

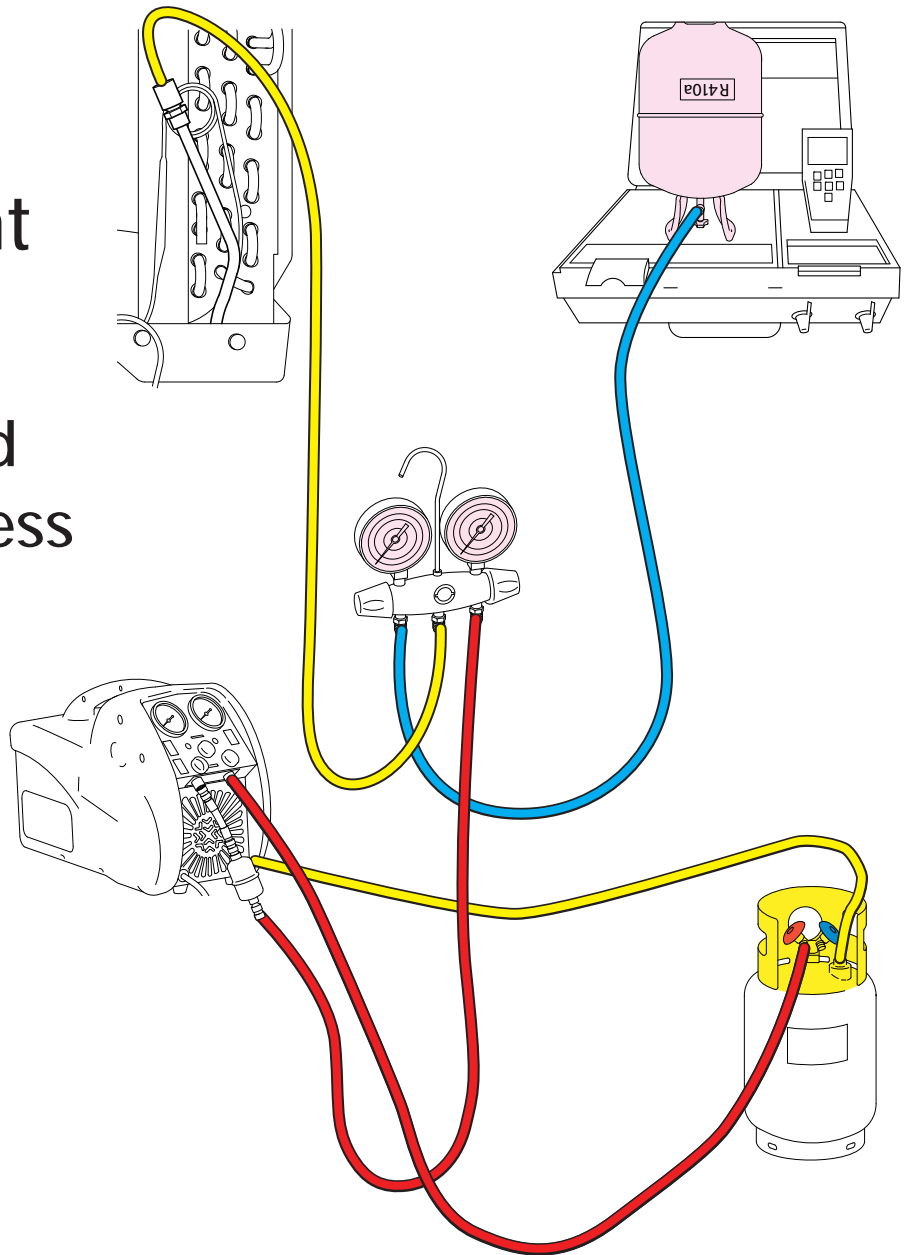
GE Consumer & Industrial

Technical Service Guide

OCTOBER 2009

R-410A Refrigerant

Charging and Recovery Process



31-9192



GE Appliances
General Electric Company
Louisville, Kentucky 40225



SYSTEM PRESSURES

Technicians with R-22 experience will need to become familiar working with high and low side pressures that are much higher when using R-410A. A typical R-22 system operates normally with a high side pressure of approximately 260 psi at a 120°F condensing temperature and a low side pressure of approximately 76 psi at 45°F evaporator saturation temperature.

A normally operating R-410A system with the same condensing temperature of 120°F and 45 degree evaporator saturation temperature will have a high side pressure of approximately 418 psi and a low side pressure of approximately 130 psi.

IMPORTANT SAFETY NOTICE

The information in this service guide is intended for use by individuals possessing adequate backgrounds of air conditioning and heat pump experience. Any attempt to repair an air conditioning or heat pump system may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

WARNING

To avoid personal injury, disconnect power before servicing air conditioning or heat pump systems. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks.

RECONNECT ALL GROUNDING DEVICES

If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

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WARNING: GE Factory Service Employees are required to use safety glasses with side shields, cut resistant (Dyneema®) gloves & steel toe shoes for all repairs.

Safety Glasses must be compliant with ANSI Z87.1-2003



Introduction to R-410A

R-410A refrigerant is the leading HFC replacement for R-22 refrigerant in new residential and light-commercial air conditioning and heat pump systems. R-410A has been around since 1995 and in 2010 it will become the most important refrigerant in this industry. R-410A refrigerant is the leading choice of most major original equipment manufacturers as the replacement for R-22 refrigerant.

What is R-410A

R-410A is an ASHREA product designation for a two-component hydro fluorocarbon refrigerant blend consisting of 50% HFC-32 and 50% HFC-125. R-410A is nontoxic. It can be charged in gas form, but liquid form is recommended. R-410A is marketed under various brand names such as DuPont™ Suva® 410A, Carrier Puron®, and Genetron® AZ-20. For instant identification, all brands of R-410A are shipped in a rose colored tank.

It is a refrigerant blend, but R-410A acts like a single-component refrigerant. It is nonflammable under any reasonably, foreseeable leak scenarios, but can become combustible when mixed with air.

R-410A has a much higher cooling capacity and a higher operating pressure than R-22. As a higher pressure refrigerant, it must be used only in equipment specifically designed for R-410A.

R-410A systems can provide higher energy efficiency to meet and exceed U.S. Department of Energy guidelines. These new systems have up to 60% greater cooling capacity than the R-22 systems.

Ozone Depletion Potential

In use since the 1940's, R-22 is being phased out due to its ozone depletion potential. The manufacturing of R-22 in the U.S. stops in 2009.

The zero chlorine content of R-410A ensures no ozone depletion potential and just a modest global warming potential. According to experts, however, the overall global warming potential of R-410A will decrease because its higher efficiency reduces power plant emissions.

