AC1234-3 - AC1234-3P - AC1X34-3 - AC1X34-3P
BAC 3000yf - BAC 3000a

en Repair instruction
A/C Service Unit

SERVICE: ac-support@robinair.com

Direct any discrepancies or corrections
to the address above.

Table of Contents

Safety Warnings

Explanation of Safety Signal Words Used in this Manual

The safety signal word designates the degree, or level, of hazard seriousness.

DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION: Used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

These safety messages cover situations Robinair is aware of. Robinair cannot know, evaluate, and advise you as to all possible hazards. You must verify that conditions and procedures do not jeopardize your personal safety.

Explanation of Safety Decals Used on the Machine

	Carefully read the instructions.
	Do not use in open air in case of rain or high humidity.
	Wear gloves.
	Wear protection goggles.
	Alternating voltage.
	Grounding protection.
	Electrical shock hazard.

WARNINGS: To prevent personal injury,

ALLOW ONLY QUALIFIED PERSONNEL TO OPERATE THE MACHINE. Before operating the machine, read and follow the instructions and warnings in this manual. The operator must be familiar with air conditioning and refrigeration systems, refrigerants, and the dangers of pressurized components. If the operator cannot read this manual, operating instructions and safety precautions must be read and discussed in the operator's native language.

USE THE MACHINE AS OUTLINED IN THIS MANUAL. Using the machine in a manner for which it was not designed will compromise the machine and nullify the protections provided.

PRESSURIZED TANK CONTAINS LIQUID REFRIGERANT. Do not overfill the internal storage vessel (ISV), because overfilling may cause explosion resulting in personal injury or death. Do not recover refrigerants into nonrefillable containers; use only type-approved refillable containers that have pressure relief valves.

HOSES MAY CONTAIN LIQUID REFRIGERANT UNDER PRESSURE. Contact with refrigerant may cause personal injury, including blindness and frozen skin. Wear protective equipment, including goggles and gloves. Disconnect hoses using extreme caution. Ensure the phase has been completed before disconnecting the machine to prevent the release of refrigeration to the atmosphere.

DO NOT BREATHE REFRIGERANT AND LUBRICANT VAPOR OR MIST. Refrigerant reduces the oxygen available for breathing, resulting in drowsiness and dizziness. Exposure to high concentrations of refrigerant causes asphyxiation, injury to the eyes, nose, throat, and lungs, and can affect the central nervous system. Use the machine in locations with mechanical ventilation that provides at least one air change per hour. If accidental system discharge occurs, ventilate the work area before resuming service.

DO NOT DISPERSE THE REFRIGERANT INTO THE ENVIRONMENT. Such a precaution is necessary to prevent the possible presence of refrigerant in the working environment.

TO REDUCE THE RISK OF FIRE, do not use an extension cord**.** An extension cord may overheat and cause fire. If you must use an extension cord, use the shortest possible cord with a minimum size of 14 AWG.

TO REDUCE THE RISK OF FIRE, do not use the machine in the vicinity of spilled or open containers of gasoline or other flammable substances.

TO REDUCE THE RISK OF FIRE, do not use the machine in the vicinity of flames and hot surfaces**.** Refrigerant decomposes at high temperatures, freeing toxic substances to the environment which are noxious to the user.

TO REDUCE THE RISK OF FIRE, do not use the machine in environments containing explosive gases or vapors.

DO NOT USE COMPRESSED AIR TO PRESSURE TEST OR LEAK TEST THE MACHINE OR VEHICLE AIR CONDITIONING SYSTEM. Mixtures of air and refrigerant can be combustible at elevated pressures. These mixtures are potentially dangerous and may result in fire or explosion causing personal injury and / or property damage.

HIGH VOLTAGE ELECTRICITY INSIDE THE MACHINE HAS A RISK OF ELECTRICAL SHOCK. Exposure may cause personal injury. Disconnect the power before servicing the machine.

NEVER LEAVE THE MACHINE LIVE IF AN IMMEDIATE USE IS NOT SCHEDULED. Disconnect the electrical supply before a long period of inactivity or before internal maintenance is performed. To ensure that unauthorized personnel cannot run the machine, use the Lockout / Tag Out feature.

DO NOT MODIFY THE PRESSURE RELIEF VALVE OR CHANGE THE CONTROL SYSTEM SETTINGS. Using the machine in a manner for which it was not designed will compromise the machine and nullify the protections provided.

Further information regarding health and safety may be obtained from the refrigerant manufacturer.

WARNING: Warranty is not valid in all cases of improper use of the machine and if the machine is not submitted to periodic ordinary and extraordinary maintenance (according to PED directive 2014/68/EU) provided in this original instructions. The manufacturer therefore declines all responsibilities for any damage resulting from not observing all the instructions and warnings provided to the user regarding installation, use and maintenance.

PED directive 2014/68/EU

The machine includes parts subject to PED EU directive 2014/68/EU, Pressure Equipment Directive. PED directive regulates all the pressurized part defining for them categories based on volume-pressure ratio and based on fluid refrigerant type. Those parts then have not to be anyhow modified nor removed. Under the responsibility of the owner, the machine and parts falling in the scope of PED shall be checked either during commissioning and periodically fulfilling local country regulations and norms. Parts in the scope of PED are:

- Tank.
- Pressure relieve valve.
- High pressure switch.
- Recovery group.
- Piping.

Call Robinair service center to get technical specifications for each part listed.

INTRODUCTION

Introduction

Model AC1X34-3/BAC 3000a - AC1234-3yf/BAC 3000yf is designed to be compatible with existing service equipment and standard service procedures. This machine is a single-pass system that meets specifications for recycled refrigerant. Follow recommended service procedures for the containment of refrigerant.

The machine includes a high-vacuum pump for fast, thorough evacuation. The compressor pulls the A/C system to -0.45 bar.

Note: Refrigerant systems require special oils. Refer to the A/C system manufacturer's service manual for oil specifications.

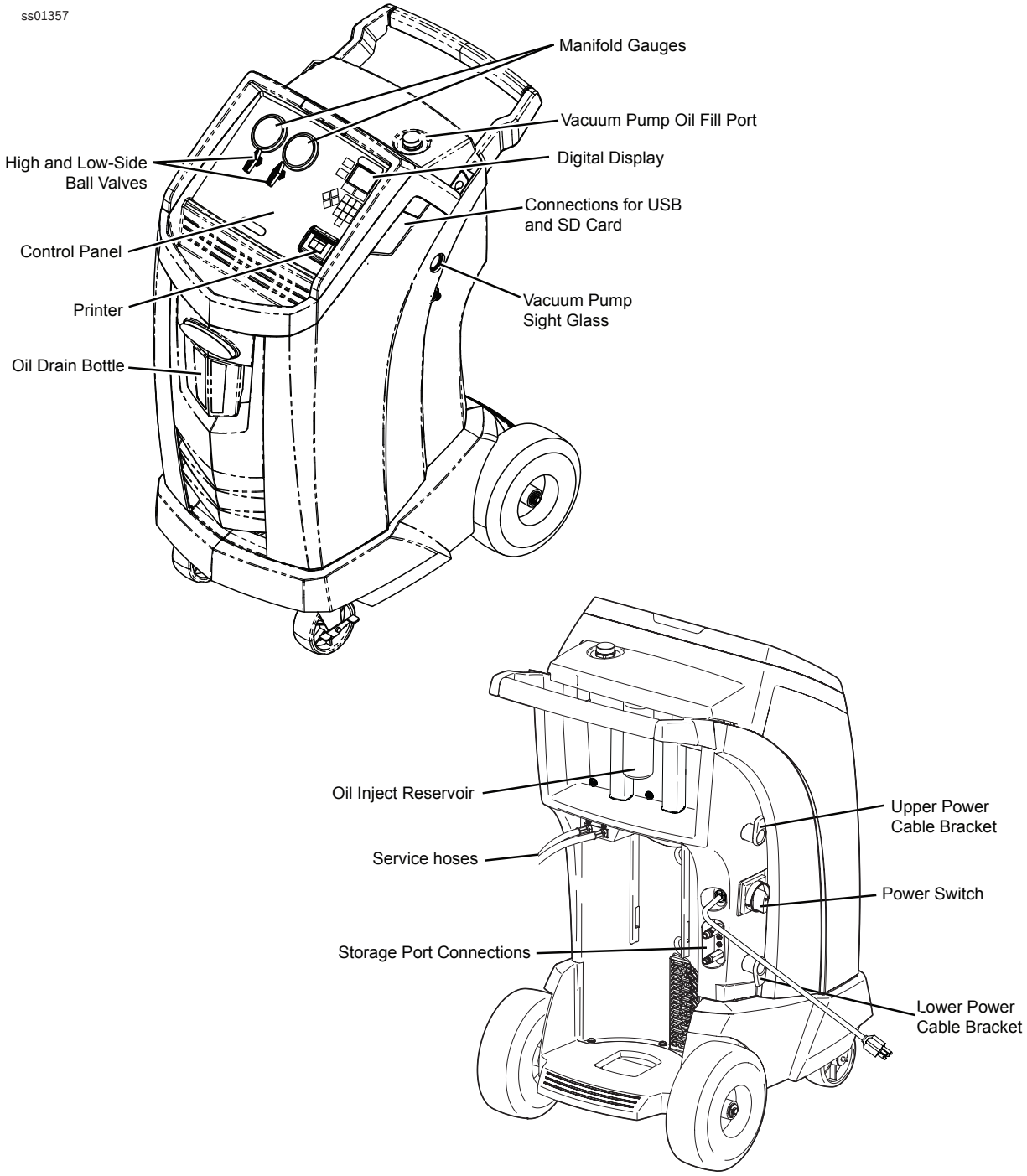


Figure 1-1. AC1X34-3/BAC 3000a - AC1234-3yf/BAC 3000yf Features

Control Panel Functions

ALPHA-NUMERIC KEYPAD allows the user to enter data when called for by the machine.

ARROW UP moves selection of a menu item to the previous item; turns up audio volume.

ARROW LEFT scrolls to the previous screen; rewinds the video.

ARROW RIGHT scrolls to the next screen; fast forwards the video.

ARROW DOWN moves selection of a menu item to the following item; turns down audio volume.

F1 makes a selection or answers a query.

F2 makes a selection or answers a query.

HELP displays information related to the current display.

MENU accesses additional functions and setup parameters.

DATABASE supplies information regarding charge capacity by vehicle model.

AUTOMATIC activates a menu that helps the user set up an automatic recover / vacuum / leak test / charge sequence.

RECOVER activates the sequence to recover refrigerant from the vehicle A/C system.

VACUUM activates the sequence that pulls a deep vacuum on the vehicle A/C system to remove air and moisture.

CHARGE activates the sequence that charges the vehicle A/C system with a programmed amount of refrigerant.

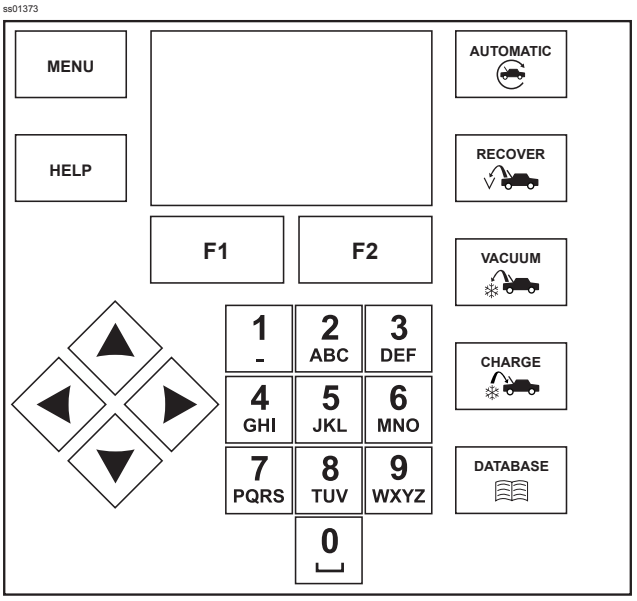


Figure 1-2. Control Panel Keyboard

Glossary

A/C System: The vehicle air conditioning system being serviced.

Evacuation: Moisture and other incondensables are removed from an A/C system by using a vacuum pump.

Internal Storage Vessel (ISV): The refillable refrigerant storage tank designed specifically for this machine; 8.5 kg capacity.

Machine: Model No. AC1X34-3/BAC 3000a - AC1234-3yf/BAC 3000yf.

Recovery/Recycling: Refrigerant is recovered from an A/C system, filtered, and stored in the ISV.

Refrigerant: R1234yf and R134a.

Source (or External Tank) : A disposable tank of new refrigerant used to refill the ISV; not included.

Setup Menu Functions

Access the following functions by pressing the Menu key and selecting Setup.

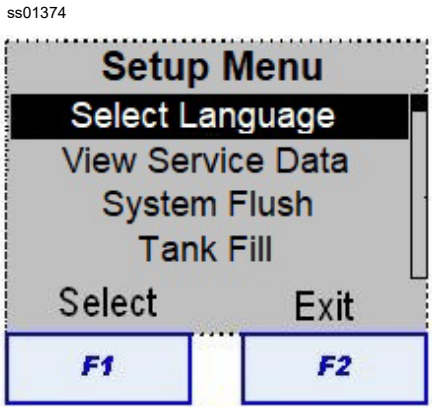


Figure 1-3. Setup Menu

Select Language

Select a language for screen prompts. English is the default language.

View Service Data

Displays vehicle information that was entered into the Enter Service Data screen. Vehicles are displayed by date of service and VIN number. The database stores 20 VIN entries.

System Flush

Provides a method of removing oil by forcing liquid refrigerant through an A/C system or components of an A/C system. After flushing, the refrigerant is recovered by the machine and filtered by the recycling circuit.

Tank Fill

Use this Setup Menu item to transfer refrigerant from a source tank to the ISV. The tank fill value may be adjusted up or down to suit the user's needs. Refer to *Tank Fill* in the Maintenance section.

Flush Hoses

Flushes residual oil from the machine to prepare for the service of next vehicle.

Refrigerant tracking

Function to memorize the refrigerant amount recovered and charged for every vehicle. The display shows five selection options:

- **Display:** It allows user to show data of recovered and charged refrigerant.
- **Print:** It allows user to print out data as: amount of refrigerant recovered and charged for every vehicle.
- **Export data to SD:** It allows user to extract the report with recovered and charged refrigerant amount in the vehicle. Data extraction via SD card, recommended size 2 GB and FAT format (support is not part of scope delivery). Data are transferred as **.csv** file.
- **Erase all data:** It allows user to erase all data stored in the A/C unit (password 02762).
- **Disable Tracking:** It allows user to disable the Refrigerant tracking function.

Refrigerant Management

Displays the amount of refrigerant recovered, charged, and replenished (for the life of the machine), and filtered since the last filter change.

Filter Maintenance

The filter removes acid, particulates, and moisture from the refrigerant. To meet requirements, it is mandatory to replace the filter after (SEE TABLE) of refrigerant has been filtered.

Model R134a	Replacement filter at: 68 kg (alert 56 kg)
Model R1234yf	Replacement filter at: 150 kg (alert 125 kg)

This menu item displays the filter capacity remaining until the machine locks down and no longer functions. Refer to *Filter Change* in the Maintenance section.

When the filter is replaced, refer to *Change Vacuum Pump Oil* in the Maintenance section.

Pump Maintenance
Displays how long the vacuum pump has operated since the last oil change, and the amount of time remaining until the next oil change is needed. For maximum vacuum pump performance, change vacuum pump oil every time the filter is replaced. Refer to the *Change Vacuum Pump Oil* in the Maintenance section.

Oil Inject Adjust
Variables affect the accuracy of oil injection. Use this menu item to adjust the oil inject correction factor when using very high or low viscosity oils, or if the machine is operating in very high or low ambient temperatures. Refer to *Oil Inject Adjust* in the Maintenance section.

Calibration Check
Use to verify internal scale calibration. Refer to *Calibration Check* in the Maintenance section.

Leak Check
Performs a pressure test to detect any leakage on the AC1X34-3/BAC 3000a - AC1234-3yf/ BAC 3000yf.

Select Units
Program the machine to display units of measure in kilograms or pounds. The default display is kilograms.

Set Date and Time
Program the machine for current date and time.

Edit Print Header
Programs information that will appear on the printout each time a print function is used.

Unit Activation
Failure to register and activate the machine within 30 days of initial startup will cause the machine to lock out and no longer function. Select this Setup Menu item and follow the prompts before the trial period expires.

System Information
Displays versions of software, firmware, and hardware used in the unit. Also displays languages available. This information is entered into the system when software is initially loaded and changes where necessary with any software updates. Firmware and hardware versions change when those component parts are updated or replaced.

Service Menu
For service center use only.

Production Menu
For production use only.

Charge no pulse
To enable or disable the pulsing charge.

Calibrate Air Flow (for R1234yf only)
To perform the air flow calibration. Refer to *Calibrate Air Flow* in the Diagnostics and Testing section.

Initial Setup procedure
The AC1X34-3/BAC 3000a - AC1234-3yf/BAC 3000yf launches into the initial Setup mode. Carry out the following setup:

1. Select Language.
2. Select Units.
3. Set Date and Time.
4. Edit Print Header.
5. Service Vacuum.
6. Tank Fill.

At the end of the initial setup procedure it is suggested to:

- Perform check scale.
- Perform air flow calibration (for R1234yf only).

NOTE: It is needed to complete all the setup procedure sequence before to use the A/C unit.

General Maintenance

Wipe off the machine often using a clean cloth to remove grease and dirt.

Note: In cases of refrigerant leaks during normal use of the machine and during installation, maintenance or repair of the machine, no refund will be made by the manufacturer.

Caution: Disconnect the power supply before any maintenance.

Electrical Protection

The machine is equipped with a circuit breaker on the control panel above the ON/OFF switch. If the breaker trips, its button will pop out. A tripped circuit breaker will cause the machine to lose all power. Press the circuit breaker button to reset. If the circuit breaker does not reset or continues to trip, there is a fault in the unit electrical system. Troubleshoot and repair the affected component(s).

Check for Leaks (R1234yf only)

The machine checks internal components for leaks after the initial setup and every 10 days. Over time, fittings loosen as the machine is moved.

The machine also checks for internal leaks each time a filter is replaced.

1. When prompted, connect both service hoses to their storage ports.
2. Open both coupler valves.
3. Press F1 to perform the leak test.

To perform a manual leak test:

1. Turn OFF the main power switch, and disconnect the power cord from the outlet.
2. Remove panels as necessary to use a leak detector to probe all connections for refrigerant leaks. Tighten fittings if a leak is indicated.
3. Reassemble body panels.

Tank Fill

This menu item is used to transfer refrigerant from a source tank to the ISV.

1. Connect the low-side (blue) hose to the liquid connector on a full source tank.
2. Position the source tank in such a way that liquid refrigerant is supplied to the connection. Open the source tank valve.
3. Select TANK FILL from the Setup Menu. The machine displays

FILL AMOUNT (KG)
XX.XXX
CONNECT LOW SIDE HOSE
TO SOURCE TANK
START EXIT

4. Enter the quantity to recover, and press F1. Add at least 3.6 kg of refrigerant to ensure enough is available for charging.
5. The machine automatically stops when the preset tank fill level is reached. To stop the tank fill before the preset level is reached, select F2.
6. Close the valve and remove the hose from the source tank.
7. Press F1 to return to the Setup Menu.

Filter Change

The filter is designed to trap acid and particulates, and to remove water from refrigerant. To meet the mandate for adequate moisture and contaminant removal, the filter must be replaced after (SEE TABLE) of refrigerant has been filtered.

The machine gives a warning when (SEE TABLE) of the filter capacity has been used; the machine locks down when the (SEE TABLE) filter capacity has been reached and will no longer function.

Check Remaining Filter Capacity

1. Select FILTER CHANGE from the Setup Menu or when the machine prompts. The machine displays

   FILTER LIFE TIME: X.XX KG
   REPLACE FILTER?

   The machine displays amount of filter capacity remaining until the machine locks down.

2. Select F1 to change the filter; F2 to resume using the machine.

Replace the Filters and Sample Hose Assembly

1. If F1 was selected to change the filter, the machine clears the filter, then prompts for the new filter code to be entered.

   WAITING FOR FILTER TO BE CLEARED
   FILTER SERIAL #

   Use the keypad to enter the serial number that appears on the new filter and select F1.

2. The machine displays

   TURN UNIT OFF
   REMOVE SHROUD AND REPLACE FILTER,
   IDENTIFIER FILTER, AND
   IDENTIFIER SAMPLE HOSE

   Shut off the machine. Remove screws holding the shroud, and hang the shroud on the back of the machine as shown in Figure 1-4.

3. Look at the new filter. Verify both O-rings are lubricated and correctly located in the grooves as shown in Figure 1-5. Thread the new filter into place and tighten.

Caution: All performance tests and claims are based on using the following specific filters.

Model R134a	Replacement filter at: 68 kg (alert 56 kg)
Model R1234yf	Replacement filter at: 150 kg (alert 125 kg)

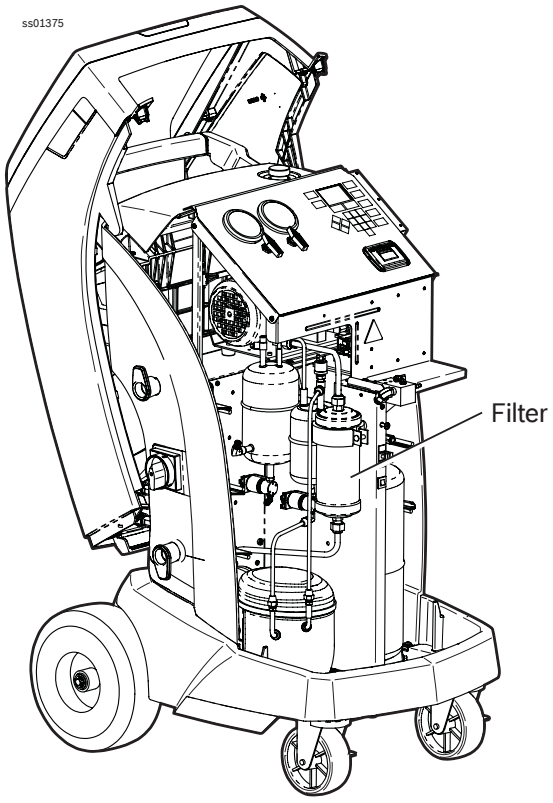


Figure 1-4. Filter Location

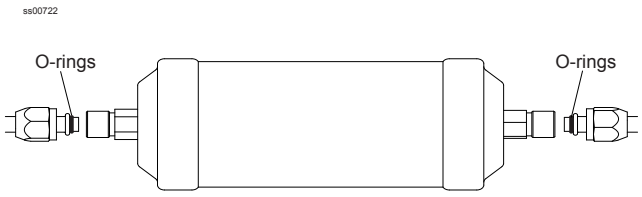


Figure 1-5. O-ring Location

Note: If SERIAL NUMBER WRONG is displayed, the serial number has been incorrectly entered or the filter has already been used in this machine.

Change Vacuum Pump Oil

NOTE Vacuum pump oil must be changed with every filter change, or more often as necessary.

1. Select CHANGE VACUUM PUMP OIL from the Setup menu or when prompted. The display shows how long the vacuum pump has operated since the last oil change.

   OIL LIFE TIME
   0 HOURS 0 MINUTES
   CHANGE OIL?

2. Press F1. If the machine displays

   OIL CHANGE
   WAIT . . .

   allow the vacuum pump to run for 30 seconds to warm up the oil. If the oil is already warm, the display shows

   OIL CHANGE
   UNIT CLEARING
   WAIT

   while the compressor runs to eliminate any pressure in the vacuum pump.

3. After the compressor stops, slowly open the oil fill port cover to verify there is no pressure in the machine. Then carefully remove the cover. See Figure 1-6.

4. The display shows

   DRAIN THE USED PUMP OIL
   AT THE END
   ADD ABOUT 150 ML OF NEW OIL
   PRESS F1 TO CONFIRM

   Remove the oil drain fitting cap, and drain the oil into a suitable container for disposal. Reinstall the cap.

5. Slowly add 150 ml of vacuum pump oil to the pump through the oil fill port, and press F1.

6. The display shows

   POUR OIL IN THE PUMP
   UP TO THE CORRECT LEVEL
   PRESS F1 TO TERMINATE

   Slowly add vacuum pump oil to the pump through the oil fill port until the oil level rises to the center of the sight glass.

7. Install the cap on the oil fill port, and press F1.

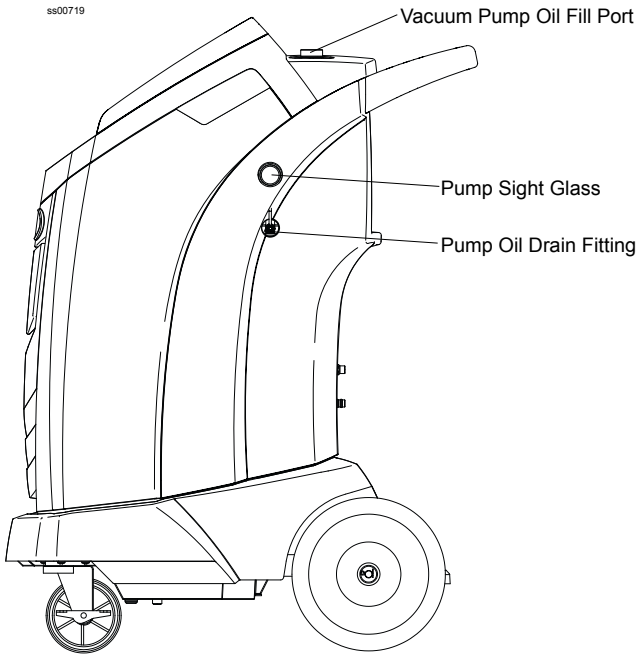


Figure 1-6. Oil Ports

CAUTION: To prevent personal injury, do NOT operate the machine at any other time without the oil fill port cap installed, because the vacuum pump is pressurized during normal operation.

NOTE: Review the laws in your jurisdiction to determine correct disposal procedures for pump oil. It is the responsibility of the user to determine if a material is a hazardous waste at the time of disposal. The user must ensure compliance with all applicable laws and regulations.

Edit Print Header

If the optional printer is installed, changes to the printed text can be made. To make changes to the text appearing in the header on each printout:

1. Select EDIT PRINT HEADER from the Setup menu.
2. The cursor should be blinking in the first field. Press the Menu key to display a virtual keyboard.
3. Use the arrow keys to move around the keyboard. Press F1 to enter a character.
4. Press the Menu key to exit the keyboard and move to the next fill field.
5. Press the F2 key to exit the keyboard.

For more information about the text edit feature, refer to the User Guide under the heading *Edit Print Header.*

Power Lockout/Tagout Switch

Never leave the machine live if an immediate use is not scheduled. To ensure that unauthorized personnel cannot run the machine, use the Lockout / Tag Out feature.

1. Turn the Lockout / Tagout lever counterclockwise (CCW).
2. Insert a padlock or other item through the aligned holes so the lever cannot be turned clockwise (CW) to start the machine.

Calibration Check

This function is used to ensure the machine's internal scale is always calibrated. During this test, use only the calibration weight that is provided with the machine.

1. Refer to Figure 1-7, and verify the magnet on the bottom of the machine is clean.
2. Select CALIBRATION CHECK in the Setup menu. The machine displays:

   PLACE CALIBRATION WEIGHT
   ON MAGNET LOCATED
   ON THE BOTTOM OF MACHINE

3. Attach the calibration weight to the magnet on the bottom of the machine. Select F1. The machine displays:

   REMOVE CALIBRATION WEIGHT
   FROM MAGNET LOCATED
   ON THE BOTTOM OF MACHINE

4. Remove the calibration weight from the magnet. Select F1.
   - If the display shows

     CALIBRATION PASSED.

     the scale is in calibration. Select F2.
   - If the display shows

     CALIBRATION FAILED

     the scale is out of calibration. Refer to the Replacement Scale/Assembly Magnet in the Electrical section and perform a Scale Calibration followed by an upper limit Calibration.

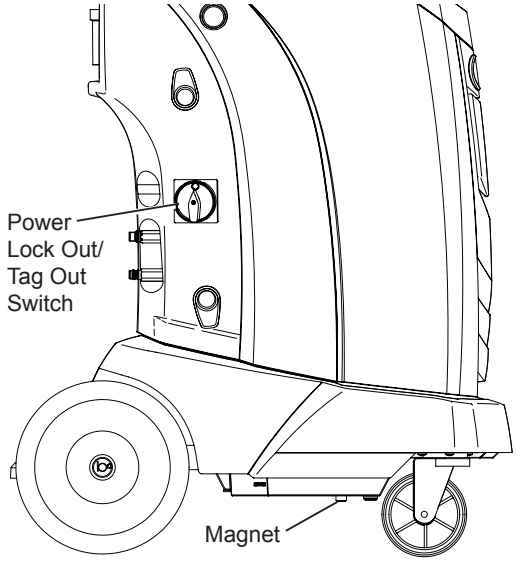


Figure 1-7. Calibration Check

Oil Inject Adjust

The oil inject functionality in this machine is automatic and timing-based. Many variables can affect the accuracy.

If you are using very high or low viscosity oils, or if you are operating at very high or low ambient temperatures, an adjustment of the oil inject correction factor may be necessary for the machine to produce accurate oil injections.

The default correction is set at 0,38 and is based on a PAG 100 oil viscosity and a 25°C ambient temperature.

1. To adjust the correction factor of Oil Inject, select OIL INJECT ADJUST from the Setup Menu. The machine displays:

   X.XX
   INCREASE TO INJECT MORE
   OIL OR DECREASE TO INJECT
   LESS OIL

2. Using the arrow keys and numeric keypad, enter in a desired correction factor. Acceptable values consist of any number between 0.01 and 1.00.
   - A correction factor of 1.00 lengthens the oil inject duration time, increasing the amount of oil injected.
   - A correction factor of 0.01 shortens the oil inject duration time, decreasing the amount of oil injected.
3. Press F1 to save the value; press F2 to return to the Setup Menu without saving the value.

CAUTION: To avoid chemical incompatibilities with the internal components of the machine, use only oils approved by the vehicle manufacturer. Problems resulting from the use of non-approved oils will cancel the warranty.

	Temperature					
Oil	**10**	**15**	**20**	**25**	**30**	**35**
PAG 46	0,50	0,31	0,23	0,19	0,15	0,13
PAG 100	1,17	0,69	0,49	0,38	0,30	0,25
PAG 125	1,34	0,79	0,55	0,42	0,33	0,28
PAG 150	1,50	0,89	0,62	0,46	0,37	0,30

UNIT SPECIFICATIONS

GENERAL INFORMATION	
Voltage:	220 – 240 VAC (230 VAC Nominal)
Frequency:	50 – 60 Hz
Amperage:	6.0 Amps @ 230 VAC
Refrigerant:	AC1X34-3/BAC 3000a: R134a AC1234-3/BAC 3000yf: R1234yf
Storage Temperature Range:	-18 to +66 °C (0°F to 140°F)
Operating Temperature Range:	10 to 50 °C (50°F to 120°F)
Normal Ambient Operating Conditions	
Temperature:	21 ± 9 °C (70°F ± 15°F)
Relative Humidity:	80% Non-condensing at 32.2°C (90°F)
Altitude:	0 – 2000 m (0 – 6561 ft.)
Refrigerant Removal	
Amount:	95% within 30 minutes
Temperature:	21°C (70°F)
Accuracy:	± 30 g (± 1 oz)
Vacuum Pull	
Volume:	375 Microns
Refrigerant Recharge	
Accuracy:	Full rated charge ± 15 g (± 0.50 oz)
Recycling Filter Type:	43 cu. inch spin-on
Unit Height:	107 cm
Unit Width:	76 cm
Unit Depth	61 cm
Shipping Weight:	67 kg
Certification:	UL1963 SAE J-2843 and others
Compressor	
Voltage:	187-253 VAC (230 VAC Nominal)
Frequency:	50 – 60 Hz
Amperage:	2.6 Amps @ 230 VAC
Locked Rotor Amperage:	13.5 Amps
Capacity	926 Watts
Oil Charge	300 cm^3
Displacement	8.85 cm^3
Vacuum Pump	
Voltage:	220 – 240 VAC
Frequency:	50 – 60 Hz
Amperage:	3.0 Amps @ 230 VAC
Locked Rotor Amperage:	1/4 HP
Oil Capacity	300 ml
Displacement (Free Air)	70 l/min (2.5 CFM)
Stages	1
Ultimate Vacuum	375 Microns

MAINTENANCE SCHEDULE

MAINTENANCE TASK	RECOMMENDED INTERVAL
Change filter	After (SEE TABLE) of refrigerant has been filtered. Refer to *Filter Change* in the *Maintenance* section of this manual. Model R134a: Replacement filter at: 68 kg (alert 56 kg) Model R1234yf: Replacement filter at: 150 kg (alert 125 kg)
Change vacuum pump oil	When the filter is replaced or at least once per year. Refer to *Change Vacuum Pump Oil* in the *Maintenance* section of this manual.
Check casters and wheels for ease of operation	Monthly.
Check internal scale calibration	Monthly. Refer to *Calibration Check* in the *Maintenance* section of this manual.
Check machine for leaks	Monthly. Check hoses and connections for leakage. Disconnect power, remove the shroud, and use an electronic leak detector to check fittings.
Air flow calibration (for R1234yf only)	Monthly
Clean air intake panels	Monthly. Use a clean cloth.
Clean cabinet and control panel	Monthly. Use a clean cloth.
Inspect power cord and hoses for cuts and abrasions	Daily.
Lubricate wheel bearings and brake components	Monthly.
Pressure Test	Every 10 years — performed by an authorized service center.

Due to normal wear and tear, these units require regular maintenance to ensure safe operation and optimum performance. The above chart provides a schedule of the minimum recommended maintenance tasks.

DIAGNOSTICS AND TESTING

UPDATING SYSTEM SOFTWARE

Download Current Software

Equipment Requirements:
(1) SD Card Reader/Programmer
(1) SD Card (formatted as FAT)
These items may be purchased from an office supply or retail store carrying computer electronics accessories.

Perform the following:

1. Connect the SD card reader/programmer to your computer and insert the SD card.
2. Cancel any residual SD card content (formatted as FAT).
3. Download the current software from EDIS.
4. Unpack the software pack onto the SD card (be sure files are visible on main root – NO subfolders).

Install Current Software

The following instructions outline the basic steps to complete this procedure.

1. Connect the unit to its power source. Verify the power switch is OFF.
2. Insert the SD card into the unit SD card slot.
3. Turn the unit ON.
4. Follow prompts to install from the menu appearing when updating software.
5. Allow the unit to install the software completely and then remove the SD card.

SERVICE CENTER MENU OPTIONS

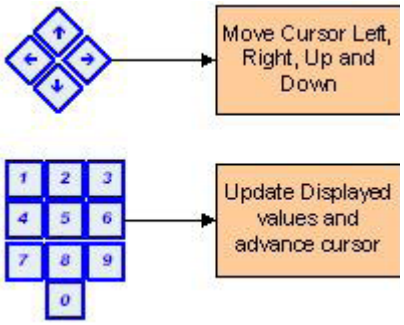
NOTE **These are the Service Options at the time of printing this service manual. Some options may be added or deleted in future circuit board and software updates and revisions.**

Never change the default settings unless directed from the factory. Otherwise the unit may fail to operate properly.

Never give the programming or service codes to customers.

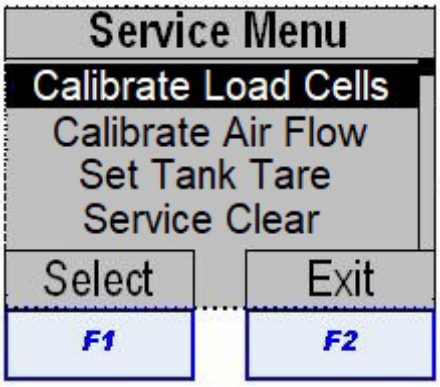
Service Menu

NOTE Consult the Technical Service Bulletins for the latest software version as applicable. To navigate through the Service Menu, use Keypad and arrow keys shown below.



Diagnostics and Troubleshooting

1. Turn unit on and allow it to run through the boot sequence.
2. From the Setup Menu, press Service Menu.
3. Enter 4-3-5-0-6 at the password prompt, then press Select (F1). The following displays



4. To exit the Service Menu, press Exit (F2).
5. To perform any of the checks in the Service Menu, scroll to the desired test listed below and press, Select (F1).

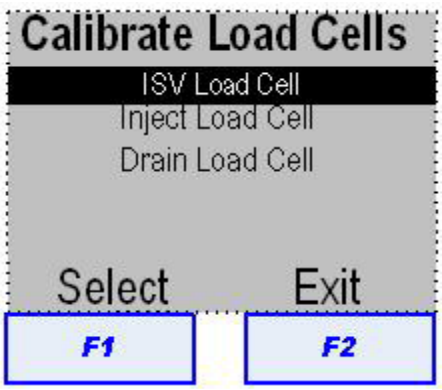
- Calibrate Load Cells
- Calibrate Air Flow
- Set Tank Tare
- Service Clear
- Service Vacuum
- Service Leak Check
- End User Install
- Maintenance Counters
- Output Test
- Input Test
- Keypad Test
- Set Serial Number
- Set Mfg Date (Manufacturing Date)
- Configuration
- Set Boot Mode
- Select Model
- Reset Board

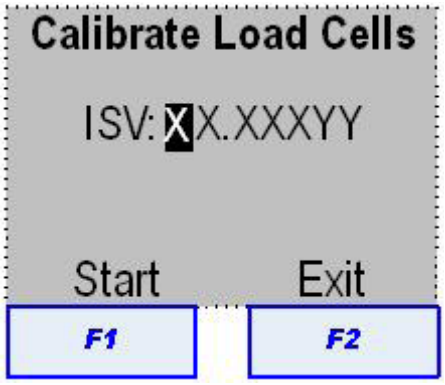
Calibrate Load Cells

Perform the following:

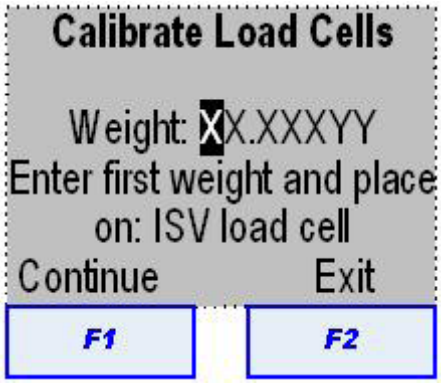
After selecting Calibrate Load Cells, the following displays:

1. Select Calibrate Load Cells from the Service Menu by pressing F1. The following displays:

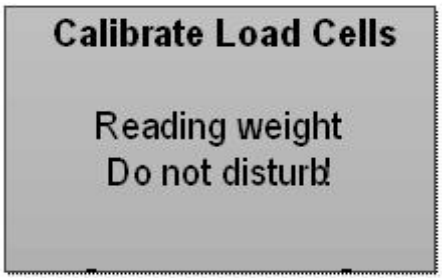




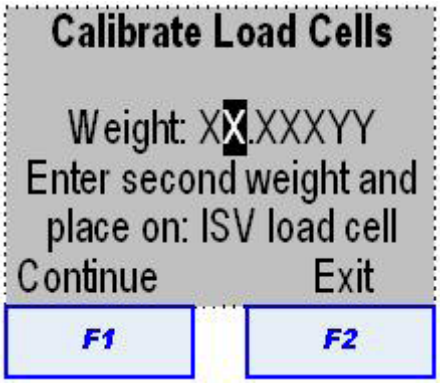
2. Press Start (F1).



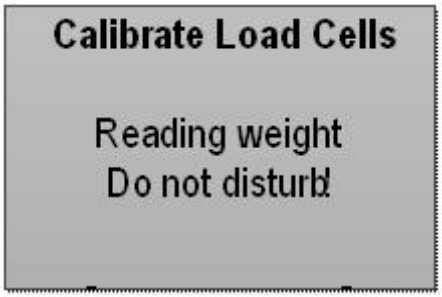
3. Enter the weight (0.0 kg recommended) using the keypad. When finished press Continue (F1) to save the entered weight value. The following will be displayed:



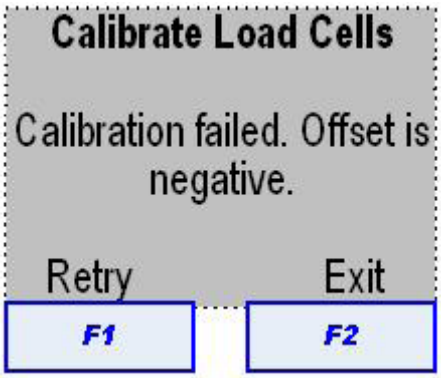
After 5 seconds:



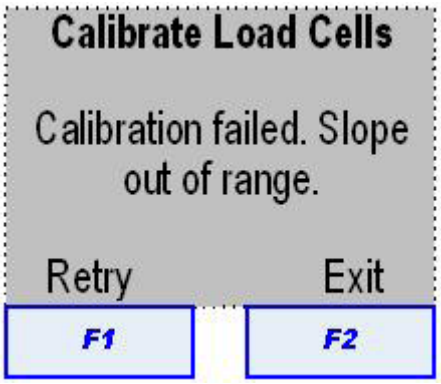
4. Enter the second weight (10-20 kg recommended) using the keypad. When finished press Continue (F1) to save the entered weight value. The following is displayed:



5. If the calibration is accepted, the offset and slope will be calculated. If either calculation fails a fail screen for the offset or slope will be displayed.



