than one scale connection, verify that the internal/external jumper is in the proper location.
3. Replace the scale if previous attempts failed.
4. Replace the main board if replacing the scale does not correct the problem.

#### ***Display Reads CPL***

1. Check for positive pressure on the unit's manifold gauges. If there is no positive pressure, connect to a vapor supply source and attempt recovery again.
2. Look for loose wires at the vacuum sensor.
3. Connect a pressure gauge to the service port and check for positive pressure. If pressure is present, go to Step 4. If there is no positive pressure, verify that the inlet check valve is operating properly. Also verify that the recovery solenoid is opening and allowing flow. Repair or replace as necessary.
4. Check the vacuum sensor for continuity and replace if necessary.

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## Troubleshooting

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### UNIT WILL NOT START OR COMPLETE RECOVERY (CONTINUED)

#### ***Display Reads CH-P***

1. If there is less than 5 psi at the inlet, attempt recovering from a positive pressure source.
2. Verify that the wires controlling the vacuum pump protection switch have continuity.
3. If there is more than 5 psi at the inlet, replace the vacuum pump protection switch.
4. If the sensor is operating properly, press Hold/Cont to override.
5. If the main board will not allow an override, verify that the keypad is sending the signal. If it is, replace the main board.

#### ***Display Reads CH-F***

1. The "CH-F" message means the filter change time has elapsed. To reset the timer, press Shift/Reset while the "CH-F" message is displayed.  
*NOTE:* On the newer-style main boards the filter changeout routine must be performed to reset the timer.
2. If, after attempting to reset the timer, the "CH-F" message doesn't disappear, replace the main board.

#### ***Display Reads 0.00 Vacuum Program Minutes***

1. If the display does not respond to keypad commands, verify that the keypad is plugged in.
2. If there is still no response, replace the keypad (if the keypad is functioning properly, you will hear a tone when you press a key).
3. If the keypad is functioning properly, replace the main board.

---

## Troubleshooting

---

**UNIT WILL NOT EVACUATE,  
PUMP IS RUNNING**

1. Verify that the manifold gauge valves are open.
2. Verify that the high and low side hoses (couplers) are tight at all fittings.
3. Be sure the vacuum hose is snug at both ends and not obstructed. Check the hose gaskets for leaks.
4. Verify that the Iso-valve is in the open position (if so equipped).
5. Check for suction at the intake of the pump. If there is none, replace the pump.
6. Remove the shroud and look for loose wires to the vacuum solenoids.
7. Check for voltage to the vacuum solenoids. If voltage is present, rebuild the solenoids or inspect for debris.
8. Check the low side gauge for proper operation and calibration.

---

**UNIT WILL NOT EVACUATE,  
PUMP IS OFF**

### ***“U HI” on Display***

1. Be sure pressure is present at the vacuum protection switch (recover before evacuating). Unplug the switch.
2. If “U HI” goes out, check for pressure at the sensor. If there is none, replace the sensor.
3. If “U HI” remains on, replace the main board.

### ***Timer Counting Down***

1. Verify that the pump is plugged in. If the vacuum pump is equipped with an ON/OFF switch, verify that it is turned on.
2. Check the voltage at the pump receptacle.
3. If proper voltage is present, be sure that the pump is not overfilled with oil (if it is, drain the pump). Start and properly refill the pump. If proper voltage is present, replace the pump.
4. If proper voltage is not present, remove the cover and look for loose wires.

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## Troubleshooting

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### UNIT WILL NOT EVACUATE, PUMP IS OFF (CONTINUED)

5. Check the voltage to the vacuum pump relay coil. If there is no voltage, check the wires between the vacuum pump relay and the main board for continuity. If the wires are okay, replace the main board. If there is voltage at the vacuum pump relay coil, replace the relay.
6. Check for voltage from the #4 contact to ground. If there is no voltage, replace the relay.

---

### UNIT WILL NOT RECYCLE, RECYCLE PROMPT IS OFF (NO FLOW)

1. Check that all recovery tank hoses are properly installed.
2. Verify that the recovery tank valves are completely open.
3. Be sure there is a minimum of 10 pounds of refrigerant in the tank.
4. Install the low side of a manifold gauge set to the service port.
5. If positive pressure is present at the service port, remove the cover and look for loose wires to the vacuum sensor. If there are no loose wires, check for continuity on the vacuum sensor. If there is none, replace the vacuum sensor.
6. Inspect the orange wires between the main board and the vacuum sensor for continuity. If the wires and the vacuum sensor have continuity, jumper the orange wires together.
7. Start recycling if the service port is being pulled into a vacuum. Look for loose wires to the recycling solenoid and verify that 110 volts is being sent to the recycling solenoid. If there is no voltage, inspect the controlling wires for continuity. Replace the main board if the wires have continuity.
8. If the recycling solenoid is receiving 110 volts, inspect the liquid line strainer bulb for obstructions (some units have the strainer installed behind the hose gasket in the liquid hose). Replace or clean as necessary.