The Preferred Refrigerant

R-410A features greater capacity, higher efficiency, and a better TEWI [total equivalent warming impact] rating than other non-chlorinated HFC refrigerants for air conditioning applications. This refrigerant was specifically designed for the latest high-efficiency systems.

R-410A allows the industry manufacturers to improve system performance, while addressing tough new energy and environmental standards against refrigerant leakage and greenhouse gas emissions.

In the Field Since 1995

R-410A refrigerant was invented in the early 1990s. Air conditioners using R-410A have been available in the U.S. since 1995, so they're not at all new. Most manufacturers have had their R-410A air conditioners and heat pumps on the market for several years.

Every major manufacturer in the U.S. and Canada now offers a R-410A brand. Because of the terrific reliability track record of R-410A air conditioners, R-410A has quickly become the new industry standard.

If you understand its characteristics and handle it properly, R-410A is as safe as the R-22 you have been using.

Leak Detection

R-410A is an HFC refrigerant. Therefore, any leak detection device or method that works for other HFC refrigerants will work for R-410A.

Like R-22, R-410A is nonflammable at room temperatures. Also like R-22, it becomes combustible if mixed with air at elevated temperature and/or pressure.

It is important that you do **not** mix R-410A with air for leak testing or other purposes.

Higher Operating Pressures

In general, R-410A should be handled the same as R-22 with the exception of the higher pressures. When using R-410A, technicians with R-22 experience will need to become familiar with working with both high and low side pressures that are much higher. A typical R-22 system operates normally with a head pressure of 260 psi at a 120°F condensing temperature and a low side pressure of 76 psi at a 45°F evaporator saturation temperature. Technicians will find the equivalent pressures in a R-410A system to be much higher.

| Relative Refrigerant Pressures (psi) | | | | |
|--------------------------------------|----------------|-----------------|-----------------|----------------|
| Temp. in °F | Freon® R-22 | Suva® R-410A | Suva® R-134a | Temp. in °C |
| 32 °F | 57.7 | 101 | 28.0 | 0 °C |
| 34 °F | 60.4 | 105 | 29.7 | 1.1 °C |
| 36 °F | 63.1 | 109 | 31.5 | 2 °C |
| 38 °F | 65.9 | 114 | 33.4 | 3.3 °C |
| 40 °F | 68.7 | 118 | 35.3 | 4.4 °C |
| 42 °F | 71.7 | 123 | 37.3 | 5.6 °C |
| 44 °F | 74.7 | 127 | 39.3 | 6.7 °C |
| 46 °F | 77.8 | 132 | 41.4 | 7.8 °C |
| 48 °F | 81.0 | 137 | 43.5 | 8.9 °C |
| 50 °F | 84.2 | 142 | 45.7 | 10.0 °C |
| 55 °F | 92.7 | 156 | 51.5 | 12.8 °C |
| 60 °F | 102 | 170 | 57.7 | 15.6 °C |
| 65 °F | 111 | 185 | 64.3 | 18.3 °C |
| 70 °F | 122 | 200 | 71.3 | 21.1 °C |
| 75 °F | 132 | 217 | 78.9 | 23.9 °C |
| 80 °F | 144 | 235 | 86.9 | 26.7 °C |
| 85 °F | 156 | 254 | 95.4 | 29.4 °C |
| 90 °F | 168 | 274 | 104 | 32.2 °C |
| 95 °F | 182 | 295 | 114 | 35.0 °C |
| 100 °F | 196 | 317 | 124 | 37.8 °C |

A normally operating R-410A system with the same condensing temperature of 120°F and a 45°F evaporator saturation temperature will have a high side pressure of 418 psi and a low side pressure of 130 psi.

Air conditioners using R-410A are specially designed for these higher pressures. These systems have been rigorously tested by their manufacturers, as well as by independent safety testing labs, such as Underwriters Laboratories.

With over a million R-410A-based air conditioners operating worldwide, and nearly a decade of field testing and product history, there is no evidence to suggest that R-22 systems are any safer than systems that contain R-410A.

Sealed System Reliability

Air conditioners and heat pumps that use R-22 use a mineral oil that circulates through the system to keep the compressor and other parts lubricated. Systems containing R-410A usually use a synthetic oil. Some of these synthetic oils can absorb moisture more readily than mineral oils. Here is why this is not an issue for sealed system reliability:

1. As long as technicians follow the manufacturers' directions in installing and servicing R-410A systems, the oils will remain clean and dry. These procedures may be required to make sure your warranty stays valid during the life of your R-410A system.
2. Nearly all air conditioners and heat pumps that use R-410A have a device called a "filter drier". This important part filters, cleans, and dries the refrigerant and oil as it circulates through the sealed system. The filter drier has been an important reason why air conditioners with R-410A are considered, by some manufacturers, to be the most reliable product they make.

Brazed Connections

The higher operating pressures encountered by R-410A systems require the use of brazing materials rated to withstand these pressures. Some technicians may have used lower temperature solders when making tubing connections on R-22 systems. This cannot be the practice on R-410A systems. Only high temperature brazing materials, such as Silphos type brazing rod or one of the silver solders should be used on any R-22 system. It is even more important, due to the much higher pressures, to use these suitable brazing materials on R-410A systems.

System Conversions

System conversions are not feasible. The differences in construction of R-410A systems exceed the practical and economic limits of converting an R-22 system to R-410A.

Tools

WARNING: Gauge manifold sets, hoses, recovery cylinders and the recovery machine must be rated for the higher pressures encountered with R-410A. An attempt to use standard refrigerant service tools on R-410A systems is very dangerous and foolish. Such a mistake could cause serious injury or death.

Tap Valve

Part number WX5X328 tap valve is used to tap the sealed system for R-410A recovery. The recommended placement of the tap is the process stub at the outlet of the condenser.

R-410A Recovery Pump

The recovery pump must have an EPA certification notice showing the use for designated refrigerants include R-410A. The high side gauge should read up to 800 psi.

R-410A Recovery Cylinder

Recovery cylinders must be rated for R-410A use. These cylinders, **DOT-4BA 400** or **DOT-4BW 400**, meet the Department Of Transportation standards for R-410A recovery cylinders. Be very careful. It would be easy and convenient to use whatever recovery cylinder was handy rather than the correct cylinder. This is a safety issue of great concern to the industry and is one reason the AC&R Safety Coalition was formed, and R-410A safety & handling certification was established.

In-Line Filter

The recovery pump can be exposed to debris that can damage it. Contamination can also be introduced from the refrigerant storage tanks. An in-line filter, such as the *Catch All C-032*, is to be used for all refrigerants, including 410A. Change the in-line filter as needed.