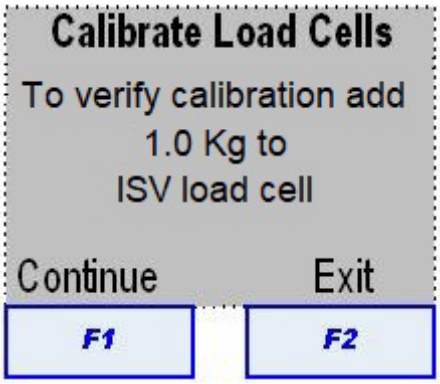
Offset Failure:



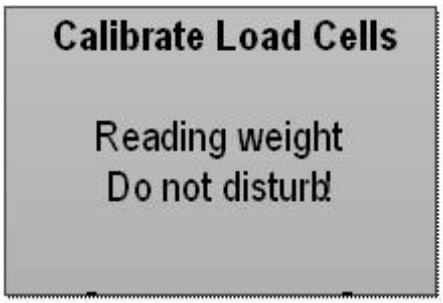
Slope Failure:

The operator is given the opportunity to retry the calculation or to exit the calibration function.

If the calibration is accepted, add 1 kg **on top of the second weight** when prompted.



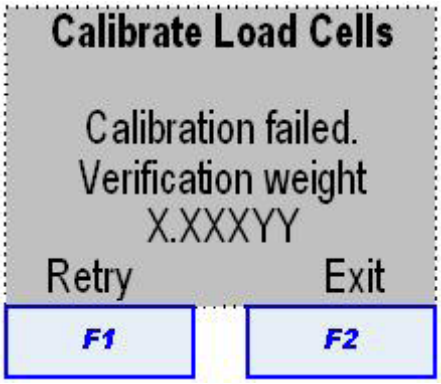
6. If Continue (F1) is pressed, the following displays:



7. If the calibration is not accepted, a Calibration Failed screen is displayed. If accepted, the accepted screen displays.

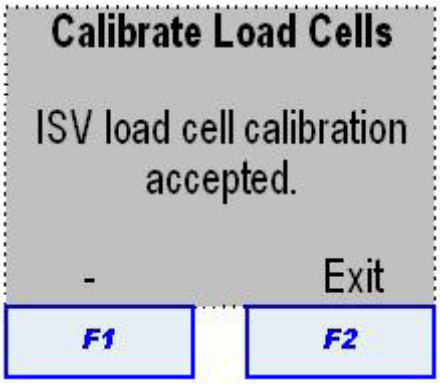
Failed:

8. Pressing Exit (F2) returns to Calibration Load Cells in the Service Menu.



NOTE If the check repeatedly fails, check that the weights are placed on the scale properly.

Accepted:

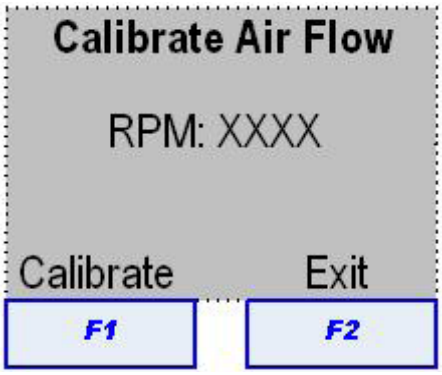


Calibrate Air Flow (R1234yf only)

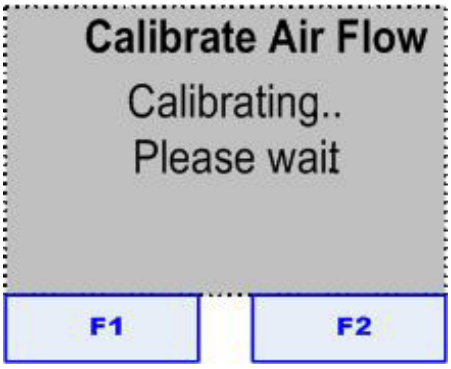
The inside the unit must be present at the correct volume to make sure enough air is present to prevent the buildup of refrigerant and to keep the compressor temperature below its upper limit.

WARNING: During airflow calibration, all the unit plastic enclosures must be on the unit and properly attached. This is because the enclosure affects the calibration itself. The unit then must be in standard operating conditions.

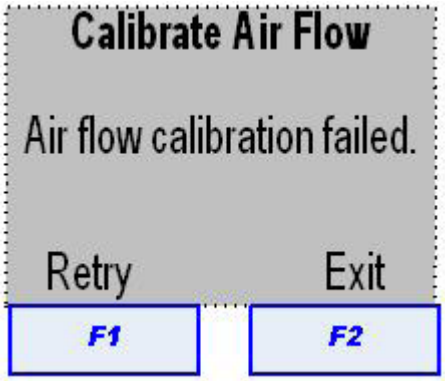
1. Scroll to Calibrate Air Flow and press Select (F1). The following is displayed:



2. Press Calibrate (F1). The following displays:

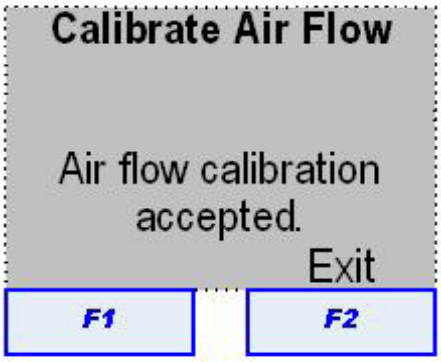


During this calibration, the airflow from the unit fan is being measured by a smaller fan. The out put voltage of the sensor fan is used to perform this calibration. If there is no airflow or the airflow is below the acceptable minimum, the calibration will fail with the following displayed:



Press Retry (F1) to attempt another airflow calibration, or press Exit (F2) to return to the Service Menu.

3. If the airflow calibration is accepted, the following displays:



Press Exit (F2) to return to the Service Menu.

Set Tank Tare

Tank tare is the empty weight of the ISV tank. The tare is subtracted from the total weight of refrigerant plus the tank to arrive at the amount of refrigerant present in the ISV.

1. Scroll to Set Tank Tare in the Service Menu. Press Select (F1). The following displays:

Confirm by pressing Save (F1).

Service Clear

Performing a Service Clear allows the unit to perform a 1st Stage Recover. This is an automatic process. When complete, the unit returns to the Service Menu.

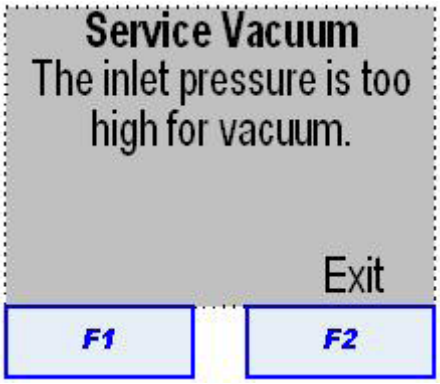
Service Vacuum

NOTE Perform Service Vacuum test with Internal tank empty.

Service vacuum is a manually operated test used to perform minor vacuum checks after service is performed on the unit such as a part replacement in the plumbing system. The service hoses must be connected to the storage ports for this test.

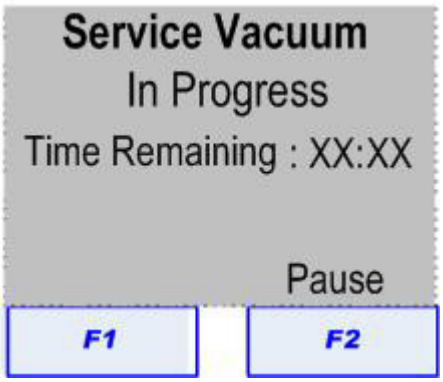
1. In the Service Menu, scroll to Service Vacuum and press Select (F1). If the Inlet, ISV, or Accumulator pressure is less than or equal to 0.35 bar, the following displays:

If the pressure is greater than 0.35 bar, this screen displays:



The only option is to press Exit (F2) to return to the Service menu.

2. The Service Vacuum default time defaults to 5 minutes. To change the default time to another value, enter a new time using the keypad and press Start (F1) to begin the vacuum. The following displays:



3. The vacuum pump should turn on and the time begins to count down. To pause at any point during the process press Pause (F2). At the Pause function, the Service Vacuum can either be resumed or cancelled.

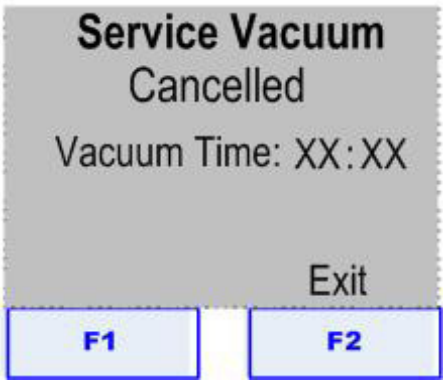
The inlet pressure should stay below 0.35 bar throughout the Service Vacuum. The outputs (Vacuum , Charge, Liquid, Oil Return, and Recover solenoids) will turn ON.

4. When the vacuum Time Remaining falls to 00.00, the outputs will turn OFF and the following displays:

5. Press Exit (F2) to return to the Service Menu.
6. If the Inlet pressure rises above 0.35 bar during the Service Vacuum, any outputs that are ON will turn OFF and the vacuum time will stop counting down. The following displays:

7. Pressing Retry (F1) may restart the vacuum process if the Inlet pressure has dropped below 0.35 bar. If restart is achieved, the vacuum pump will restart and the outputs will turn ON again completing the Service Vacuum.

If the Inlet pressure stays above 0.35 bar, the only alternative is to press Cancel (F2). The following displays:

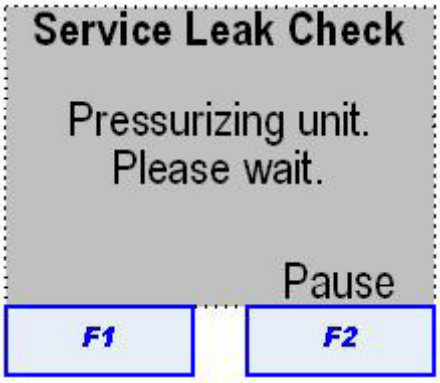


8. Press Exit (F2) to return to the Service Menu.

Service Leak Check

Perform this test only if internal tank is filled with minimum amount of refrigerant required (3.6 kg).

1. From the Service Menu, scroll to Service Leak Check and press Select (F1). The Charge, Recover, and Oil Return solenoids with turn ON and the following displays:



To interrupt the Service Leak Check, press Pause (F2). At the Pause function, the Service Leak Check can either be resumed or cancelled.

During pressurization, the Accumulator and Inlet pressures will build to greater than 3.5 bar. As long as the pressures are below 3.5 bar, the tank liquid solenoid will be energized. Once 3.5 bar is achieved, the tank liquid solenoid turns OFF and displays:

2. Pressing Recover (F1) or Exit (F2) will turn off the Charge, Recover, and Oil Return solenoids. Pressing Recover (F1) will cause a 1st Stage Recovery to begin. Pressing Exit (F2) will return to the Service Menu.

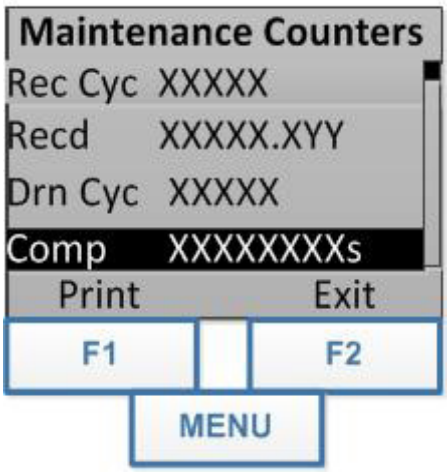
End User Install

The End User Install accesses the production functions arrested at the end of producing the unit prior to shipment. These functions can be accessed to customize the unit for the end user, and to re-establish the customization when a component part, such as a control board or printer, has been replaced. The End User Install would not normally be needed.

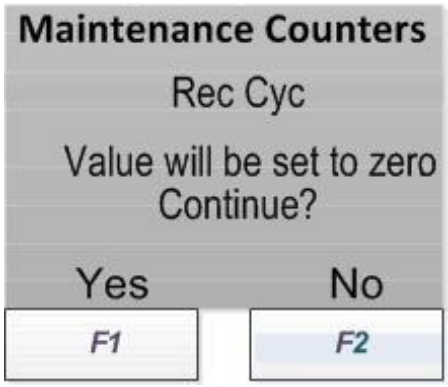
Maintenance Counters

Maintenance Counters record the number of times a maintenance function has been performed. These counters run in the background.

1. Scroll to Maintenance Counters and press Select (F1). The following displays:



2. Scroll through the list and select the counter to be viewed. The list of available items follows.
3. Press Print (F1) to print the entire list of Maintenance Counter items and associated values. Press Exit (F2) to return to the Service Menu. Press Menu to reset the Maintenance Counter value for the highlighted item.
4. To reset an amount, press Menu then enter 28712 in the space provided. Press Enter.
5. If the password is valid, the following displays:



The second line of the display, above, represents the item to be reset.

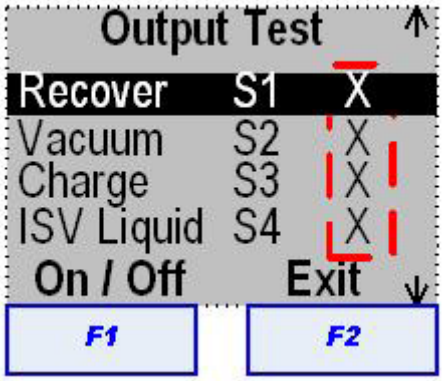
6. Press Yes (F1) to reset the amount. Press No (F2) to leave the amount current.
7. Press either Yes or No to return to the Service Menu.
8. Scroll to the next desired Maintenance Counter. If none is desired, press Exit (F2) to return to the Service Menu.

ITEM	DISPLAY	FORMAT
Recover Cycles	Rec Cyc	XXXXX
Recovered Refrigerant Lifetime	Recd	XXXXX.XYY
Oil Drain Cycles	Drn Cyc	XXXXX
Compressor Run Time	Comp	XXXXXXXXs
Filtered Refrigerant	Filtd	XXXXX
Filter Change Cycles	Filt Cyc	XXXXX
Vacuum Cycles	Vac Cyc	XXXXX
Vacuum Pump Run Time	Pump	XXXXXXXXs
Vacuum Pump Oil Change Cycles	Oil Cyc	XXXXX
Vacuum Pump Oil Time	VP Oil	XXXXXXXXs
Charge Cycles	Chg Cyc	XXXXX
Charged Refrigerant Lifetime	Chgd	XXXXX.XYY
Hose Flush Cycles	HF Cyc	XXXXX
Replenished Refrigerant Lifetime	Repld	XXXXX.XYY

Output Test

The Output Test checks the electrical outputs from the power board and wiring harnesses to the various solenoids, fan, vacuum pump, and compressor. This test is useful as a troubleshooting method to determine if a device is operating properly or not.

1. From the Service Menu, scroll to Output Test.
2. Press Select (F1). The following displays:



The placeholder “X” indicates the state of the output device. A “1” or “0” indicates whether the device is ON or OFF. A list of the tests is provided in the table below:

OUTPUT TEST	
S1	Recover Solenoid
S2	Vacuum Solenoid
S3	Charge Solenoid
S4	ISV Liquid Solenoid
S5	Oil Inject Solenoid
S6	Oil Drain Solenoid
S7	Oil Return Solenoid
S8	Unused
S9	Unused
S10	Unused
S11	Unused

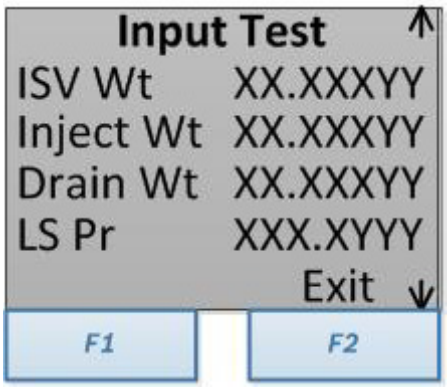
OUTPUT TEST	
Fan	Fan
Pump	Vacuum Pump
Compressor	Compressor
Beacon	Unused
Beeper	Beeper

3. As the tests are highlighted, press On/Off. The state will change from “0” to “1”. There should be a “click” heard as the solenoids are energized, the motors of the fan, vacuum pump, and compressor should start, the beacon, if installed will flash once, and the beeper will sound.
4. When the test is complete, press Exit (F2) to return to the Service Menu.

Input Test

The Input Test presents a present value of the many parameters the control board processes to correctly operate the unit. The parameters shown in this test are observable only and cannot be changed or deleted. They can be used to indicate whether or not a parameter is within the required limits for proper unit operation.

1. From the Service Menu, scroll to Input Test.
2. Press Select (F1). The following displays:



The placeholders “X” and “Y” represent actual values seen during this test. A list of the parameters and what the values represent follows:

INPUT TEST		
Parameter	**Value Format**	**Property**
ISV Wt	XX.XXXYY	ISV Weight
Inject Wt	XX.XXXYY	Inject Oil Weight
Drain Wt	XX.XXXYY	Drain Oil Weight
LS Pr	XXX.XYYYYY	Low Side Pressure
HS Pr	XXX.XYYYYY	High Side Pressure
AC Pr	XXX.XYYYYY	Accumulator Pressure
ISV Pr	XXX.XYYYYY	ISV Pressure
ISV Tp	XXX.X^{0}Y	ISV Temperature
Vac Sw	X	Vacuum Switch
HP Sw	X	High Pressure Quantity
Overfill	X	ISV Liquid Quantity
Air Flow	XXXXrpm	Fan Airflow

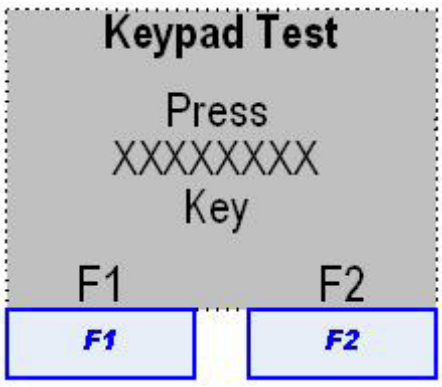
3. Scroll through the parameters to observe the values. When finished, press Exit (F2) to return to the Service Menu.

Keypad Test

The Keypad Test is used to determine if the keys on the control panel are functioning when pressed. The keys affected by this test are listed in the table below:

• Menu	• Vacuum	• 3	• 9
• Help	• Charge	• 4	• Up Arrow
• F1	• Database	• 5	• Down Arrow
• F2	• 0	• 6	• Left Arrow
• Automatic	• 1	• 7	• Right Arrow
• Recover	• 2	• 8	

1. From the Service Manu, scroll to Keypad Test.
2. Press Select (F1). the following displays:



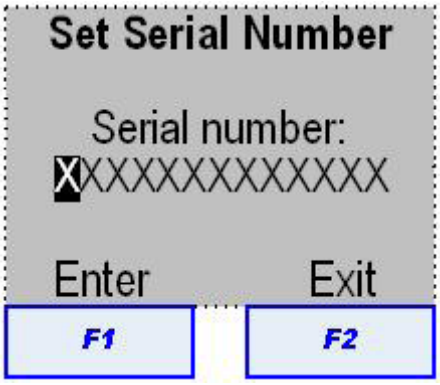
The “X” represents the key to be tested. The first key is Menu. After each key check, the next key will scroll up automatically.

3. Press F2 to return to the Service Menu.

Set Serial Number

Setting the serial number is usually done at the factory but may be performed or checked when maintenance is performed on the unit. This function is accessed through the Service Menu, Production Menu or the Production Line Test.

1. From any menu scroll to Set Serial Number.
2. Press Select (F1). The following displays:



3. Enter the serial number using the keypad and press Enter (F1).
   - If the number is valid, it will be saved and return to the Production or Production Test menu or Service Menu.
   - If the number is not valid, the beeper will sound 3 times. If that occurs, repeat this step.

Set Mfg (Manufacturing) Date

Setting the Manufacturing Date is usually done at the factory but may be performed or checked when maintenance is performed on the unit. This function is accessed through the Service Menu, Production Menu or the Production Line Test.

1. From any menu scroll to Set Mfg Date.
2. Press Select (F1). The following displays:

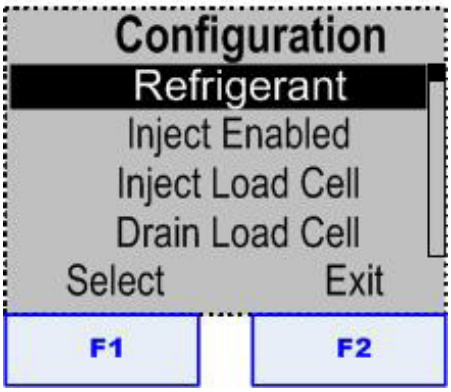
3. Enter the manufacturing date using the keypad and press Save (F1).

Configuration

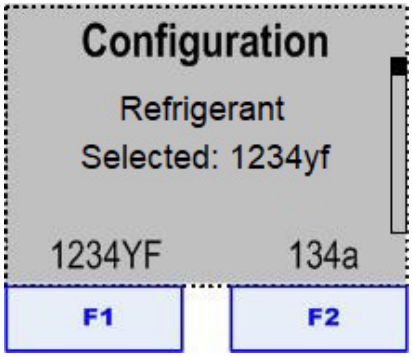
CAUTION: Configuration can only be modified when unit is new and without any refrigerant recovered; or during a R134a conversion (R1234yf).

Setting the Configuration is usually done at the factory but may be performed or checked when maintenance is performed on the unit.

1. From any menu scroll to Configuration.
2. Press Select (F1). The following displays:



As the items are selected one at a time, the current value of that item is displayed in a new screen. The windows where Select and Exit normally appear with change to Yes or No, except for the refrigerant which will change to 1234yf and 134a, which is shown below.



The items, selectable options, and default settings are listed in the table.

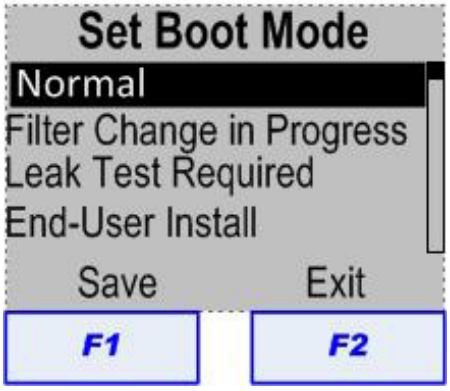
ITEM	OPTIONS	DEFAULT
Refrigerant	R1234yf / R134a	R1234yf
Inject Enabled	Yes /No	Yes
Inject Load Cell	Yes /No	No
Drain Load Cell	Yes /No	No
HS Transducer	Yes /No	No
LS Transducer	Yes /No	Yes
ISV Transducer	Yes /No	No
Acc Transducer	Yes /No	Yes
ISV Temp	Yes /No	No
Charge Leak Test	Yes /No	Yes
Air Flow Sensor	Yes /No	Yes

3. After the options have been entered press Exit (F2) to return to the Service Menu.

Set Boot Mode

Setting the Boot Mode makes it possible to boot into a mode other than Normal (default). The choices to boot to are Normal, Filter Change in Progress, Leak Test Required, or End-User Install.

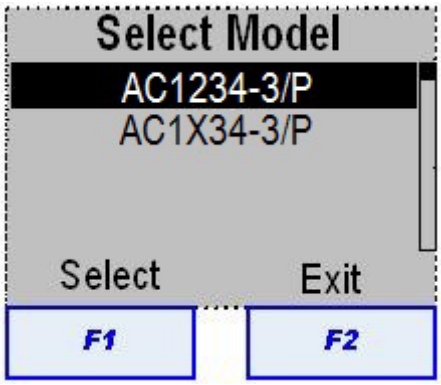
1. From any menu scroll to Select Boot Mode.
2. Press Select (F1).
3. Enter password to 2-8-7-6-8, If the password is valid, the following displays:



4. Scroll to the boot mode desired and press Save (F1). The unit will boot to the selected mode at the next power up cycle.

Select Model

1. From Production Test or Service menu scroll to Select Model.
2. Press Select (F1). The following displays:



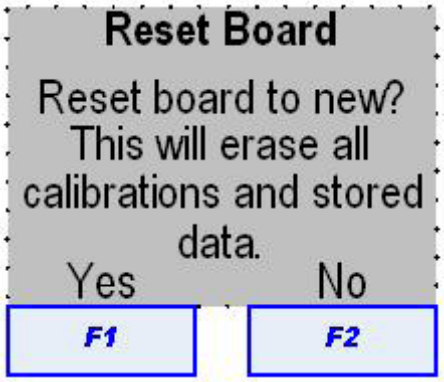
Model	Refrigerant
AC1234-3/P	R1234yf
AC1X34-3/P	R134a
BAC 3000yf	R1234yf
BAC 3000a	R134a

3. Scroll through the list and press Select (F1) or press Exit (F2) to return to the Service Menu.

Reset Board

Unless absolutely necessary, resetting the board is not recommended. Resetting the board will erase any customization and restore the factory defaults.

1. From any menu scroll to Reset Board.
2. Press Select (F1). The following displays:



3. Press Yes (F1) to reset the board, or No (F2) to return to the Service Menu.

DEPRESSURIZING THE UNIT

Contact with refrigerant can cause eye injury. Always wear safety goggles when working with refrigerants. 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.

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

1. Disconnect the high and low side service hoses from vehicle or service tank, whichever is applicable. Make sure the coupler valves are closed.
2. Open the shroud.
3. Connect one service hose (LP or HP) of auxiliary recovery unit to the storage port of the original unit.
4. Connect the other service hose of the original unit to the storage port as well.
5. Open the high-side (red) or low-side (blue) panel valve on the control panel (depending on user input).
6. Access the OUTPUT TEST in the Service menu on original unit and enable ISV liquid solenoid (S4) and charge solenoid (S3).
7. Start the recovery on auxiliary recovery unit and empty the original unit tank.
8. When the original unit is empty, the auxiliary recovery unit stops automatically. Disconnect hoses.
9. To repair the original unit carefully disconnect or remove components since there might be refrigerant still present.
10. Repeat the process in opposite way, to get all refrigerant back into the original unit.

TROUBLESHOOTING

Grounding, Noise, and Power Issues

To provide proper protection and maximize system reliability, it is important to consider grounding, shielding, and AC and DC power supply issues.

Grounding Issues

Grounding must be looked at first, for without a low impedance ground; all of the noise protection measures built into the electronic components and assemblies are rendered useless.

Grounding equipment is done for two reasons. The first and most important is safety. To meet safety requirements, any exposed conductive surface of the equipment must be within the safe touch voltage range of under 30 Volts **RMS**. Any voltage greater may result in a life threatening electrical shock if conditions are met.

The second reason is the process by which the case and any extensions of the case are connected to earth ground. If the ground is open or has a high resistance, electrical noise will not be shorted to ground and can radiate into the unit.

Noise (Shielding) Issues

Proper shielding prevents noise from entering the unit. Two types of noise can affect the operation of a unit; noise coming in on the AC line and external noise (such as ignition noise) radiated directly into the unit.

AC Noise - any signal on the power line other than the advertised voltage and frequency; this includes spikes, surges, and sags.

External Noise - (such as ignition noise) is generally radiated into the unit. Other types of radiated noise sources are light ballasts, transmitting towers, power lines, etc. External noise can cause the unit to lock-up, reset, or behave erratically. The effect varies with the type and intensity of the noise.

Power Issues

The power applied to the unit must be from a stable, low impedance source. Long term stability must be within +5% or –10% of the nominal voltage. For a 230-Volt line the limits are 207V to 241V. The unit will operate above and below the voltage limits. However, problems in operation may appear if the voltage drops (sags) below or rises above (surges) these limits. The life expectancy of the components in the unit may be shortened significantly.

The impedance controls the ability of the line to supply a constant voltage with a changing load. Noting the line voltage with the unit off, then noting the voltage with the unit on, a technician can determine the impedance of the line from the unit to the power transformer. If there is a greater than 5% change, the line has too much resistance or load is too great. The solution is a dedicated line.

The line cord must be wired correctly. When replacing the line cord, make sure the terminals at the plug have high, neutral, and ground connections in the proper locations. A ground circuit tester can be used to test wiring.

Verify the Power Outlet

1. Ensure the outlet is in good working order.
2. With no load on the circuit, use a ground circuit tester to verify proper polarity and presence of earth ground.
3. Using a DVM and with no load on the circuit, verify there is less than .3 Volts from neutral to ground and the voltage is stable. Be suspicious of a 0-Volt reading. This may indicate a short between neutral and ground.
4. With no load on the circuit, verify the output voltage is nominally 230 Volts and stable.
5. With the unit connected to the circuit (loaded) verify the voltage varies less than 4 VAC measured from neutral to ground.
6. Using an oscilloscope, monitor the waveform output from the outlet for any distortion. The signal should be a sine wave.

Will Not Power-Up, No Display

1. Ensure the door is firmly latched.
2. Verify the unit is connected to a known good power source with a good ground, and not through an extension cord.
3. Verify the power cable is wired correctly, and the connector has not been damaged. Replace or repair as required.
4. If unit does not power up, check if the circuit breaker has tripped.
5. Turn on the main power switch.
6. If the display does not activate, verify line voltage is present at the input and output terminals of the switch.
   - If line voltage is *not* present at power switch input, check connections between power switch and AC connector.
   - If line voltage is present at power switch input, but not at output with switch turned on, replace power switch.
   - If line voltage is present at both input and output of switch, proceed to next step.

Circuit Breaker Not Tripped

1. Turn off unit and disconnect AC power cord from receptacle.
2. Check the circuit breaker for continuity.
   - If there is no continuity, replace circuit breaker.
   - If there is continuity, continue to next step.

NOTE Before replacing any component, make sure the interconnecting harnesses are in good condition and proper electrical contact is made between the connectors.

3. Perform the following continuity checks:
   a. Disconnect the cable from power supply PSJ1.
   b. Jumper all input power cable pins together at the plug end.
   c. Press the door safety switch actuator and check for continuity across power supply input cable pins 2 and 3.
      - If continuity exists, remove jumpers from the input power cable and connect PBP3.
      - If no continuity, check the power (lock out/tag out) and door switches for proper operation. Repair or replace as required.
4. Connect the unit to a proper AC power source and place the unit power switch on. The display should illuminate. If the unit is still inoperative, perform the following voltage checks.
   a. Measure the voltage at the output of the power supply from PSJ2 pin 2 (+) to pin 3 (-). Voltage should be 12VDC.
      - If 12Vis not present, go to step 5.
      - If 12V is present, replace control board.
5. Connect the unit to a proper AC power source and place the unit power switch on.
   a. Disconnect the cable from power board PBP4.
   b. Measure the voltage at PBP3 pins 2 and 3.
      - Voltage should be 207 to 241VAC. If voltage is correct, replace power supply.
      - If voltage is less than 207VAC, replace power board.

Circuit Breaker Tripped

1. Place unit power switch off and reset the circuit breaker.
2. Place unit power switch on. If the circuit breaker remains engaged, the unit should operate normally and no further action is required. Otherwise, proceed to step 3.
3. If the circuit breaker trips again after being reset, place the power switch off.
4. Disconnect PBP3 and perform continuity checks of the power switch (lock out/tag out) and door switch circuitry. If no faults are found, replace the circuit breaker.
5. Connect PBP3 and disconnect remaining connectors from the power board.
6. Place unit power switch on.
7. If the reset circuit breaker trips again, replace the power board.
8. If the circuit breaker doesn't trip after being reset, place the power switch off.
9. Connect one connector at a time into the power board, placing the power switch on after each additional connection.
10. Perform step 9 until the circuit breaker trips when placing the power switch on.
11. Check all components associated with the last connector to be attached to the power board when the power switch was placed on.

Will Not Fill Tank

NOTE The compressor should be running during this test. If it does not run, refer to compressor troubleshooting in the Compressor section of this manual.

1. Check the tank fill setting and the tank tare setting.
2. Verify the low-side hose is properly connected and threaded completely onto the source tank fitting. Check quick-seal on tank fill hose and make sure virgin tank valve is open.
3. Verify there is liquid refrigerant in the tank and the tank is positioned to supply liquid refrigerant to the low-side hose. Inverted for a disposable tank or attached to the liquid port on a refillable tank.
4. Verify the liquid port solenoid (S4) is receiving power and opening properly.

NOTE The recover solenoid (S1) is controlled to maintain a maximum of 35 psi in the accumulator.

5. Monitor accumulator pressure. If reading is low, check restriction up stream of the accumulator. If pressure is normal, check compressor, oil return solenoid (S7) and discharge check valves.
6. Check the charge (S3), recover (S1), oil return (S7), and oil drain (S6) for bleed-through. Repair as needed.
7. Verify the operation of the tank fill and normal/discharge check valves. Replace as needed.
8. Check the clearing discharge check valve for bleed-through. Replace as needed.
9. Check the compressor for suction and discharge performance. Refer to Compressor Testing procedure in this section.
10. Remove the filter and inspect all fittings and gaskets to verify that no obstructions exist. Replace/repair gaskets as needed and reinstall filter.
11. Verify that the scale is calibrated and free to move.

Will Not Perform Clearing

NOTE The compressor should be running during this test. If it does not run, refer to compressor troubleshooting in the Compressor section of this manual.

Basic Recovery Sequence

1. Low-side clear to 4 mBar (4 in-Hg)
2. High-side clear to 304 mBar (9 in-Hg)
3. Recovery
4. Clear to 4 mBar (4 in-Hg)

Service Tech Actions

1. Recover the hoses to verify customer claim.
2. Verify valve on external source tank is closed.
3. Place hand on compressor to be sure it is running.
4. Turn power off.
5. If unit completed recovery with source tank valve closed, but did not complete with valve open, replace liquid port solenoid (S4) and try again.

Verify Transducers

1. Make sure the transducers are wired correctly and at the control board.
2. Check the range listed on the accumulator transducer label. It should read “0-10 Bar” (“0-150 psi”).

Verify Solenoids

1. Inspect all solenoids for correct wire numbers.
2. Check oil return solenoid (S7) to be sure it is not backward.

NOTE Ports are stamped 1 and 2. Port 1 is OUT, Port 2 is IN.

Verify Transducers are Reading Correctly

1. Attach a calibrated compound gauge to the accumulator service port.
2. Turn power on.
3. Enter vacuum mode and pull vacuum for one minute on service hoses.
4. Enter the service menu and turn on Display Pressures.

5. Verify the low-side (gauge), tank, and accumulator transducer pressures are providing logical readings. A transducer reading of 1046 mBar (31 in-Hg) vacuum means the transducer is defective.
6. Compare the accumulator transducer reading with the manual gauge reading at the accumulator service port. Replace the transducer if its reading doesn't match the calibrated test gauge.

NOTE
Verify replacement transducer reads zero before installing it into the machine by connecting it to the wire harness and checking the reading in the "display pressures" screen in the service menu.

Check Accumulator Pressure Transducer and Solenoids

1. Go into the service menu and turn on DISPLAY ACC PRESSURE.
2. Fill the service hoses and then recover.
3. The clearing must stop at -0.4 bar.
4. Compare accumulator pressure reading on display with manual gauge.
5. If this is a new unit and the accumulator pressure is higher than 690 mBar (10 psi), the accumulator shell and look for loose nuts on the copper coil. Install accumulator shell when inspection/repair is complete.
6. If accumulator pressure is between 69 mBar and 690 mBar (1 psi and 10 psi), open the compressor oil return solenoid and look for debris.
7. If accumulator pressure is between 0 Bar (0 psi) and 270 mBar (8 in-Hg), pull one wire off the compressor oil return solenoid (S7).
   - If unit completes recovery with one wire off the solenoid, the discharge solenoid may be leaking by the plunger. Replace it and recover hoses again.
   - If unit still does not complete recovery, charge solenoid (S3) might be leaking past the plunger. Close the tank liquid valve, bleed the liquid line, then replace the charge solenoid (S3). Run all tests again.

Inspect the Check Valves

1. Close all tank valves.
2. Relieve pressure on the vapor hose at the tank.
3. Remove both the normal discharge and clearing discharge check valves.
4. Inspect them for debris and cut O-rings.
5. Inspect and test check valve function by pushing the check valve plunger completely open. Verify it moves smoothly and returns correctly to the sealing position.
6. Replace or reinstall the check valves based on what was replaced.
7. Tighten vapor hose.
8. Open tank valve and verify unit operation if a bad check valve was replaced.

If unit continues to fail, test compressor per instructions. If failure persists, check vapor hose for free flow, then call the Tech Line. Go into the service menu and turn off DISPLAY ACC PRESSURE when repair is complete.

Will Not Recover

NOTE
The compressor should be running during this test. If it does not run, refer to compressor troubleshooting in the Compressor section of this manual.

1. Verify there is pressure reading on the gauges.
   - If pressure is present, the service hoses are connected correctly.
   - If pressure is absent, the service hoses are connected improperly or there is a restriction. Clear and reconnect service hoses.
2. Display the accumulator pressure.
   - If there is no pressure, inspect inlet valves, recover solenoid and check valves.
   - If pressure seems normal at the accumulator, inspect oil return solenoid, compressor, and charge solenoid.

The recover solenoid is controlled to maintain 35 psi (max) in the accumulator.

3. Check the clearing discharge check valve for bleed-through. Repair as needed.
4. Verify operation of the recover and normal/discharge check valves. Replace as needed.
5. Check the compressor for suction and discharge performance.
6. Remove the filter and inspect all fittings and gaskets to verify that no obstructions exist. Replace/repair gaskets as needed and reinstall filter.

7. Verify that the accumulator transducer is functioning properly by attaching a calibrated gauge to the service port and compare readings to those on the transducer ID plate.
8. Check the oil return, clear, tank fill/liquid, and charge solenoids for bleed-through and proper operation. Repair as needed.
9. If problem still exists, check the charge and vacuum solenoids, as applicable.

NOTE If the compressor fails to operate, refer to Compressor Troubleshooting.

Will Not Drain Oil

1. Verify the accumulator transducer is functioning properly.
2. Is an Oil Drain Error Message displayed?
   - *Error 1 - Can't get 1100mBar (16 psi) into the accumulator to do oil drain.*
     a. Verify operation of the charge solenoid.
     b. Verify liquid valve on ISV is open.
     c. Verify there is 454g (1 lb) minimum chargeable refrigerant in the ISV.
     d. Verify the oil drain solenoid (S6) is receiving power and opening properly.
        - If not receiving power, check the continuity of the wiring between solenoid and power board. Repair as needed.
        - If the wiring is correct and no power is being applied to the solenoid, replace the power board.
        - Verify the solenoid coil is opening the solenoid properly.
   - *Error 2 - Pressure cannot drain from accumulator.*
     Verify the oil drain solenoid (S6) is receiving power and opening properly.
        - If not receiving power, check the continuity of the wiring between solenoid and power board. Repair as needed.
        - If the wiring is correct and no power is being applied to the solenoid, replace the power board.
        - If the unit continually drains oil until Oil Drain Error 2 displays, the accumulator may be filled with oil that must be manually drained. Manually drain accumulator until empty.

NOTE Determine the reason the oil separator isn't draining properly. Improper draining could be caused by a faulty component or improper operation by the user. Access the maintenance counters in the service menu. Comparing the recover cycles to the oil drain cycles may indicate user operational errors. If the procedure in step "a" does not solve the problem, replace the control board.

Will Not Air Purge

If the air doesn't purge, check the air purge pressure relief valve.
If the air purge pressure relief valve is locked, open it manually.

Will Not Evacuate (Vacuum)

The vacuum pump should be running during this test. If the pump does not run, refer to Vacuum Pump Troubleshooting in the Vacuum Pump section of this manual.

1. Verify the service hoses are properly attached to the unit (valves open) without any restrictions.
2. Make sure the two plastic vacuum lines are snug at both ends and not obstructed. Check the pneumatic fittings for leaks.
3. Check for proper vacuum oil level in the vacuum pump sight glass (oil level should be in the center of the sight glass while the pump is running). Replace vacuum pump oil if necessary.
4. Check for suction at the intake of the pump. If there is none, replace the pump.
5. Verify that the vacuum solenoid is receiving power,and low-side and high-side inlet valves are open.
   - If not receiving power, check continuity of the wiring between the solenoid and power board. Repair as needed.
   - If the wiring is correct and no power is being applied to the solenoid, replace the power board.

6. Check the oil inject solenoid for bleed-through and proper operation. This can be done by checking for suction at the oil inject tube in the oil inject bottle. Remove the oil inject bottle during the vacuum process and check for suction at oil inject tube or watch for oil movement in the tube towards the manifold. Repair as needed.
7. Check the charge solenoid if pressure rises above zero (0) when the unit is off.
8. Verify the low side pressure transducer is functioning properly.

Vacuum Pump Not Running

1. Check gauges for vacuum.
2. If pressure is over 690mBar (10 psi), recover hoses. If unit won't maintain vacuum, check the following for leakage:
   - Charge solenoid (S3)
   - Hose couplers
   - Hoses
   - Gauge tubing
   - Bulkhead/Oil inject manifold
   - Suction side vacuum hoses and connections
3. If there is no pressure on gauges and display says Pressure Exists, enter the service menu and verify low side inlet transducer reading. If it is reading pressure where none exists, replace transducer. If replacing the transducer doesn't correct the reading, replace the power board.
4. Refer to "Vacuum Pump Does Not Run for electrical troubleshooting.