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## Troubleshooting

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**UNIT WILL NOT RECYCLE,  
RECYCLE PROMPT IS OFF (NO FLOW)  
(CONTINUED)**

9. If the strainer is not plugged, attempt to recalibrate the expansion valve. If you are unable to recalibrate the expansion valve, rebuild the recycling solenoid and replace the expansion valve.
10. If all previous attempts have failed, replace the main board.

---

**UNIT WILL NOT RECYCLE,  
RECYCLE PROMPT IS ON (NO FLOW)**

1. Check that all recovery tank hoses are properly installed.
2. Verify that the recovery tank valves are completely open.
3. Be sure there is a minimum of 10 pounds of refrigerant in the tank.
4. Check the oil drain valve for leaks (it should be closed).
5. Inspect the liquid line strainer for debris. Clean or replace as necessary.
6. Install the low side of a manifold gauge set to the service port.
7. Verify that the expansion valve calibration is at 35 psi. Always check the expansion valve pressure while recycling for 10 minutes with at least 10 pounds of refrigerant in the tank.
8. Check the filter for flow obstructions. Be sure gaskets are not crushed, but are sealing (replacement gasket 40084).
9. Check the equalization solenoid for internal bleed through. Replace if necessary.
10. If the compressor is not running, verify that 110 volts is being supplied to the compressor. If it is not receiving 110 volts, check the wiring for continuity and the system relay for proper operation.
11. If the compressor is receiving 110 volts but is not running, inspect the compressor start components and check the amp draw (see page 26). Replace the compressor as necessary.
12. If the compressor is running, check the compressor suction and discharge pressures as well as the oil level. Add oil if needed. If the oil is fine but there is no suction or discharge pressure, replace the compressor.

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## Troubleshooting

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### UNIT WILL NOT RECYCLE, RECYCLE PROMPT IS ON (WITH FLOW)

1. Verify that the recovery tank valves are completely open.
2. Be sure there is a minimum of 10 pounds of refrigerant in the tank.
3. Replace the filter and recycle for 1½ hours minimum.
4. Replace the moisture indicator if it will not turn green.

---

### UNIT WILL NOT PERFORM AN AIR PURGE

Note: The air purge only operates the first 10 minutes of recycling and then drops power to the air purge solenoid. A minimum of 10 pounds of refrigerant must be in the tank for the air purge to function properly.

1. Verify that the recovery tank has excess air pressure in it. The only accurate way to do this is to connect a hand-held manifold gauge set to the recovery tank's air purge fitting and check the pressure in the tank in relationship to a temperature/pressure chart.
2. If excess air pressure is confirmed, verify that all recovery tank hoses are properly connected to the tank.
3. *Slowly* open the yellow hose where it attaches to the back of the unit. If the tank is allowing access and the yellow hose is unobstructed, pressure will be released. Repair or replace as necessary.
4. If the yellow hose has flow, remove the front cover and verify that the exhaust port of the air purge device is not obstructed.
5. While recycling for at least three minutes, verify that 110 volts is being sent to the air purge solenoid. If it is not getting 110 volts, inspect the control wires for continuity. Repair or replace as necessary. If the air purge solenoid is getting 110 volts, go to Step 7.
6. If the wires have continuity, replace the main board.
7. If the solenoid is receiving 110 volts, remove the air purge solenoid and verify that pressure passes through it when receiving power. Rebuild or replace as necessary.
8. If the air purge solenoid is operating properly, replace the air purge device and retry recycling.

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## Troubleshooting

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### UNIT WILL NOT CHARGE, NO PRESSURE ON GAUGES

1. Verify that the tank's liquid valve is open.
2. Verify that the manifold valves are completely open and unobstructed.
3. Inspect the liquid hose for proper installation on the tank, and check for crushed hose gaskets.
4. Verify that the liquid line strainer is unobstructed. Replace or clean as necessary.
5. Verify that the main board has accepted program.
6. Remove the shroud and look for loose wires.
7. If the main board does not accept a program, replace it. Be sure the keypad is sending a program signal before replacing. If the keypad is sending a signal, an audible tone will sound when keys are pressed.
8. Check the voltage at the charging solenoid. If there is no voltage, check the wires for continuity. If the wires are okay, replace the main board. If there is proper voltage to the solenoid, rebuild or replace the solenoid.