R-410A Gauge Manifold Set

R-410A systems require higher pressure gauges and hoses. Look for R-410A printed on the center of the dial. The high side pressure gauge should read up to 800 psi and the low side up to 500 psi.

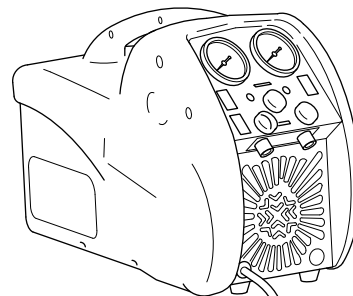
Digital Refrigerant Scale

A CPS® Compute-a-Charge CC220 digital scale is used when charging R-410A.

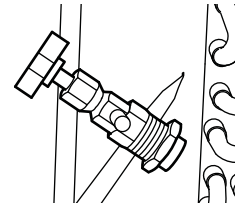
R-410A Refrigerant Cylinder

For instant identification, all brands of R-410A are shipped in a rose colored tank.

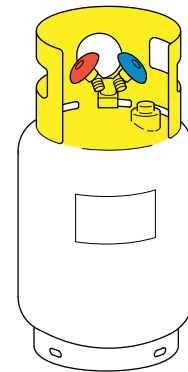
R-410A Rated Tools



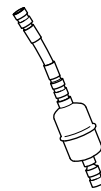
R-410A Recovery Pump with 800 psi gauge for the High Side



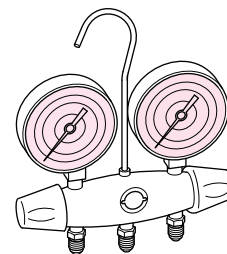
Tap Valve



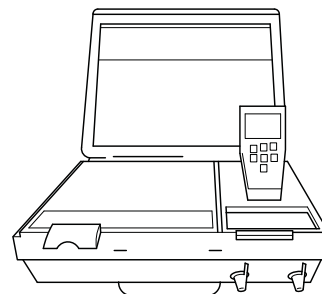
R-410A Recovery Cylinder DOT-4BA400 or DOT-4BW400



In-Line Filter No. WX10X10003



R-410A Cylinder Gauge Manifold



Digital Refrigerant Scale #CC220

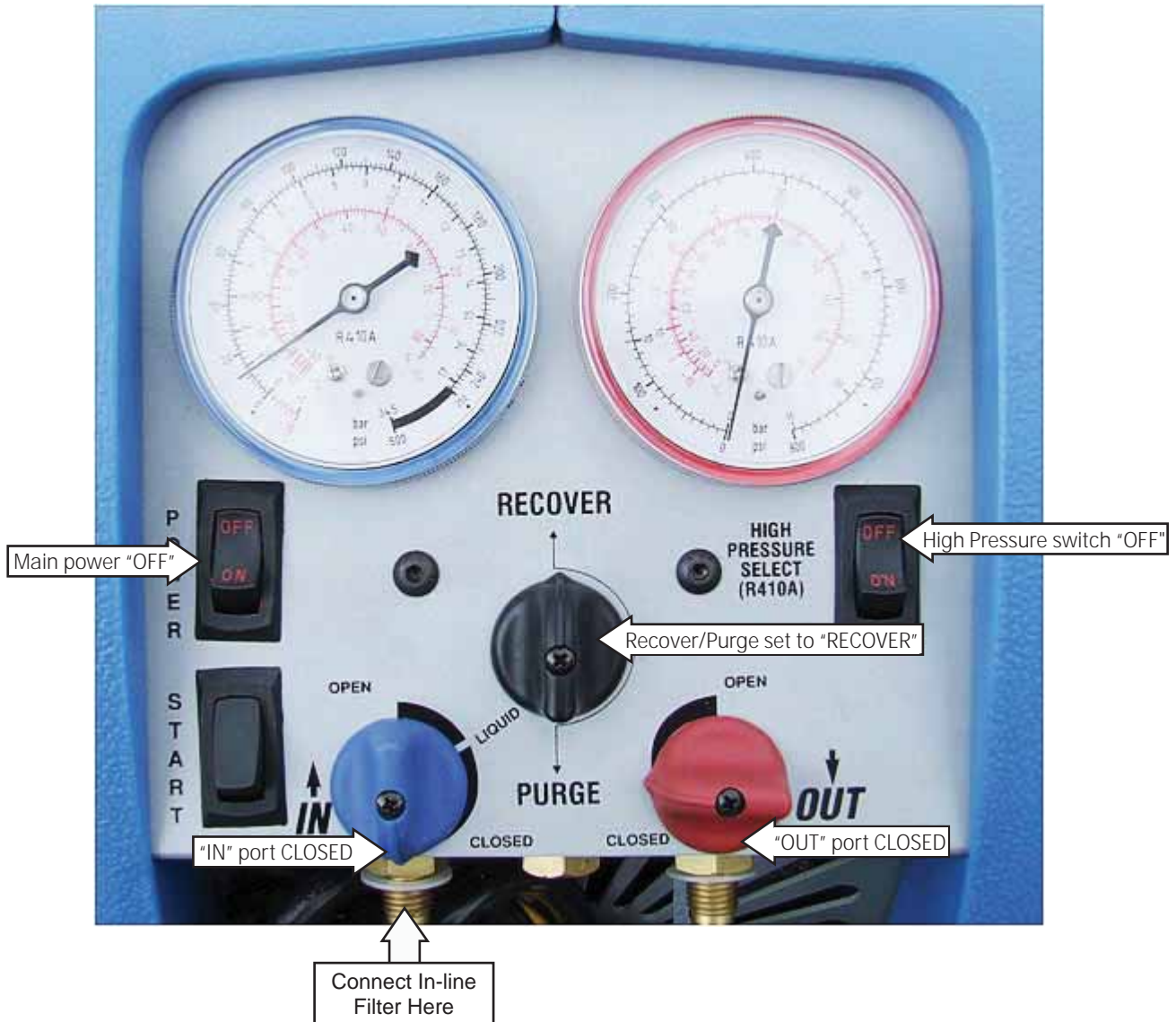


R-410A Refrigerant

Recovery of R-410A

Recovery Pump

Note: The pressure gauge for the high side reads up to 800 psi.