Fails Leak Test

NOTE To ensure an accurate leak test, it is imperative that a thorough recovery and evacuation of the system be performed. During the recovery process, cold spots can develop in the automotive system. Pockets of refrigerant in desiccant and in system oil will continue to vaporize as the A/C system temperature equalizes toward ambient. As this occurs, A/C system pressure will increase, which may be interpreted by the unit as a leak. This will vary somewhat with ambient temperature conditions.

1. Verify the service hoses are properly attached to the unit (valves open) without any restrictions. Verify the connections of the quick couplers and gauges (with their adapters and plastic hoses).
2. If vacuum can not be maintained, using Service Leak Check in the service menu, pressurize the unit and use a leak detector to check all hoses, fittings and components for leaks. Repair as needed.
3. Check the charge (S3), oil inject (S5), and vacuum solenoids (S2) for bleed-through. Repair as needed.

NOTE A leaking charge solenoid (S3) could be identified by an internal pressure rise above zero. A leaking vacuum (S2) or oil inject solenoid (S5) would not normally rise above zero.

4. Verify the low-side pressure transducer is functioning properly. Enter service menu and verify low side inlet transducer reading.
   - If the low-side inlet transducer is reading pressure while the system is in a vacuum, replace the transducer. Verify the replacement transducer reads zero at atmosphere by plugging it into the wiring harness prior to installation.
   - If replacing the transducer doesn't correct the reading, replace power board.

Pressure Decay Leak Test (R1234yf only)

1. Check the oil drain (S6) and oil return (S7) solenoids for bleed-through.
2. Verify Vapor check valve on the tank work in right way avoid refrigerant come back to accumulator shell.

Will Not Inject Oil

1. Verify the oil injection bottle is securely attached and contains an appropriate amount of oil.
2. Verify a vacuum has been pulled on the system.
3. Verify the high-side service hose is properly attached to the unit without any restrictions and coupler valve is open.
4. Enter the Output Step Test and activate the oil inject solenoid (S5).
5. Verify power to the oil inject solenoid (S5).
6. Verify the solenoid coil is opening the solenoid properly.
   - If not receiving power, check the continuity of the wiring between solenoid and power board. Repair as needed.
   - If the wiring is correct and no power is being applied to the solenoid, replace the power board.
7. Verify operation of the oil inject check valves. Replace as needed.

Will Not Charge

NOTE There is no component that pumps refrigerant into a system during the charge process. The refrigerant flows in due to a pressure differential. If the system is not in a vacuum, unit will not charge.

The pre-charge vacuum and pressure decay tests are disabled on the AC1X34-3/BAC 3000a units.

1. Verify the service hoses are properly attached to the unit without any restrictions and coupler valves are open.
2. Verify a deep vacuum has been pulled on the system being charged.
3. Check that all ISV hoses are properly installed and ball valve (liquid) is open.
4. INSUFFICIENT REFRIG AVAILABLE will be displayed if the weight entered leaves less than 1.8kg (3.97 lbs) of refrigerant in the internal tank after charge. If there is enough refrigerant in the tank check scale calibration and recalibrate if necessary.
5. Verify the charge (S3) solenoid and liquid port solenoid (S4), are receiving power and opening properly.
   - If not receiving power, check the continuity of the wiring between solenoid and power board. Repair as needed.
   - If the wiring is correct and no power is being applied to the solenoid, replace the power board.
6. Verify the operation of the charge check valve. Replace as needed.

NOTE If the unit does not complete a full charge, the compressor and charge (S3) solenoid are switched on and off to build tank pressure.

Slow Charge

When there is a slow charge error, “Try again?” will be displayed if the charge slows and fails after three (3) attempts.

1. Check and ensure there is a good vacuum in the vehicle being tested.
2. Verify sufficient pressure in the ISV to transfer refrigerant.

NOTE During the charge process, there must be a transfer of at least 23 g (0.05 lbs) of refrigerant within 30 seconds.

3. Ensure chargeable weight is greater than desired charge.
4. Verify the charge couplers are completely open and the vehicle ports are actuated.
5. Check for debris in any of the charging circuit solenoids. Clean or replace if necessary.
6. If slow charge persists, there may be a pin hole leak in the ISV dip tube. Substitute a known good ISV tank.

Will Not Hose Flush

Flushing the hoses is required if the next vehicle to be serviced contains a different type of A/C system oil than the previous vehicle serviced.

1. Verify the service hoses are properly attached to the unit storage ports without any restrictions and coupler valves are open.
2. Verify the ISV valves are open and tank hoses are properly connected to the ISV.
3. If there is no pressure on the gauges, refer to the Will Not Charge troubleshooting procedures earlier in this section.
4. If the pressure does not clear on the gauges, refer to the Will Not Recover troubleshooting procedures earlier in this section.

Will Not Print

1. Does the printer have power?
2. Does the printer have paper?
3. If the machine is operating in direct sunlight, move it or cover the face of the printer and try again.

Printer Has Power

If the printer has power, check the continuity of the printer harness between the printer (P3) and the control board (P15).

- If harness tests good, replace the printer assembly and retest. If the harness test fails, replace printer harness.
- If printer still does not print, replace the control board.

Printer Does Not Have Power

Verify the printer is receiving power at connector P1. Test for +5 VDC across the RED (pins 1 & 2), and BLACK (pins 3 & 4) wires.

- If voltage is present at P1, replace the printer assembly and retest. If not, check for printer power at CBP15.
- If printer power is present at CBP15, check for continuity of the printer harness. Repair or replace if necessary. If printer power is not present at CBP15, replace the control board.

NOTE The control board gets its power from the power board PBP2, through connector P19 If the control board is not receiving power, the printer will not function.

Replace the Printer Paper

1. Pull the cover open by inserting a finger into the pocket in the cover and pull.
2. Remove the paper core.
3. Install the new roll of paper with the end of the paper at the top of the roll, unrolling from the back.
4. Feed the paper out the top of the opening, and close the cover.

Error Messages

Refer to the list of error messages:

ACC Pressure Error H

The accumulator pressure transducer is reading accumulator pressure greater than 9.8 bar (140 psi).

ACC Pressure Error L

The accumulator pressure transducer is reading accumulator pressure less than 77.5 cm-Hg (30.54 in-Hg) of vacuum. Increase vacuum.

Calibration Error/Calibration Rejected

When the calibration check is performed, the unit measures the scale weight before and after the calibration weight has been attached to the scale. If the difference in weight is 535 ± 14 grams (1.18 ± 0.03 lbs), the calibration check will pass. However, if the difference is anything else, the Calibration Error/Calibration Rejected message will be displayed.

- Check for debris on the magnet assembly (debris may cause scale binding)
- Verify scale is unobstructed. Check tank hoses and wiring
- Recalibrate scale
- Make sure to use the authorized calibration weight

Insufficient Refrigerant Available

If the weight entered leaves less than 1.8 kg (3.97 lbs) of refrigerant in the internal tank after charge, the charge function will not start. Add additional refrigerant to the tank.

Low Recover Pressure, Check Connections

At the beginning of the recovery process, the unit is seeing less than 0.7 bar (10 psi) at the low-side pressure transducer. Verify all connections before continuing. If the pressure is at 0, use the vacuum function to clear system.

LS Pressure Error H

The low-side pressure transducer is reading low-side pressure greater than 9.8 bar (140 psi).

LS Pressure Error L

The low-side pressure transducer is reading low-side pressure less than 77.5 cm-Hg (30.54 in-Hg) of vacuum. Increase vacuum.

Out of Range Error

If the value entered exceeds the recoverable amount displayed on the standby page, this error message will be displayed.

Pressure too High for Vacuum

If this message occurs during the evacuation process, the unit is seeing greater than 0.7 bar (10 psi) at the Low-Side Pressure Transducer. Perform recovery before continuing.

If this message occurs during the initial setup process, the unit is seeing greater than 0.7 bar (10 psi) at any pressure transducer. You must remove all pressure from the unit before continuing.

Serial Number Error

The 10-digit serial number for the filter was entered incorrectly or previously used in this unit. Re-enter serial number or use new filter.

High Pressure or Scale Error

A high pressure or scale error can be triggered by factors that cause a premature trip of the safety circuit.

Vibration or jarring of the tank in combination with one or more of the following factors can cause a high scale reading:

- Tank Tare setting
- Tank nearly full or over filled
- Tank Fill setting at the maximum

The best remedy for this is to make the proper adjustments to tank tare, calibration, etc., but only if required.

Power Board Troubleshooting

1. Possible reasons to replace the power board:
   - No power to any components.
   - A solenoid won't open.
   - Compressor and fan won't start.
   - Vacuum pump won't start.
   - A function does not start or finish a process.
2. Do not replace the power board for these issues:
   - Display has lines, missing characters, etc.
   - Repeated read errors.
   - Repeated communication errors.
   - Display is blank at power up and contrast can't be adjusted and power has been verified.

The best way to troubleshoot is to go into the diagnostic menu:

- If you are able to switch a solenoid or relay on and off, the output portion of the board is likely okay.
- If the fan, compressor, or vacuum pump is selected it should receive power.

Pressures can be verified with a gauge at the accumulator port, low side hose and by accessing the tank. The tank pressure transducer can be checked by charging a hose and comparing to the low side transducer or the gauges. They should be reasonably close initially, but the gauge or low side reading should drop quickly if the tank is warm.

Control Board Troubleshooting

1. Possible reasons to replace controller:
   - Repeated read errors.
   - Repeated Communication errors.
   - Keys don't read (after verifying keypad).

NOTE Do not reflash controller unless updated software is required or a Technical Service Bulletin indicates the need.

2. Do not replace the control board for these issues:
   - A solenoid will not open.
   - A motor won't start.
   - Scale is out of calibration, (overcharge/undercharge etc).
   - The display is dim or dark (unless it can not be adjusted).
   - A pressure reading is wrong.
   - High pressure, air purge time out, etc.
   - A function doesn't start or complete (Recovery, Charge Tank Fill etc).

Compressor

Compressor Troubleshooting

1. Check for proper power source, circuit breaker, and electrical connectors for damage or corrosion.
2. Connect the unit directly to a known good power source. Do not use an extension cord.
3. Verify the ground wire between the compressor electrical box and chassis ground is securely fastened.
4. Check for 220VAC to the compressor.
   - If there is no voltage to the compressor's start components, proceed to the next step.
   - If voltage is present at the compressor, replace the compressor thermal protector and start relay assembly. If compressor runs, verify the compressor amp draw is within specs. If the compressor doesn't run and/or is drawing locked rotor amps, replace the compressor.

CAUTION

If using the output step test to run compressor, the oil return solenoid must be open before the compressor is started.

5. Check for 220VAC from the power board on connector P4, pins 1 and 2.

   When checking voltage to the compressor it is normal to read low voltage at the connector when it's disconnected and the power to the compressor is off.

   - If voltage is present, check wiring between the power board and the compressor start components. Repair as needed.
   - If voltage is not present, replace the relay board.
6. Perform functional check.

Compressor Testing Procedure

1. Remove shroud from the unit.
2. Close tank valve and depressurize the unit in accordance to the service manual.
3. Remove all 3 lines attached to the compressor.

CAUTION

The discharge line will be under pressure.

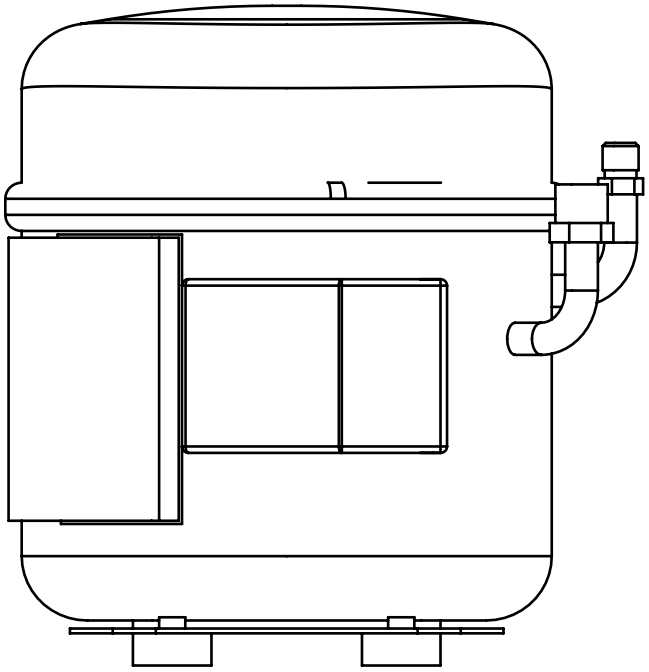


Figure 2-1. Compressor Assembly

4. Cap off the compressor oil return port.
5. Connect a manifold set to the compressor, high side to the compressor discharge and the low side to the suction port. Remove hose from center port of manifold.
6. Close both valves on the manifold.
7. Enter the service menu, scroll to the output test and select the compressor test.
8. Start the compressor.
9. The first time the compressor is tested, the gauges may read approximately 7 bar (100 psi) and 540 mBar (16 in-Hg).
10. Turn off the compressor and release pressure from manifold.

Test the Compressor a Second Time

NOTE

Studies have shown the first test may give false compressor values due to imbedded refrigerant in the oil.

1. Close the valves on the manifold and start the compressor.
2. A good compressor will produce 14 bar (200 psi) discharge and 472 mBar (14 in-Hg) on the suction side, minimum.
3. Repeat the test a third time to verify readings.
4. If the suction or discharge of the compressor is under specifications, replace the compressor.

Vacuum Pump

Vacuum Pump Troubleshooting

1. Check gauges for vacuum.
2. If pressure is over 0.7 kgf/cm^2 (10 psi), recover hoses.
3. If unit won't maintain vacuum, check high and low side charge solenoids, hoses, couplers, gauges, and other related components, for leakage.
4. If there is no pressure on the gauges and the display says Pressure Exists, enter the Service Menu and verify low side inlet transducer reading. If it is reading pressure where none exists, replace transducer. If replacing the transducer doesn't correct the reading, replace the control board.
5. If the compressor is not running or appears to be running poorly, refer to Vacuum Pump Does Not Run.

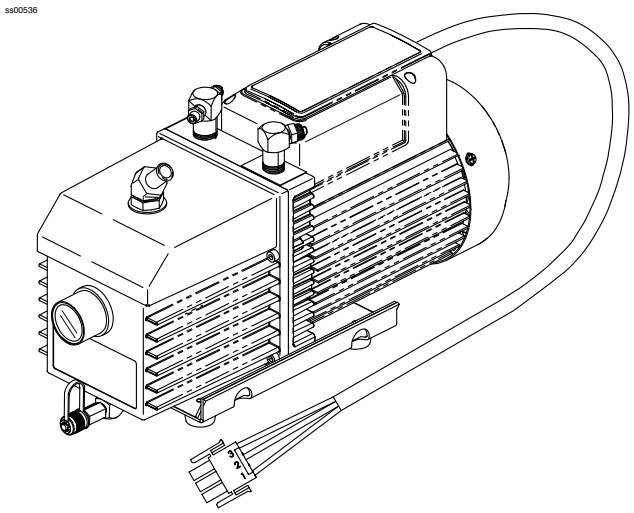


Figure 2-2. Vacuum Pump Assembly

Vacuum Pump Does Not Run

1. Check for proper power source, circuit breaker, and electrical connectors for damage or corrosion. Replace or repair as required.
2. Connect the unit power cable directly to the power source. Do not use an extension cord.
3. Check for 230 Volts at the vacuum pump connector, pins 2 and 3.
   - If voltage is present, replace vacuum pump assembly.
   - If voltage is not present, continue to next step.

NOTE: When checking voltage to the vacuum pump it is normal to read low voltage at the connector when it's disconnected and the power to the vacuum pump is off.

4. Check for 230 Volts from the power board on connector P4 pins 3 and 4.
   - If voltage is present, check wiring between the power board and the vacuum pump. Repair as needed.
5. Use the output test and verify fan operation.
   - If the fan is not functioning, check/verify wiring, switches, and circuit breaker.
   - If the fan is functioning, replace the power board.
   - If voltage is not present, replace the power board.

NOTE: If fan works, power is present at the power board. The fan, vacuum pump, and compressor use the same power source.

6. Perform functional check.

ERROR MESSAGES

ERROR/WARNING	PROCEDURE	DESCRIPTION OF ERROR/ WARNING
Air Flow Calibration failed! (R1234yf only)	Calibrate Air Flow	Air flow sensor is not reading air flow correctly. Press **Retry** (**F1**) or **Exit** (**F2**).
Calibration failed! Offset is negative	Calibrate Load Cells	Offset between the two weights is negative. Press **Retry** (**F1**) or **Exit** (**F2**).
Calibration failed! Slope is out of range.	Calibrate Load Cells	Difference between upper and lower limits is too great. Press **Retry** (**F1**) or **Exit** (**F2**).
Calibration failed! Verification weight X. XXXYY.	Calibrate Load Cells	Weight too high or low. Press **Retry** (**F1**) or **Exit** (**F2**).
Calibration failed.	Calibration Check	Press **Retry** (**F1**) to return to the beginning of the calibration check, or **Exit** (**F2**) to return to the service menu.
Insufficient vacuum for charge.	Charge	System vacuum to low to draw in enough refrigerant. Press **Vacuum** (**F1**) or **Exit** (**F2**).
Insufficient refrigerant available for charge.	Charge	Refrigerant in ISV too low. Press **Retry** (**F1**) or **Exit** (**F2**). May require tank fill.
Leak test failed!	Charge Leak Test	Check for leaks and retest. Press **Exit** (**F2**).
Oil drain halted. Pressure error.	Drain Oil	Pressure insufficient to push oil out of separator. Press **Retry** (**F1**) or **Exit** (**F2**).
Oil drain halted. Flow error.	Drain Oil	Oil drain timed out. Press **Retry** (**F1**) or **Exit** (**F2**).
Invalid password!	Enter Password	Password entered is incorrect. Verify function password is correct. Press **Retry** (**F1**) or **Exit** (**F2**).
Charge stalled! Check connections and valves. XX.XXXYY of XX.XXXYY charged.	Fast Charge	Check panel valve position and couplers. Press **Retry** (**F1**) or **Exit** (**F2**).
Invalid serial number!	Filter Change	Filter serial number must be different from any other filter serial number previously installed. Press **Re-Enter** (**F1**) or **Exit** (**F2**).

ERROR/WARNING	PROCEDURE	DESCRIPTION OF ERROR/ WARNING
Serial number has already been used.	Filter Change	Filter serial number must be different from any other filter serial number previously installed. Press **Re-Enter** (**F1**) or **Exit** (**F2**).
Remaining capacity: XXX.XYY Replace filter now?	Filter Change	Display shows filter capacity remaining until machine locks down.
Pressure test failed. Check for leaks.	Leak Check	Locate and repair any leaks. Press **Retry** (**F1**) or **Exit** (**F2**).
Vacuum test failed. Check for leaks.	Leak Check	Locate and repair any leaks. Press **Retry** (**F1**) or **Exit** (**F2**).
No pressure on inlets. Recover Anyway?	Recover	Press **Yes** (**F1**) or **No** (**F2**).
Vacuum halted! The inlet pressure is too high for vacuum.	Service Vacuum	Press **Retry** (**F1**) or **Exit** (**F2**).
Invalid entry. Must be between XXYY and XXYY.	Set Tank Tare	Tank tare range is either too low or too high. Press **Retry** (**F1**) to re-enter tank tare value or or **Exit** (**F2**).
Charge stalled! Check connections and valves. XX.XXXYY of XX.XXXYY charged.	Slow Charge	Check panel valve position and couplers. Press **Retry** (**F1**) or **Exit** (**F2**).
System Fault. RTC Fault.	Startup	System missing date/time information. Press **Continue** (**F2**) to run RTC routine.
Insufficient refrigerant. 6.00kg required for system flush.	System Flush	Press **Exit** (**F2**), then perform tank fill.
Pressure too high for flush. System must be recovered.	System Flush	Press **Exit** (**F2**), then perform recovery.
Source tank is empty. Filled: XX.XXYY.	Tank Fill	Source tank emptied during the tank fill process. Connect new source tank, then press **Retry** (**F1**) or **Exit** (**F2**).
The inlet pressure is too high for vacuum. Recover or cancel.	Vacuum	Run a recovery by pressing **Recover** (**F1**) or **Exit** (**F2**).
Vacuum Halted! The inlet pressure is too high for vacuum.	Vacuum	Press **Retry** (**F1**) or **Exit** (**F2**).
Test failed!	Vacuum Test	Press **Retry** (**F1**) or **Exit** (**F2**).

ERROR/WARNING	PROCEDURE	DESCRIPTION OF ERROR/ WARNING
Oil life remaining: XX:XXX Change oil now?	Oil Change	The display shows how long the vacuum pump has operated since the last oil change.
IOE Communication failed!	All procedure	Failed communication with relay board. Reset the relay board by pressing **F2**.

Electrical Operation and Troubleshooting

Electrical System Operation

The electrical system provides the various voltage levels required for the machine to operate effectively. The power board, power supply, and control board work together to condition the input voltage by removing voltage spikes and noise, transforming the input voltage to 12VDC (power supply) for operating relays and voltage regulators (power board), to power the unit cooling fan, engage the compressor and vacuum pump when required. Inputs from the sensors and transducers are processed (control board), to ultimately power the manifold solenoids (power board) for recovering, recycling, and recharging vehicle A/C systems.

Power Board and Power Supply Operation

The Power Board is shown in Figure 3-1. The Power Supply is shown in Figure 3-2. Refer to these figures as needed.

Power Board Connector Assignments

See Figure 3-1, Power Board for connector locations:

P1: Power Supply J2
P2: Control Board P19
P3: AC Input
P4: Power Supply J1
P5: Fan
P6: Vacuum Pump, Compressor
P7: High Pressure Switch
P8: Solenoids

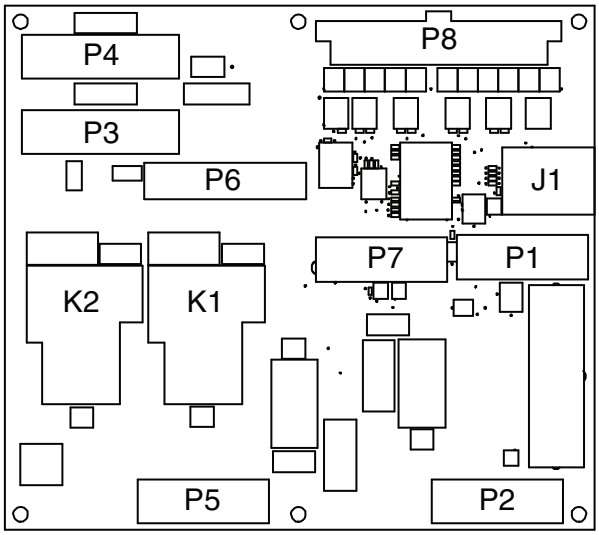


Figure 3-1. Power Board

The Power Board (PB) receives AC voltage at PBP3 from the power switch through the circuit breaker to PBP3 pins:

- Pin 1 – Unit ground (on center divider)
- Pin 2 – AC low
- Pin 3 – AC high

The input voltage is immediately applied to the Power Supply (PS) through PBP4 and the interconnecting cable to PSJ1. The output of the power supply is 12V ±0.1VDC. This is the main system “control voltage” and used throughout the unit for its various functions through PSJ2 to PBP1 and Control Board (CB) receives 12VDC from power board PBP2 through an interconnecting cable to CBP19 (See Control Board Functions). Relay K3 is used to couple the 12V output from the power supply to the power board through PBP10.

Input AC voltage within the power board is also routed to relays K1, K2, K4, and K5. Relay functions are:

- K1 – Compressor
- K2 – Vacuum Pump
- K3 – Fan
- K5 – UL Cutoff

Power for the unit fan, vacuum pump, and compressor is routed to those units through PBP5 and PBP6 and wiring harnesses.

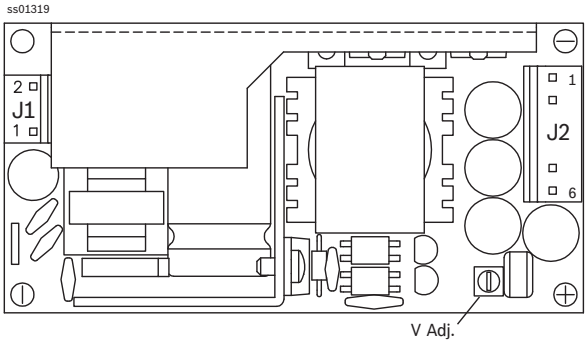


Figure 3-2. 12 VDC Power Supply

Control Board Operation

The Control Board, Figure 3-3, is mounted in the control panel and provides the control for the entire operation of the unit based upon the signals from sensors, transducers, and manual operator inputs via the keyboard.

Control Board Connector Assignments

See Figure 3-3 for connector locations.
J1: To Power Board
P1: Airflow Sensor (R1234yf only)
P2: Unused
P3: Unused
P5: Low-Side Pressure Transducer
P6: Accumulator Pressure
P7: Vacuum Transducer
P8: Scale Assembly
P13: USB Port
P15: Printer Power
P17: Keypad
P18: Printer Data
P19: 12VDC from Power Board PBP2

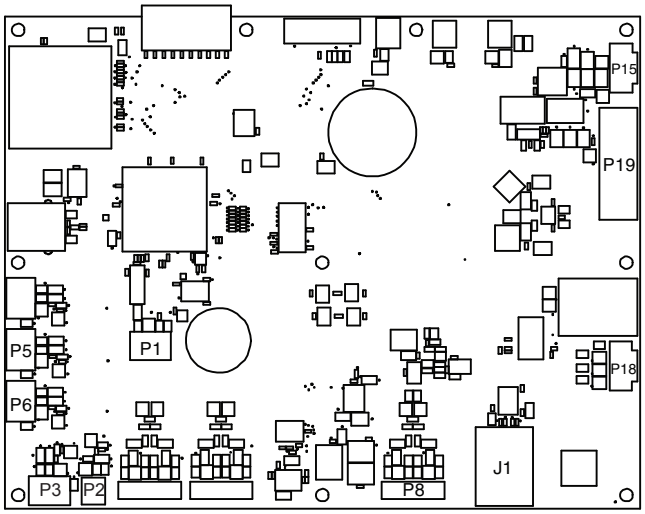


Figure 3-3. Control Board

The Control Board (CB) receives power from the Power Board PBP2 to CBP19. This voltage is used to power the sensor circuits, processors, and is provided as an output signal to the Power Board to energize manifold solenoids, and the compressor and vacuum pump relays. Three regulated power supplies of 8VDC, 5VDC, and 3.3VDC provide the power for the logic and data circuitry. A fourth regulated power source supplies voltage to the integral printer (optional).

Control Board Functions

1. Reads Keypad
   - If a key does not respond, it's most likely that:
     √ it isn't supposed to respond at that time
     √ the keypad is faulty (replace keypad)
2. Operates Display
   - The display contrast changes with temperature and light conditions.
   - Always try to adjust the contrast before replacing the control board (Up/Down Arrows).
   - After adjustment, if there are missing segments, characters, etc., in the lines of the display, replacement is required.
3. Contains Programming
   - Normally, if a unit runs at all, the program and the control board are okay. Reflashing does nothing unless a valid upgrade program is available.
4. Communicates with SD Card and other memory expansion ports.
   - This occurs during a software updates.
5. Contains calibration and other stored variables.
   - Normally if a variable is corrupt an error will appear.
   - Never replace the control board to try to correct a reading inaccuracy.
   - If the calibration data is repeatedly corrupt and causing calibration errors or won't hold calibration, the board could be suspect.
6. Communicates with the Power Board
   - Never replace the control board to correct an input reading or output failure.
   - If any part of the program works the controller is not the problem (it will not fail to operate any one output or input).

Sensors and Transducers

The sensors and transducers provide the input and feedback data needed to control the operation of unit.

Sensors include:

1. **Airflow Sensor (AF)**; senses whether the unit cooling fan is operating (R1234yf only).
2. **Scale Assembly**; weighs the refrigerant in the ISV as a baseline for determining the amount of refrigerant withdrawn from the vehicle A/C system, the amount of refrigerant added to the system, and how much refrigerant is available in the ISV for use.

Transducers include:

1. **Low-side Pressure (LST)**; measures the pressure in the low side of the vehicle A/C system.
2. **Accumulator Pressure (AT)**; measures the pressure in the oil separator to ensure proper oil separation from the refrigerant.

Memory Expansion

Two types of memory expansion are available:

1. SDIO: An SD expansion card port for up or downloading vehicle information and for updating the unit software.
2. USB Host: Standard USB port to connect external refrigerant identifier (plug and play).

The external identifier is detected only when a recovery is launched (not in stand-by mode).

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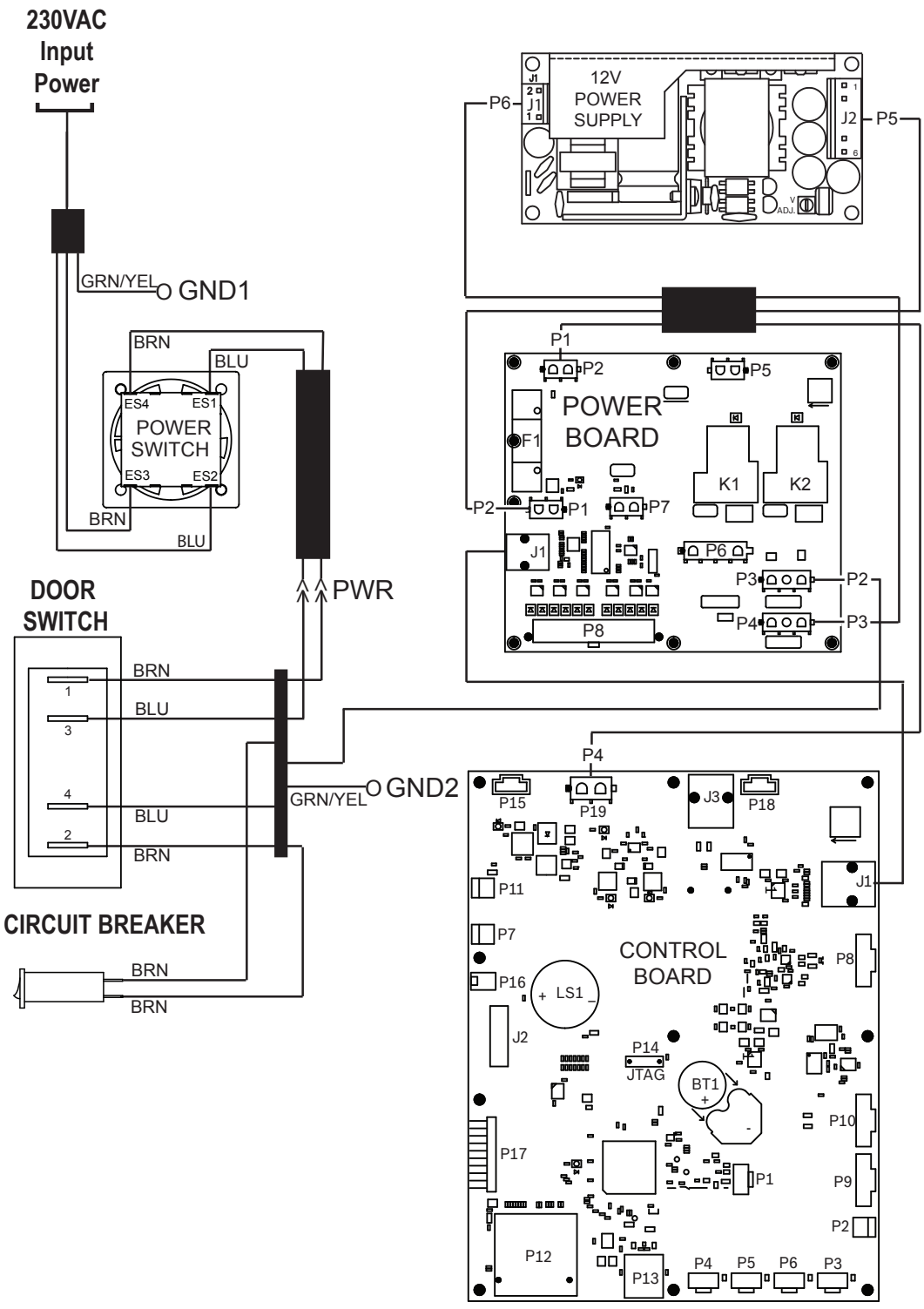

Figure 3-4. Electrical Connections (Sheet 1 of 3)

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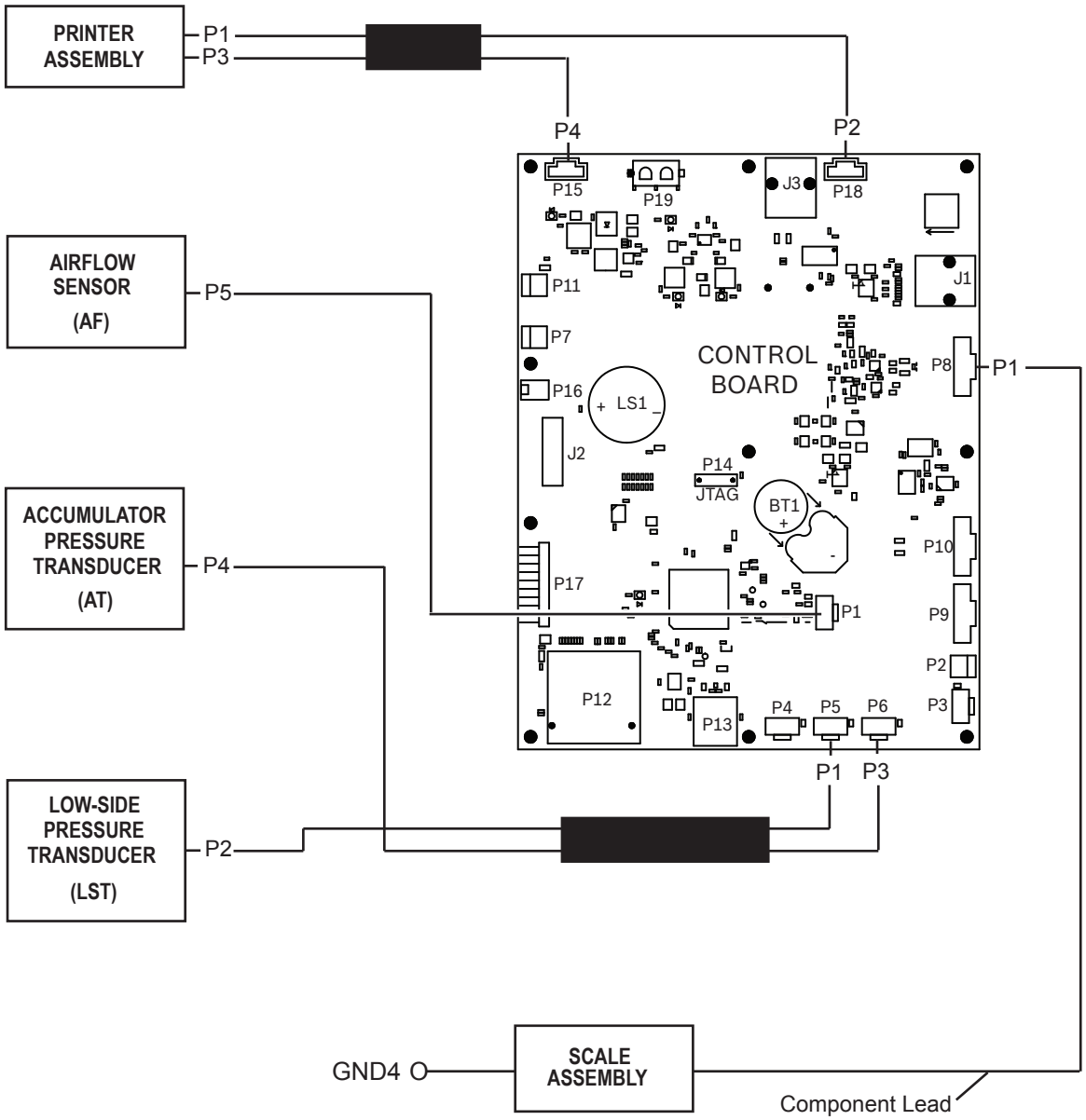


Figure 3-4. Electrical Connections (Sheet 2 of 3)

NOTE

Airflow sensor (R1234yf only)

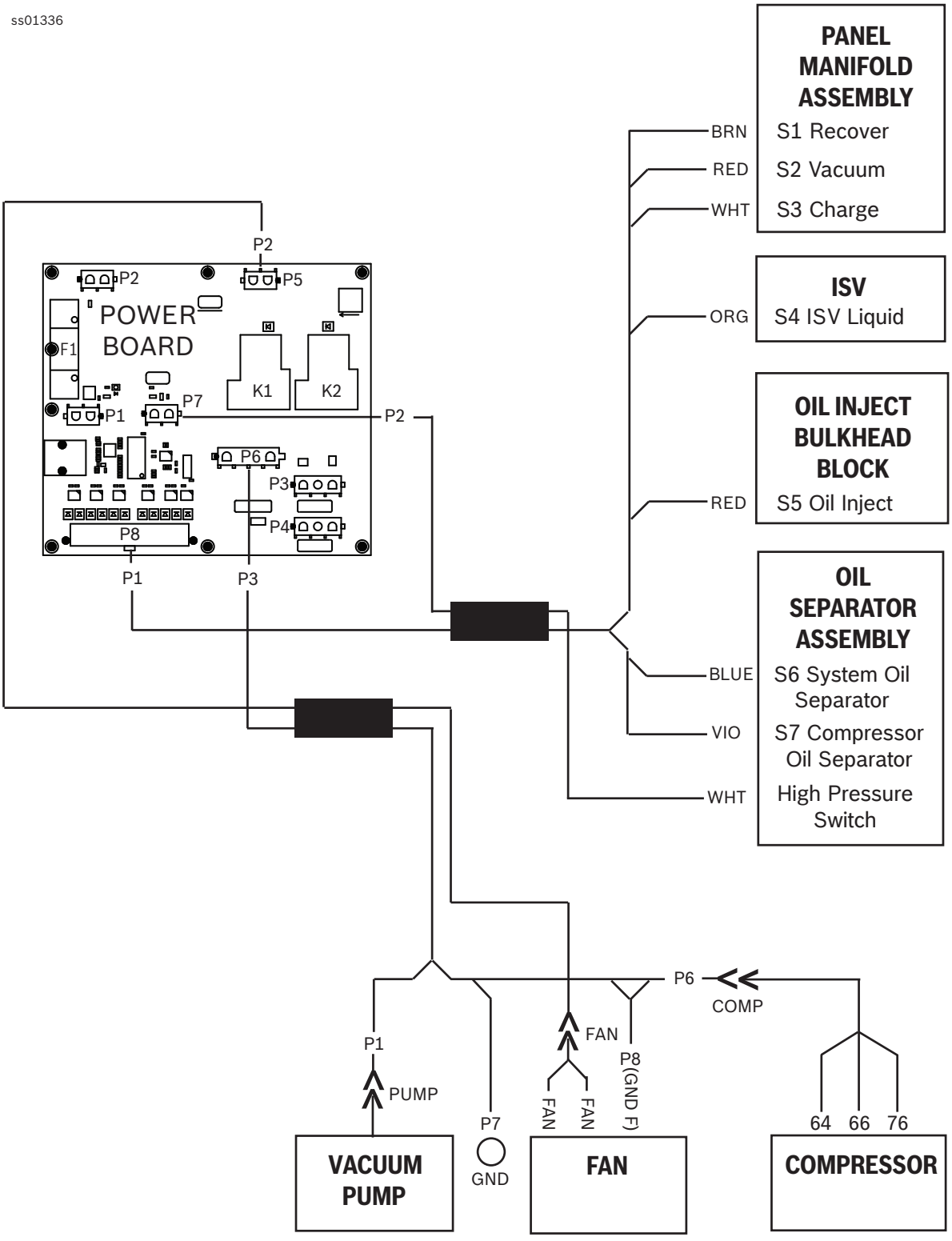


Figure 3-4. Electrical Connections (Sheet 3 of 3)

Replacement Power Board

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Instructions

These instructions outline the basic steps to replace the power board. Follow the prompts on the control panel to move through the procedure correctly.

Remove the Existing Power Board

1. Disconnect unit from the power source.
2. Remove shroud.
3. Disconnect all wires from power board.
4. Remove screws securing power board in place, and remove power board.

Install the Replacement Power Board

1. Install new power board, and secure in place with screws.
2. Connect wires as shown in power board wiring diagram. See Figure 3-5.
3. Reinstall the shroud.
4. Power up the unit and perform a functional test.