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### UNIT WILL NOT CHARGE, PRESSURE ON GAUGES

1. Verify that the access couplers and ports are engaged on the system.
2. Be sure there is a minimum of 10 pounds of refrigerant in the tank.
3. Be sure the scale moves freely and is unobstructed.
4. Verify charging through both the high and low side hoses.
5. Check for proper voltage to the charging solenoid (is voltage being dropped erratically to the charging solenoid?). If voltage is fine, go to Step 6. If there is a problem with the voltage, replace the main board.
6. Close the high side valve, start the vehicle and pull in the remaining charge on the low side of the system. When the remaining charge has been pulled from the tank, the charging solenoid will close preventing a possible overcharge.

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## RA19064 Replacement Main Board

The main board is used in the Series 17700 R-12 or R-134a units. The boards have had several revisions since their first introduction in May of 1991. They can easily be identified by the six-digit part number stenciled in white lettering on the back side of the main board.

The **first generation board** (part number 111367) performs several basic functions:

- Recovery automatic shutdown
- Displays amount recovered
- Programmable vacuum time
- Programmable charge amount
- Manual diagnostics:
  - #1 starts vacuum pump
  - #2 engages add sequence
  - #5 turns on the entire display
  - #6 displays scale readings

The **second generation board** (part number 111961) performs the same basic functions, but adds the automatic calibration feature. This feature enables the user to easily and accurately calibrate the scale. The 10-hour timer on the oil change procedure for the vacuum pump was also added.

- Automatic scale calibration
- Vacuum pump oil change timer

*NOTE:* See the automatic scale calibration instructions on page 37.

The **third generation board** (part number 113139) performs all the basic functions with automatic calibration and the vacuum pump oil timer and adds the new function of low side clearing as well as a timed oil return to the compressor.

The low side clearing feature allows the user to receive a more accurate reading of the amount of refrigerant recovered. To do this, the board does not apply power to the recovery solenoid when the Recover key is pressed. The solenoid remains closed until the inlet tubing is in a 17" vacuum. When a vacuum is reached, the vacuum sensor opens, the main board detects that and the recovery solenoid then opens. After the recovery solenoid opens, the vacuum sensor closes and the scale displays the amount of refrigerant being recovered. Before the recovery solenoid opens, the screen will display the "CL-L" message. This board also has timed oil return every 10 minutes for three seconds, whereas the older boards only allow oil to return when the compressor shuts off.

- Low side clearing
- Timed oil return to the compressor

The **fourth generation boards** are designed for specialty units. They all have the same basic functions (low side clearing and automatic calibration capabilities) with specific programs for that unit:

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## RA19064 Replacement Main Board

### **113285 (17534 GM)**

- The “CH-P” message alerts the operator that there is less than 5 psi at the inlet
- 15-minute minimum vacuum time

### **113429 (34700 OTC)**

- 20-minute minimum vacuum time
- 15-hour vacuum oil timer

### **112343 (17534, NI, NIA, INF)**

- 20-minute minimum vacuum time
- No refrigerant counter
- No filter change warning

### **113286 (17534 BMW, BMWA)**

- 30-minute minimum vacuum time

A **fifth generation board** uses the previous basic functions with automatic calibration, low side clearing, timed oil return and a 10-hour oil time change. The board can be programmed for a minimum vacuum time, oil change time and filter change time.

The board automatically defaults to a 15-minute vacuum time, 10-hour oil change and 300-pound filter change. The board also has the “CH-P” message, which is initiated when recovery is engaged. If there is less than 5 psi at the inlet of the unit, this prompt will appear. The board can read the amount of refrigerant recovered over a period of time (week or month, depending upon how often you want to check it). To access that function, you must enter manual diagnostics and press 3. The amount recovered will be displayed. To “zero out” the display, press the Shift/Reset and Enter keys. You can also read the amount of refrigerant in the tank by accessing diagnostics and pressing 7.