In-line Filter

During the recovery process, the recovery machine may be exposed to debris that can damage it. This includes brazing spatter and copper or brass slithers. Contamination can also be introduced from the refrigerant storage tanks. To prolong the life of your recovery pump, always use an in-line filter at

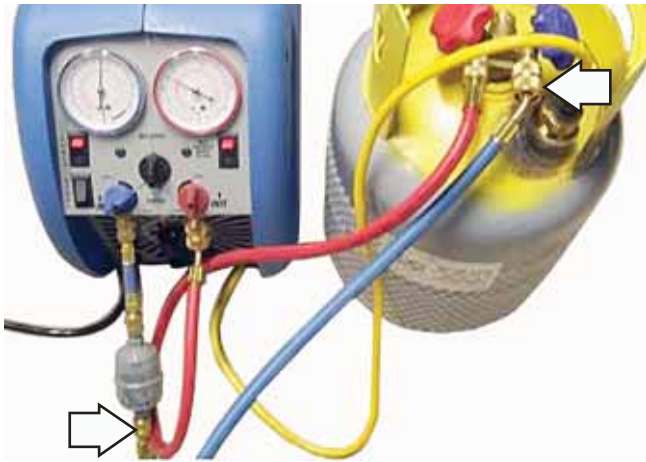
the inlet port. The *Catch All C-032* in-line filter (Part No. WX10X10003) is acceptable for all refrigerants, including 410A. When installing the in-line filter, be sure the directional arrows on the filter point towards the pump. Change the in-line filter as needed.

Sub Cooling the Recovery Tank

When working in extreme ambient temperatures, the recovery tank can be sub cooled before the recovery procedures are performed. This sub cooling can speed up the recovery process.

Note: To sub cool the recovery tank, it is necessary for the tank to contain a minimum of 5 pounds of liquid R-410A in the tank.

1. Connect one end of the blue hose to the pump inlet port and the other end to the vapor port on the recovery tank.



2. Connect one end of the red hose to the pump outlet port and the other end to the liquid port on the recovery tank.



3. Start the recovery pump.



4. Throttle the output valve so that the output pressure is 100psi greater than the input pressure, but **not** more than 300psi.



5. Run until the recovery tank is cold.

Recovery Procedures

Standard recovery procedures remain unchanged. The only difference is the necessity to use a recovery machine and cylinders approved for the higher pressures of R-410A.

WARNING: When working in extreme ambient temperatures, the recovery tank can be sub cooled before the recovery procedures are performed. (See *Sub Cooling the Recovery Tank*.)

Note: Check all hoses to make sure the "O" rings are in place before connecting to system.

1. Tap the sealed system at the process stub tube, using the WX5X328 tap valve.



Note: When installing the in-line filter, be sure the directional arrows on the filter point towards the pump.

2. Attach one end of the blue recovery hose to the tap valve and the other end to the in-line filter attached to the recovery pump.

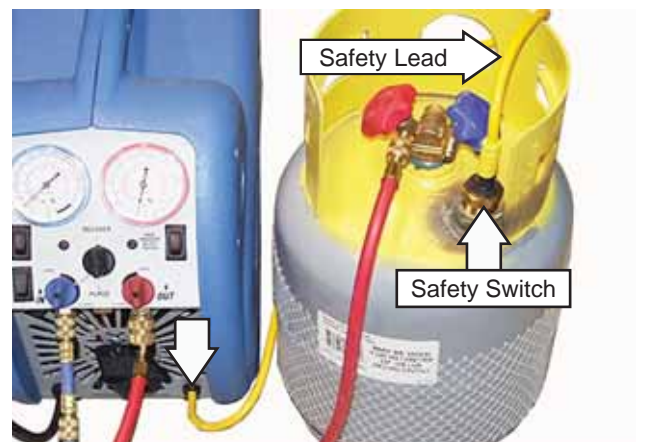


3. Close the red outlet port of the recovery pump.
4. Attach one end of the red hose to the outlet port of the recovery pump and the other end to the liquid port of the recovery tank.



Note: The compressor on the recovery pump will fail to start if the yellow overfill safety lead is not connected.

5. Connect the yellow overfill safety lead from the recovery pump to the tank limit safety switch on the recovery tank.



6. Set the black Recover/Purge valve of the recovery pump to RECOVER.



7. With all hoses connected and tight, open the liquid port of the recovery tank slowly to check hoses and connections for leaks.

- Rotate the output port of the recovery pump to the OPEN position.



- Open the tap valve on the high pressure side of the sealed system.
- Press recover pump power switch to ON.



Note: The fan should be running.

- Press the high pressure select switch to the ON position, and press the compressor START switch.



Note: If the pump begins to knock, slowly throttle back the input valve until the knocking stops.

- Slowly open the input port of the recovery pump. Once the liquid has been recovered, fully open the input valve.



- Run the recovery pump until a 15-inch vacuum is achieved.
- After recovery is complete, self-purge the recovery pump.

Self-purge/Auto Evacuate

The hygroscopic nature of the oils used in R-410A systems cannot be over-emphasized. Moisture can be a significant problem affecting the proper operation and life expectancy of any system operating on the mechanical refrigerant cycle. Therefore, it is more important than in the past to take precautions to keep moisture out of a system during installation and service. Evacuate to 15-inch vacuum and replace filter-driers when a system has been opened. Questionable workmanship that may have been acceptable when working on R-22 systems cannot be tolerated by R-410A systems.

After recovery is complete:

- Close the input port valve.
- Turn the recovery pump off.



- Set the Recover/Purge valve to Purge.
- Restart the recovery pump until a 15-inch vacuum is achieved.



- Turn unit off, reset Recover/Purge to Recover, and remove the tap valve from the process stub tube.

The pump is now ready for another recovery.

Summary of Normal System Recovery

1. Inspect the recovery pump thoroughly to ensure that it is in good operating condition.
2. Connect recovery tank to recovery pump and make sure all connections are correct and tight.
3. Open the liquid port of the recovery cylinder. (Always open valves slowly to check hoses and connections for leaks.)
4. Make sure the Recover/Purge valve is set on Recover.
5. Open the output port of the recovery pump.
6. Open the tap valve on the sealed system.
7. Switch the main power to ON. The fan should be running.
8. Press the compressor START switch.
9. Slowly open the input port on the recovery pump.
 - a. If the compressor begins to knock, slowly throttle back the input valve until the knocking stops.
 - b. If the input valve was throttled back, it should be fully opened once the liquid has been removed from the system.
10. Run recovery pump until the desired vacuum is achieved.
11. Close tap valve.
12. Close the recovery pump input port.
13. Turn off recovery pump.
14. Turn the Recover/Purge valve to the Purge position.
15. Restart the recovery pump.
16. Run until the desired vacuum is achieved.
17. Close the ports on the recovery tank and the recovery pump.
18. Turn off the recovery pump and return the Recover/Purge valve to Recover.

