

Safety Information

Safety Notice

For your safety, read this manual thoroughly before operating your DUAL 3412 unit.

Your DUAL 3412 unit is intended for use by properly trained, skilled professional automotive technicians. The safety messages presented below and throughout this user's manual are reminders to the operator to exercise care when using this unit.

There are many variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. Because of the vast number of test applications and variations in the products that can be tested with this instrument, Snap-on cannot possibly anticipate or provide advice or safety messages to cover every situation. It is the automotive technicians responsibility to be knowledgeable of the system that is to be tested. It is essential to use proper service methods and test procedures and to perform tests in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area, or the vehicle or equipment being tested.

It is assumed that the operator has a thorough understanding of vehicle air conditioning systems before using this DUAL 3412 unit. This understanding of principles and operating theories is necessary for competent, safe and accurate use of this instrument.

Before using your DUAL 3412 unit, always refer to and follow the safety messages and applicable test procedures provided by the manufacturer of the vehicle or equipment being tested.

Read All Instructions

Read, understand and follow all safety messages and instructions in this manual and on the test equipment. Safety messages in this section of the manual contain a signal word with a three-part message and, in some instances, an icon.

The signal word indicates the level of the hazard in a situation.

- **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or bystanders.
- **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or bystanders.
- **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury to the operator or bystanders.
- **IMPORTANT** indicates a situation which, if not avoided, may result in damage to the test equipment or vehicle.

Safety messages in this section contain three different type styles.

- Normal type states the hazard.
- Bold type states how to avoid the hazard.
- *Italic type* states the possible consequences of not avoiding the hazard.

An icon, when present, gives a graphical description of the potential hazard.

IMPORTANT SAFETY INSTRUCTIONS



Risk of a lack of oxygen.

- Vehicle exhaust gases contain carbon monoxide.
- Refrigerant gas can displace air in work area.

Use your DUAL 3412 unit in locations with mechanical ventilation providing at least four air changes per hour.

Impairment of breathing can cause injury.

Power



Risk of electric shock and fire.

To avoid electric shock the power cord must be connected to a properly grounded A.C. outlet.

Do not remove or bypass the grounding pin.

Use the proper A.C. outlet for the unit to operate correctly. See the ID plate on the back of the unit.

Extension cords are not recommended. If an extension cord must be used, use:

16 AWG for cords up to 50', and

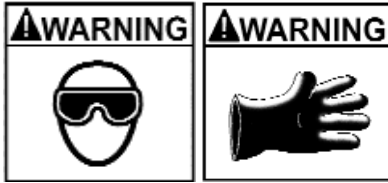
14 AWG for cords greater than 50' but less than 100'.

Do not use on wet surfaces or expose to rain

Use only fuses with the rating specified near the fuse holder.

Electric shock and fire can cause injury.

Refrigerant



Risk of expelling refrigerant under pressure.

Wear safety goggles and protective gloves, user and bystander. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses. If any refrigerant gets into the eyes, flush with water and seek a doctor's aid immediately, even though irritation may cease. Do not remove master filter while under pressure. Perform maintenance procedure for removing master filter in Chapter 3 Changing the Master Filter.

Prevent refrigerant from contacting the skin. Expelled refrigerate can cause injury.



Risk of explosion.

Do not use compressed shop air for leak detection or to pressure test a system containing refrigerant. Refrigerant can form combustible mixtures at pressures above atmospheric and with air concentrations greater than 60% by volume. Do not heat a container of refrigerant above 125 F (52 C).

Explosion can cause injury.



Risk of fire.

Do not use this equipment in the vicinity of spilled or opened containers of gasoline. Do not use your DUAL 3412 unit or any leak detector equipment if R-12 substitutes are suspected. R-12 refrigerant substitutes may be flammable.

Fire can cause injury.



Risk of poison.

Avoid breathing air conditioning refrigerant and lubricant vapor or mist. Do not allow refrigerant to contact open flame or be drawn into a running engine. This can cause refrigerant to become poisonous phosgene gas. Use your DUAL 3412 unit to remove refrigerant from air conditioning systems.

Exposure can irritate eyes, nose and throat.

CAUTION

Risk of irritation to mucous membranes.

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. To remove HFC-134a from the A/C system, use service equipment certified to meet the requirements of SAE J2210 (HFC-134a Recycling Equipment). Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

Exposure can irritate eyes, nose and throat.