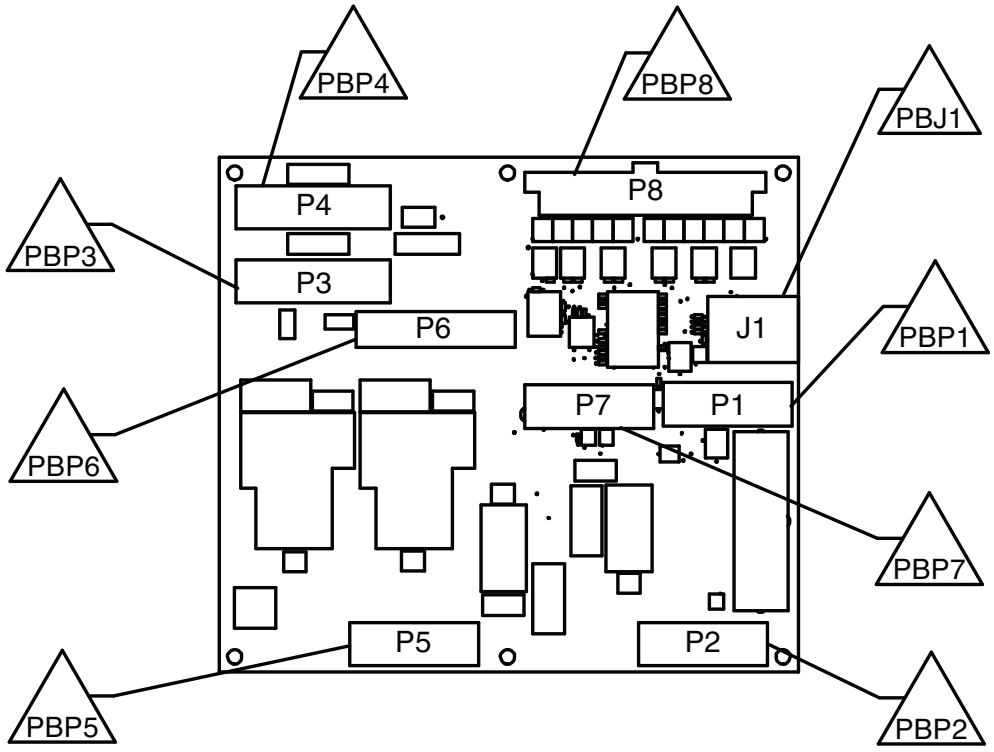


Figure 3-5. Power Board Connector Identification

Replacement Control Board

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Instructions

These instructions outline the basic steps to replace the control board. Follow the prompts on the control panel to move through the procedure correctly.

Remove the Existing Control Board

1. Disconnect unit from the power source.
2. Remove shroud.
3. Remove the upper right and left hand screws from the control panel, then tilt the control panel towards the front of the unit.
4. Disconnect all wires from control board including keypad and display ribbon cables.
5. Remove screws securing control board in place, and remove control board.

Install the Replacement Control Board

1. Assemble the display to the replacement control board and attach the display ribbon cable to the control board.
2. Connect wires as shown in Figure 3-6.
3. Tilt the control panel down and secure with two screws.
4. Reinstall the shroud.
5. Download new software and install it following the “Updating System Software” section procedure.
6. After updating the software, exit the “Display Test.”
7. Enter the Service Menu and perform the following in the order listed as Steps 8 through 14.
8. Calibrate Load Cells.
9. Calibrate Air Flow.
10. Set Tank Tare
11. Set Unit Serial Number (check unit data plate for number).
12. Set Manufacturing Date (set board replacement date).
13. Set Boot Mode (set to Normal).

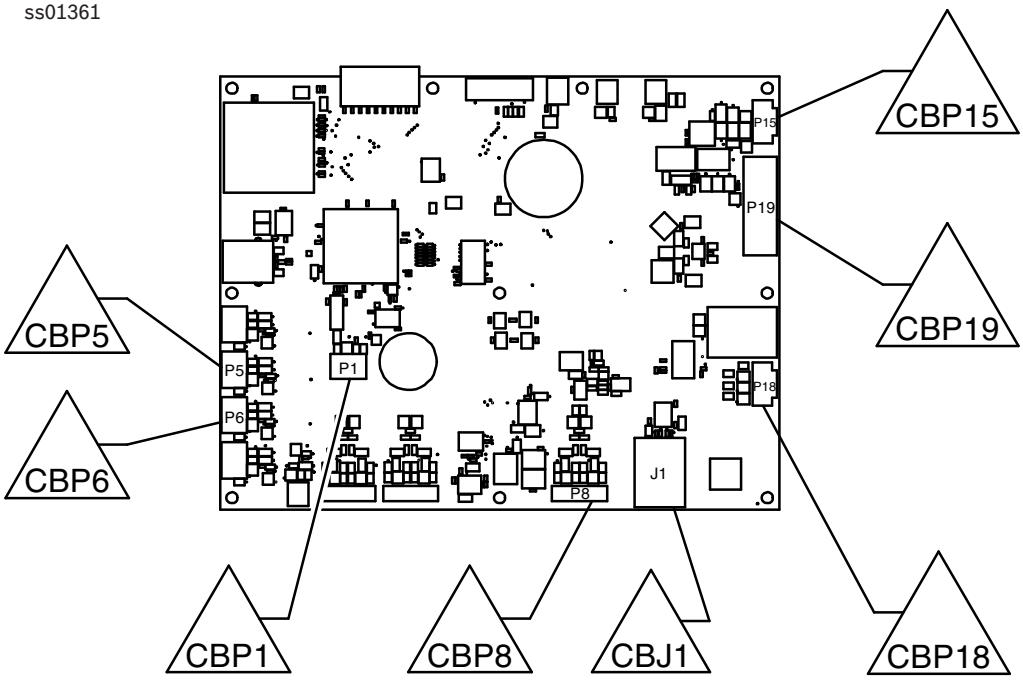


Figure 3-6. Control Board Connector Identification

14. Select Model.
15. Exit Service Menu and “Set Date and Time” and Save.
16. Restart the unit.
17. Repeat “Unit Activation” if requested. See Users Manual if needed.

Replacement High-Pressure Cut-Out Switch

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Replacement Instructions

Follow these steps to replace the high pressure cut-out switch on your unit. See Figure 3-7.

1. Close the tank valve and depressurize the unit.
2. Turn off the power switch, and disconnect the unit from the power source.
3. Remove the shroud to access the manifold block.
4. Disconnect the wires from the faulty high pressure cut-out switch.
5. Carefully remove the faulty cut-out switch.
6. Clean the fitting by wiping away dirt, grease, and oil.

NOTE

DO NOT apply thread sealant to any internal threads. Apply thread sealant to only the external pipe threads of the fittings.

7. Install the new high pressure cut-out switch.
8. Connect the wires to the new switch.
9. Connect the unit to the power source.
10. Open the tank valve.
11. Operate the unit and check for leaks.
12. Reinstall the shroud.

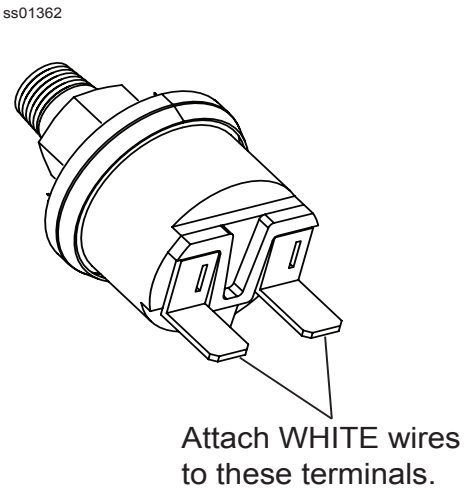


Figure 3-7. High Pressure Cut-Out Switch

Replacement Fan

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Replacement Instructions

Follow these steps to replace the fan. Refer to Figure 3-8.

1. Disconnect the unit from the power source.
2. Refer to "*Replacement Compressor*" in the Plumbing and Mechanical section and perform the steps to remove the compressor.
3. Remove the service hoses from the bulkhead block assembly and the two screws securing the assembly to the back panel.
4. Remove the oil inject bottle as applicable, load cell cover, and oil inject shelf assembly.
5. Disconnect the power cord wire harness at the vacuum pump shelf assembly to relieve stress on the power cord when the back panel is removed.
6. Refer to "*Replacement Vacuum Pump*" in the Plumbing and Mechanical section and perform the steps to remove the vacuum pump.
7. Remove 10 screws; five around the bottom at the base assembly and five securing the back panel to the internal assembly.
8. Remove the back panel from the base assembly to access the fan assembly mounting screws.
9. Remove the two screws securing the air flow sensor bracket to the fan.
10. Note the orientation of the fan blades. Remove the two sheet metal screws securing the fan to the rear panel assembly.
11. Disconnect the FAN connectors and fan ground connector from the fan.
12. Remove the fan.
13. Fasten the fan ground connector to the ground screw on the replacement fan body.
14. Install the air flow sensor bracket on the replacement fan.
15. With the fan blades properly oriented as noted in step 10, install the replacement fan by securing it to the rear panel assembly with two sheet metal screws.
16. Connect the FAN connectors to the fan assembly. Use tie-wraps to secure the fan wires.

NOTE: There is no polarity requirement for these connections.

17. Install the back panel assembly with the ten screws removed earlier in step 7. At this point, use tie-wraps to secure the power cord harness.
18. Refer to "*Replacement Vacuum Pump*" in the Plumbing and Mechanical section and perform the steps to install the vacuum pump.
19. Connect the power cord wire harness to the vacuum pump shelf assembly, while supporting the back panel to relieve stress on the power cord after connecting.
20. Install the oil inject shelf, load cell cover, and oil inject bottle.
21. Install the bulkhead block assembly and reconnect the service hoses.
22. Refer to "*Replacement Compressor*" in the Plumbing and Mechanical section and perform the steps to install the compressor.
23. Connect the unit to a power source and place the power switch on. The fan should run. If the fan does not run, refer to the "Diagnostics and Testing" section.

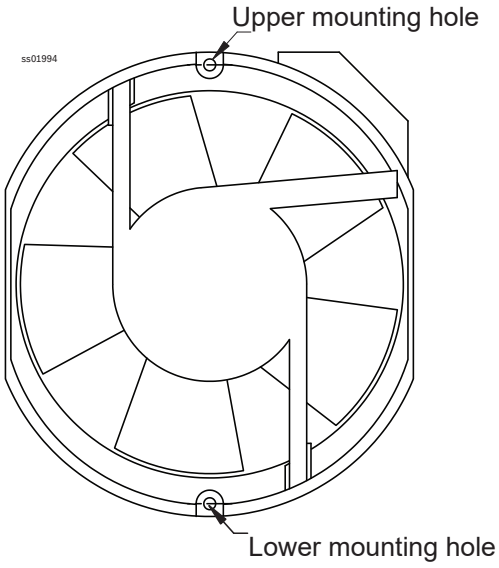


Figure 3-8. Fan

Replacement Air Flow Sensor (for R1234yf only)

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Replacement Instructions

Follow these steps to replace the air flow sensor. Refer to Figure 3-9.

1. Disconnect the unit from the power source.
2. Refer to "*Replacement Compressor*" in the Plumbing and Mechanical section and perform the steps to remove the compressor.
3. Remove the service hoses from the bulkhead block assembly and the two screws securing the assembly to the back panel.
4. Remove the oil inject bottle as applicable, load cell cover, and oil inject shelf assembly.
5. Disconnect the power cord wire harness at the vacuum pump shelf assembly to relieve stress on the power cord when the back panel is removed.
6. Refer to "*Replacement Vacuum Pump*" in the Plumbing and Mechanical section and perform the steps to remove the vacuum pump.
7. Remove 10 screws; five around the bottom at the base assembly and five securing the back panel to the internal assembly.
8. Remove the back panel from the base assembly to access the air flow sensor.
9. Remove the two nuts securing the air flow sensor to the fan assembly.
10. Disconnect the connector from the air flow sensor.
11. Remove the air flow sensor.
12. Install the replacement air flow sensor (see Figure 3-9) by securing it to the fan assembly with two nuts.
13. Connect the connector to the air flow sensor. Use tie-wraps to secure the fan wires.
14. Install the back panel assembly with the ten screws removed earlier in step 7. At this point, use tie-wraps to secure the power cord harness.
15. Refer to "*Replacement Vacuum Pump*" in the Plumbing and Mechanical section and perform the steps to install the vacuum pump.
16. Connect the power cord wire harness to the vacuum pump shelf assembly, while supporting the back panel to relieve stress on the power cord after connecting.
17. Install the oil inject shelf, load cell cover, and oil inject bottle.
18. Install the bulkhead block assembly and reconnect the service hoses.
19. Refer to "*Replacement Compressor*" in the Plumbing and Mechanical section and perform the steps to install the compressor.
20. Connect the unit to a power source and place the power switch on.
21. Perform air flow calibration. Refer to "*Air Flow Calibration*" in the Diagnostics and Testing section.

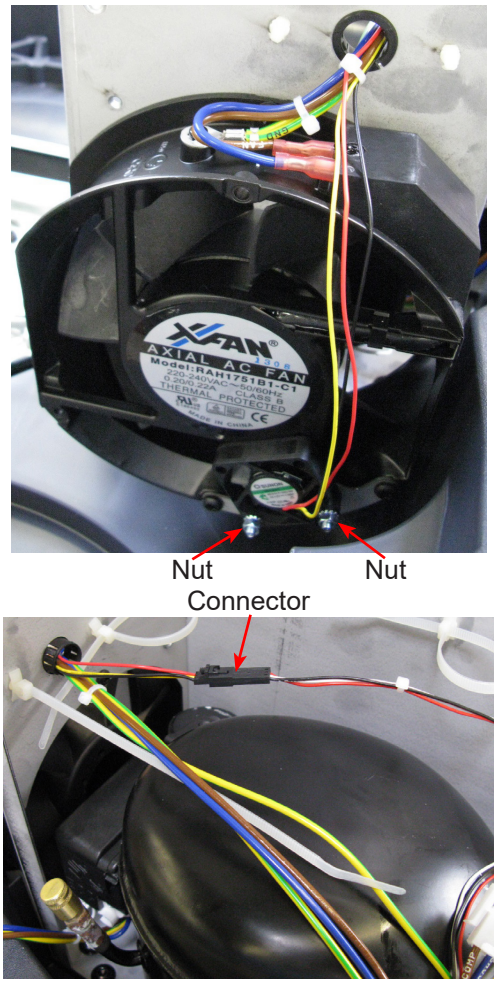


Figure 3-9. Air Flow Sensor

Replacement Scale Assembly/Magnet

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

If scale assembly is not calibrated, the tank can overfill, causing possible explosion and/or vehicle overcharge.

Instructions

These instructions outline the steps to replace the scale assembly. See Figure 3-10.

Removing the Scale Assembly

1. Depressurize the unit.
2. Disconnect the unit from the power source.
3. Remove the shroud.
4. Close the tank valve.
5. Disconnect the liquid hose and vapor hose from the tank.
6. Disconnect the wire from the liquid solenoid.
7. Remove the two (2) bolts securing the tank to the scale.
8. Remove the tank from the scale.
9. Remove the four (4) bolts holding the scale in place.
10. Remove the ground wire connected to the center divider of the unit and the harness connected to the control board.
11. Remove the scale.

Installing the Replacement Scale Assembly

1. Slide the rear flange of the scale under the retaining lip of the chassis.
2. Connect the ground wire from the scale to the center divider.
3. Install the scale into the unit fastening securely with four (4) bolts.
4. Connect the scale assembly wire to the control board.
5. Connect the unit to the power source.

Scale Calibration

Refer to Calibrate Load Cells in the Service Center Menu Options section of chapter Diagnostics and Testing.

After complete the scale calibration:

1. Remove the weight and place the tank on scale.
2. Reconnect liquid solenoid wire.
3. Reconnect the liquid hose and vapor hose to tank.

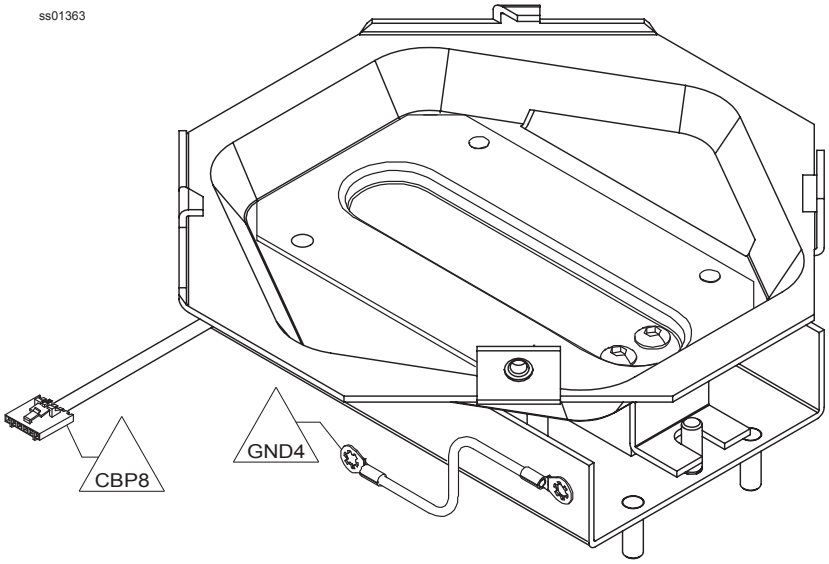


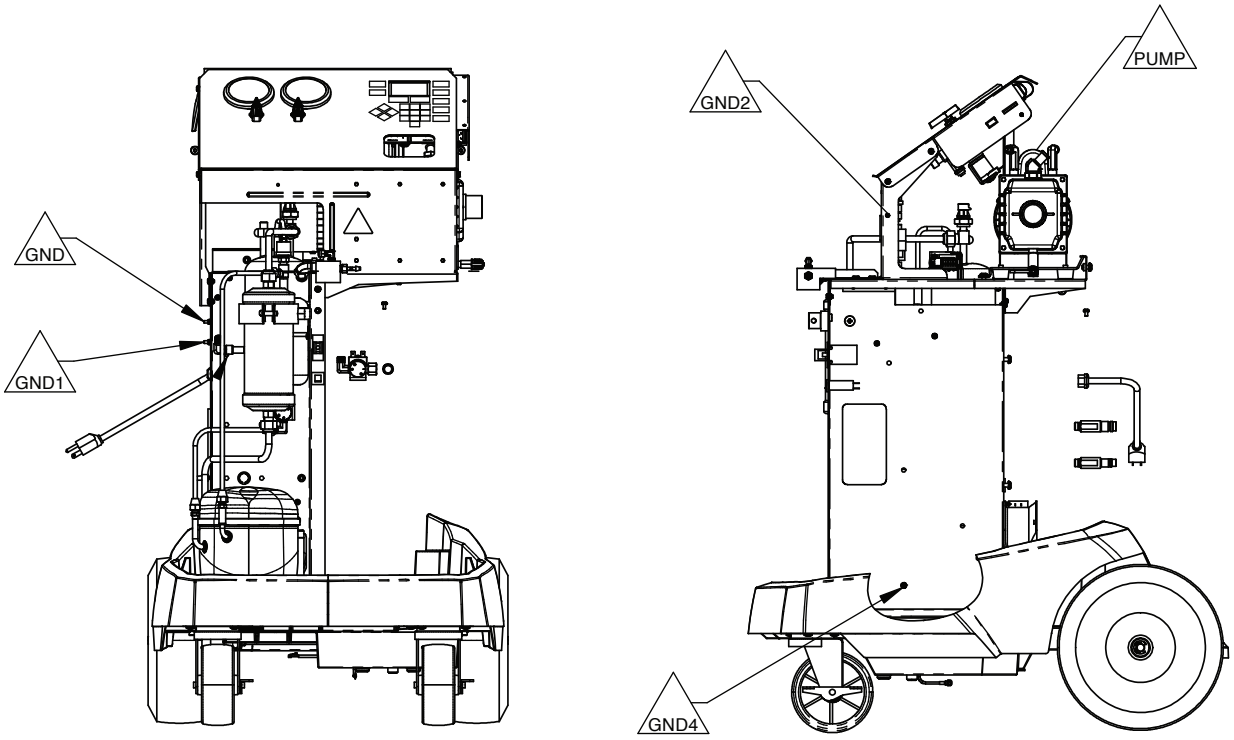
Figure 3-10. Scale Assembly

4. Secure the tank to the scale with 2 bolts.
5. Perform a functional test, check for leaks.
6. Reinstall the shroud.

Wire Connector Designations

The following several illustrations depict the designated names and locations for the connection points throughout the AC1X34-3/BAC 3000a - AC1234-3yf/ BAC 3000yf. See figure 3-11 (sheets 1 through 4).

ss01329

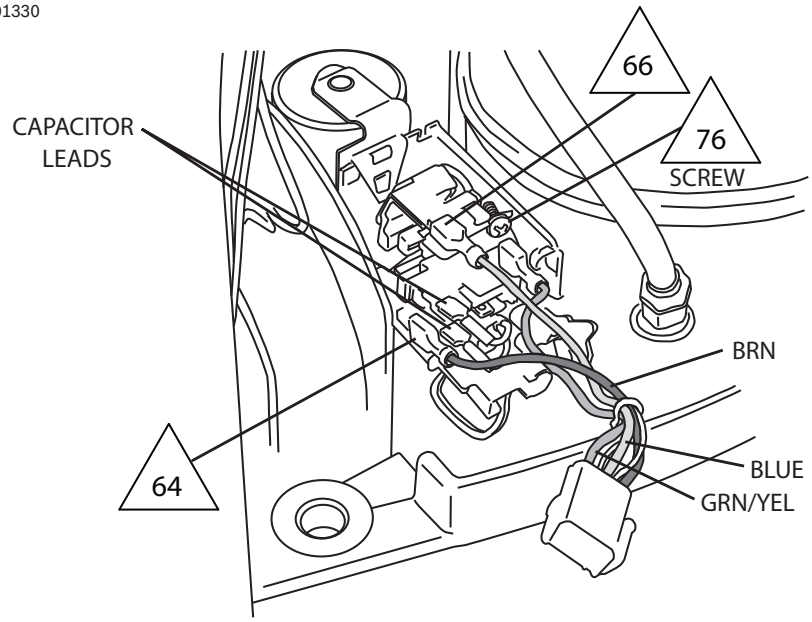


ASSEMBLY WIRING GROUNDS

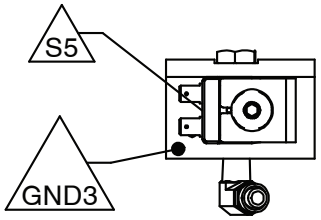
Note: Take note of the wire harness positions before disturbing a harness location and routing to the components in this unit. Use new cable ties snapped into the holes provided on the various panels when securing harnesses after a component replacement or troubleshooting.

Figure 3-11. Component Connections (Sheet 1 of 4)

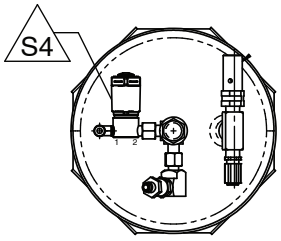
ss01330



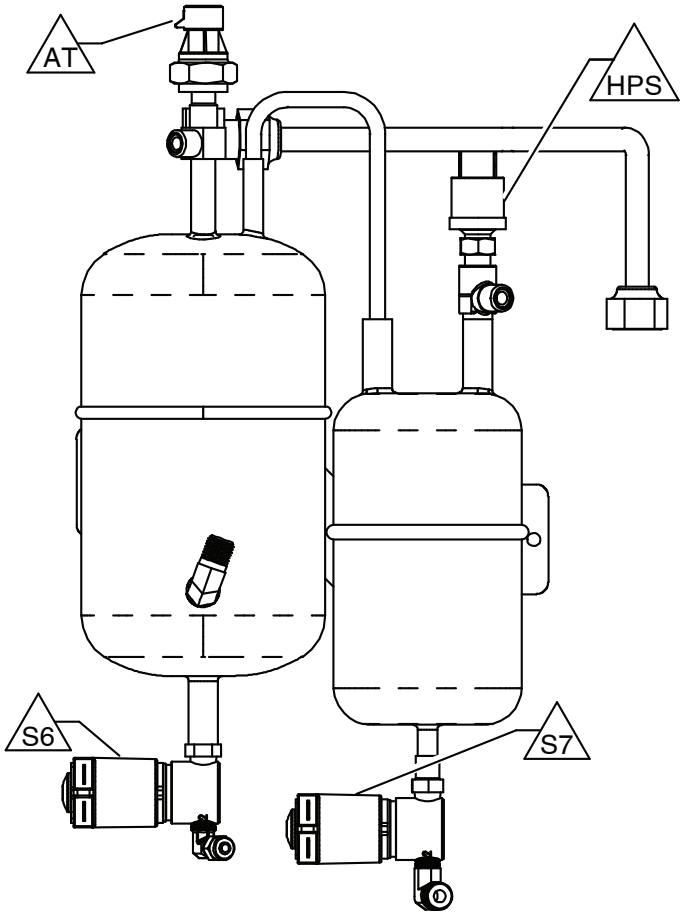
COMPRESSOR ASSEMBLY



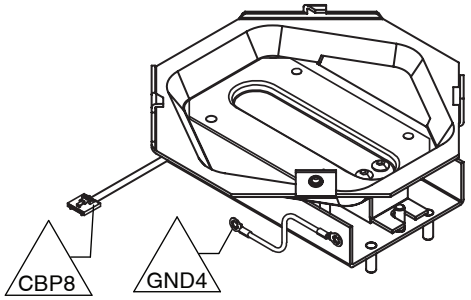
BULKHEAD/INJECTION
MANIFOLD ASSEMBLY



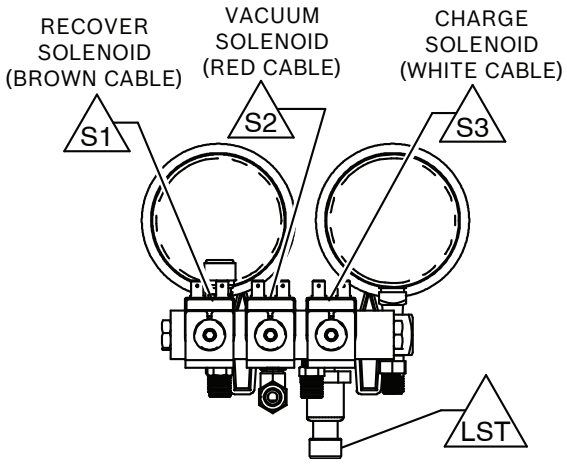
ISV ASSEMBLY
(TOP VIEW)



OIL SEPARATOR ASSEMBLY



SCALE ASSEMBLY



PANEL MANIFOLD
ASSEMBLY

Figure 3-11. Component Connections (Sheet 2 of 4)

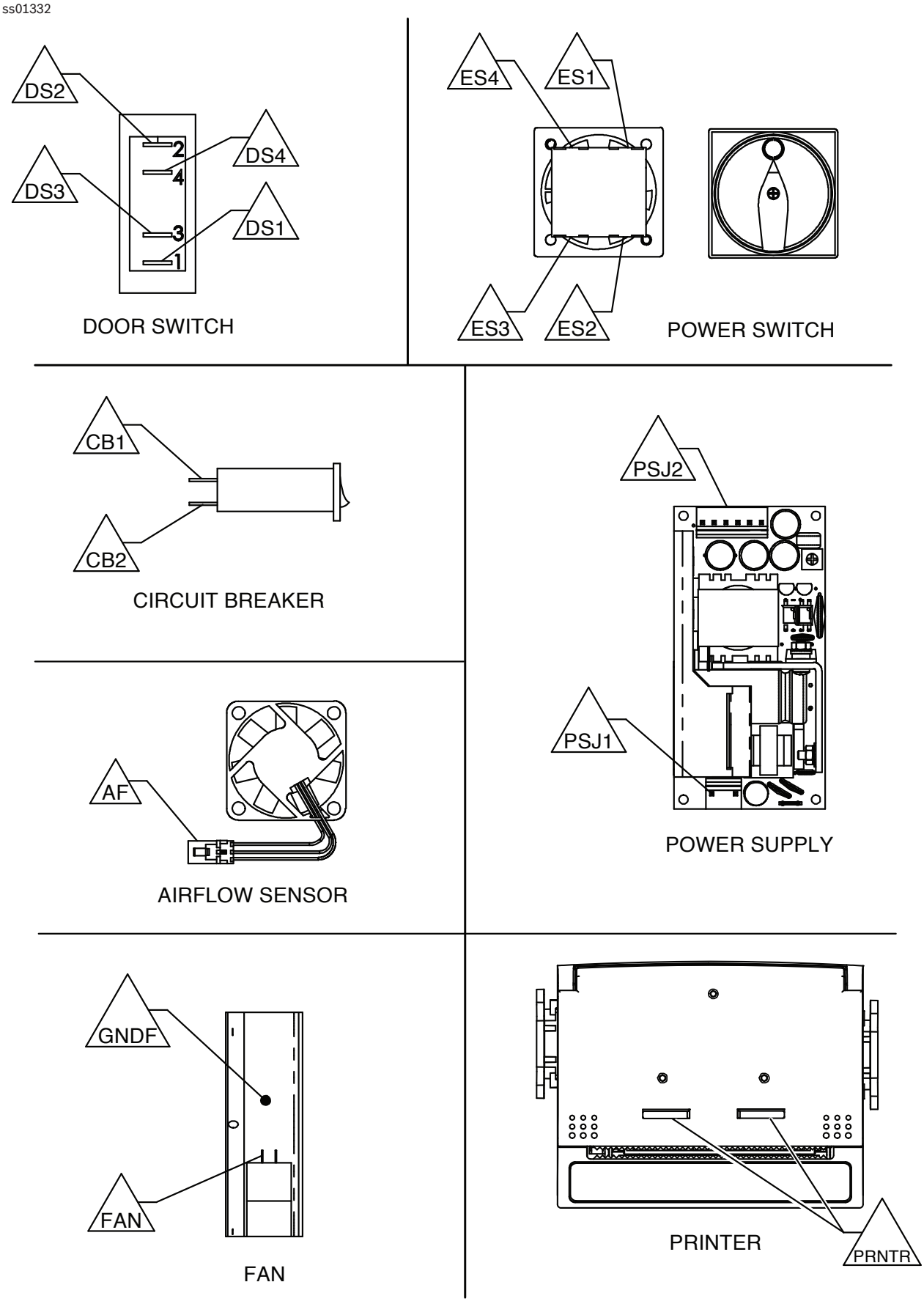


Figure 3-11. Component Connections (Sheet 3 of 4)

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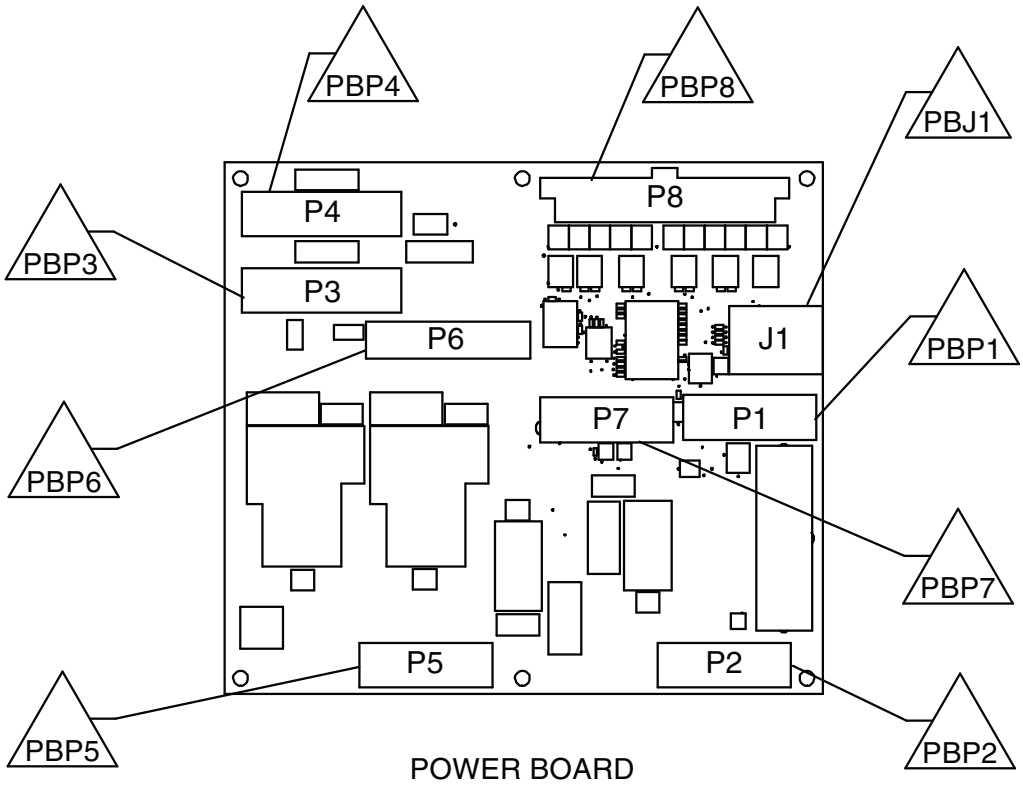


CONTROL BOARD

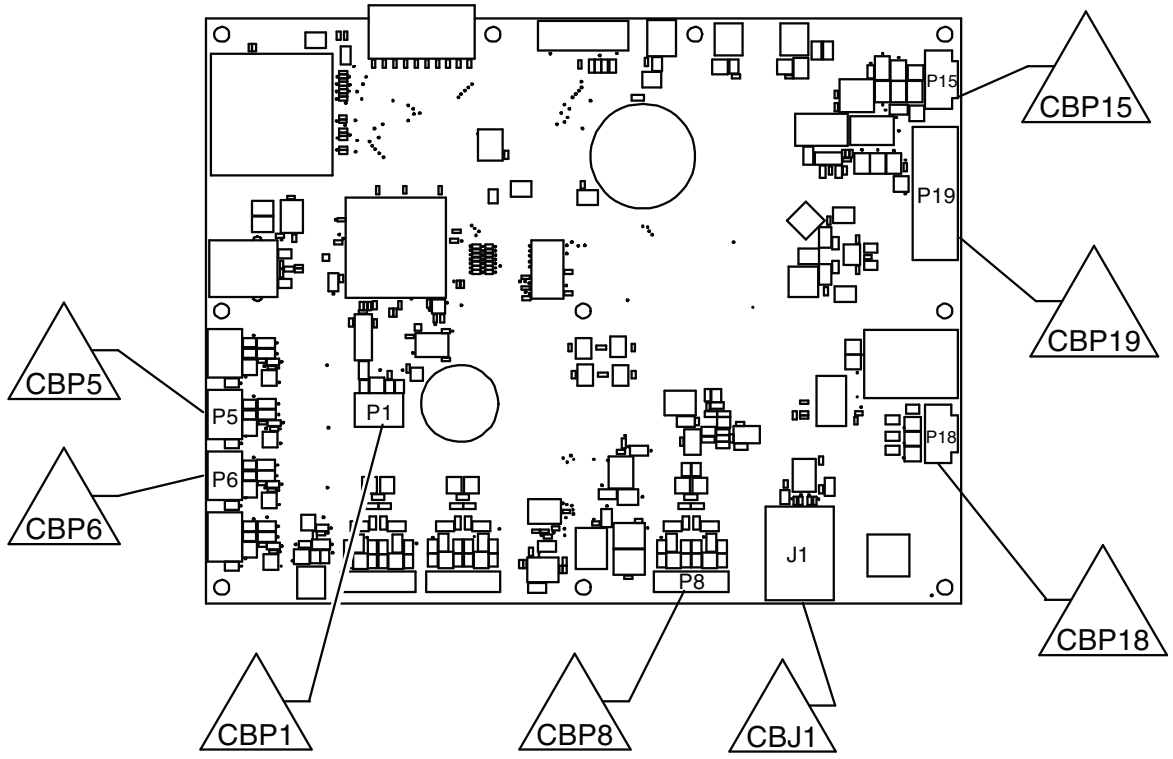


Figure 3-11. Component Connections (Sheet 4 of 4)

Plumbing and Mechanical

Plumbing and Mechanical System Operation

The plumbing and mechanical system is controlled by electrical impulses from the electrical system. There are five main components to the plumbing system:

- Compressor
- Vacuum Pump
- Panel Manifold Assembly
- Internal Storage Vessel (ISV)

Along with these components are several ancillary components:

- Cooling Fan
- Bulkhead Oil Inject Assembly
- Oil Drain Bottle
- High and Low Side Gauges
- High (red) and Low (blue) Side Service Hoses

All components are interconnected with various lengths and diameters of flexible tubing or copper tubing. The copper tubing is to connect the compressor discharge port to the manifold assembly. All lines connected to the compressor are high pressure lines.

Compressor

The compressor is configured for R1234yf (AC1234-3/BAC 3000yf) or R134a (AC1X34-3/BAC 3000a) refrigerant. When replacing the compressor, heed the warnings, cautions, and any other related safety information. For compressor specifications, see **General Information**.

Vacuum Pump

The vacuum pump is used in this unit for the recovery and vacuum processes. For vacuum pump specifications, see **General Information**.

Manifold Assembly

The “top” or “panel” manifold assembly consists of the high- and low-side pressure gauges, high- and low-side manually operated ball valves, and three solenoids (S1, Recover; S2, Vacuum; and S3, Charge). This unified assembly permits efficient, reliable, operation of the unit. Unlike other units, this assembly does not have the oil separator and filter/dryer attached to it. This manifold assembly is not interchangeable with any other manifold assemblies. Repair or replacement of the manifold should be performed under clean conditions so particulates do not enter the assembly from any open ports. Particulates can clog the small chambers and cause solenoid and check valve malfunctions, as well as contaminate a vehicle air conditioning system.

Internal Storage Vessel (ISV)

The ISV stores the refrigerant from the vehicle A/C system and from the external refrigerant source tank. It is important to note that if the external source tank is always connected to the unit, the unit will make sure the required amount of refrigerant is always in the ISV through the “Tank Fill” function which will run in the background whenever the unit is in use.

Ancillary components and assemblies included are:

Cooling Fan: The cooling fan is necessary to keep the compressor below its maximum ambient operation temperature of 50°C (140°F) or less. The fan is also used to prevent build up of refrigerant in the cabinet and prevent fire. Attached to the cooling fan is a small fan which is used as an airflow sensor. If the cooling fan is not operating, the airflow sensor will not turn, and thus a signal will not be sent to the control board. When this happens, the unit will not operate.

Bulkhead Oil Inject Block Assembly: This assembly serves as the attachment ports for the high- and low-side service hoses and as the oil injection point through the Oil Inject Solenoid (S5).

Oil Drain Bottle: This bottle provides a reservoir for used oil and must be drained when the user is instructed to do so by the control panel. Operators could drain this bottle prior to each use of the unit to make sure unit operation is not interrupted.

High- and Low-Side Gauges: These gauges monitor the high- and low-side pressures when the unit is operating.

High- (red) and Low-Side (blue) Service Hoses: These hoses connect the unit to the vehicle A/C system.

Refer to Chapter Diagnostics and Testing for operation instructions.

Replacement Compressor

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Instructions

These instructions outline the steps to replace the existing compressor. See Figure 4-1 and 4-2 Plumbing Interconnection Diagram. Refer to this schematic of the unit plumbing and mechanical system when performing all removals and replacements of plumbing or other mechanical parts and assemblies.

Removing the Compressor

1. Depressurize the unit.
2. Disconnect the unit from its power source.
3. Remove the shroud.
4. Disconnect the three (3) copper lines from the compressor.

NOTE There may be pressure in the copper lines.

5. Remove the compressor mounting nuts and washers and slide the compressor out from the rear retainer.
6. Disconnect the compressor connector from the main harness.
7. Remove the compressor from the unit.

CAUTION To prevent personal injury, use caution when removing the compressor. Capacitor wires may still be energized.

Installing the Replacement Compressor

Refer to Figure 4-1 and 4-2 during this installation.

1. Install the rubber mounts (included in kit) into the base of the compressor. Place two metal sleeves in the front mounts only.
2. Place the compressor into the unit. It may be necessary to lubricate the rear compressor mounts. If needed, apply a small amount of light oil such as compressor oil to the top and bottom of the rubber mount.
3. Secure the compressor into place with nuts and washers.
4. Connect the compressor connector into the main harness.
5. Refer to the illustration and install the three (3) copper lines connecting to the compressor. Replace the O-rings where used.
6. Connect the unit to the power source, perform a function test, and check for leaks.
7. Reinstall the shroud.