Installation of Charge Valve

After the system recovery and self purge/auto evacuate is completed, cut the process stub tube below the piercing valve hole. Braze a Schrader charge valve onto the process stub tube prior to charging.



Charge Valve

There are 2 basic types of Schrader charge valves available to the service technician. The first type (Part No. WJ56X10008) is swaged to fit over 1/4-inch tubing. The second type (Part No. WJ56X61) has a 90° bend to ease access to the Schrader valve in certain installations.



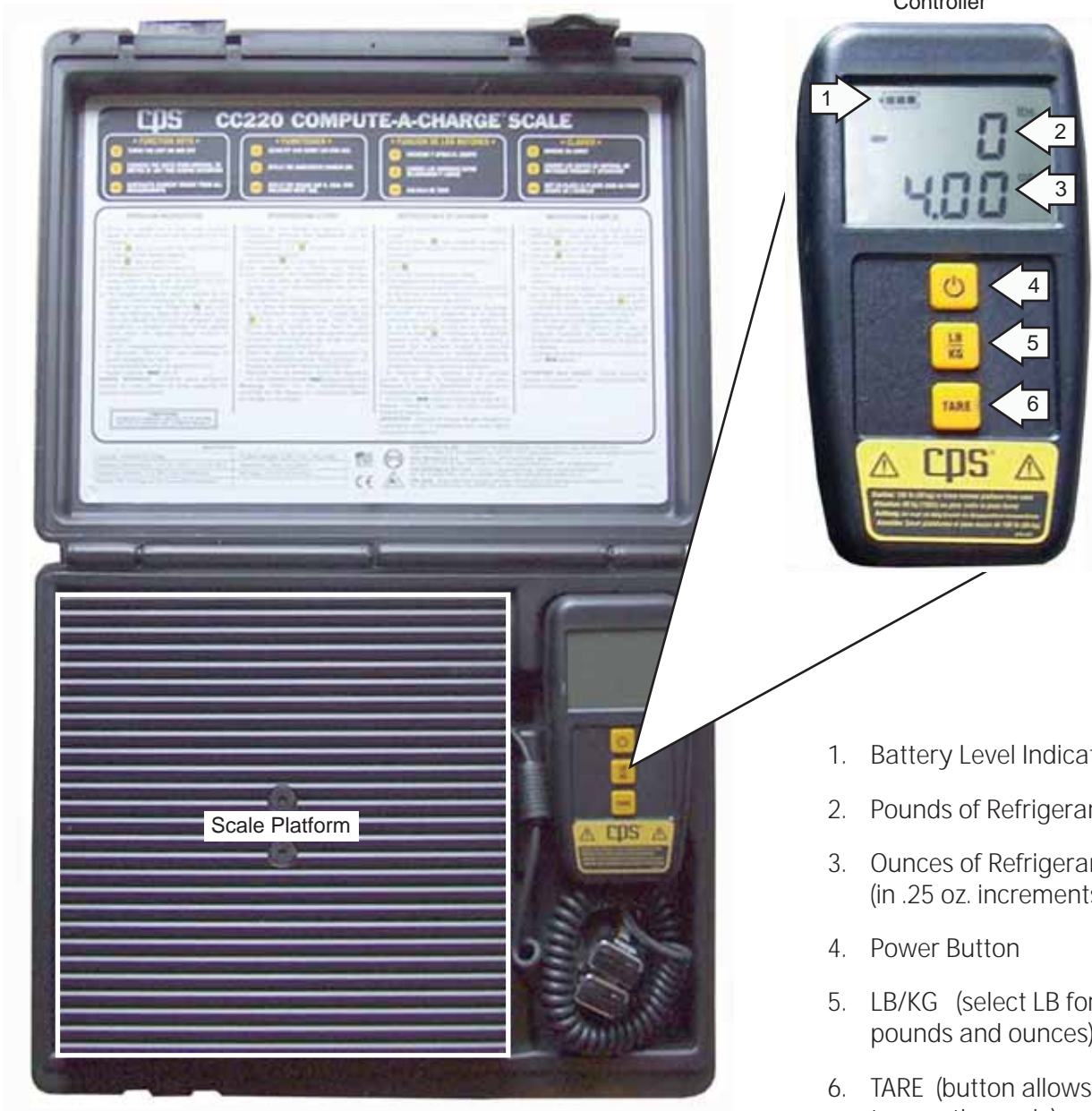
Part No. WJ56X10008



Part No. WJ56X61

Charging of R-410A

Digital Refrigerant Scale



- 1. Battery Level Indicator
- 2. Pounds of Refrigerant
- 3. Ounces of Refrigerant (in .25 oz. increments)
- 4. Power Button
- 5. LB/KG (select LB for pounds and ounces)
- 6. TARE (button allows you to zero the scale)

The CPS CC220 Scale

The CPS CC220 scale is used to add the required amount of 410A refrigerant.

There are two 9-Volt batteries supplied with the scale. Insert these in the back of the controller. The back of the controller has a magnetic surface, which allows the controller to be attached to any metal surface. If a metal surface is unavailable, use the hook located in the case under the controller to hang the controller. The base of the hook attaches to the top of the controller.

Digital Scale Operating Instructions

Note: All objects should be removed from the scale platform.

1. Place the scale on a level, rigid surface.
2. Press the power button key to turn the unit on. Wait for the LCD to display a zero weight reading.

Note: Change batteries when all segments of the battery level indicator are off.

3. Press the unit selection key, LB/KG, to select LB (pounds and ounces).
4. The scale is now ready for weighing.

Caution: An overload (OL) message will be displayed if the rated capacity is exceeded. Reduce the load immediately to avoid damaging the scale.

Refrigerant Charging:

Caution: Carefully place the R-410A refrigerant cylinder on the scale platform to avoid subjecting the scale to mechanical shock.

1. Place the R-410a cylinder on the digital scale platform and allow the liquid refrigerant to come to rest in the tank.
2. Connect the charging hose to the cylinder.
3. Bleed the air out of the hose.
4. Press the TARE key (LCD will now read zero).
5. Open the R-410A cylinder valve. The LCD will indicate the amount of R-410a refrigerant being transferred in negative numbers.
6. Close the R-410A cylinder valve when the desired charge amount is displayed.

Manifold Gauges

The R-410A system requires higher pressure gauges. Be sure that R-410A is printed on the face of the gauge you are using.

A normally operating R-410A system with a condensing temperature of 120° and 45°F evaporator saturation temperature has a high side pressure of approximately 418 psi, and a low side pressure of approximately 130 psi.