Oil (Lubricant)

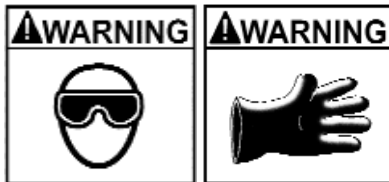


Risk of expelling oil under pressure.

Wear safety goggles and protective gloves, user and bystander. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses. If any oil gets into the eyes, flush with water and seek a doctor's aid immediately, even though irritation may cease.

Expelled oil can cause injury.

General



Engine systems can malfunction expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

Wear safety goggles and protective gloves, user and bystander. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses.

Service should be performed by a certified A/C service technician.

Engine systems that malfunction can cause injury.



The engine compartment contains electrical connections and hot or moving parts.

Keep yourself, test leads, clothing and other objects clear of electrical connections and hot or moving engine parts.

Do not place test equipment or tools on fenders or other places in the engine compartment.

Contact with electrical connections and hot or moving parts can cause injury.



Service hoses can not withstand high temperatures or severe mechanical stress.

Keep the service hoses away from moving or hot engine parts.

Service hoses can split or burst causing injury.



Risk of explosion if improper tank is used.

Do not use any tank with this equipment other than part number EAA0157C00A for R-12 or EAA0158C00A for R-134a. These tanks are D.O.T. certified for refilling. D.O.T certified tanks are marked "D.O.T. 4BA 350" or "D.O.T. 4BA 400". Explosion can cause injury.



Removing tubing assemblies may discharge refrigerant.

Wear safety goggles and protective gloves, user and bystander. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses.

Expelled refrigerant may cause injury.



A test vehicle may move if not properly prepared.

Block the drive wheels before performing a test with the engine running. Unless instructed otherwise, set the parking brake and put the gear selector in neutral (manual transmission) or park (automatic transmission). If the vehicle has an automatic parking brake release, disconnect the release mechanism for testing and reconnect it when testing is completed.

Do not leave a running engine unattended.

A moving vehicle can cause injury.



Risk of injury.

This equipment should be operated by qualified personnel only.

Use this equipment only as described in this manual. Use only the manufacturer's recommended attachments.

Do not operate equipment with a damaged cord or if the equipment has been dropped or damaged, until it has been examined by a qualified service representative. Care should be taken to arrange the power cord so that it will not be tripped over or pulled.

Always unplug equipment from electrical outlet when not in use. Never use the cord to pull the plug from the outlet. Grasp the plug and pull to disconnect.

Let the equipment cool completely before putting it away. Loop the power cord loosely in proper location when storing.

Operation of your DUAL 3412 unit by anyone other than qualified personnel may result in injury.

⚠ CAUTION

Risk of refrigerant leakage.

Hose couplings are not self closing. Always close the valves on the gauge set before disconnecting a hose.

Loosened hose couplings can leak refrigerant into the atmosphere.

⚠ CAUTION

Misdiagnosis may lead to incorrect or improper repair and/or adjustment.

Do not rely on erratic, questionable, or obviously erroneous test information or results. If test information or results are erratic, questionable, or obviously erroneous, make sure that all connections are correct and that the test procedure was performed correctly. Refer also to the Maintenance/Troubleshooting section and perform tests and make repairs as required. If test information or results are still suspicious, do not use them for diagnosis. Contact your Snap-on Representative.

Improper repair and/or adjustment may cause vehicle or equipment damage or unsafe operation.

SAVE THESE INSTRUCTIONS

Equipment Damage

Situations arise during testing that could damage the vehicle or the test equipment. The word **IMPORTANT** signals these situations.

Example:

IMPORTANT

Failure to follow these instructions could damage the compressor.

Safety Messages

Safety messages are provided to help prevent personal injury and equipment damage. All safety messages are introduced by a signal word indicating the hazard level. The types of safety messages are:

▲ DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or to bystanders.

▲ WARNING

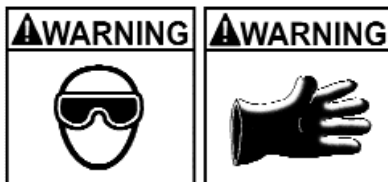
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or to bystanders.

▲ CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to the operator or to bystanders.

Some safety messages also contain visual symbols with signal words.

Example:



Engine systems can malfunction expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

Wear safety goggles and protective gloves, user and bystander. Everyday eyeglasses only have impact resistant lenses, they are **NOT** safety glasses.

Engine systems that malfunction can cause injury.