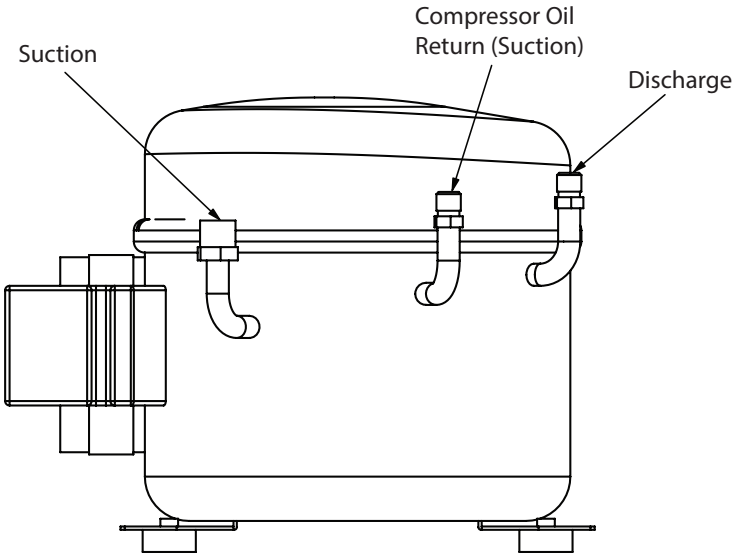


Figure 4-1. Compressor

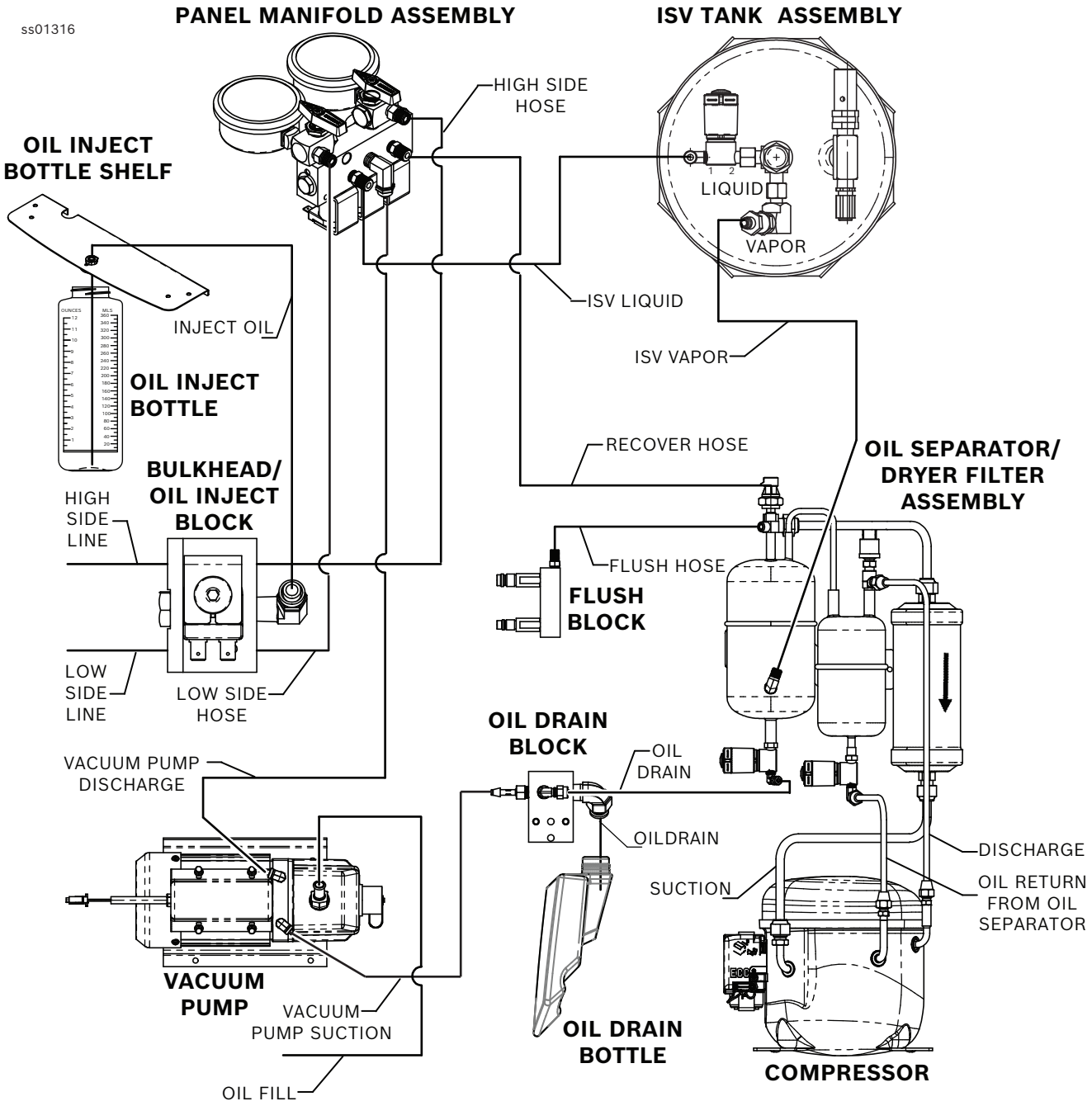


Figure 4-2. Plumbing Interconnection Diagram

Replacement Vacuum Pump

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Instructions

These instructions outline the steps to replace the existing vacuum pump. See Figure 4-2 and 4-3.

Removing the Vacuum Pump

1. Disconnect the unit from the power source.
2. Remove the shroud from the unit as needed to gain access to the vacuum pump.
3. Remove the upper right and left hand screws from the control panel, then tilt the control panel towards the front of the unit.
4. Remove the two existing nylon lines from the vacuum pump, and the oil fill tube from the load cell shroud.
5. Disconnect the vacuum pump connector from the main harness.
6. Remove and save the screws fastening the vacuum pump to the unit.
7. Remove the vacuum pump assembly from the unit.

Installing the Replacement Vacuum Pump

1. Place the vacuum pump into the unit.
2. Secure the vacuum pump to the unit with the screws.
3. Connect the vacuum pump into the main harness.
4. Reconnect the two nylon lines, and the oil fill tube to the load cell shroud.
5. Tilt the control panel down and secure with two screws.
6. Remove the brass plug from the vacuum pump oil fill port.
7. Add 300 ml of oil into the vacuum pump.
8. Connect the vacuum pump to the power source, and perform the steps to start the pump.
9. While the vacuum pump is running, add more oil to the correct fill level in the sight gauge.
10. Reinstall the brass plug in the fill port.
11. Perform a function test, and check for any leaks.
12. Reinstall the shroud.

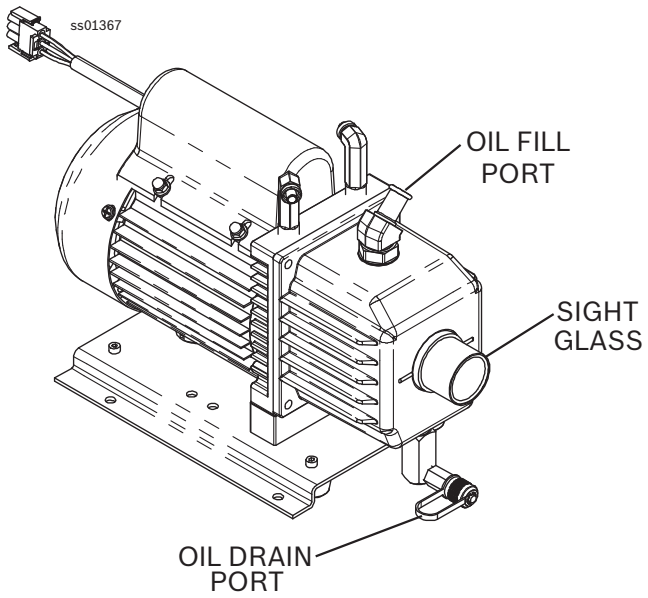


Figure 4-3. Vacuum Pump

Replacement Manifold Block

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Instructions

These instructions outline the steps to replacing the existing manifold block. See Figure 4-4.

In some cases, the manifold block does not have to be removed from the unit. Solenoids and check valves can be replaced without complete removal of the block from the panel. When this is possible, remove and replace the faulty component in place, after following steps 1 through 5 in “Removing the Manifold Block.”

If the injection manifold is being repaired, refer to the Replacement Manifold Solenoid or Replacement Check Valve as needed. When installing hoses, solenoids, and check valves, replace the O-rings and use thread sealant where necessary.

Removing the Manifold Block

1. Depressurize the unit.
2. Disconnect the unit from the power source.
3. Remove the shroud.
4. Close the tank valve.
5. Close the tank liquid valve and remove the wires from the Tank Fill/Liquid solenoid (S4).
6. If the entire manifold block must be removed, remove the knobs from the front of the panel.
7. Disconnect the high and low side hoses, vacuum pump hose, tank fill/liquid hose and recover hose.
8. Disconnect all wires from the block.
9. Remove nuts and washers from the ball valves holding the manifold block to the panel, and save for reassembly.
10. Remove the manifold block.

Installing the Replacement Manifold Block

See Figure 4-4 while performing the following procedures.

1. Locate the manifold block so the shafts of the inlet valves protrude from the front of the panel. Secure with washer and nuts removed during removal.
2. Connect the high and low side hoses, vacuum pump hose, tank fill/liquid hose and recover hose. Refer to Figure 4-2 for the proper location of the hoses.
3. Reconnect all wires as shown in Figure 3-11.
4. Open the tank valve.
5. Connect unit to the power source, perform a function test, and check for leaks.
6. Reinstall the shroud.

NOTE: All wires must be clear of moving parts, pinch points, and sharp edges.

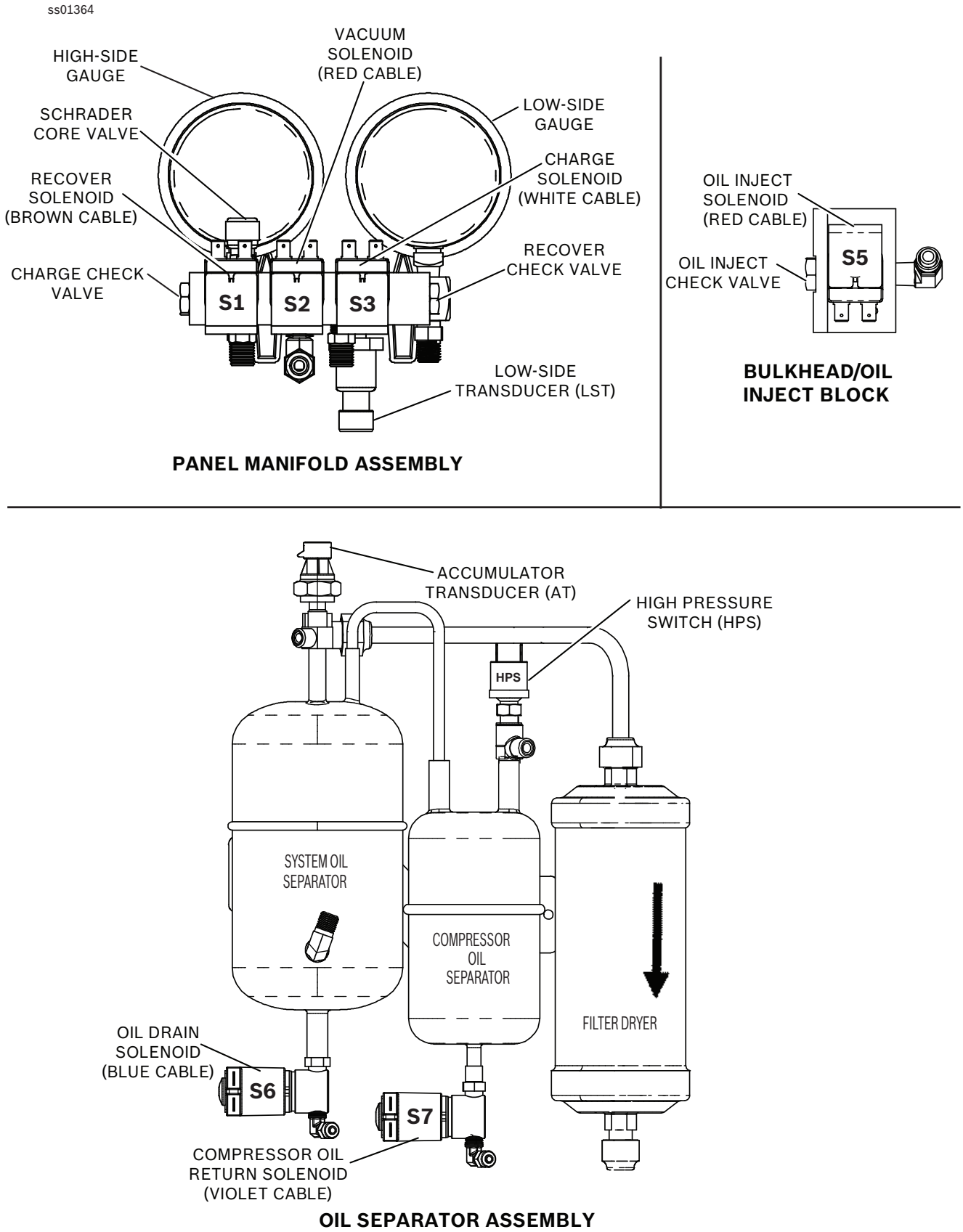


Figure 4-4. Assembly Component Names

Bulkhead/Oil Inject Block Repair

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Instructions

These instructions outline the steps to replacing the existing injection block. See Figures 4-5. If the injection block is being repaired, refer to the Replacement Manifold Solenoid or Replacement Check Valve as needed.

When installing hoses, solenoid, and check valve, replace the O-rings and use thread sealant where necessary.

Removing the Injection Block

1. Depressurize the unit.
2. Disconnect the unit from the power source.
3. Remove the shroud.
4. Close the tank valve.
5. Remove the red and blue service hoses from the rear of the unit.
6. Remove two (2) screws from the rear of the unit securing the injection block.
7. Remove wiring from the injection block.
8. Remove the injection block.
9. Remove the inside high and low side lines and the plastic line.

Installing the Injection Block

1. Attach the inside high and low side lines and the plastic line to the injection manifold.
2. Connect the wiring to the injection block solenoid and the ground wire.
3. Install the injection block to the rear panel with two (2) screws.
4. Attach the outside high (red) and low (blue) service hoses to the injection block assembly.
5. Open the tank valve.
6. Connect unit to the power source, perform a functional test, and check for leaks.
7. Reinstall the shroud.

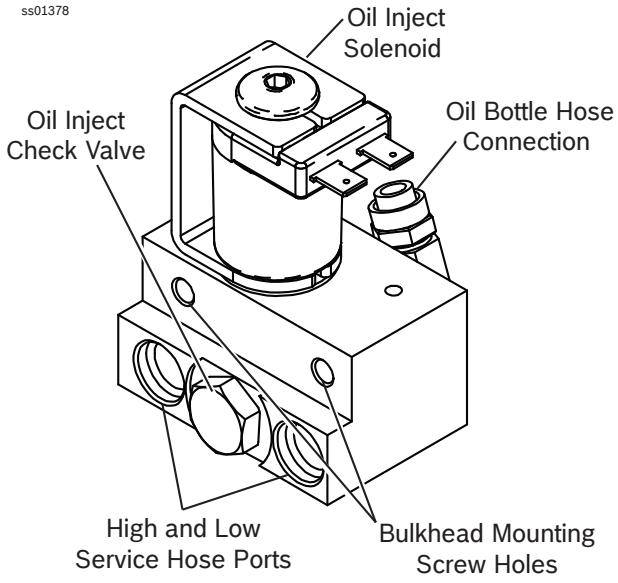


Figure 4-5. Bulkhead Oil Inject Block

Replacement Manifold Solenoid

Disconnect the unit from the power source before beginning service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Instructions

These instructions outline the steps to replace any existing manifold solenoid, including the Injection Manifold Assembly.

Removing a Manifold Solenoid

1. Depressurize the unit.
2. Disconnect the unit from the power source.
3. Remove the shroud and close tank valve.
4. Disconnect the two wires connected to the solenoid being replaced.
5. Remove the fastener holding the coil on the solenoid, and remove the coil.
6. Remove the solenoid assembly from the manifold block.
7. Check the manifold block for any debris before installing a new solenoid.

Installing a Replacement Manifold Solenoid

1. Lubricate the O-rings and threads on the new solenoid assembly.
2. Install the new solenoid assembly onto the main block and hand tighten.
3. Using a torque wrench, tighten the solenoid assembly to a torque of 8-9 Nm (70-80 in-lbs).
4. Install the new coil on the new solenoid assembly, and secure with the fastener holding the coil in place.
5. Using a torque wrench, tighten the coil retaining bolt to a torque of 3-4 Nm (25-35 in-lbs).
6. Reconnect the wires that were disconnected when removing the old solenoid assembly.
7. Plug unit into power source, open tank valve, perform a function test, and check for any leaks.
8. Reinstall the shroud.

Replacement Check Valve

Disconnect the unit from the power source before performing service work. Incorrect use or connections can cause electrical shock.

Wear safety goggles when working with refrigerants. Refrigerants can cause eye injury.

Use extreme caution when disconnecting hoses. Pressurized refrigerant may be present in hoses. Point hoses away from you and anyone nearby.

Instructions

These instructions outline the steps to replace panel manifold and injection manifold check valves.

Removing the Check Valve

1. Depressurize the unit.
2. Disconnect the unit from the power source.
3. Remove the shroud.
4. Close the tank valve.
5. Remove the faulty check valve.

Installing the Replacement Check Valve

1. Lubricate the O-rings on the new check valve.
2. Install the new check valve and hand-tighten.
3. Torque the check valve to 8-9 Nm (70-80 in-lbs).
4. Connect unit to the power source, open the tank valve, perform a function test, and check for any leaks.
5. Reinstall the shroud.

COMPONENT APPLICATION CHART

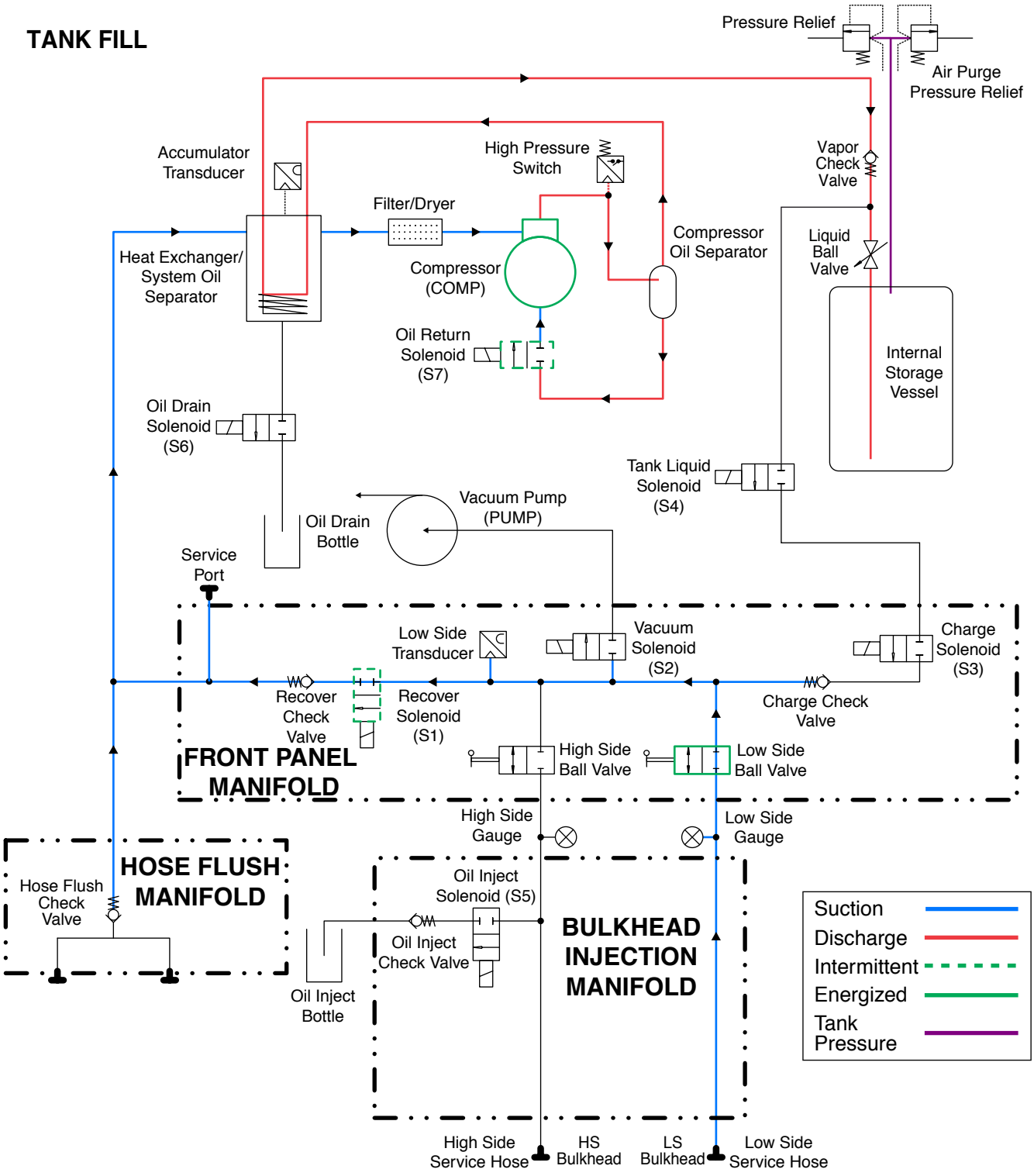
Manifold Component Application Chart, AC1234-3/BAC 3000yf and AC1X34-3/BAC 3000a									
	Tank Fill	Clear	Recovery	Vacuum	Oil Inject	Charge	Leak Test	Hose Flush	Oil Drain
S1 Recovery Solenoid	I		I						
S2 Vacuum Solenoid				ON					
S3 Charge Solenoid						I		I	
S4 Tank Liquid Solenoid						ON		ON	
S5 Oil Inject Solenoid					ON				
S6 Oil Drain Solenoid									ON
S7 Oil Return Solenoid	I	I	I					I	I
High-Side Ball Valve			ON	ON	P	P	ON	ON	
Low-Side Ball Valve	ON		ON	ON	P	P	ON	ON	
Vacuum Pump				ON					
Compressor	ON	ON	ON					ON	
Fan	ON	ON	ON	ON	ON		ON	ON	ON
Legend	ON	ON	P	User Programmed			I	ON Intermittently	

NOTES FOR COMPONENT APPLICATION CHART

Notes:

1. Tank Fill Process: The output state of the Recover solenoid is controlled to maintain 35 psi in the accumulator.
2. Recover Process: The output state of the Recover solenoid is controlled to maintain 35 psi (max.) in the accumulator. The output state of the Oil Return solenoid is initially activated for 3 seconds, and reactivated every ten minutes thereafter depending on the length of the recovery process.

FLOW DIAGRAMS

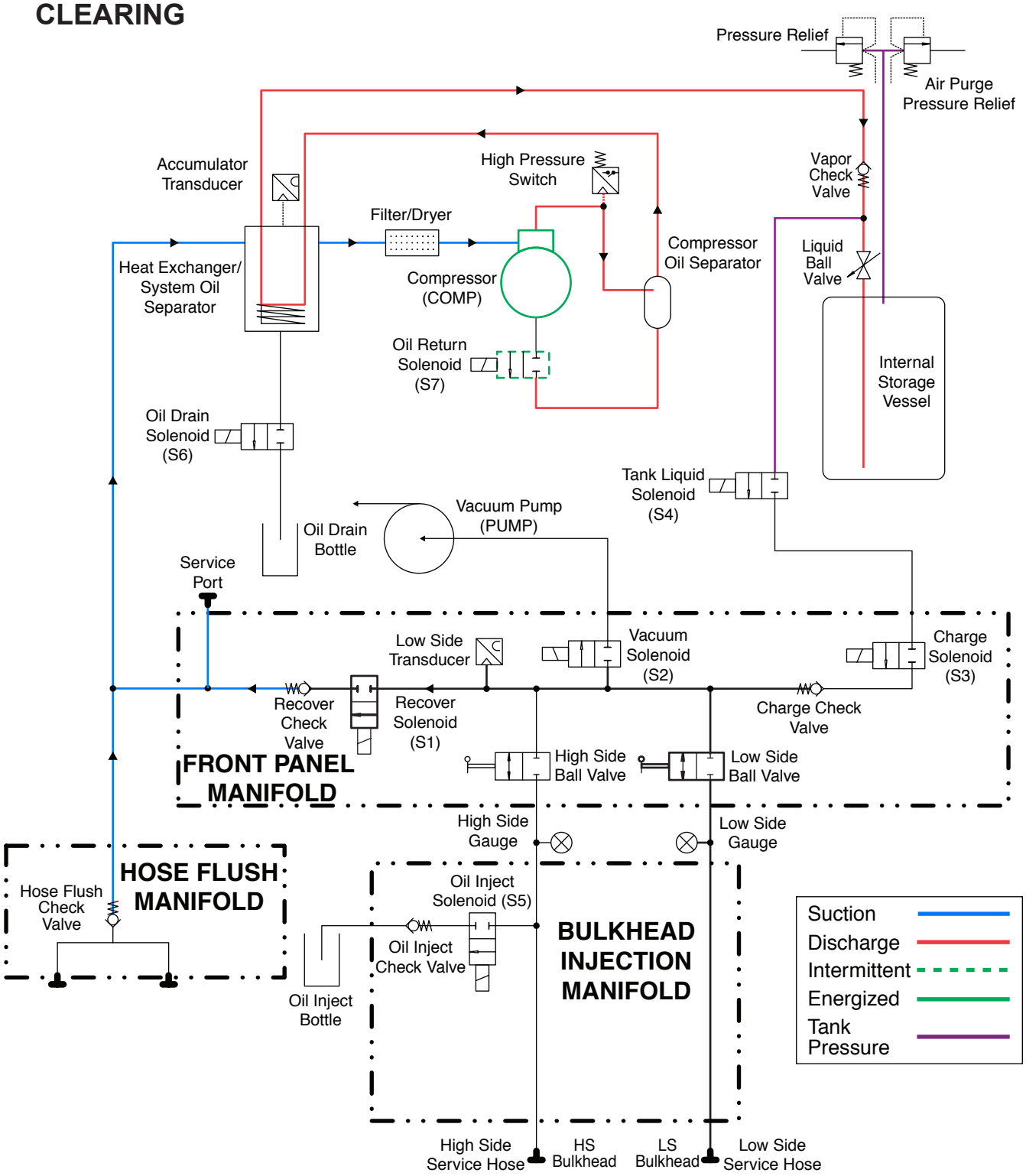


TANK FILL

During the tank fill process, the source tank is connected to the low-side service hose and the Recover solenoid S1 is activated. The low-side ball valve is opened and the recover solenoid is cycled to maintain 2.4 bar (35psi) in the accumulator. When the ISV reaches the target weight, the recover solenoid closes. The low-side ball valve is closed and the low-side service hose is removed from the source tank.

Figure 4-6. Tank Fill Diagram

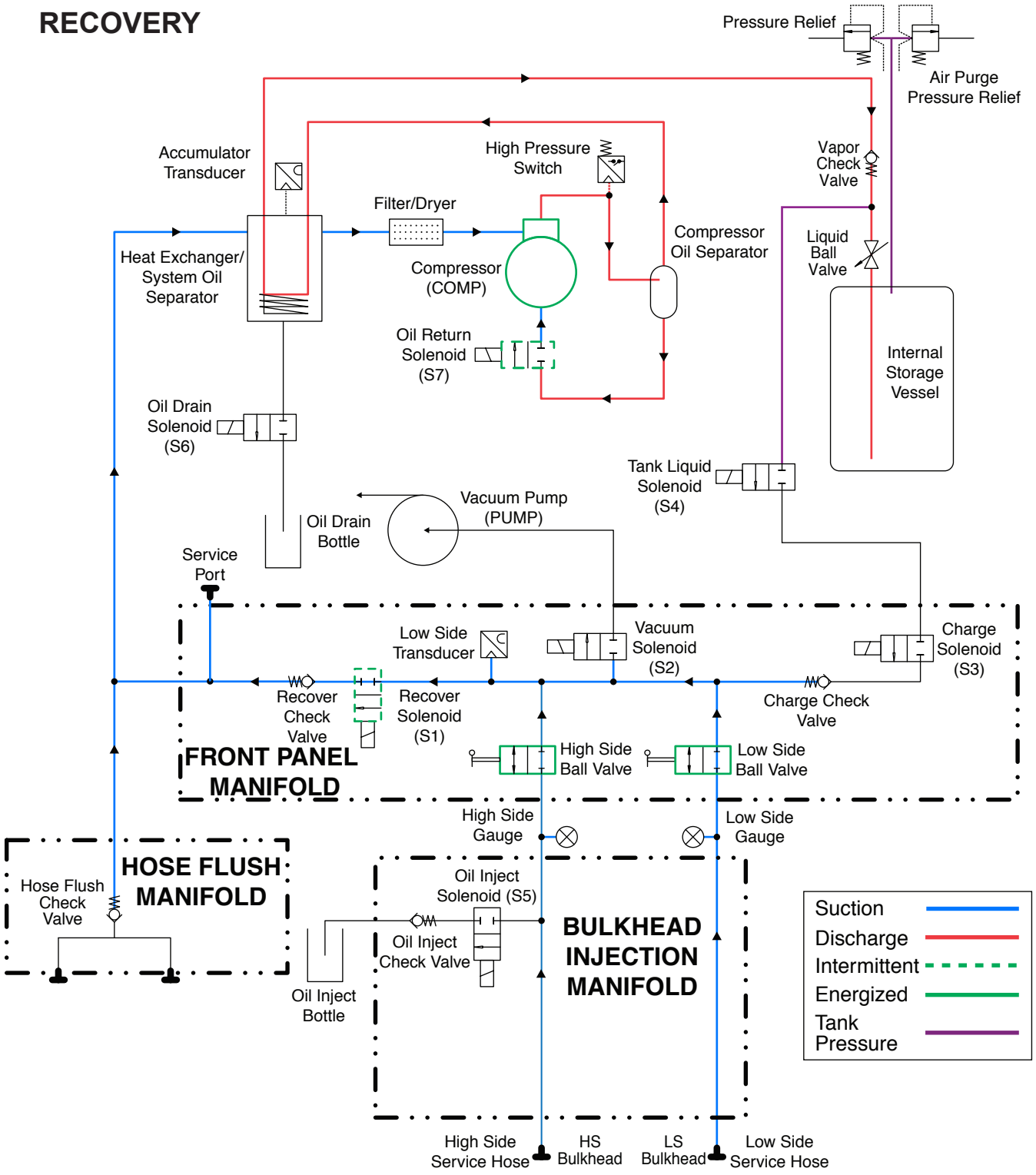
CLEARING



CLEARING PROCESS

During the Clearing process, the oil return solenoid and compressor are activated. The process continues until the accumulator transducer reads 135 mbar (4 in-Hg).

Figure 4-7. Clear

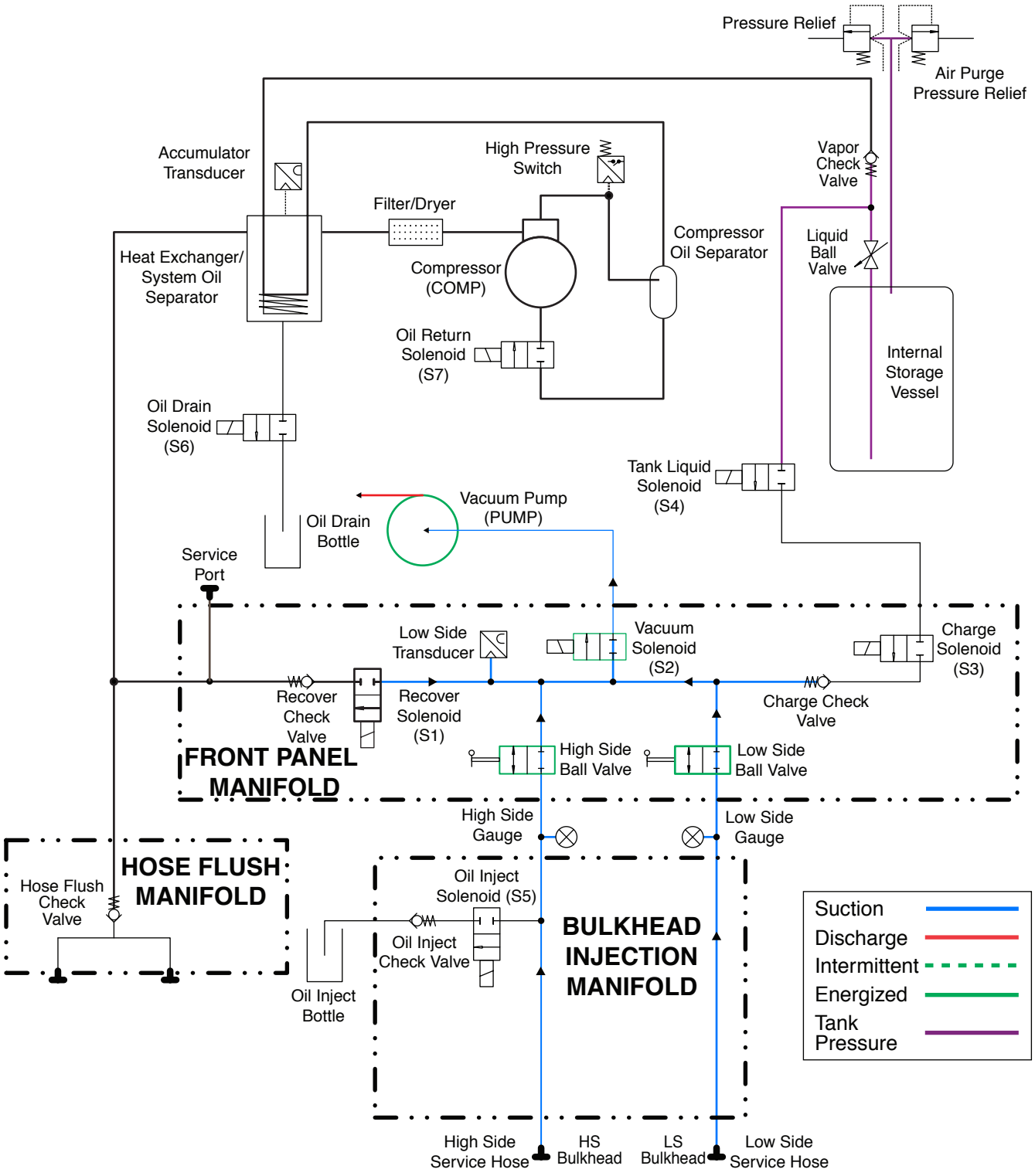


RECOVERY PROCESS

During the recovery process, the fan, compressor, and recover solenoid are activated. The panel valves are both open. The recovery solenoid cycles intermittently to maintain 2.4 bar (35psi) in the accumulator. A leak test is performed at the end of the recovery.

Figure 4-8. Recover

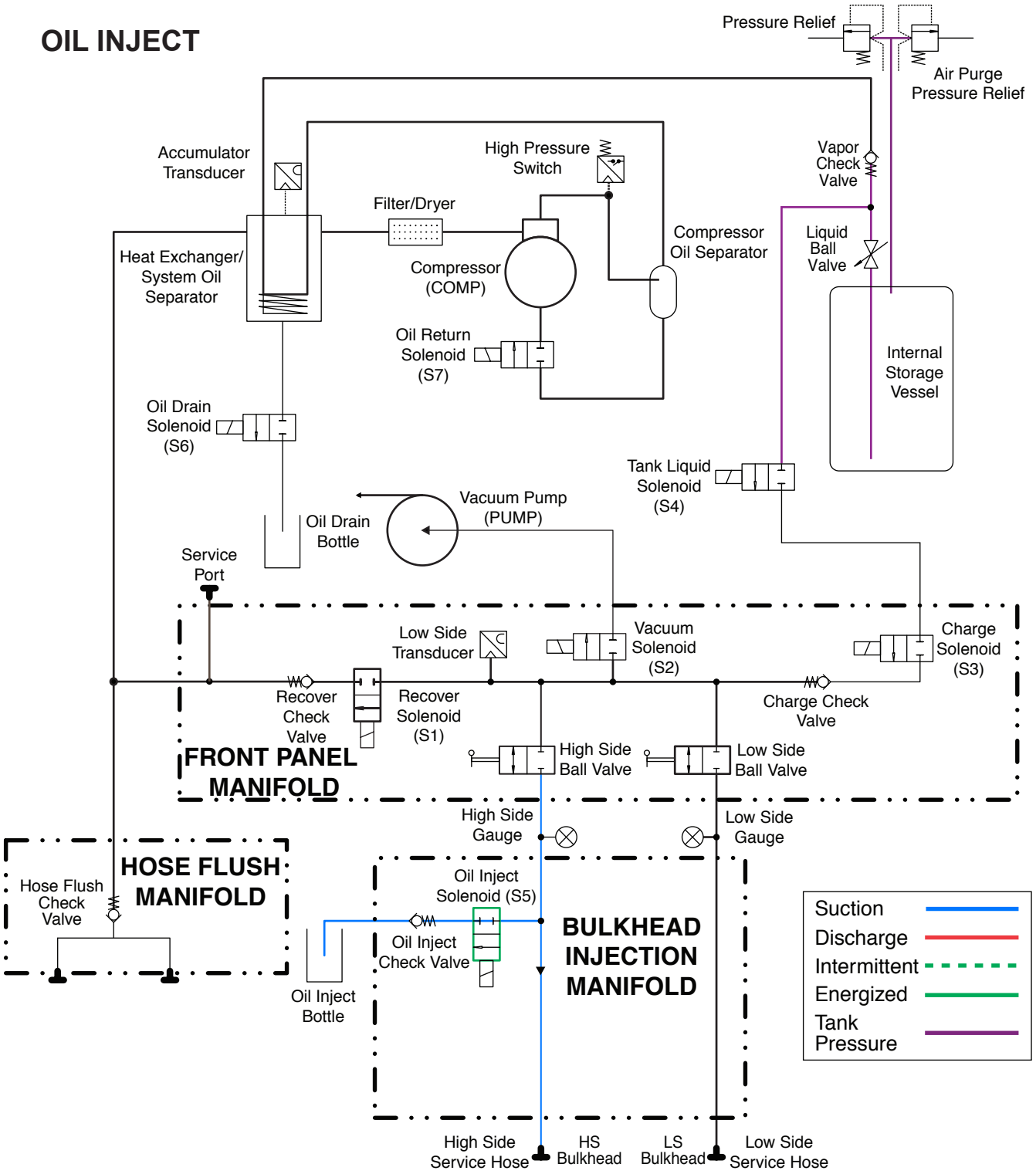
VACUUM



VACUUM PROCESS

The default vacuum time is 10:00 minutes. When the vacuum process begins, the vacuum pump is activated. After a 5 second delay, the vacuum solenoid activates. The HS and LS valves must be open. A timer will start when once the vacuum transducer reading reaches 5 mBar.

Figure 4-9. Vacuum

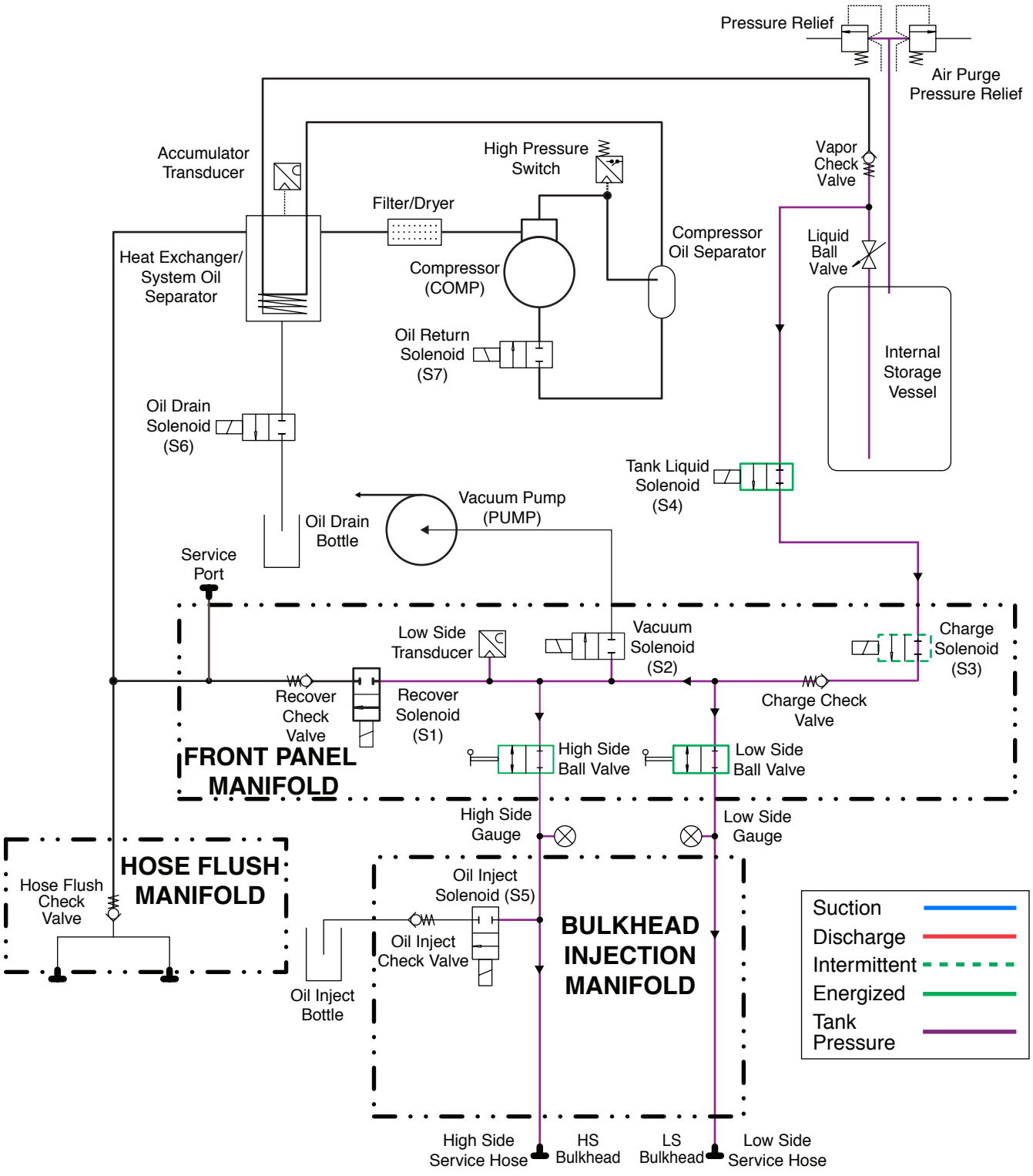


OIL INJECT PROCESS

The oil inject process is an automatic function. The oil is drawn into the system when the oil inject solenoid (S5) is activated and there is a vacuum on the system to draw oil in.