Low Side Pressure Gauge

The inner dial of the low side pressure gauge reads the temperature in °F from 80 to -40.

The outer dial reads pressure in PSI from 0 to 500. The outer dial also reads vacuum in Inches Hg.



High Side Pressure Gauge

The inner dial of the high side pressure gauge reads the temperature in °F from 0 to 160.

The outer dial reads pressure in PSI from 0 to 800.



Charging Procedures

IMPORTANT: The R-410A system can only be charged on the high pressure side of the system, and only with liquid refrigerant.

The amount of refrigerant used in the charge is measured by weight with a digital scale. If the R-410A cylinder does not have a dip tube, the cylinder must be turned upside down when placed on the digital scale.

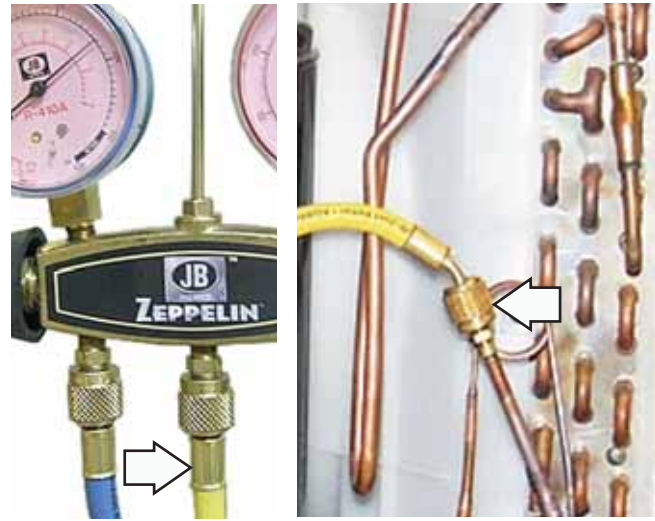
A 15-inch vacuum is required in the sealed system before the charging process begins. This permits the system's compressor to remain off during the charging process. Pressures are monitored by manifold gauges. The high side pressure gauge must be capable of reading pressures up to 800psi.

Note: Using the recovery pump, achieve a 15-inch vacuum prior to charging the system.

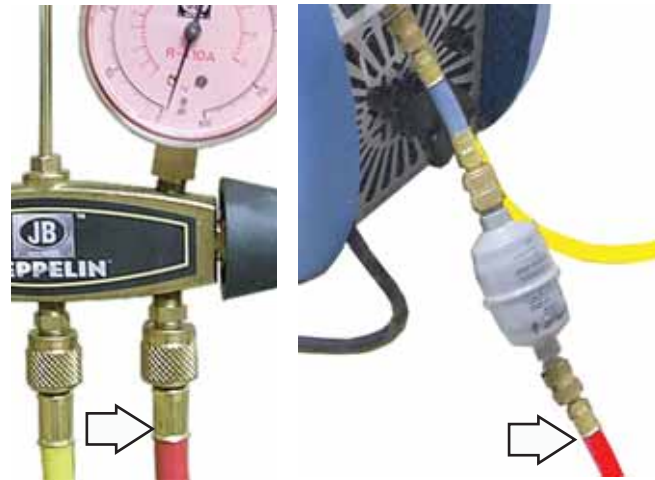
1. Set up recovery pump, recovery tank, gauge manifold, and scale. (See *410A Refrigerant Charging Connections*.)
2. Connect the blue hose from the refrigerant cylinder to the low side port of the manifold.
3. Open the R-410A refrigerant cylinder to purge the air from the blue refrigerant hose using the low side port manifold valve.



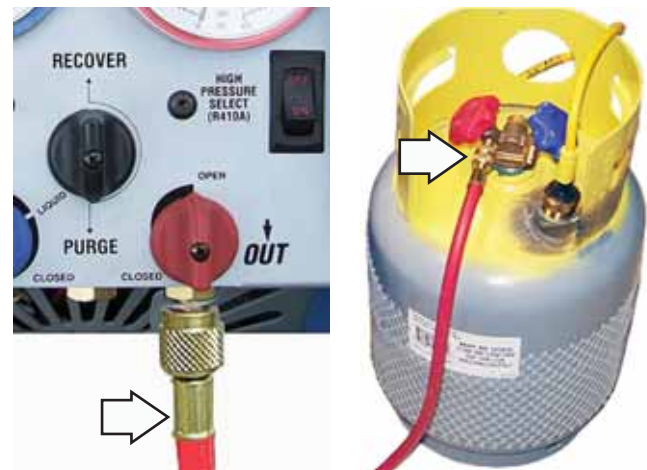
4. Connect the yellow hose from manifold to the charge valve on the high pressure side of the sealed system.



5. Connect the red hose from the manifold gauge to the filter on the inlet port of the recovery pump.



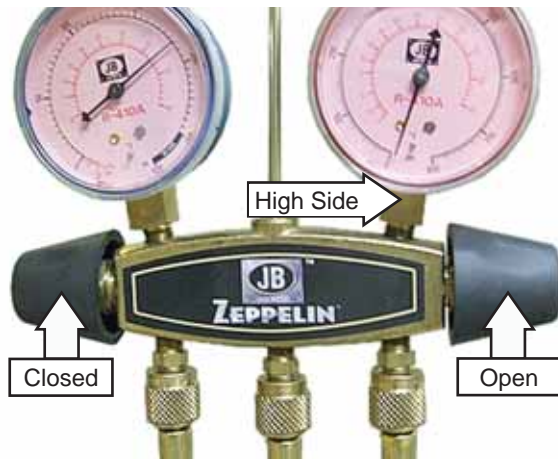
6. Connect the outlet port of the recovery pump to the liquid port of the recovery cylinder.



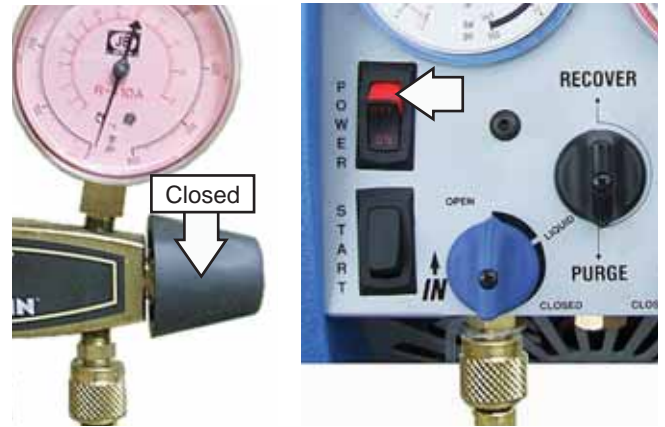
- Open the inlet and the outlet ports on the recovery pump and turn the power on. Open recovery cylinder liquid valve.