Terms

Use the following definitions as a foundation to help understand your DUAL 3412 units processes and/or components.

Virgin Tank

A refrigerant tank, disposable or refillable, that contains new refrigerant. When empty, a disposable virgin tank must be evacuated and cannot be refilled. Dispose of this evacuated tank in accordance with local, state and federal regulations that apply in your area. A refillable virgin tank should be returned to your supplier.

Recovery Tank

A refrigerant tank designed to store refrigerant recovered from a vehicle or transferred from a virgin tank.

Recover

The process of removing refrigerant from a system to prevent release of refrigerant into the atmosphere. On your DUAL 3412 unit, this process is part of recycle.

Recycle

The process of removing refrigerant from a system, filtering, drying and storing it in the recovery tank.

3 Recycle is the only process that removes refrigerant. There is not a separate recovery process.

3 Your DUAL 3412 unit is a single pass unit. This means refrigerant is filtered and dried before reaching the recovery tank. Once in the recovery tank, it is ready for reuse, after manual purging, if necessary. There is no separate "recycle" process to perform.

Evacuate

The process of drawing a vacuum on a refrigerant system to remove air and moisture. On your DUAL 3412 unit, this process is known as vacuum.

Charge

The process of filling an air conditioning system with refrigerant.

Purging

The process of bleeding off non-condensable gases from the recovery tank.

Stable Scale

The situation where the reading from the refrigerant weight measuring device is steady. Moving your DUAL 3412 unit causes the liquid refrigerant to slosh around in the recovery tank, resulting in an unsteady scale reading. Avoid moving your DUAL 3412 unit before taking scale readings.

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Using this Manual

This manual contains instructions for use and setup of your DUAL 3412 unit. A table of contents and table of illustrations are provided to make this manual easy to use.

Some of the information shown in text or illustrations is obtained using optional equipment. A Snap-on Sales Representative can determine option availability.

Conventions

This section contains a list of conventions used in text.

Service and Manifold Hand Valves

References in text to opening and closing the manifold hand valves assume:

- Clockwise closes the valves, and
- Counterclockwise opens the valves.

References in text to opening and closing the service hose valves assume:

- Valve is open with the lever parallel to the hose, and
- Valve is closed with the lever perpendicular to the hose.

References in text to opening and closing the 134a couplers assume:

- Counterclockwise closes the valves, and
- Clockwise opens the valves.

Check Note

A check note provides additional information about the subject in the preceding paragraph.

Example:

- 3** For additional information refer to Chapter 2 Connecting Service Hoses to DUAL 3412 and Chapter 2 Connecting Service Hoses to Vehicle.

Equipment Tips

Equipment tips provide information that applies to specific equipment. Each tip is introduced by this icon **p** for easy identification.

Example:

- p** Never attempt to change the recovery tank during unit operation. For additional information refer to Chapter 2 Removing Recovery Tank.

Introduction

Use your Dual 3412 unit on automotive air conditioning systems to:

- Recover,
 - Remove refrigerant from vehicle,
- Recycle,
 - Filter, dry and store recovered refrigerant in a refillable tank,
- Evacuate,
 - Remove air and moisture from air conditioning system using a vacuum pump to draw the system into a deep vacuum, and
- Recharge,
 - Refill the air conditioning system with a specified amount of refrigerant.

Your DUAL 3412 unit is a single pass design. This means recovered refrigerant is filtered and dried before entering the recovery tank. Refrigerant in the tank is always ready for use, after manual purging, if necessary. See Chapter 2 - Recovering Refrigerant From Vehicle. There is no need to perform a separate recycle function. Recover, evacuate and recharge functions are performed manually.

This manual applies to the following DUAL 3412 model:

Model Number	Refrigerant Type	Voltage
EEAC310B	R-12/R-134a	120 VAC

References in text to DUAL 3412 apply to both refrigerants. When a difference exists, the difference is specified.

Your DUAL 3412 unit includes:

- A Liquid Crystal Display (LCD),
- A Standard gauge set with service hoses, fittings, and adapters,
- A 30 pound capacity recovery tank and electronic scale,
- A Master filter, and
- An Oil cup.

- 3 The recovery tank is temperature-monitored to maintain accurate purging of non-condensable gases under all conditions.

Halogens are any of the five elements (fluorine, chlorine, bromine, iodine and astatine) that form part of group 7a of the Periodic Table of Elements. The fluorine and chlorine elements of this family are used to create a methane organic compound used to form dichlorodifluoromethane (CCL_2F_2), a halogenated hydrocarbon called CFC-12 (chlorofluorocarbon 12). This refrigerant gas is commonly known as Refrigerant-12, or R-12, and has been used as a refrigerant in mobile air conditioning systems for many years.