- Programmable settings for oil changes, filter change time
- Running refrigerant counter
- Diagnostics 7 counter for refrigerant weight

The **sixth generation board** (part number 114240) is identical to the fifth generation board except for the addition of one feature. When the unit is in the Program Charge mode and an amount is requested that drops the recovery tank’s capacity below 6 pounds, the “ADD” message appears on the display. This alerts the user that there is insufficient refrigerant in the tank to properly charge the system.

- Add refrigerant when less than 6 pounds of refrigerant is in the tank and a charge is requested.

The **seventh generation board** (part number 115309) has no feature changes, but the overall layout of components changed.

## RA19008 Replacement Scale

There are two types of scales used on the Series 17700 units. They both handle a 50-pound tank and have the same overflow shut off protection of 73 pounds. Where the two scales differ is in the method of calibration. The first type of scale is calibrated using trim pots mounted on the scale board. The second type of scale has no scale board and is calibrated through programming of the main board. Both scales have different design harness connections at the main board. The two types of scales have been manufactured by different vendors and can be identified using the "Scale Specifications" chart on page 38 and 39.

### CHECKING THE SCALE ACCURACY

The method of checking the scale accuracy is the same for both types of scales:

1. Turn on the Main Power switch.
2. Press the Shift/Reset key until the Program prompt is highlighted on the display.

*NOTE:* If the unit is just being turned on, the screen defaults to the Program mode. When the screen displays the Program prompt, press Shift/Reset and Enter at the same time. The screen will be blank when the manual diagnostics mode has been accessed properly.

3. Press 6 to turn the scale into a direct reading weight scale. The scale should read  $\pm 0$  to 2 pounds with nothing on the scale other than the empty platform. The scale will need to be recalibrated if the reading is out of tolerance.

*NOTE:* If the scale does not react to testing, be sure the scale is plugged into the main board.

### CALIBRATING AN OLD-STYLE SCALE

1. Unplug the unit from the power source.
2. Remove the scale platform.
3. Remove the scale box cover and the four scale mounting nuts.

4. Lift the scale assembly out of the box and turn it to rest on the scale box with the adjusting pots facing out. Replace the platform on the scale assembly.

**CAUTION!** Do not remove the scale board from the mounting plate to attempt calibration. If this is done, the board could be shorted and possibly damaged.

5. Plug the unit into the power source and turn on the Main Power switch.
6. Press Shift/Reset and Enter at the same time. Press 6 to display the scale weight.
7. With only the scale platform on the scale, adjust the high gain pot until the display reads "0.00."
8. Place a known weight of 20 pounds on the scale. The display should read 20 pounds. If it does not, place an additional 20-pound weight on the scale. The display should read 40.00 pounds, plus or minus three percent. If it does not, adjust the high gain pot to read 40.00 pounds.
9. Remove the second 20-pound weight. The display should read 20.00 pounds, plus or minus three percent. If it does not, adjust the low gain pot to read 20.00 pounds.

*NOTE:* Adjustments between 20 and 40 pounds may need to be repeated to ensure proper calibration.

10. Remove all weight from the platform. The display should read 0.00 pounds, plus or minus one pound. Place a 20-pound weight on the platform. The scale should read between 19.40 and 20.60 pounds.

*NOTE:* If the scale won't calibrate, replace the scale. When calibration is complete, re-assemble the scale box.

## RA19008 Replacement Scale

### CALIBRATING A NEW-STYLE SCALE

1. Remove all weight from scale platform.
2. Turn on the Main Power switch.
3. Press Shift/Reset and Enter at the same time.
4. Press 8-7-8-7. The display will show "A-1."

*NOTE:* If you press any other key before the 8-7-8-7 sequence, you will not be able to enter the automatic calibration routine.

5. Press 0 and then Enter. The display will show "0.00" and then change to the "A-2" message.
6. Place a known weight (between 10 and 80 pounds) in the center of the platform. Enter that weight on the display using the keypad, then press Enter. The display will return to the vacuum mode.
7. Check the scale accuracy by pressing Shift/Reset and Enter at the same time. When the diagnostics mode is entered (the display will be blank), press 6. The display will show the amount of weight on the scale platform.

### SETTING THE P-1 POT

1. Press Shift/Reset and Enter at the same time. When the diagnostics mode is entered (the display will be blank), press 6. The display will show the amount of weight on the scale platform.
2. Add weight to the scale platform until the "HOLD" message appears on the display. Then turning the P-1 pot clockwise to increase the amount allowed on the scale before the "HOLD" indicator appears. Turning the P-1 pot counter-clockwise decreases the amount of weight allowed before "HOLD" will appear.
3. Set the P-1 pot so that with 73 pounds on the scale the "HOLD" message appears. Lift the weight on the scale and "HOLD" should disappear.