- Open the high pressure valve on the manifold and start the recovery pump.



- After a 15-inch vacuum is achieved, close the high pressure valve on the manifold, then turn the recovery pump off.



Note: Make sure to press the TARE key on the digital scale controller to set the scale to zero.

- Open the low pressure valve on the manifold to allow the refrigerant to enter the sealed system.



- When the proper charge weight is displayed, add 0.25 oz. for each 5 ft. length of hose in the sealed system line that has not been purged. (In this case, only 0.25 oz. would need to be added for the 5 ft yellow hose.)



12. When the proper charge weight has been reached, close the low pressure manifold valve to stop the refrigerant flow.

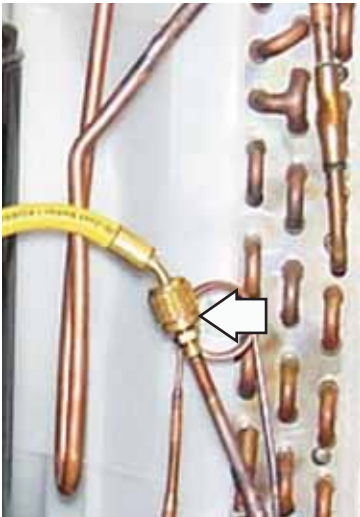


14. Run the recovery pump to achieve a vacuum. (See *Recovery Procedures*.) Then, run a purge on the recovery pump. (See *Self Purge/Auto Evacuate*.) Carefully disconnect all hoses.

Note: The system should now be fully charged and ready for operation. To be certain, complete the following check list:

1. Double check the sealed system valve and the sealed system for leaks.
2. Secure the cap on the charge valve.
3. Check the system for proper operation.
4. Complete all of the EHS Safety requirements.

13. Disconnect the yellow hose attached to the sealed system.



Purging Non-Condensable Gasses from the Recovery Cylinder

1. Allow the recovery cylinder to sit undisturbed for 24 hours to allow the air to rise to the top.
2. Determine the ambient temperature in the room.
3. Connect the high pressure manifold gauge to the vapor port of the recovery cylinder and compare the pressure reading to the ambient temperature.
4. If the pressure reading is higher than the pressure listed for the ambient temperature, slowly open the manifold to release the non-condensable gas until the pressure reading is within 5psi of the corresponding chart pressure.
5. Close vapor port and allow the recovery cylinder to sit for 10 minutes; then, check the cylinder pressure again.
6. Repeat the process if necessary.

| Relative Refrigerant Pressures (psi) | | | | |
|--------------------------------------|----------------|-----------------|-----------------|----------------|
| Temp. in °F | Freon® R-22 | Suva® R-410A | Suva® R-134a | Temp. in °C |
| 32 °F | 57.7 | 101 | 28.0 | 0 °C |
| 34 °F | 60.4 | 105 | 29.7 | 1.1 °C |
| 36 °F | 63.1 | 109 | 31.5 | 2 °C |
| 38 °F | 65.9 | 114 | 33.4 | 3.3 °C |
| 40 °F | 68.7 | 118 | 35.3 | 4.4 °C |
| 42 °F | 71.7 | 123 | 37.3 | 5.6 °C |
| 44 °F | 74.7 | 127 | 39.3 | 6.7 °C |
| 46 °F | 77.8 | 132 | 41.4 | 7.8 °C |
| 48 °F | 81.0 | 137 | 43.5 | 8.9 °C |
| 50 °F | 84.2 | 142 | 45.7 | 10.0 °C |
| 55 °F | 92.7 | 156 | 51.5 | 12.8 °C |
| 60 °F | 102 | 170 | 57.7 | 15.6 °C |
| 65 °F | 111 | 185 | 64.3 | 18.3 °C |
| 70 °F | 122 | 200 | 71.3 | 21.1 °C |
| 75 °F | 132 | 217 | 78.9 | 23.9 °C |
| 80 °F | 144 | 235 | 86.9 | 26.7 °C |
| 85 °F | 156 | 254 | 95.4 | 29.4 °C |
| 90 °F | 168 | 274 | 104 | 32.2 °C |
| 95 °F | 182 | 295 | 114 | 35.0 °C |
| 100 °F | 196 | 317 | 124 | 37.8 °C |

Common Questions About R-410A

1. Are the higher pressures of R-410A safe?

Actually, air conditioners that use R-410A are specially designed for the higher pressures of R-410A. These systems have typically been rigorously tested by their manufacturers, as well as by independent safety testing laboratories, such as Underwriters Laboratories.

With over a million R-410A-based air conditioners operating worldwide, and nearly a decade of field testing and product history, there is no evidence to suggest that R-22 systems are any safer than systems that contain R-410A.

2. Will the higher pressures of R-410A cause air conditioners to break down more often?

Evidence shows that R-410A air conditioners are remarkably more reliable than air conditioners that use R-22.

Air conditioners that use R-410A are designed to be more robust, with a thicker compressor shell. Usually this results in a smaller, sturdier unit that vibrate less, putting less strain on the piping connections that are the source of most leaks.

3. Isn't R-410A technology too new and risky?

The refrigerant 410A was invented in the early 1990s. Air conditioners using R-410A have been available in the U.S. since 1995, so they're not at all new. They're just new to people who haven't heard about them!

It's taken several years for some air conditioner dealers to learn about these products and for some air conditioner manufacturers to design and offer their own R-410A systems. Most manufacturers have had their R-410A air conditioners and heat pumps on the market for several years.

Every major manufacturer in the U.S. and Canada now offers an R-410A brand, and because of the terrific track record of the reliability of R-410A air conditioners, they have quickly become the new industry standard.

4. But won't the lubricating oil used in R-410A systems absorb water and make the systems break down?

Many air-conditioning technicians who haven't learned about R-410A often hear this myth and repeat it to others.

Air conditioners and heat pumps that use R-22 use a mineral oil that circulates through the system to keep the compressor and other parts lubricated. Systems containing R-410A usually use a synthetic oil. Some of these synthetic oils do absorb moisture more readily than mineral oils, but there are several reasons why this is not an issue for home owners.