Figure 4-10. Oil Inject

CHARGE



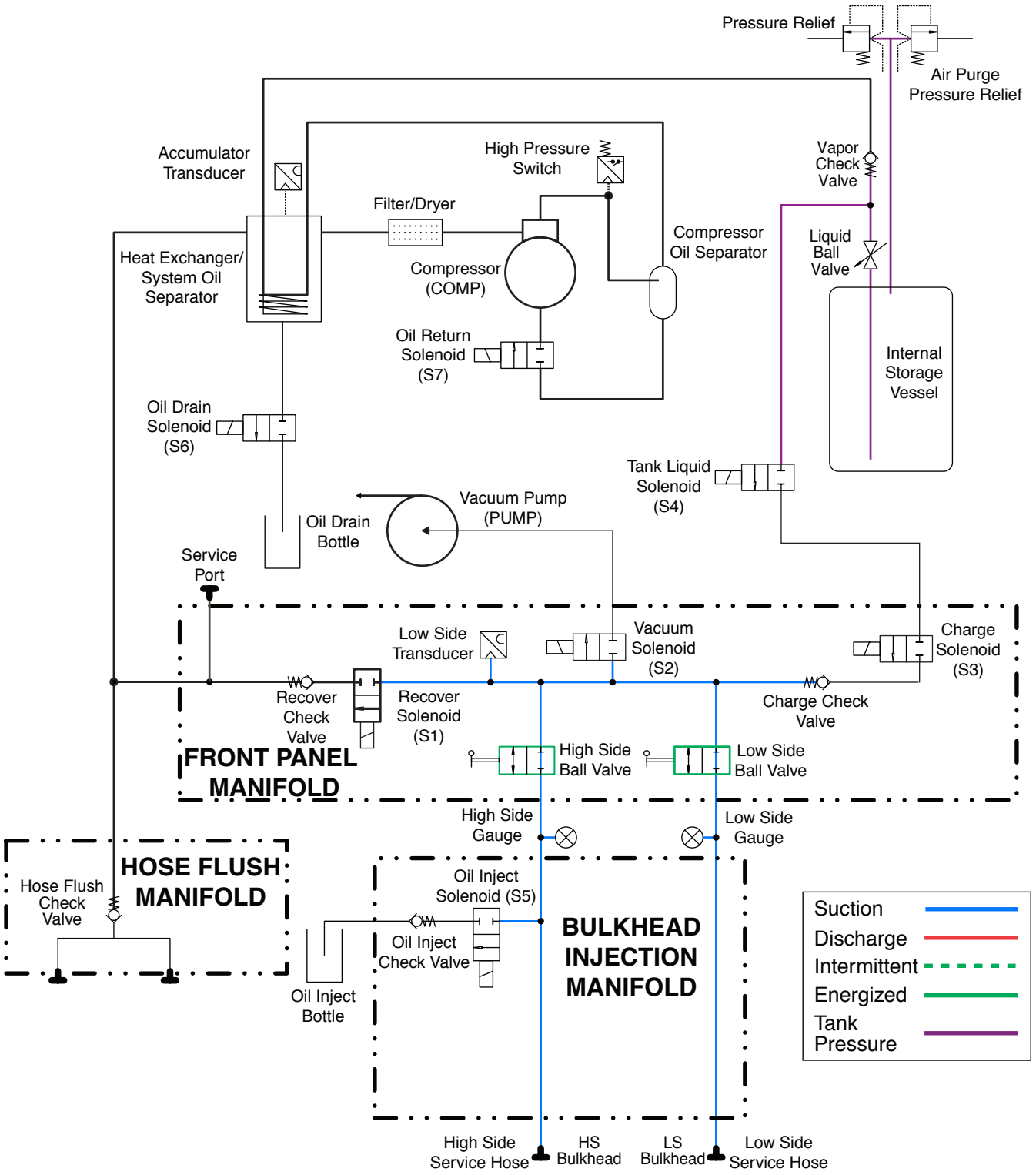
CHARGE PROCESS

During the Charge process, the end user may select either high-side charge, low-side charge, or both. When the charge process gets close to the programmed weight, the unit slows down. The unit will charge, settle, charge again, settle, etc.

Note: During the charge process, the pre-charge vacuum and pressure decay functions are disabled for the AC1X34-3/BAC 3000a.

Figure 4-11. Charge

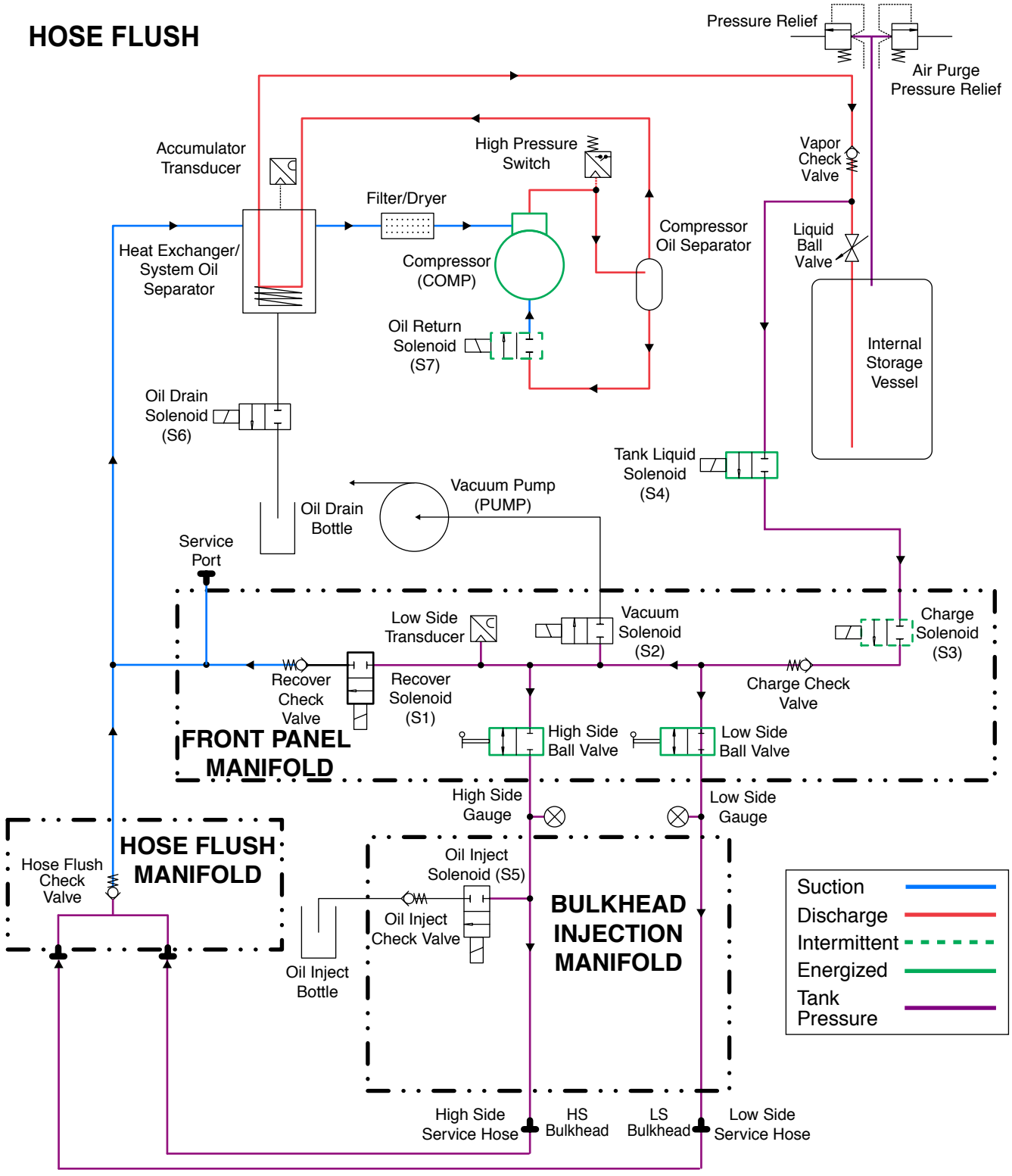
LEAK TEST



LEAK TEST PROCESS

High-Side inlet and Low-Side inlet valves are opened to equalize high and low sides of system being serviced. Unit checks low-side transducer for rise in vacuum (this is not a service menu test.).

Figure 4-12. Leak Test

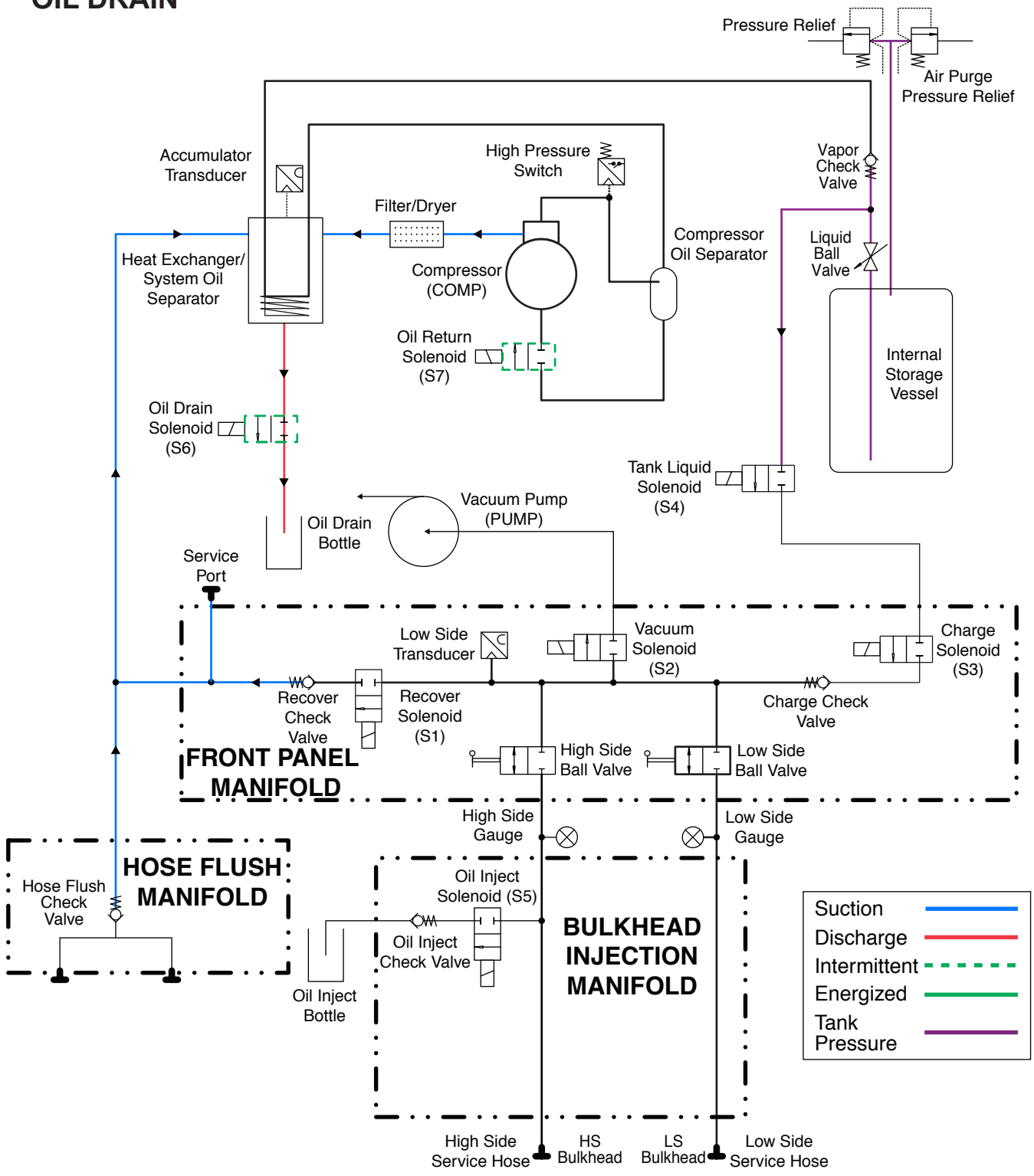


HOSE FLUSH

Flushing of the hoses is required if the next vehicle to be serviced contains a different type of A/C system oil than the previous vehicle serviced. During the Hose Flush process, the compressor and tank liquid solenoid are on, the high- and low-side valves are open, and the charge and oil return solenoids operate intermittently to flush hoses of refrigerant and any residual oils.

Figure 4-13. Hose Flush

OIL DRAIN



OIL DRAIN PROCESS

During the Oil Drain process, the oil return and tank liquid solenoid is activated until there is 1.1 bar (16psi) in the accumulator. The oil return solenoid is then deactivated and the oil drain solenoid is activated until there is either a greater than 0.01 bar (0.15psi) change per second in the accumulator or less than 0.62 bar (9psi) in the accumulator.

Figure 4-14. Oil Drain

PARTS AND COMPONENTS

Parts and Components

This section provides illustrations and parts breakdown of all parts of the assembly(ies) shown on the title page which can be disassembled, repaired or replaced, and reassembled.

How to Use the Parts and Components Illustrated Parts Listing

Number Column (No.)

This column contains the callout or index number of a part on the exploded view assembly drawing. Each number corresponds to a specific part on the drawing. When a triple dash (---) is shown, the part is either the top assembly for the drawing, or the part is not illustrated and therefore not called out.

The illustrated parts list does not list or illustrate parts which lose their identity by being permanently welded or riveted to other pieces.

Description Column (Description)

This column lists the noun name of the item followed by any descriptor (Example: GAUGE, LOW SIDE). In this case “GAUGE” is the noun, and “LOW SIDE” is the descriptor.

Qty (Units Per Assembly)

The Qty column shows the total number of numbers required per assembly, per subassembly, and per sub-subassembly as applicable. For bulk items, the letters AR indicate “as required”. The letters REF, if used, indicate the item is listed for reference purposes.

Effectivity Column (Effectivity)

The Effectivity column indicates which machine model variant(s) the listed item pertains to. When no model variant is listed in the Effectivity column, that particular item is used on all model variants.

Part Number Column (Part No.)

This column contains the part number of the item listed in the Description column. The abbreviation Ref. Only, if used, indicate the item is listed for reference purposes, but is not available for purchase.

Items Not Illustrated

Items not illustrated are indicated by a (Not shown.) notation in the Description column.

HOOD ASSEMBLY

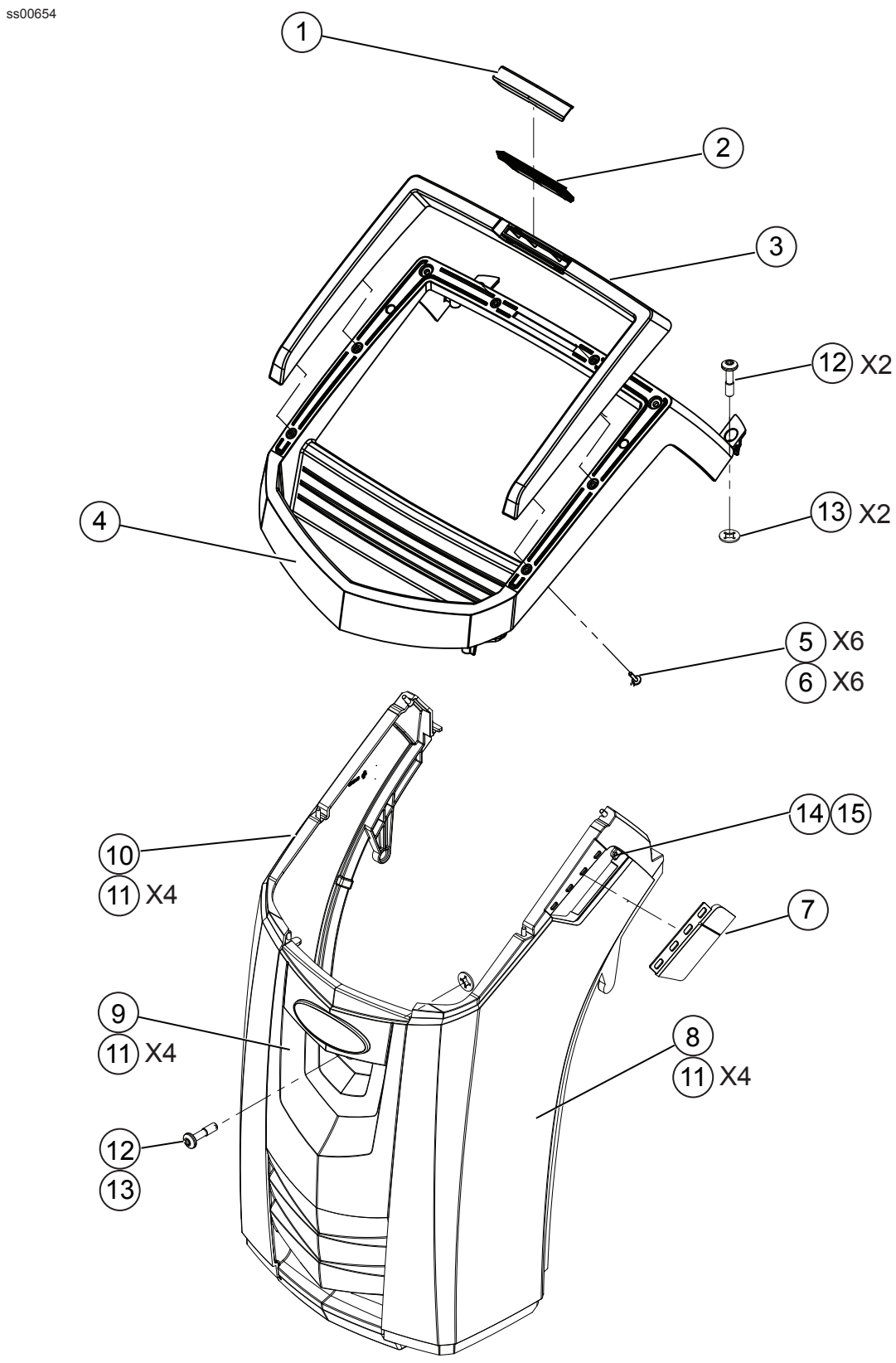


Figure 5-1. Hood Assembly

HOOD ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	ASSEMBLY, HOOD, AC1234-3/AC1X34-3 - BAC 3000yf/BAC 3000a ENCLOSURE	---	SP01100136 (RA30017)	
---	ASSEMBLY, BEZEL (Includes items 1 to 6)	1	SP01100202	
1	LENS	1	Ref. Only	
2	LIGHT PIPE	1	Ref. Only	
3	VISOR	1	Ref. Only	
4	DISPLAY BEZEL	1	Ref. Only	
5	SCREW, PLASTITE, M4 X 20mm	6		
6	WASHER, FENDER, M4	6		
7	COVER, I/O	1	SP01100141 (RA30021)	
8	PANEL, RIGHT SIDE	1	SP01100137 (RA30018)	
9	PANEL, FRONT	1	SP01100139 (RA30020)	
10	PANEL, LEFT SIDE	1	SP01100138 (RA30019)	
11	SCREW, PLASTITE, 1/4 X 3/4	12		
12	SCREW, MACHINE, M6 X 30mm	3		
13	WASHER, SELF RETAINING, M6	3		
14	BOTTLE, OIL DRAIN (Not shown)	1	SP01100162 (RA30028)	
16	DECAL, AC1234-3 (Not shown)	1	SP01100337	A, B
	DECAL, AC1X34-3 (Not shown)		SP01100335	C, D
17	NAMEPLATE, TECH, R1234yf (Not shown)	1		A, B, E
	NAMEPLATE, TECH, R134a (Not shown)			C, D, F
18	DECAL, R1234yf (Not shown)	1	SP01100293	A, B, E
	DECAL, R134a (Not shown)		SP01100336	C, D, F
19	DECAL, BAC 3000yf (Not shown)	1	SP00101420	E
	DECAL, BAC 3000a (Not shown)		SP00101421	F
20	DECAL, ROBINAIR (Not shown)	1	SP01100088	A, B, C, D
	DECAL, BEISSBARTH (Not shown)		SP00100965	E, F
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

INTERNAL ASSEMBLY

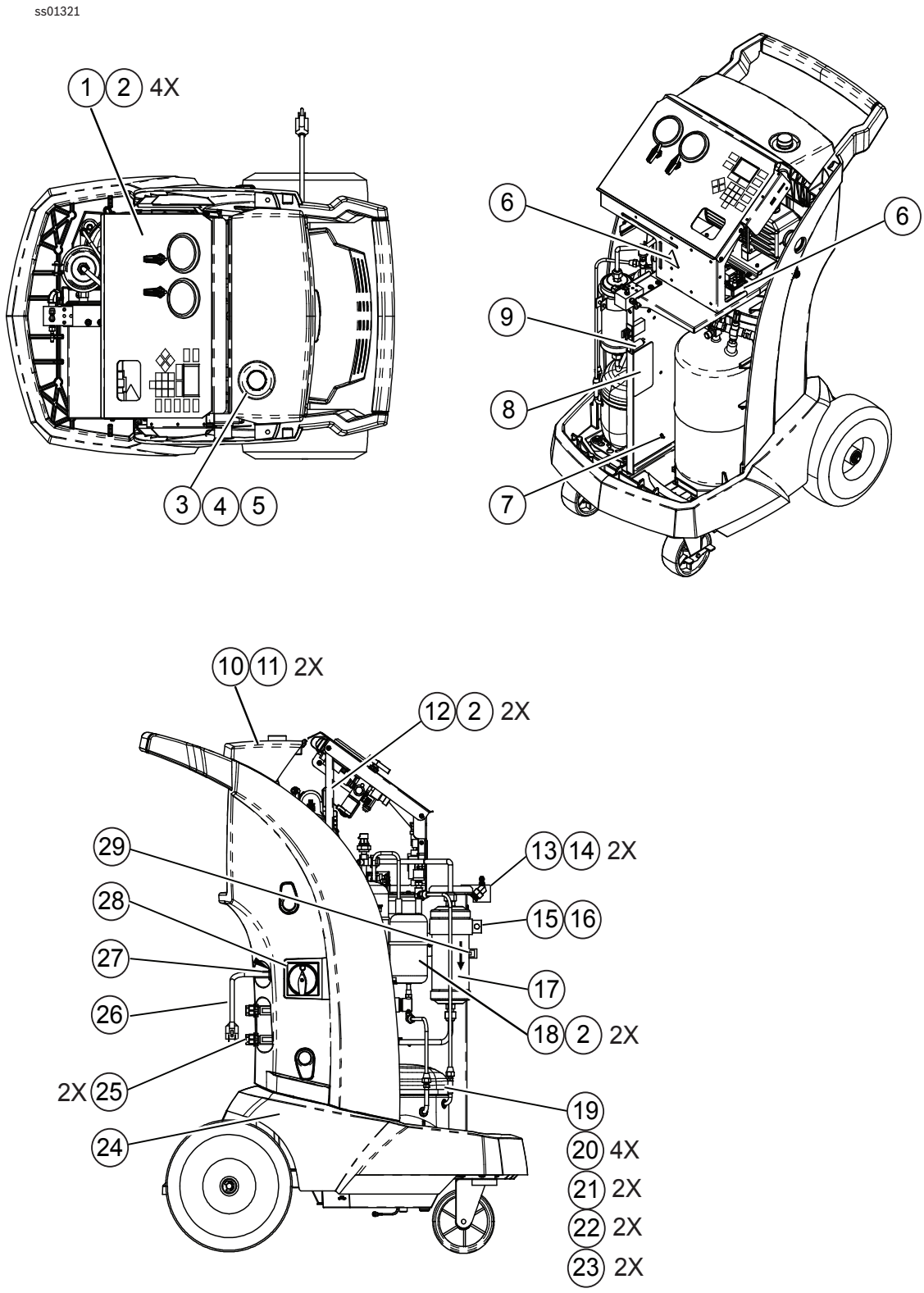


Figure 5-2. Internal Assembly (Sheet 1 of 2)

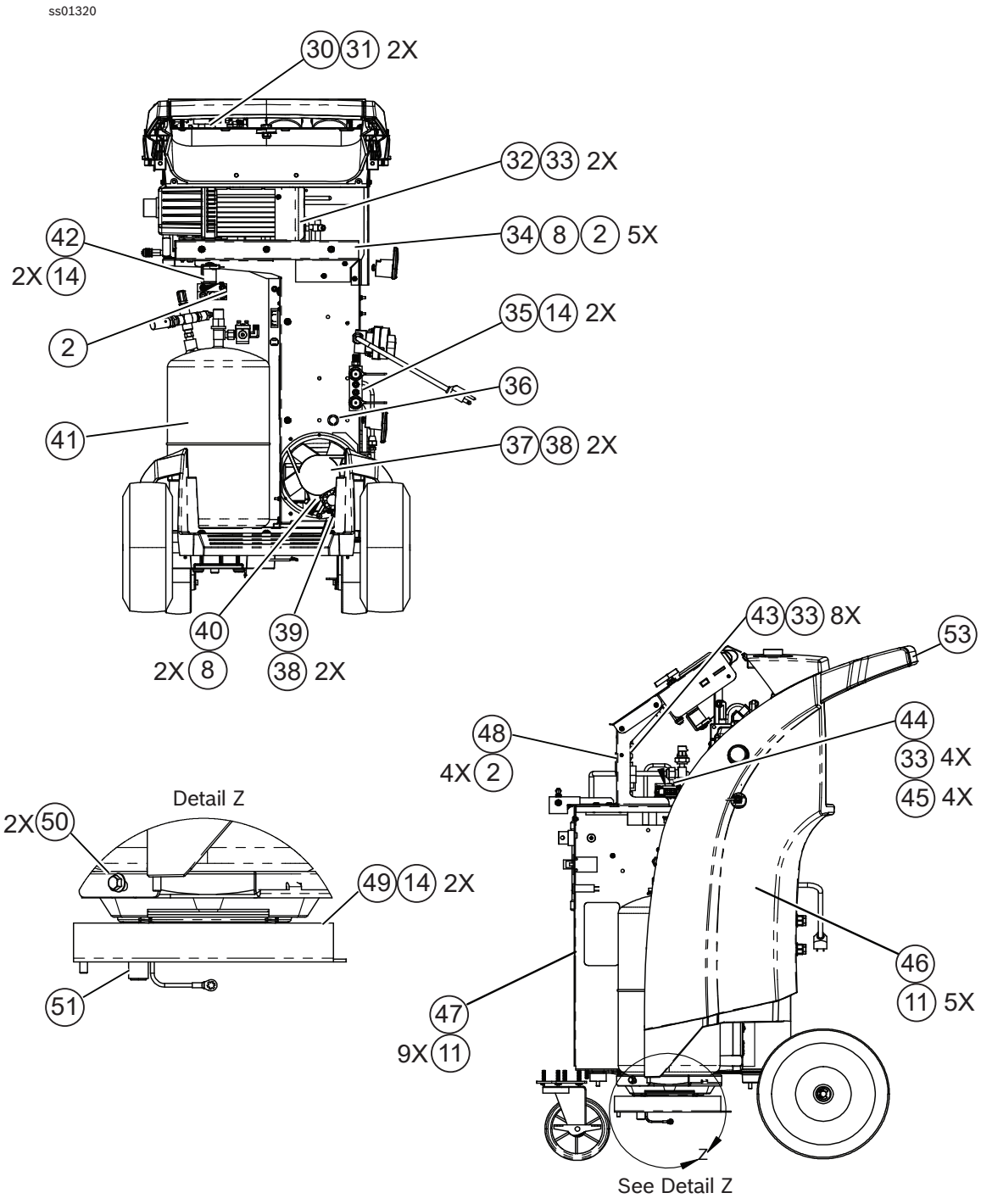


Figure 5-2. Internal Assembly (Sheet 2 of 2)

INTERNAL ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	INTERNAL ASSEMBLY	---	Ref. Only	
1	ASSEMBLY, CONTROL PANEL (See Figure 5-3 for breakdown.)	1	Ref. Only	
2	SCREW, SEMS, M4 X 8mm	18		
3	CAP, OIL FILL W/O-RING	1	SP01100191 (RA30033)	
4	NUT, BULKHEAD, M30 X 2.0	1	Ref. Only	
5	FITTING, BULKHEAD	1	RA30129	
6	DECAL, ELECTRIC SHOCK	2		
7	NUT, KEPS M4	10		
8	DECAL, PRESSURE, CAUTION	1		
9	CIRCUIT BREAKER, 7A, PANEL MOUNT, 250V	1	SP01100115 (SP01100115879)	
10	COVER, LOAD CELL	1		
11	SCREW, PLASTITE, .250 X .750	11	RA19916	
12	GUSSET, CONTROL PANEL	1	Ref. Only	
13	ASSEMBLY, OIL DRAIN	1	SP01100298 (SP01100298810)	
14	SCREW, SEMS, M6 X 12mm	15		
15	RING, INSULATED PIPE	1		
16	SCREW, M8 X 16mm L MACHINE	1		
17	FILTER/DRYER	1	SP00101192 (SP00101192879)	
18	ASSEMBLY, OIL SEPARATOR	1	Ref. Only	
19	ASSEMBLY, COMPRESSOR, 230V (See Figure 5-9 for breakdown.)	1	SP00100068 (SP00100068810)	
20	GROMMET, COMPRESSOR	4	Ref. Only	
21	SLEEVE, COMPRESSOR	2	Ref. Only	
22	WASHER, FENDER, M6	2		
23	BOLT, M6 X 35mm	2		
24	ASSEMBLY, BASE (See Figure 5-11 for breakdown.)	1	SP01100134 (RA30016)	
25	CAP PLUG, w/TETHER	2	Ref. Only	
26	ASSEMBLY, CABLE, POWER INPUT	1	SP01100217	
27	BUSHING, HEYCO (Sold in package of 5 items.)	1		
28	SWITCH, POWER LOCK-OUT/TAG-OUT	1	SP00100013 (3113125)	
29	SWITCH, DOOR	1	SP01100195 (RA30035)	
30	ASSEMBLY, OIL INJECT SHELF	1	Ref. Only	
31	SCREW, PLASTITE, 1/4 X 3/4	7		

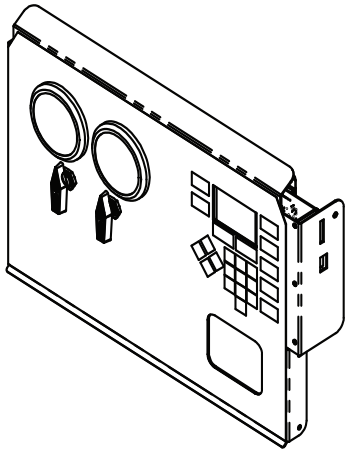
32	PUMP, VACUUM, 230V, 2.5CFM, 1 STAGE (See figure 5-10 for breakdown.)	1	SP01100317	
33	SCREW, MACHINE, M3 X 6mm (Sold in package of 5 items.)	12		
34	ASSEMBLY, VACUUM PUMP SHELF	1	Ref. Only	
35	ASSEMBLY, BLOCK, FLUSH LOOP, R1234yf	1	SP01100339 (SP01100339810)	A, B, E
	ASSEMBLY, BLOCK, FLUSH LOOP, R134a		SP01100291	C, D, F
	CONNECTION ADAPTER LP, R1234yf (Not shown)	1	SP01100274	A, B, E
	CONNECTION ADAPTER HP, R1234yf (Not shown)	1	SP01100275	A, B, E
	CONNECTION ADAPTER LP, R134a (Not shown)	1	SP01100276	C, D, F
	CONNECTION ADAPTER HP, R134a (Not shown)	1	SP01100277	C, D, F
	O-RING (Not shown)	2	SP01100105 (SP01100105395)	
36	GROMMET	1	RA19916	
37	ASSEMBLY, FAN, 230V	1	SP0110013 (RA17516)	
38	SCREW, #10 X 1/2	4		
39	BRACKET, FAN, AIRFLOW SENSOR	1	Ref. Only	
40	FAN, AIRFLOW SENSOR	1	SP01100146 (RA30024)	
41	ASSEMBLY, ISV, TANK, (See Figure 5-4 for breakdown.)	1	SP01100287	
42	ASSEMBLY, BLOCK, BULKHEAD	1	Ref. Only	
43	ASSEMBLY, POWER BOARD	1	SP01100295 (SP01100295760)	
44	REGULATOR, 12V, 60W, 2 X 4 OPEN FRAME	1	SP01100326	
45	SPACER, M3 X 16mm	4	Ref. Only	
46	ASSEMBLY, BACK	1	SP01100197	
47	DIVIDER, CENTER	1		
48	PANEL, POWER BOARD	1		
49	ASSEMBLY, SCALE	1	SP00101359	
50	SCREW, M6.1 x 16 HEXHEAD, FLANGE	2		
51	MAGNET	1		
52	STRAP, HOOK AND LOOP, 1.5" X 45" (Not shown)	2		
53	REAR HANDLE	1	SP01100132	
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

CONTROL PANEL ASSEMBLY

ss01322

Notes:

1. When replacing overlay (2), both gauge lenses and ball valve knobs must be removed then reinstalled after the overlay is positioned correctly over the control panel.
2. Torque screws to 0.2 - 0.5 Nm.



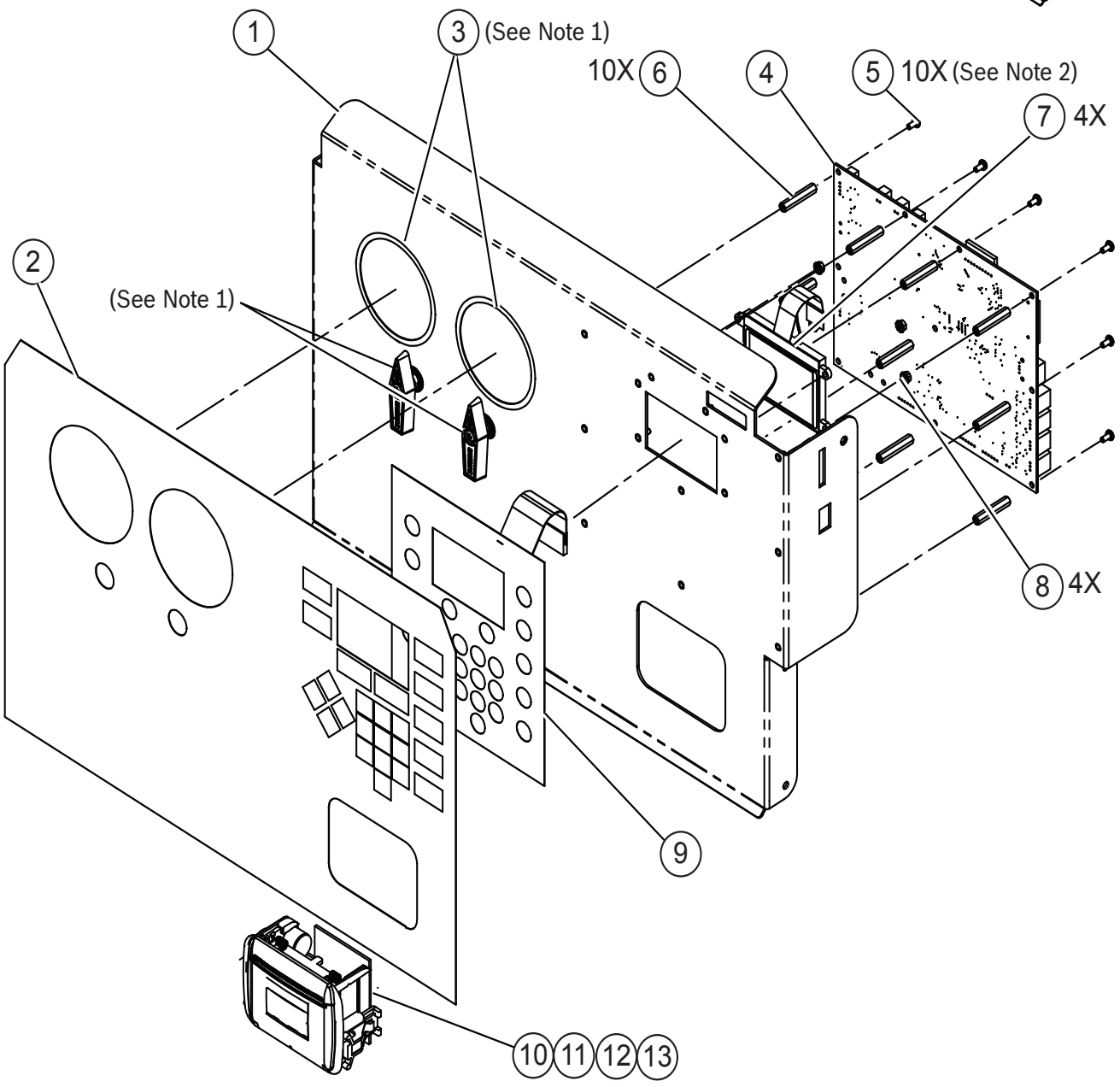


Figure 5-3. Control Panel Assembly

CONTROL PANEL ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	CONTROL PANEL ASSEMBLY (See Figure 5-2 for next higher assembly.)	---	Ref. Only	
1	PANEL, CONTROL	1		
2	OVERLAY, CONTROL PANEL	1	SP01100279	
3	ASSEMBLY, PANEL MANIFOLD	1	SP01100286	
4	PCB ASSEMBLY, CONTROL BOARD	1	SP01100258 (SP01100258760)	
5	SCREW, MACHINE, M3 X 6mm (Sold in package of 5 items.)	10		
6	STANDOFF, (28mm) (Sold in package of 5 items.)	10		
7	DISPLAY	1	SP01100315 (SP01100315879)	
8	NUT, KEPS M3 X 0.5 (Sold in package of 5 items.)	4		
9	KEYPAD ASSEMBLY	1	SP01100316 (SP01100316879)	
10	PRINTER	1	SP00101306 (SP00101306810)	B, D, E, F
11	CAP, PRINTER LOCATION (Location only shown.)	1		A, C
12	ADHESIVE, WIRE MOUNT (Not shown.)	1		A, C
13	CABLE TIE (Not shown.)	1		A, C
14	ROLL, PAPER (Not shown.)	1	SP00100087 (5607069)	B, D, E, F
15	LEVER, PRINTER COVER (Not shown.)	1	SP00101882	B, D, E, F
16	COVER, PRINTER (Not shown.)	1	SP00101881	B, D, E, F
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

ISV ASSEMBLY

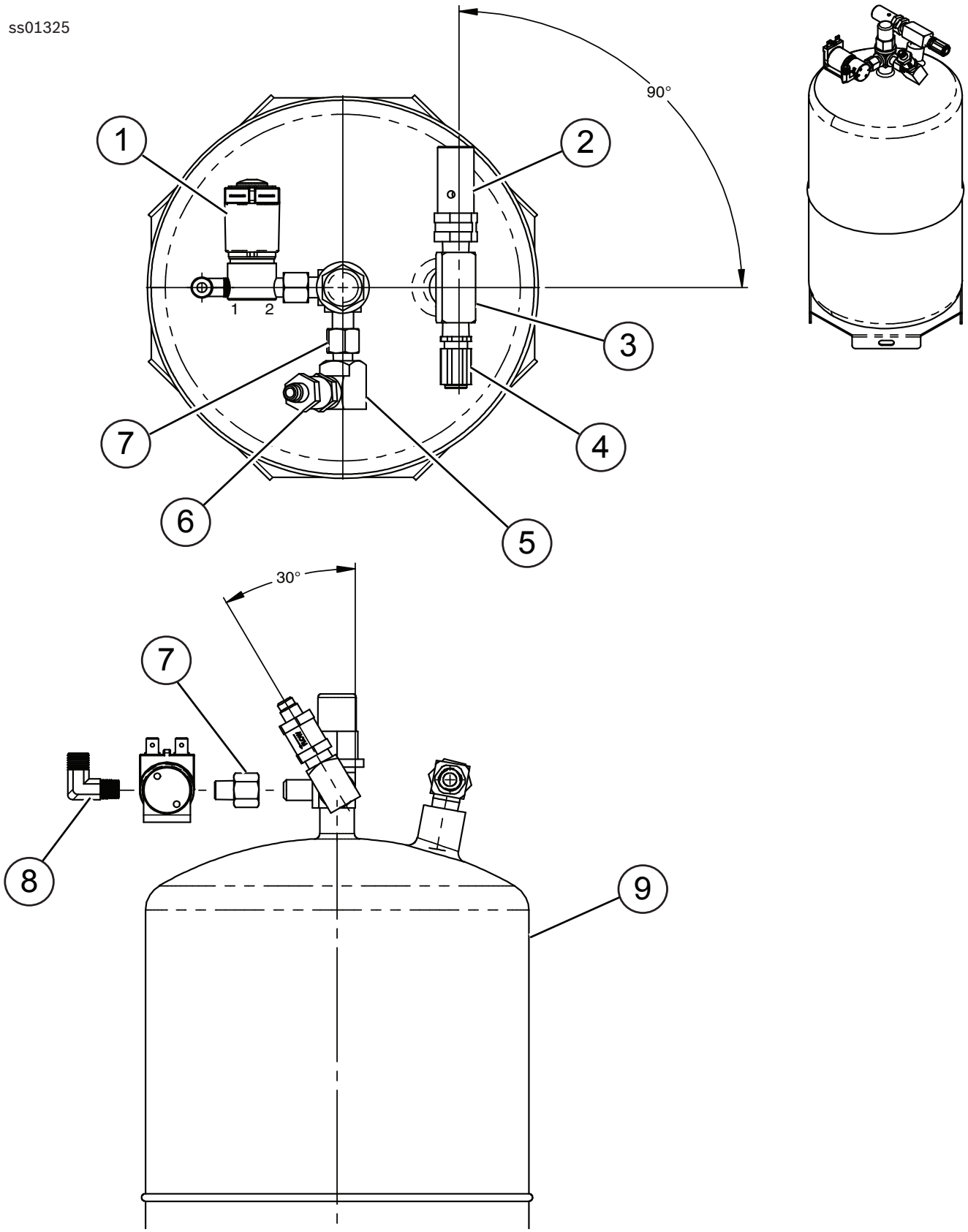


Figure 5-4. ISV Assembly

ISV ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	ISV ASSEMBLY (See Figure 5-2 for next higher assembly.)	---	SP01100287	
1	SOLENOID, 12VDC, DISCRETE	1	SP01100077 (SP01100077760)	
2	VALVE, TANK, PRESSURE RELIEF	1	SP00100032 (5117483)	
3	FITTING, TEE, .25FP X .25FP X .25MP	1	SP01100057	
4	VALVE, AIR PURGE, PRESSURE RELIEF	1	SP00100031 (5117482)	
5	ELBOW, 1/4 FPT x 1/8 FPT	1	SP01100341	
6	VALVE, CHECK, 1/4 NPT X 1/4 FLR	1	SP01100206 (SP01100206760)	
7	FITTING, 1/4 FLARE X 1/8 NPTF	2	SP01100302 (SP01100302810)	
8	ELBOW, 1/8 MP X O-RING SEAL	1	SP01100028 (SP01100028879)	
9	TANK, PED ISV	1	Ref. Only	
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