*NOTE:* If the scale won't calibrate, replace the scale.

### RA19008 SCALE SPECIFICATIONS (OLD-STYLE)

Manufacturer .....	Robinair
Application .....	17700-style units until 3/92
Capacity .....	50-pound tanks
Control .....	Circuit board on scale
Cable .....	Gray in color
Connector .....	5 pins
Dimensions .....	6¾"W, 6"L
Maximum Capacity .....	81.74 pounds

### RA19008 SCALE SPECIFICATIONS (NEW-STYLE)

Manufacturer .....	Robinair
Application .....	17700-style units
Capacity .....	50-pound tanks
Control .....	Main PC board
Cable .....	Gray in color
Connector .....	4 pins
Dimensions .....	6¾"W, 6"L
Maximum Capacity .....	81.74 pounds

### RA19008 SCALE SPECIFICATIONS (NEW-STYLE)

Manufacturer .....	Tedea Huntleigh
Application .....	17700-style units
Capacity .....	50-pound tanks
Control .....	Main PC board
Cable .....	Black in color
Connector .....	4 pins
Dimensions .....	5¾"W, 7½"L
Maximum Capacity .....	81.74 pounds
Date First Used .....	7/29/93

### RA19008 SCALE SPECIFICATIONS (NEW-STYLE)

**This scale can give floating scale readings. It should be replaced if performing questionably.**

Manufacturer .....	Hitech
Application .....	17700-style units
Capacity .....	50-pound tanks
Control .....	Main PC board
Cable .....	Gray in color
Connector .....	4 pins
Dimensions .....	5¾"W, 7½"L
Maximum Capacity .....	81.74 pounds
Date First Used .....	8/16/93

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## Diagnostic Procedures

### DIAGNOSTIC PROCEDURES

To access the diagnostics mode, press Shift/Reset and Enter at the same time. When the display is blank, you'll know diagnostics has been successfully entered. Pressing these keys while in the diagnostics mode produces these results:

- 1 Vacuum pump runs continuously
- 2 "ADD" message displays, compressor starts
- 3 Total amount of refrigerant recovered to date displays
- 4 Not used
- 5 Displays all LCD information
- 6 Shows the total weight on scale
- 7 Shows the weight on the scale less 27 pounds
- 8 Not used
- 9 Not used
- 0 Not used

Press Shift/Reset and Enter at the same time, then press Shift/Reset and Filter at the same time to enter the diagnostics level. Pressing these keys then produces these results:

- 1 Actuates the air purge solenoid, if so equipped
- 2 Not in use
- 3 Actuates the equalization solenoid
- 4 Actuates the compressor
- 5 Actuates the vacuum pump
- 6 Actuates the recovery solenoid
- 7 Actuates the recycling solenoid
- 8 Actuates the charging solenoid
- 9 Actuates the vacuum solenoid



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## Function Check

### RECOVERY CHECK

1. Turn on the Main Power switch.
2. Install the loose end of the low side hose (coupler) to the service port located between the filter and accumulator.
3. Close the low side manifold valve.
4. Open the high side manifold valve.
5. Verify that all tank hoses are properly attached to the recovery tank.
6. Completely open both tank valves.
7. Press Recover. The compressor will start and the low side gauge will pull into a 17" vacuum.

*NOTE:* The unit's low side gauge will pull to a 17" vacuum and start the recovery process (recovery is engaged when the scale reading is displayed). The low side gauge will pull to a 17" vacuum again and the unit will shut off.

8. When recovery is complete, the display will show a scale weight and then display the "CPL" message.
9. The low side manifold gauge will build positive pressure and a pressure transfer should be heard. This is the result of the equalization solenoid opening and returning oil to the compressor. If no pressure rise occurs, the equalization solenoid and its tubing must be inspected for obstructions
10. Disconnect the low side hose (coupler) from the service port and open the low side manifold valve.
11. Press Recover. The unit will recover to 17" of vacuum and shut off.

### EVACUATION & RECYCLING CHECK

*NOTE:* The recovery tank must have at least 10 pounds of refrigerant in it to perform this test.

1. Close the high side manifold valve.
2. Install the loose end of the low side hose (coupler) from a separate hand-held manifold gauge set to the service port. Verify that the valves are closed on hand-held manifold gauge set.