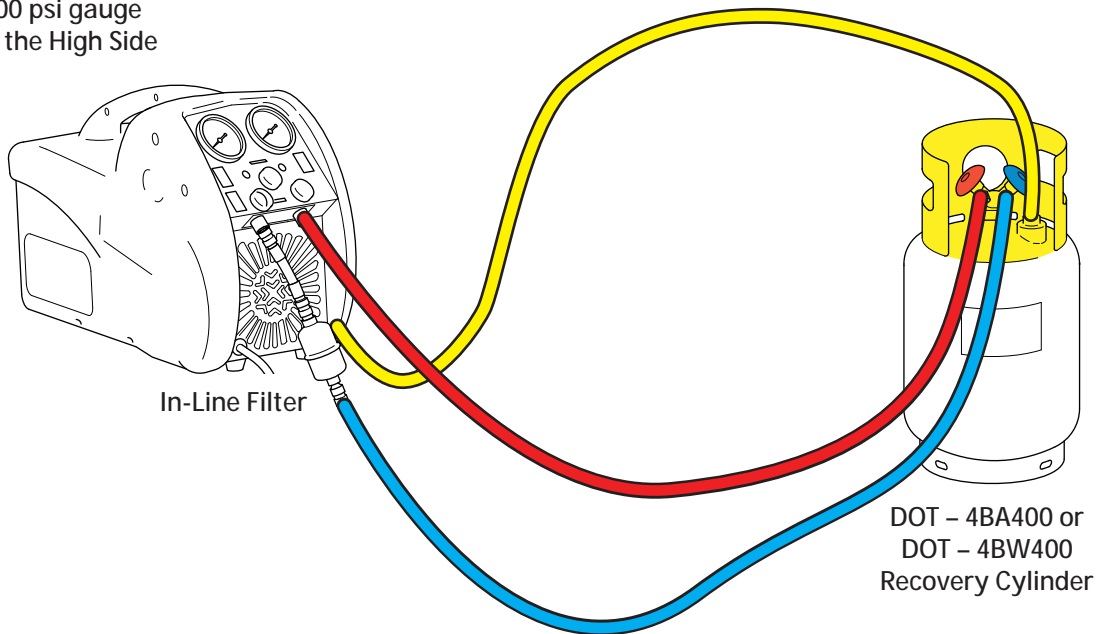
As long as technicians follow the manufacturers' directions in installing and servicing R-410A systems, then the oil will remain clean and dry. These procedures may also be required to make sure the warranty stays valid during the life of a R-410A system.

Second, nearly all air conditioners and heat pumps that use R-410A have a device called a "filter drier". This important part does exactly what the name implies - it filters, cleans, and dries the refrigerant and oils as it circulates through a system just like the oil filter in a car. Use of this device has been an important reason why air conditioners with R-410A are considered by some manufacturers to be the most reliable product they make.

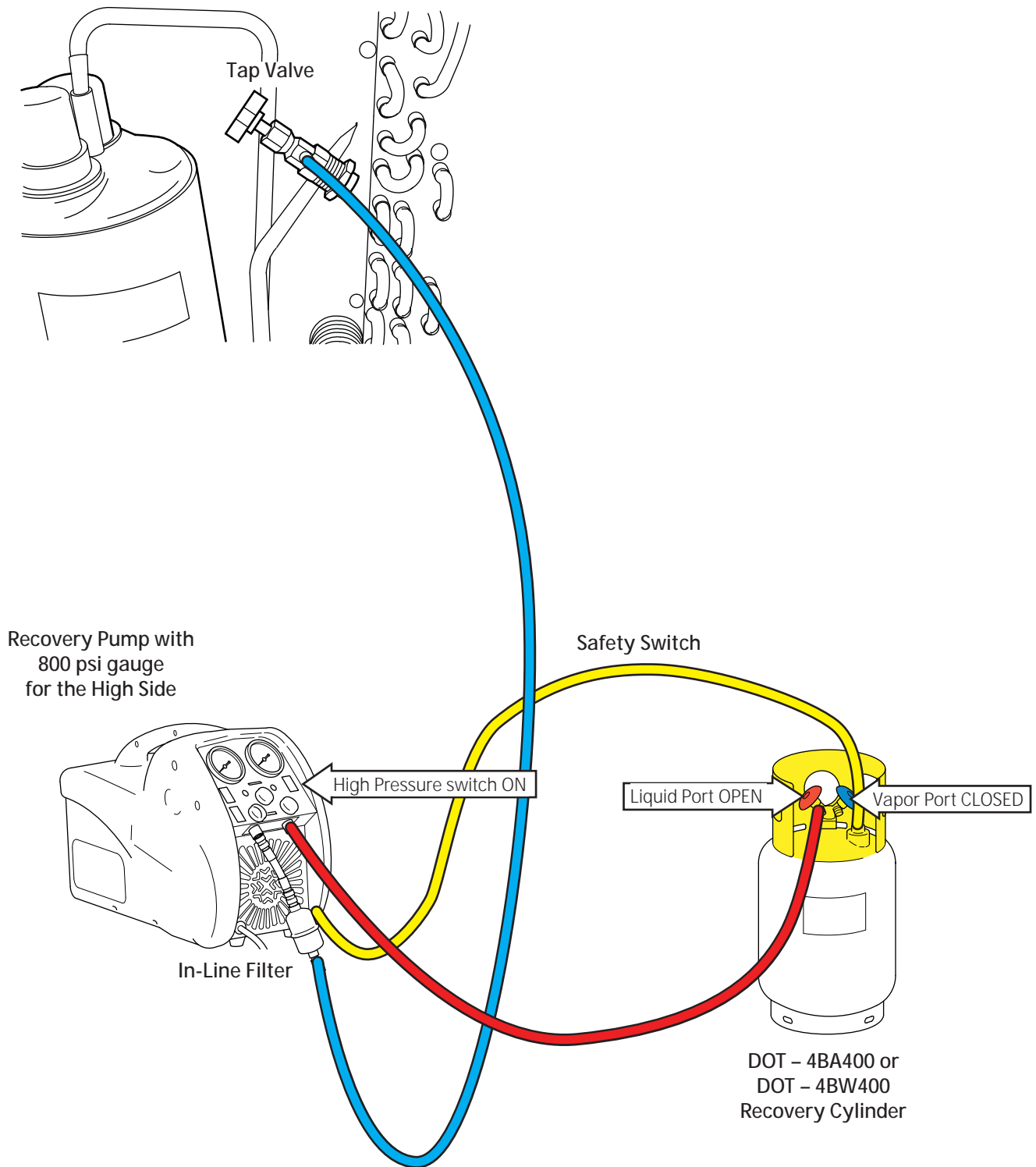
Hose Connection Diagrams

Refrigerant Sub Cooling Recovery Tank Connections

Recovery Pump with
800 psi gauge
for the High Side



Refrigerant Recovery Connections



Refrigerant Charging Connections