PANEL MANIFOLD ASSEMBLY

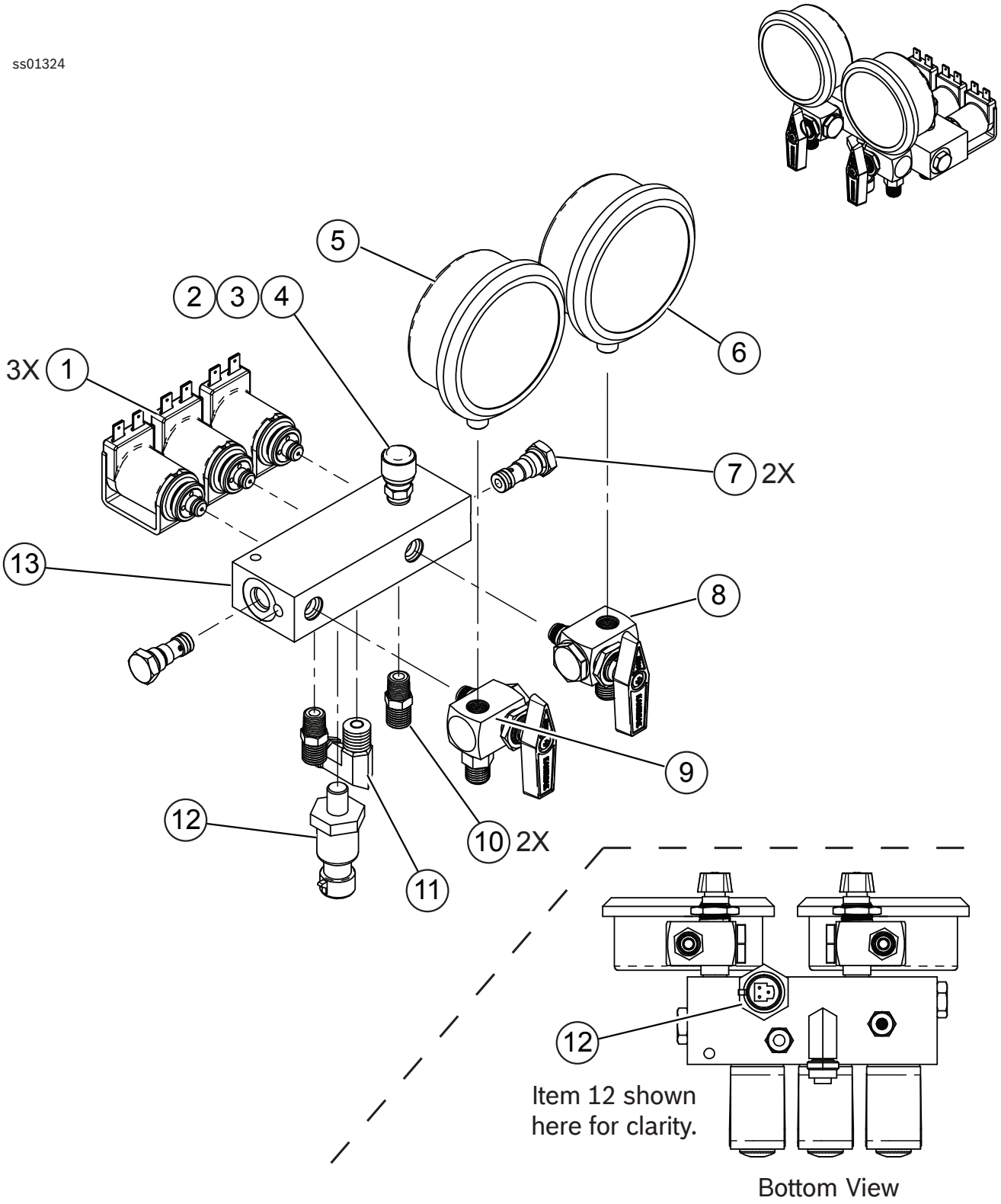


Figure 5-5. Panel Manifold Assembly

PANEL MANIFOLD ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	PANEL MANIFOLD ASSEMBLY (See Figure 5-2 for next higher assembly.)	---	SP01100286	
1	SOLENOID, 12VDC, MANIFOLD (S1, S2, and S3)	3	SP01100078 RA20010	
2	CAP, FLARE W/O-RING (Sold in package of 5 items.)	1		
3	CORE, SCHRADER	1	SP01100061 (RA19916)	
4	FITTING, 1/4 MFL X 1/8 NPTF	1		
5	GAUGE, LOW SIDE PRESSURE	1	SP01100332 (SP01100332879)	
6	GAUGE, HIGH SIDE PRESSURE	1	SP01100333 (SP01100333879)	
7	VALVE, CHECK	2	SP01100142 (RA30022)	
8	VALVE, HIGH SIDE PANEL BALL	1	SP01100288 (SP01100288760)	
9	VALVE, LOW SIDE PANEL BALL	1	SP01100284 (SP01100284760)	
10	FITTING, HALF UNION, 1/8 NPT X O-RING	2	SP01100027	
11	ELBOW, 1/8 MP X 3/8 PNEU COMP	1	Ref. Only	
12	LOW PRESSURE TRANSDUCER	1	SP01100076 (SP01100076480)	
13	BLOCK, PANEL, MANIFOLD	1	Ref. Only	
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

BULKHEAD/OIL INJECT BLOCK ASSEMBLY

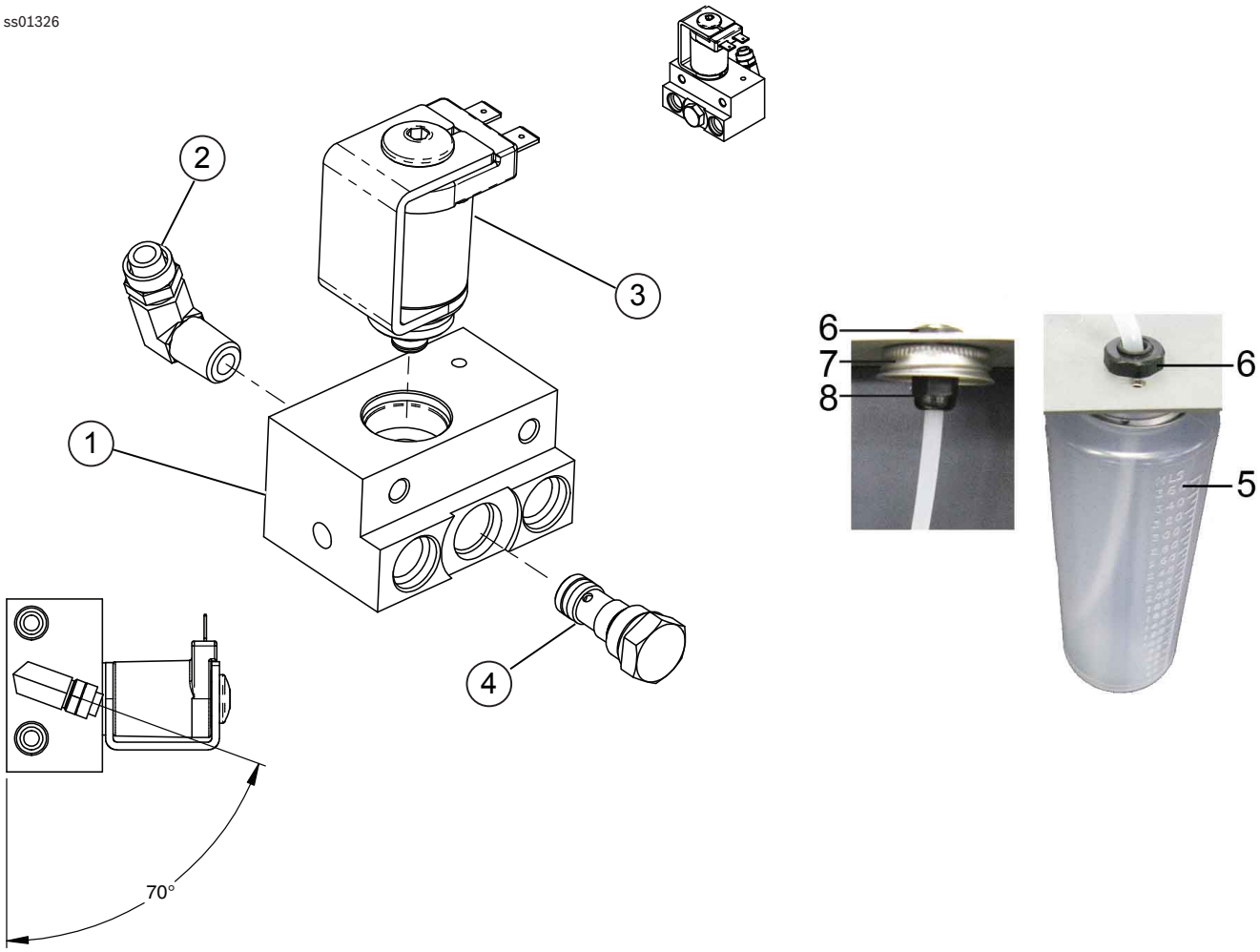


Figure 5-6. Bulkhead/Oil Inject Assembly

BULKHEAD / OIL INJECT ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	BULKHEAD / OIL INJECT ASSEMBLY (See Figure 5-2 for next higher assembly.)	---	SP01100285	
1	BLOCK, BULKHEAD (W/OIL INJECT)	1	Ref. Only	
2	ELBOW, 1/8 NPTF C 1/4 COMP	1	SP01100080	
3	SOLENOID, MANIFOLD, 12V	1	SP01100078	
4	VALVE, CHECK	1	SP01100241	
5	BOTTLE, OIL INJECT	1	SP01100025 (SP01100025760)	
---	KIT, OIL INJECT (Includes items 6 to 8)	---	SP00101764	
6	NYLON NUT	1	SP01100063	
7	CAP	1	SP01100065	
8	NYLON FITTING	1	SP01100040	
	Effectivity:			
	AC1234-3 - AC1234-3P			A - B
	AC1X34-3 - AC1X34-3P			C - D
	BAC 3000yf - BAC 3000a			E - F

OIL DRAIN BLOCK ASSEMBLY

ss01328

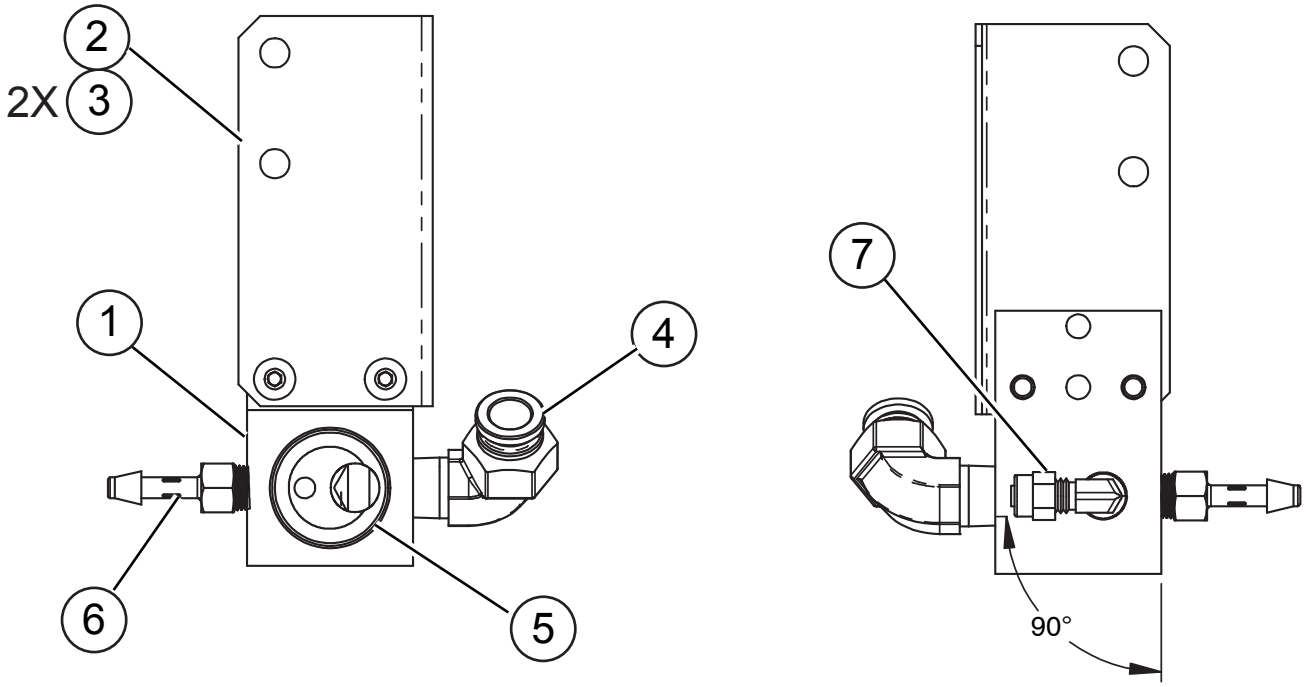


Figure 5-7. Oil Drain Block Assembly

OIL DRAIN BLOCK ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	OIL DRAIN BLOCK ASSEMBLY (See Figure 5-2 for next higher assembly.)	---	SP01100314	
1	BLOCK, OIL DRAIN	1	Ref. Only	
2	BRACKET, OIL DRAIN BLOCK	1	SP01100298	
3	SCREW, BUTTON HD, M5	2	Ref. Only	
4	FITTING, ELBOW, 90 DEGREE	1	SP01100053	
5	O-RING	1	SP01100005 (SP01100005760)	
6	FITTING, 1/8 NPT X .25 ID BARB	1	Ref. Only	
7	FITTING, ELBOW, 1/8 MP X 1/8 PNEU	1	SP01100044	
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

OIL SEPARATOR ASSEMBLY

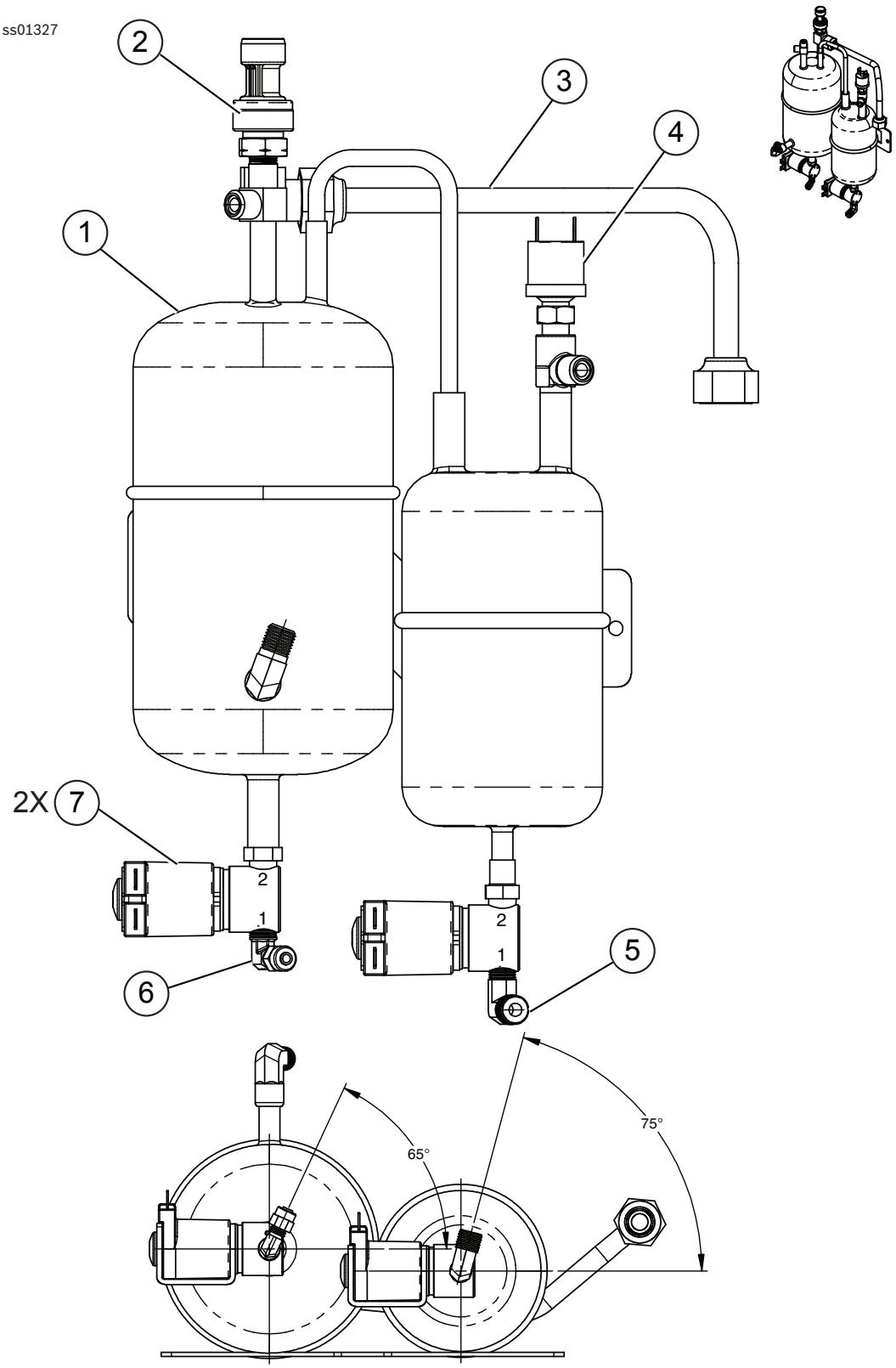


Figure 5-8. Oil Separator Assembly

OIL SEPARATOR ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	OIL SEPARATOR ASSEMBLY (See Figure 5-2 for next higher assembly.)	---	SP01100289	
1	ASSEMBLY, ACCUMULATOR (BRAZING)	1	RA30096	
2	TRANSDUCER, ACCUMULATOR PRESSURE	1	SP01100334 (RA20066)	
3	TUBE, ACCUMULATOR TO FILTER/DRYER	1	SP01100303 (SP01100303810)	
4	SWITCH, HIGH PRESSURE CUT OUT	1	SP01100329 (SP01100329879)	
5	ELBOW, 1/8 MP W/O-RING SEAL	1	SP01100028 (SP01100028879)	
6	ELBOW, 1/8 MP X 1/8 PNEU	1	SP01100044	
7	SOLENOID, DISCRETE, 12V	2	SP01100077 (RA20009)	
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

COMPRESSOR ASSEMBLY

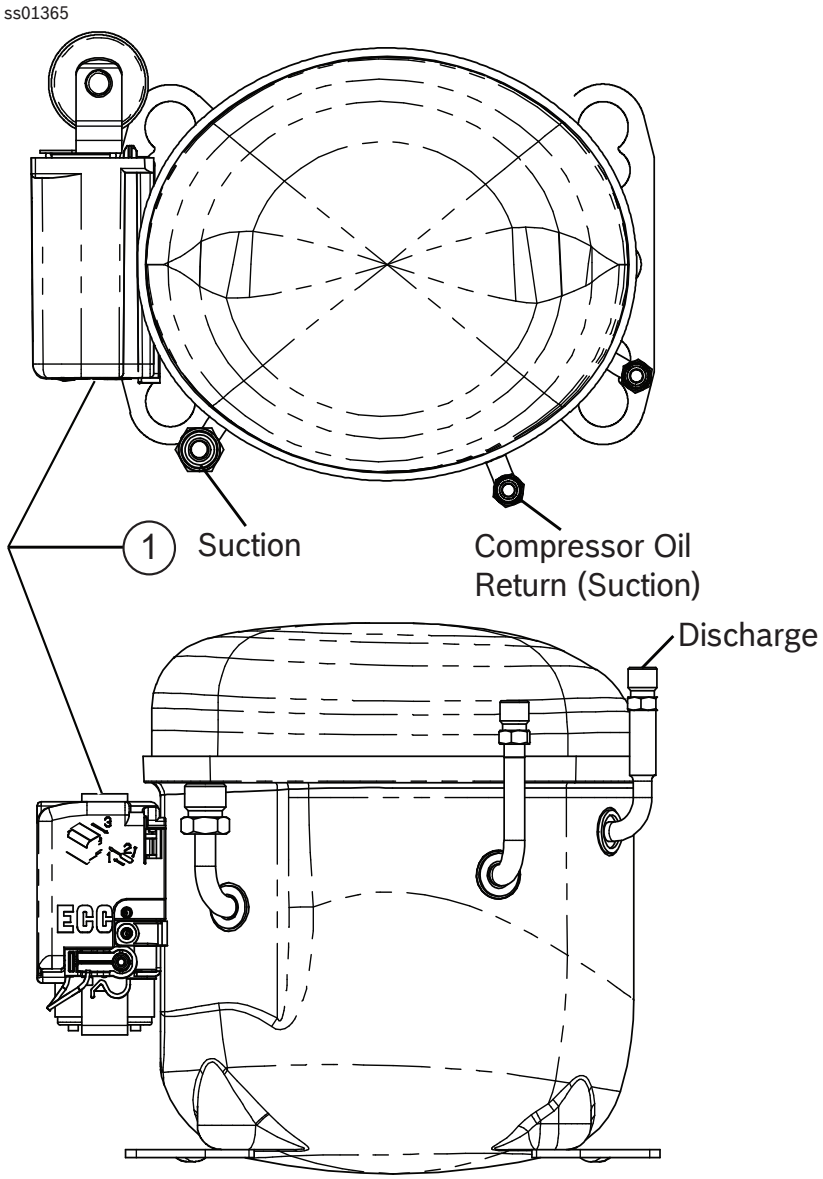


Figure 5-9. Compressor Assembly

COMPRESSOR ASSEMBLY, 230V				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	COMPRESSOR, 230V	---	SP00101714	
1	ELECTRICAL SERVICE KIT, 230V (Includes thermal protector, start relay, capacitor, capacitor cap, and capacitor leads.)	1	TBD	
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

VACUUM PUMP ASSEMBLY

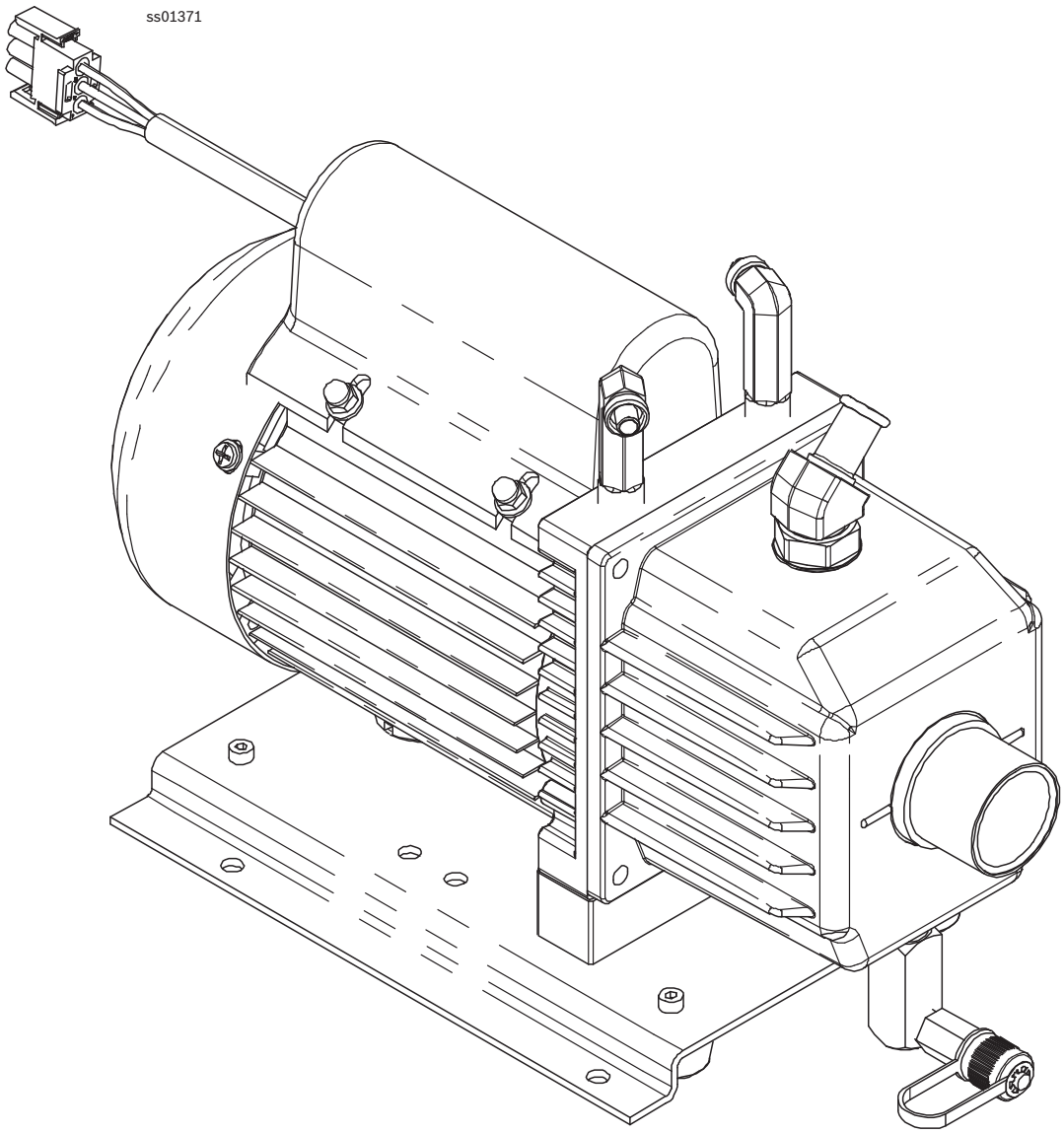


Figure 5-10. Vacuum Pump Assembly

VACUUM PUMP ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	VACUUM PUMP ASSEMBLY, 2.5 CFM, 230VAC	---	SP01100317	
---	No repair parts exist for this unit. If faulty, replace entire assembly.	---	---	
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

BASE ASSEMBLY

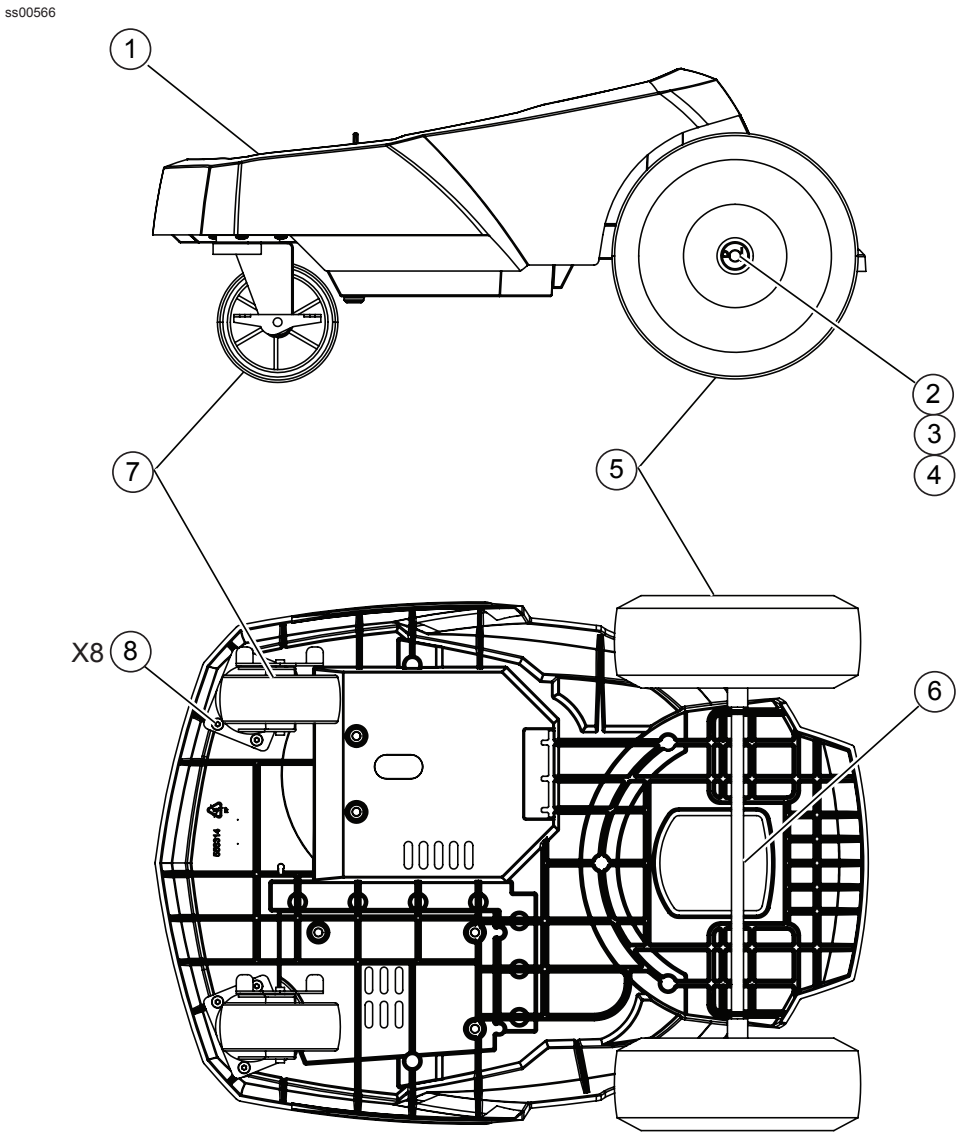


Figure 5-11. Base Assembly

BASE ASSEMBLY				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	BASE ASSEMBLY (See Figure 5-2 for next higher assembly.)	---	SP01100134 (RA30016)	
---	KIT (Includes items 2, 3, 4)	---	IN PROGRESS	
1	BASE	1		
2	RING, RETAINING	2		
3	WASHER, FLAT, ZINC, 1/2 ID	2		
4	BUSHING	2		
5	WHEEL, 10"	2	SP00101109 (SP00101109879)	
6	AXLE	1		
7	FRONT WHEEL	2	SP00101108 (SP00101109760)	
8	SCREW, PLASTITE, 1/4 X 1"	8		
9	VACUUM PUMP OIL (600 ml) (Not shown.)	1	SP00100086 (5604052)	
10	VINYL DUST COVER (Not shown.)	1	SP00101300	
11	CALIBRATION WEIGHT (Not shown.)	1	SP01100095	
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

WIRING HARNESS DIAGRAM

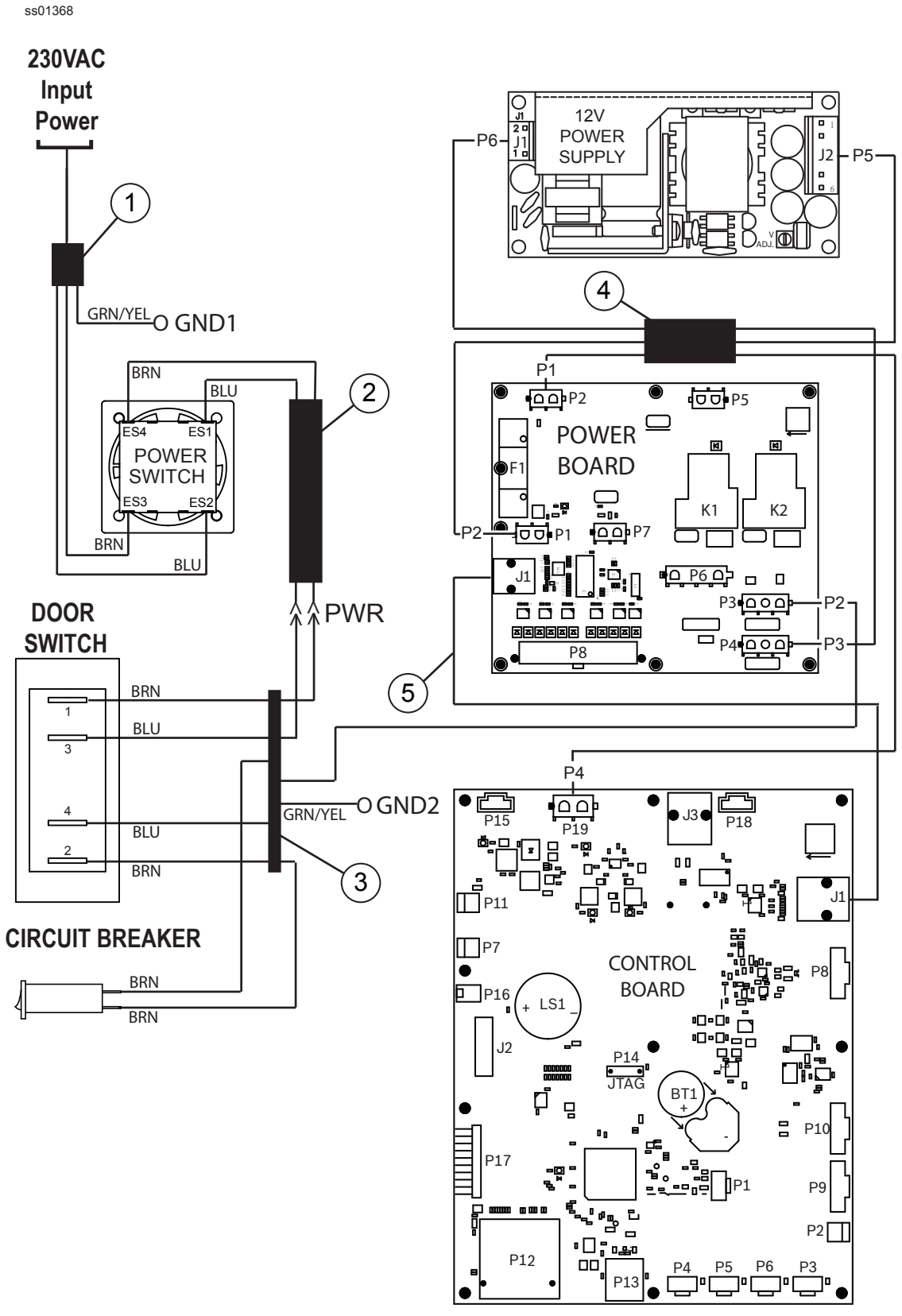


Figure 5-12. Wiring Harness Diagram (Sheet 1 of 3)

ss01369

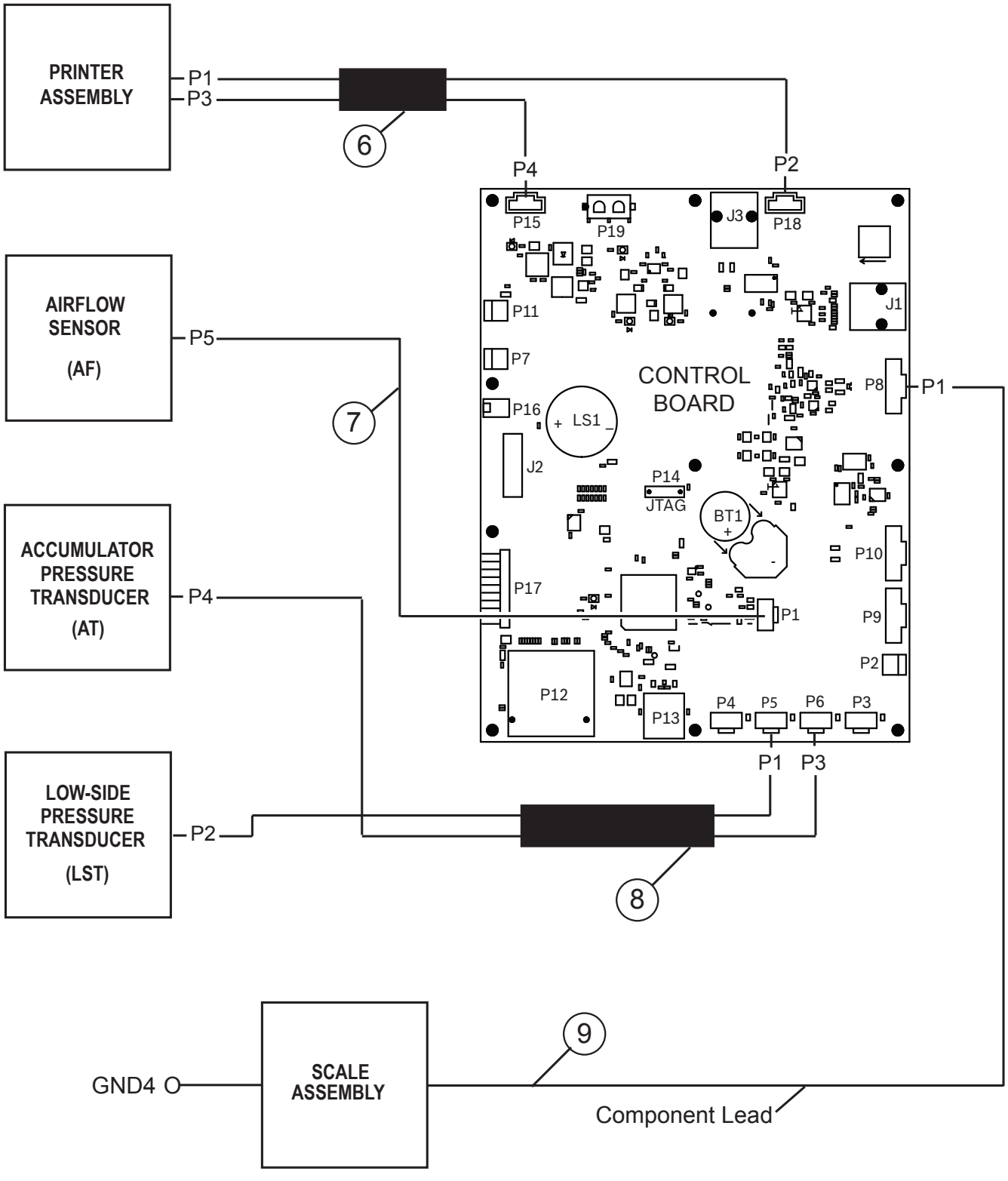


Figure 5-12. Wiring Harness Diagram (Sheet 2 of 3)

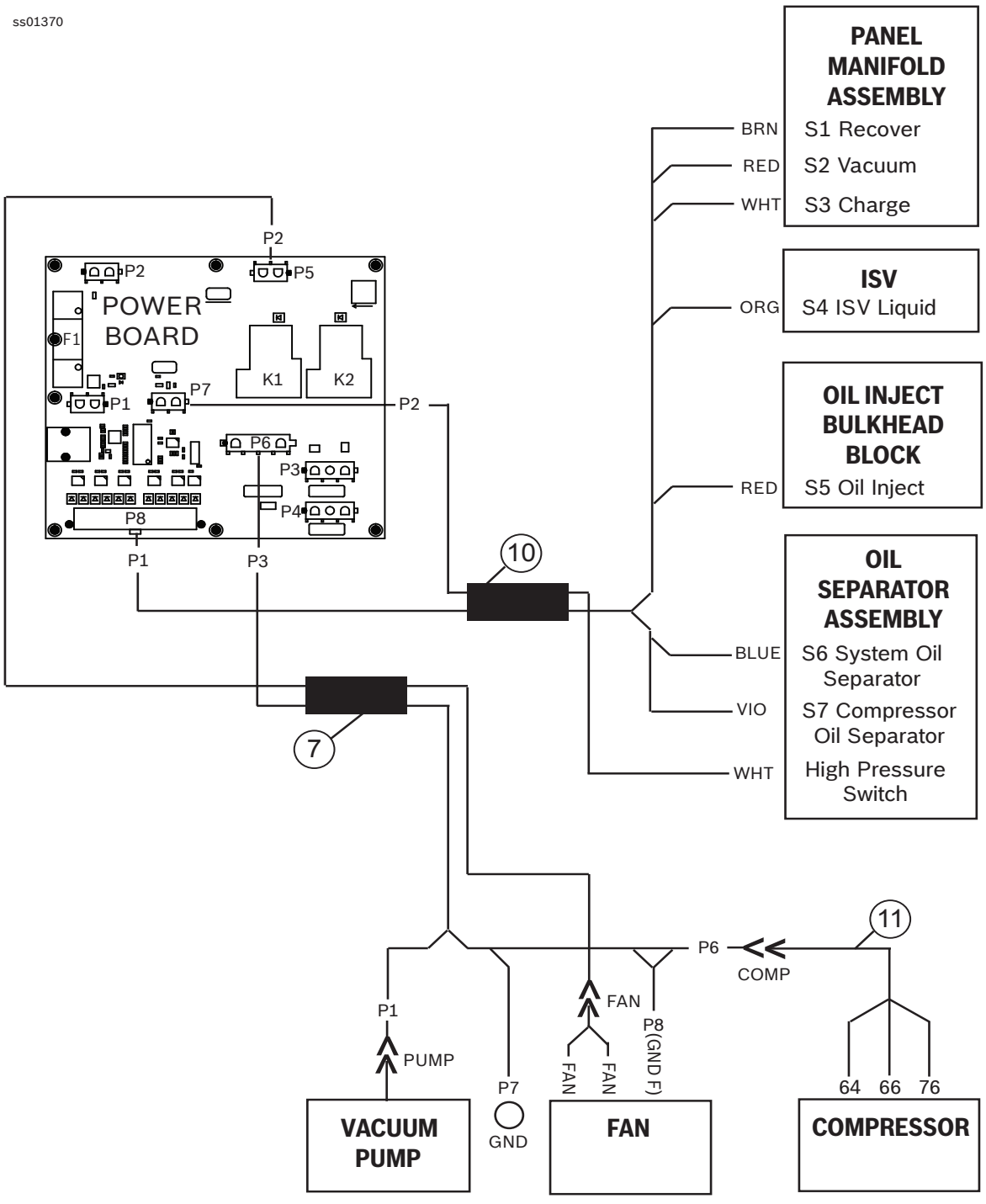


Figure 5-12. Wiring Harness Diagram (Sheet 3 of 3)