3. Program a 20-minute vacuum into the main board and start the automatic vacuum process. The vacuum pump will start.
  4. Verify that the low side manifold valve on the unit's control panel is open.
  5. The low side gauge on the unit will start registering a vacuum.
  6. Within 10 to 15 seconds of the vacuum pump starting, the Recycle prompt will appear on the display and a click will be heard (the compressor is starting and the recycling solenoid is being energized).
  7. After 60 seconds of recycling, the air purge solenoid will be receiving 110 volts to open it. If air is being purged, the solenoid is getting 110 volts. In some cases no air will be present and the voltage needs to be checked to verify the solenoid operation.
  8. After 5 minutes the low side gauge on the unit's control panel will be in a 29" to 30" vacuum.
  9. The low side gauge on the hand-held manifold gauge set will rise to around a 30 to 40 psi reading (expansion valve pressure).
  10. After 20 minutes of recycling, the moisture indicator will turn mint green, indicating that the refrigerant is dry.
  11. When the unit shuts off automatically (completes the vacuum process), disconnect the low side hose (coupler) from the service port.
  12. The low side manifold gauge on the unit's control panel should hold a vacuum. If it does not, inspect the quick coupler and hose for leaks.
  13. Close the tank's red vapor valve.
  14. Disconnect the tank's red vapor hose from the tank.
  15. Using a separate manifold gauge set, verify that the manifold gauge valves are closed.
  16. Connect the tank's red vapor hose to the high side of the separate manifold gauge set.
  17. Connect the hose between the center port of the hand-held manifold gauge set to the tank's vapor fitting.
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## Function Check

18. Open the tank's red vapor valve but do not open the red high side valve on the hand-held manifold gauge set.
19. Press Shift/Reset.
20. Press Shift/Reset and 1 at the same time. The unit will begin recycling and the high side manifold gauge will start increasing pressure.
21. The unit will shut off when the high side manifold gauge shows a pressure of 405 psi ( $\pm 20$  psi). The display will show the "HI-P" message.
22. The pressure on the high side gauge should hold for at least three minutes. If the pressure drops instantly or bleeds off steadily, replace the recovery check valve.
23. After checking for pressure loss, *slowly* open the high side manifold valve to equalize the unit and tank pressure.
24. Once the pressure is equalized, close the tank's red vapor valve.
25. Close the high side manifold valve and disconnect (at the tank end) the hose between the tank's red vapor valve and the manifold gauge set.
26. Disconnect the tank's red vapor hose from the manifold gauge set.
27. Reconnect the tank's red vapor hose to the tank's red vapor valve.
28. Open both manifold gauge valves on the unit's control panel and press Recover. Allow the unit to recover until it automatically shuts off.

### CHARGING AND SCALE CHECK

1. Turn on the Main Power switch.
2. Press Shift/Reset and Enter at the same time, then press 6.
3. Check the scale accuracy and recalibrate if necessary (see pages 37 and 38).
4. Install the high and low side hoses to the vapor and liquid valves of a separate reusable cylinder.

*Note:* In order to do this, specially purchased 35296 and 35396 hoses must be used.

5. Program a 2-pound charge into the main board.
6. Open both manifold gauge valves and start the automatic charging process. The charging process will stop when the programmed amount of weight has been lost from the scale and the display will show the "CPL" message.
7. Recover the refrigerant charged into the tank.

*NOTE:* To ensure a complete charge, recycle for at least five minutes before attempting to charge. During this process the refrigerant is heated in the recovery tank.

### LABOR RATES

Robinair authorizes a 1¼ hour charge to troubleshoot and complete a full function test on units that are covered under factory warranty (this includes leak testing). The authorized time for parts replacement is 15 minutes per part. Some items require an additional amount of time to facilitate installation. These items and their times are listed below. If repairs are estimated to exceed three hours, prior authorization from Robinair is required.

Components	Total Time
RA17424 Expansion Valve	30 minutes
RA19006 Recycling Solenoid	45 minutes
RA19006 Recovery Solenoid	45 minutes
RA19064 Main Board	30 minutes
RA18760 System Oil Separator	30 minutes

*NOTE:* The RA19258 Solenoid Rebuild Kit is the standard method for repairing a RA19006 solenoid. If a solenoid must be replaced, it must be described in detail on the warranty claim to justify its replacement and reimbursement.

*NOTE:* Robinair considers filters to be a consumable item and they are not covered under warranty. This includes parts and labor.