WIRING HARNESS DIAGRAM PARTS LIST				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	HARNESS, KIT (Includes items 1 to 12)	---	SP00101449	
1	HARNESS, MAIN POWER (230 Input to ES2, ES3, and GND)	1	SP01100217	
2	HARNESS, LOCKOUT CABLE (LO/TO Switch ES1 and ES4 to PWR)	1	SP01100218	
3	HARNESS, PB AC INPUT/DOOR SWITCH (PWR, to Door Switch DS1 and DS3, DS2 to Circuit Breaker CB2, Circuit Breaker CB1, Door Switch DS4, and GND2 to Power Board PBP3.)	1	SP01100305	
4	HARNESS, POWER BOARD AC OUTPUT (Power Board PBP3 to Power Supply PSJ1; Power Supply PSJ2 to Power Board PBP1; and Power Board PBP2 to Control Board CBP19.)	1	SP01100318	
5	HARNESS, BOARD TO BOARD (CBJ 1 to PBJ 1)	1	SP01100158	
6	HARNESS, PRINTER POWER AND COMMUNICATION (Control Board CBP15 and CBP18 to Printer PRNTR)	1	SP01100321	B, D, E, F
7	HARNESS, COMPRESSOR, FAN, VACUUM PUMP, AIR FLOW SENSOR (Power Board PBP6 to PUMP, COMP, and Fan GNDF, and GND4; Power Board PBP5 to Fan, and Air Flow Sensor to Control Board CBP1.)	1	SP01100322	
8	HARNESS, TRANSDUCER (Control Board CBP5, CBP6, LST, and AT)	1	SP01100304	
9	HARNESS, SCALE (Scale to Control Board CBP13, GND4 to unit ground stud behind ISV. Harness is part of scale assembly and included here for reference only.)	Ref. Only	RA30005	
10	HARNESS, SOLENOID CONTROL (Air Flow Sensor AF to Control Board CBP1; Power Board PBP8 to Panel Manifold S1, S2, S3; ISV S4; Oil Separator Assembly S6 and S7; and Power Board PBP7 to HP Switch)	1	SP01100306	
11	HARNESS, COMPRESSOR PIGTAIL (COMP to Compressor 64, 66, 76)	1	SP01100209	
12	LEAD, GROUND (Upper stud on center divider GND to ground on Bulkhead/Oil Inject Block GND3 .) (Not shown.)	1	SP01100221	
	Effectivity:			
	AC1234-3			A
	AC1234-3P			B
	AC1X34-3			C
	AC1X34-3P			D
	BAC 3000yf			E
	BAC 3000a			F

PLUMBING DIAGRAM

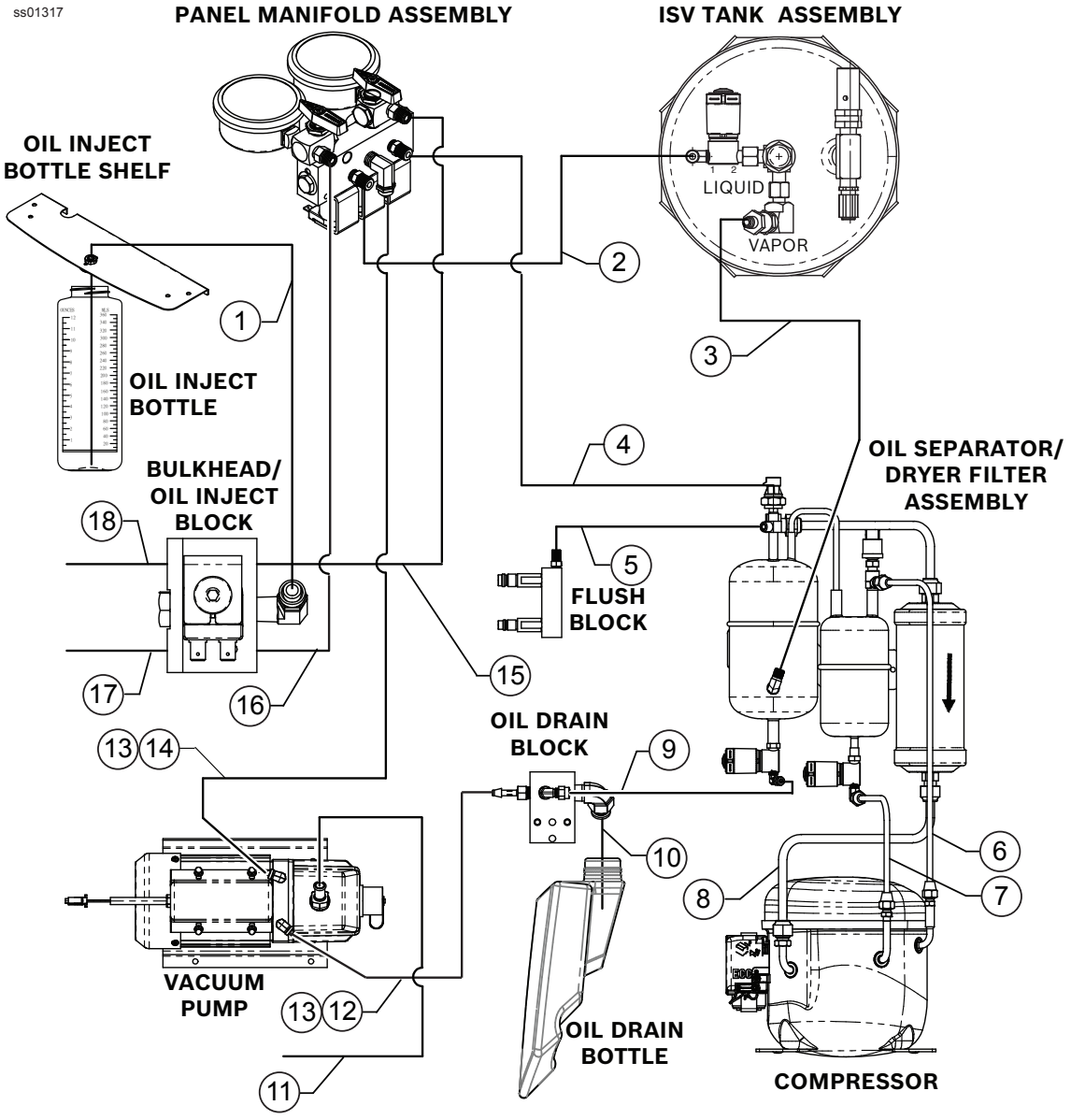


Figure 5-13. Plumbing Diagram

PLUMBING DIAGRAM PARTS LIST				
No.	**Description**	**Qty**	**Part No.**	**Effectivity**
---	KIT, HOSES (Includes items 1, 9, 10, 11, 12, 14)	---	SP00101164 (SP00101164810)	
1	OIL INJECT HOSE 724mm	1		
2	HOSE, ISV LIQUID	1	SP01100310	
3	HOSE, ISV VAPOR	1	SP01100309	
4	HOSE, RECOVER	1	SP01100308	
5	HOSE, FLUSH	1	SP01100307	
6	HOSE, DISCHARGE, COMPRESSOR TO OIL SEPARATOR	1	SP01100300	
7	HOSE, SUCTION, EVAPORATOR, HIGH PRESSURE	1	SP01100299	
8	HOSE, SUCTION, FILTER/DRYER, HIGH PRESSURE	1	SP01100301	

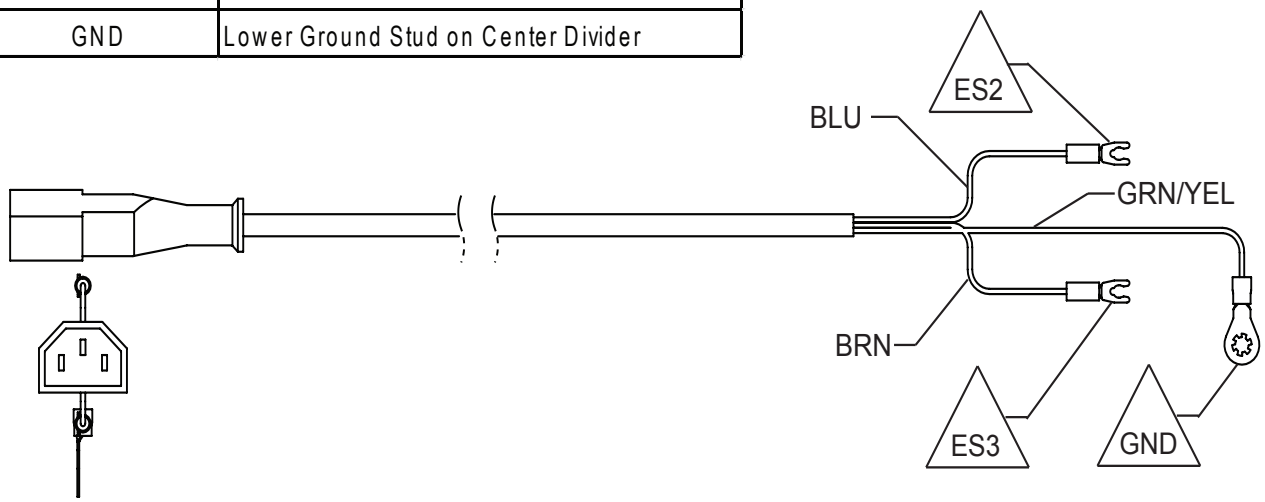
9	HOSE, OIL DRAIN, 489mm	1		
10	HOSE, OIL DRAIN, 483mm	1		
11	HOSE, OIL FILL, 113.5mm	1		
12	HOSE, VACUUM, LOW SIDE, 527mm	1		
13	NUT, COMPRESSION (3/8 TUBE)	2		
14	HOSE, VACUUM, HIGH SIDE, 390mm	1		
15	HIGH SIDE TUBE, RED	1	SP01100312	
16	LOW SIDE TUBE, BLUE	1	SP01100325	
17	SERVICE HOSE (LOW-SIDE, BLUE), R1234yf	1	SP01100508 (SP01100508760)	A, B, E
	SERVICE HOSE (LOW-SIDE, BLUE), R134a + QUICK COUPLER		SP01100268 (RA30134)	C, D, F
18	SERVICE HOSE (HIGH-SIDE, RED), R1234yf	1	SP01100509 (SP01100509760)	A, B, E
	SERVICE HOSE (HIGH-SIDE, RED), R134a + QUICK COUPLER		SP01100269 (RA30135)	C, D, F
19	O-RING, HOSES (2 x hose) (Not shown.)	2	SP01100105 (SP01100105395)	A, B, E
20	O-RING, HOSES (1 x hose) +	1	SP01100105 (SP01100105395)	C, D, F
	O-RING (1 x hose) (Not shown.)	1	IN PROGRESS	
21	COUPLER, HIGH SIDE, R1234yf (Not shown)	1	SP00101063 (SP00101063760)	A, B, E
	COUPLER, HIGH SIDE, R134a (Not shown)		SP00100083 (RA18191A)	C, D, F
22	COUPLER, LOW SIDE, R1234yf (Not shown)	1	SP00101062 (SP00101062760)	A, B, E
	COUPLER, LOW SIDE, R134a (Not shown)		SP00100082 (RA18190A)	C, D, F
23	QUICK COUPLER FOR COMMERCIAL TANK 1/4” SAE (Not shown)	1	SP00100019 (5117226)	C, D, F
24	TANK ADAPTER W21.8-14 X 1/4” FL (Not shown)	1	SP00100080 (5117228)	C, D, F
25	GASKET, 1/4 HOSE (Not shown)	6	SP00100084	
26	TANK ADAPTER (1234 DNT) + GASKET (Not shown)	1	SP01100352 (RA30079)	A, B, E
27	TANK ADAPTER (1234 <22 HW) + GASKET (Not shown)	1	SP01100353 (RA30080)	A, B, E
28	TANK ADAPTER (1234 >22 HW) + GASKET (Not shown)	1	SP01100354 (RA30081)	A, B, E
	Effectivity:			
	AC1234-3 - AC1234-3P			A - B
	AC1X34-3 - AC1X34-3P			C - D
	BAC 3000yf - BAC 3000a			E - F

Appendix

ss00550

Main Power Harness

MAIN POWER HARNESS	
CONNECTOR NO.	CONNECTS TO
ES2	Terminal 2
ES3	Terminal 3
GND	Lower Ground Stud on Center Divider



Lockout Cable Harness

LOCKOUT CABLE HARNESS	
CONNECTOR NO.	CONNECTS TO
PWR	Power on Door Interlock Harness
ES1	Terminal 1
ES4	Terminal 4

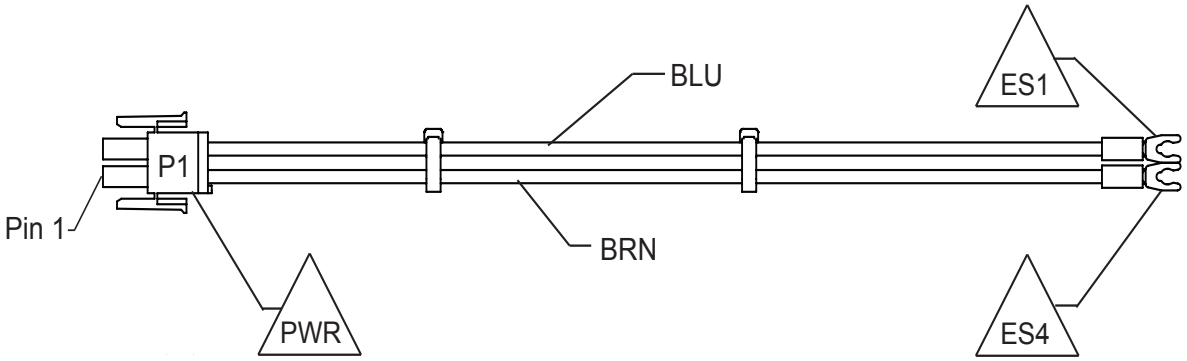


Figure A-1. Main Power and Lockout Cable Harnesses

ss01351

Door Interlock Harness

DOOR INTERLOCK HARNESS	
CONNECTOR NO.	CONNECTS TO
DS1	Door Switch Terminal 1
DS2	Door Switch Terminal 2
DS3	Door Switch Terminal 3
DS4	Door Switch Terminal 4
PWR	Harness Lockout Cable
GND2	Upper Ground Stud on Center Divider
CB1	Circuit Breaker Terminal 1
CB2	Circuit Breaker Terminal 2
PBP3	Power Board Connector P3

Note: Harness not to scale.

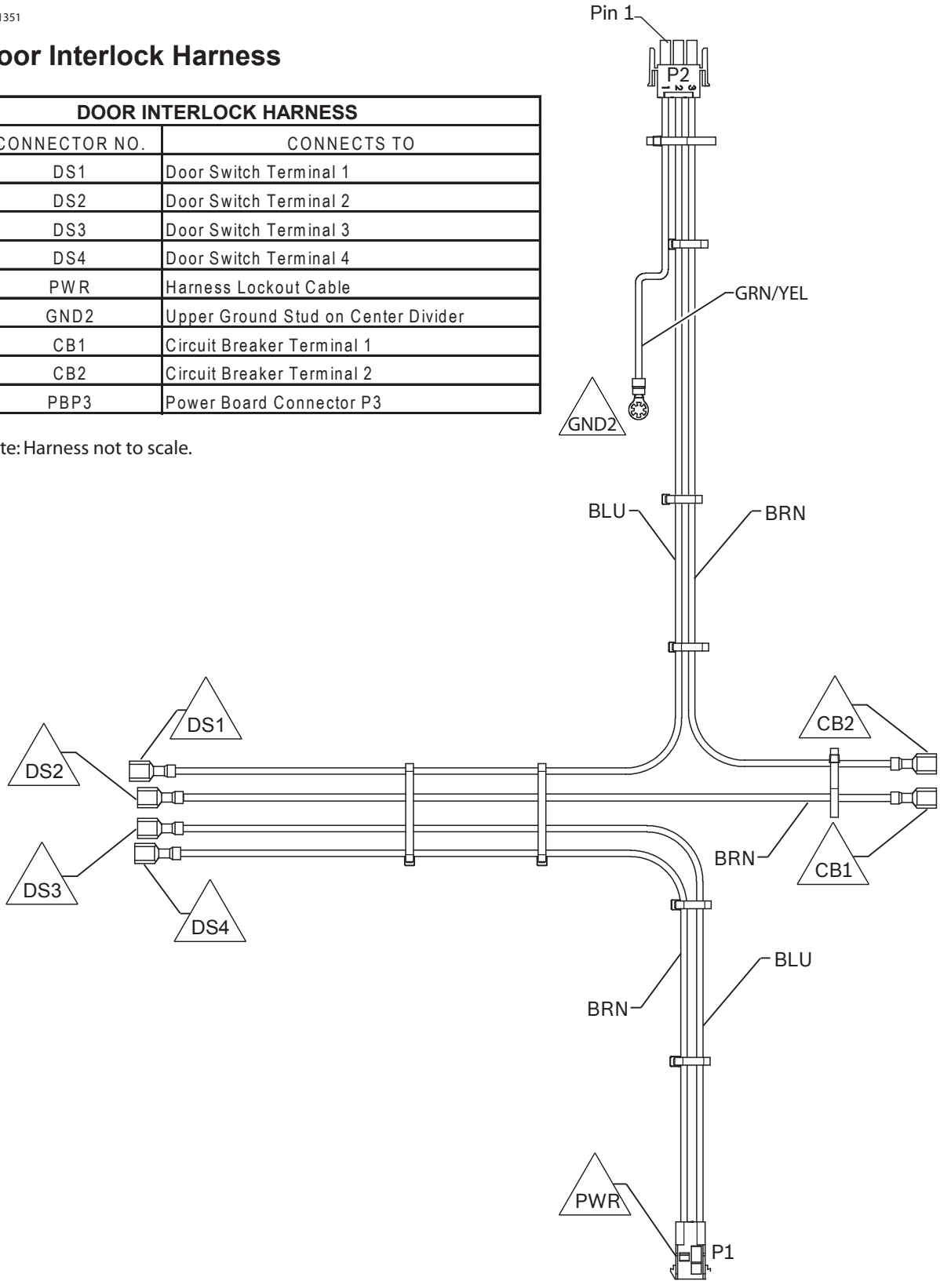


Figure A-2. Door Interlock Harness

ss01352

12 Volt Power Harness

12 VOLT POWER HARNESS	
CONNECTOR NO.	CONNECTS TO
P1	Power Board PBP2
P2	Power Board PBP1
P3	Power Board PBP4
P4	Control Board CBP19
P5	Power Supply PSJ2
P6	Power Supply PSJ1

Note: Harness not to scale.

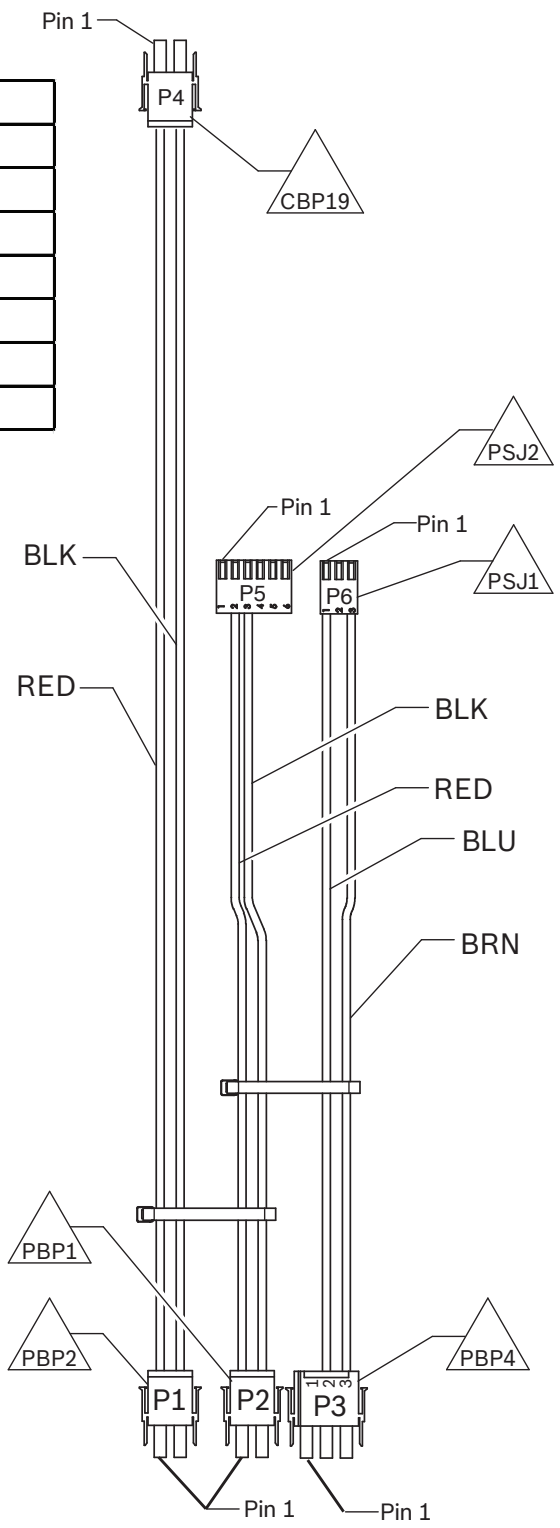


Figure A-3. 12 Volt Power Harness

ss01372

Board to Board Cable

BOARD TO BOARD CABLE	
CONNECTOR NO.	CONNECTS TO
Bidirectional Cable	J1 Control Board
	J1 Power Board

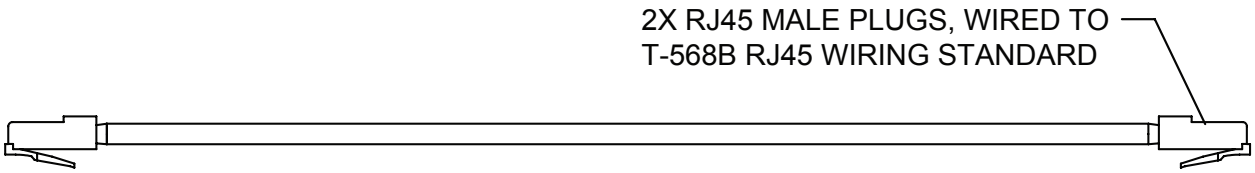


Figure A-4. Board to Board Harness

ss01358

Printer Power/Communication Harness

PRINTER POWER/COMMUNICATION HARNESS	
CONNECTOR NO.	CONNECTS TO
PRNTR (2X)	Printer
CBP15	P15 Control Board
CBP18	P18 Control Board

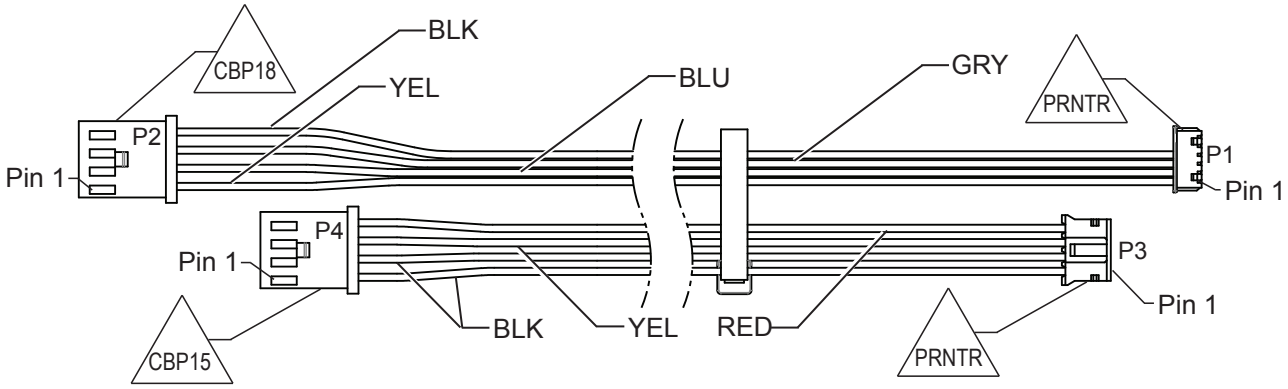


Figure A-5. Printer and Communication Harness

ss01353

Compressor, Fan, and Vacuum Pump Harness

COMPRESSOR, FAN, and VACUUM PUMP HARNESS	
CONNECTOR NO.	CONNECTS TO
COMP	Compressor pigtail
AF	Airflow Sensor
FAN (2X)	Fan Terminals
GND	Upper Ground Stud on Center Divider
GND F	Fan Ground
PUMP	Vacuum Pump Pigtail
CBP1	P1 Control Board
PBP5	P5 Power Board
PBP6	P6 Power Board

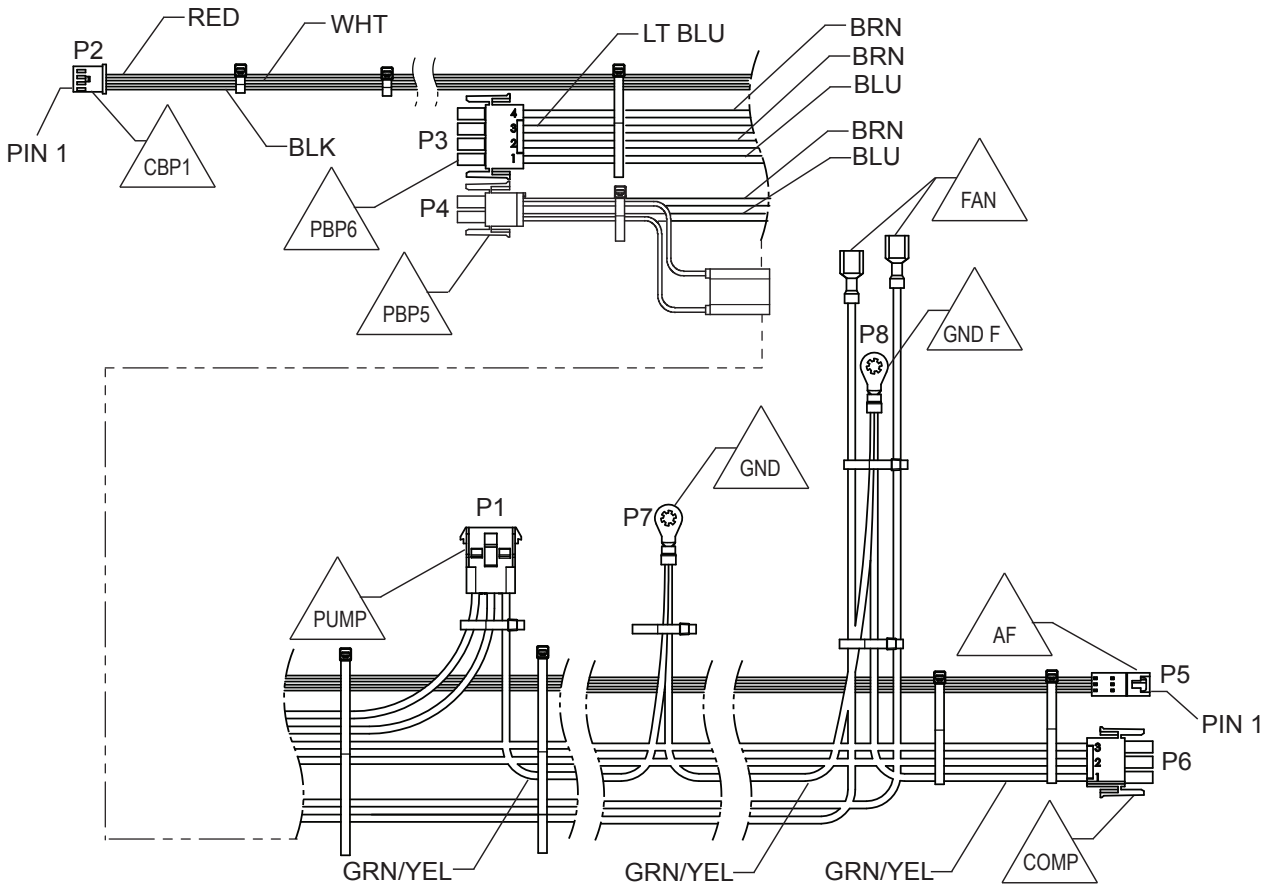
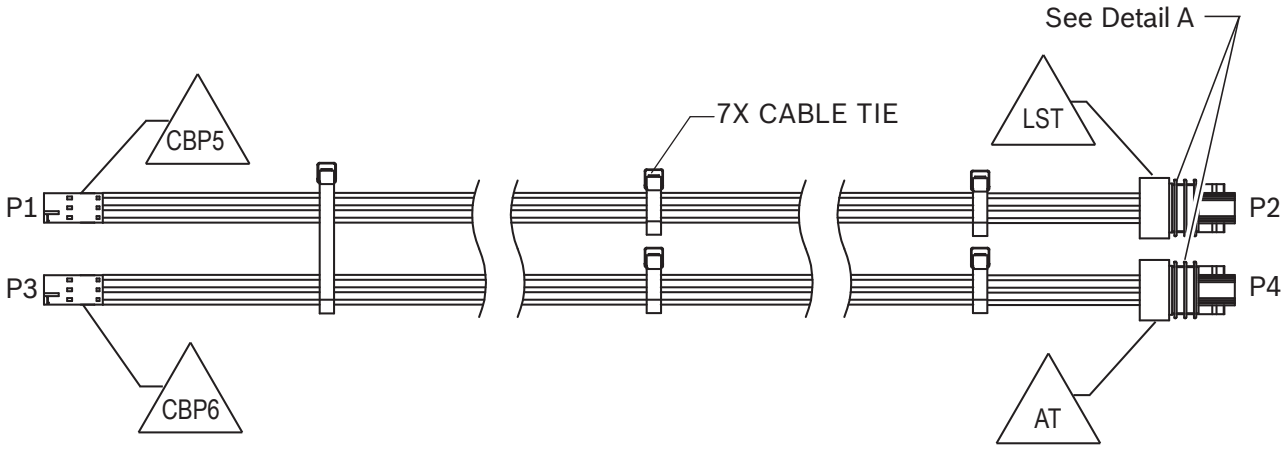


Figure A-6. Compressor, Fan, Vacuum Pump, and Air Flow Sensor Harness

ss01355

Pressure Transducer Harness

PRESSURE TRANSDUCER HARNESS	
CONNECTOR NO.	CONNECTS TO
CBP5	P5 Control Board
CBP6	P6 Control Board
AT	Accumulator Transducer
LST	Low-Side Transducer



POINT TO POINT WIRING		
From	To	Color
P1-3	P2-3	BLK
P1-1	P2-2	RED
P1-2	P2-1	ORG
P3-3	P4-3	BLK
P3-1	P4-2	RED
P3-2	P4-1	WHT

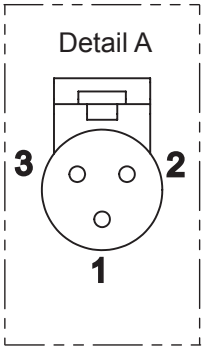


Figure A-7. Transducer Harness

ss00556

Compressor Pigtail Harness

COMPRESSOR PIGTAIL HARNESS	
CONNECTOR NO.	CONNECTS TO
COMP	COMP on Compressor, Fan, and Vacuum Pump Harness
64	Compressor Start Relay
66	Compressor Thermal Switch
76	Compressor Ground

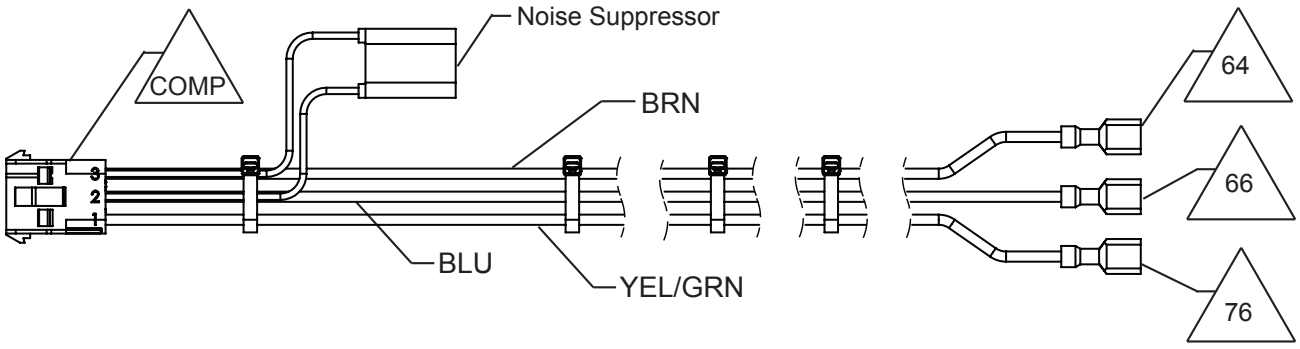


Figure A-8. Compressor Pigtail Harness

ss01356

Solenoid Control Harness

Note: Harness lead lengths not to scale.

SOLENOID CONTROL HARNESS	
CONNECTOR NO.	CONNECTS TO
P1	PBP8 Power Board
P2	PBP7 Power Board
S1	S1 Recover Solenoid
S2	S2 Vacuum Solenoid
S3	S3 Charge Solenoid
S4	S4 ISV Tank Solenoid
S5	S5 Oil Inject Solenoid
S6	S6 Oil Drain Solenoid
S7	S7 Oil Return Solenoid
HPS	High Pressure Cut-Out Switch

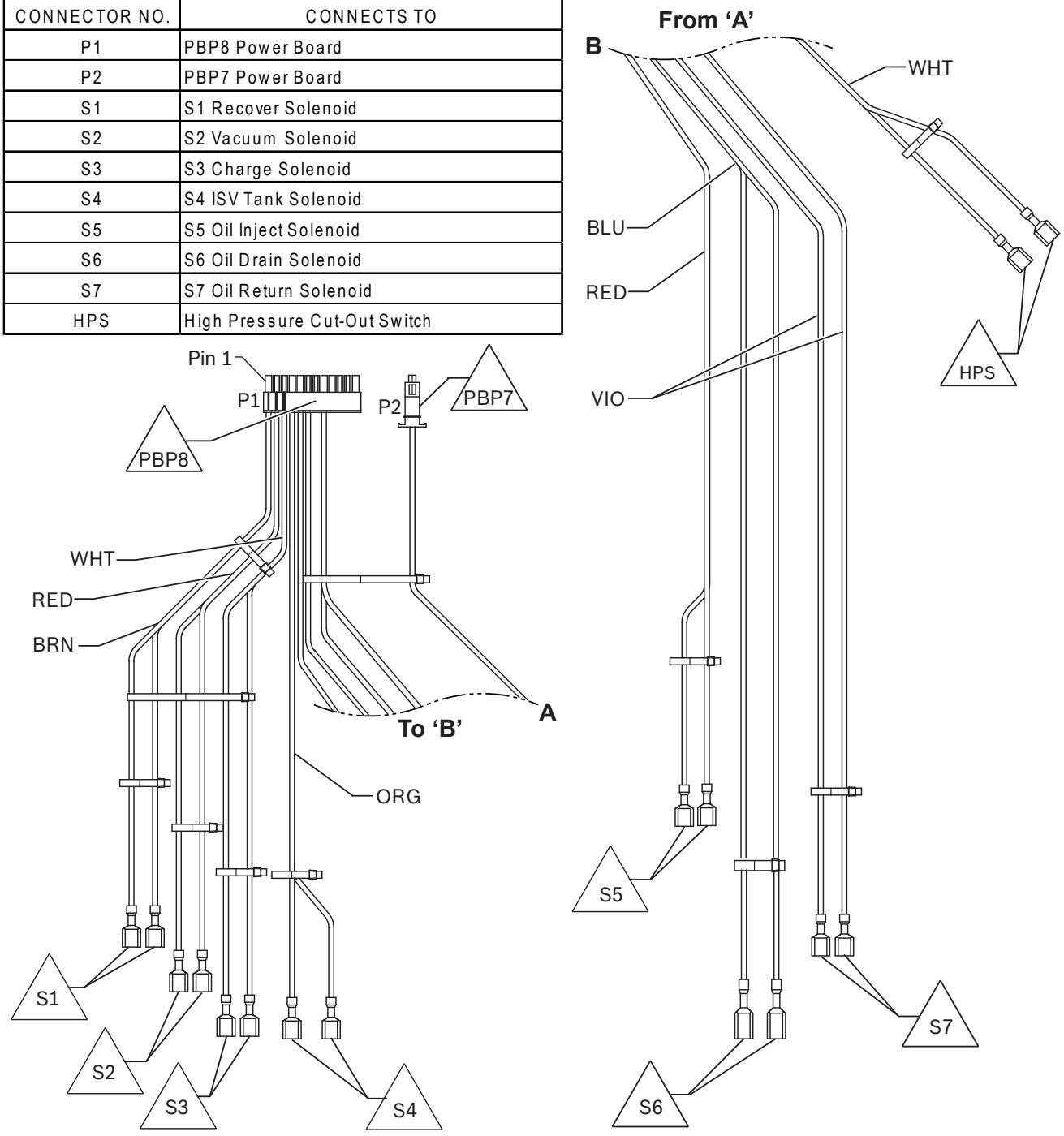


Figure A-9. Solenoid Control Harness

ss01354

Bulkhead/Oil Inject Ground Harness

OIL INJECT GROUND	
CONNECTOR NO.	CONNECTS TO
GND	Upper Center Divider Ground
GND 3	Bulkhead/Oil Inject Block

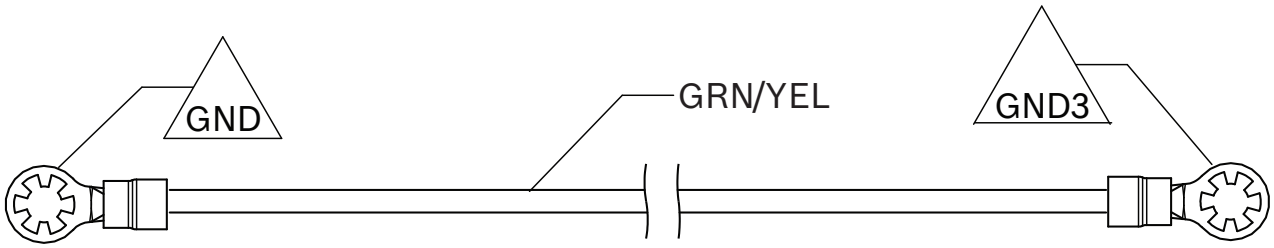


Figure A-10. Bulkhead/Oil Inject Ground Harness

SERVICE BULLETINS

Place all service bulletins for the AC1234YF in this section

SOFTWARE UPDATES

Software 002.000.007

New feature
- ***Scale Calibration***: Calibration check often fails.
- ***Charge***: Charge often stalls.
- ***Periodic Leak Check***: Often fails without apparent reason.
- ***Pre-charge***: Pre-charge leak test does not end by vacuum.
- ***SD card***: Reading failure. Sometime the SD card reading error is generated.
- ***French message on filter maintenace page***: Wrong translation and wrong message length.
- ***Printout***: Printout for not 'central EU' languages does NOT work.
- ***Refrigerant charge inaccuracy***: Tank load cell reading inaccurate.
- ***French Language translation***.
- ***System Info***: Missing ACS model and refrigerant type.

Software 002.000.009

New feature
- ***Air Flow calibration threshold (MOE process)***.
- ***Printout***: Added ACS model, refrigerant type and graphic logo improved.

Software 002.001.001

New feature

Mandatory software update during ordinary unit maintenance.

Issue: charge failing during automatic. Wrong amount charged and displayed.
Root cause: not systematic bug at process level into automatic charge due to not properly managed specific selection, in particular when:
- HP + LP selected.
- Oil Injection set: 0 ml.
- Some recovered oil * before charge.

NOTES

Bosch Automotive Service Solutions S.r.l.
Via Monte Aquila, 2
43124 Parma
ITALY
www.bosch.com
ac-support@robinair.com

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