The new refrigerant in the halogenated hydrocarbon family, HFC-134a (CH_2FCF_3), or R-134a, is now being incorporated in mobile air conditioning systems. HFC stands for hydrofluorocarbon.

The environmental impact of mobile air conditioning refrigerant containing chlorine (R-12) has caused regulatory action that will eventually eliminate the use of such products. Regulatory action is necessary because when the chlorine content in R-12 is exposed to the atmosphere:

- It depletes the protective ozone layer in the atmosphere,
- It has relatively high global warming potential, and
- Its long atmospheric lifetime is approximately 120 years.

R-134a has been developed for new vehicle production but does not replace or directly substitute for R-12 in existing vehicles. R-134a does not contain chlorine, does not deplete the ozone layer in the atmosphere and has an atmospheric lifetime of about 15.5 years.

Environmental Protection Agency (EPA) and state regulations specify that:

- Provisions be made to certify all air conditioning service, installation and repair personnel,
- Refrigerant be recovered, recycled or reclaimed from automotive air conditioning systems, instead of allowing vapors to be expelled, or vented, into the atmosphere, and
- Refrigerant be recycled and reused, or properly disposed of, instead of allowing vapors to be expelled, or vented, into the atmosphere.

Mobile air conditioning service, installation and repair technicians must be qualified and certified.

Refrigerant Handling

Mobile air conditioning systems contain chemical mixtures that require special handling to avoid injury and to avoid venting refrigerant into the atmosphere.

Do not discharge any refrigerant gas, vapor or liquid from a refrigeration system into the atmosphere. If service is required that involves opening the refrigerant system, use a certified recovery system.

Refrigerant Safety



W ear safety goggles and protective gloves, user and bystander. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses. If any refrigerant gets into the eyes, flush with water and seek a doctor's aid immediately, even though irritation may cease. Do not remove master filter while under pressure. Follow instructions for removing master filter. For additional information refer to Chapter 3 Changing the Master Filter. Prevent refrigerant from contacting the skin. Read, understand and follow Safety Information in the front of this manual.

WARNING

Use your DUAL 3412 unit in locations with mechanical ventilation providing at least four air changes per hour. Avoid breathing air conditioning refrigerant and lubricant vapor or mist. Do not allow refrigerant to contact open flame or be drawn into a running engine. This can cause refrigerant to become poisonous phosgene gas. Use your DUAL 3412 unit to remove refrigerant from air conditioning systems. Read, understand and follow Safety Information in the front of this manual.

IMPORTANT

Tighten all tubing connections properly. Insufficient or excessive torque can result in loose joints or deformed parts. Either condition can result in refrigerant leakage.

Refrigerant Substitute Warning



Do not use your DUAL 3412 unit or any leak detector equipment if R-12 substitutes are suspected. R-12 refrigerant substitutes may be flammable.

Read, understand and follow Safety Information in the front of this manual.

Aftermarket R-12 refrigerant substitutes are being sold that are dangerous or potentially flammable gases. These products contain a blend of butane, isobutane and propane and have the potential for explosion. Some of these products are:

- OZ-12,
- Refrigerant-176,
- Arctic Chill R-176, and
- GHG Refrigerant 12.

Some vehicles using OZ-12 can be identified by a label that may be placed in the engine compartment, but many cannot be identified. Studies are currently being conducted to develop a procedure to identify the type of refrigerant in a refrigerant system. State agencies and the Environmental Protection Agency (EPA) are moving to ban flammable substitutes.

If it is suspected that a refrigerant system contains a product of this type:

- Question the customer about previous service,
 - Be aware of any unfamiliar odor from the system,
 - Do not use any leak detector equipment,
 - Do not use recycling equipment, and
 - Contact your state fire marshall or local EPA office.
-

Refrigerant Oils

In mobile air conditioning units, the lubricant needed for the compressor is blended with the refrigerant. Mineral (petroleum) oils were used with R-12 systems. Mineral oils are not soluble in R-134a and the industry had to substitute synthetic lubricating fluids for the mineral oils. Polyalkylene glycol oils (PAGs) were the first synthetics to meet the auto a/c compressor manufacturers performance criteria, and most automakers and compressor manufacturers devised their retrofit specifications with PAGs in mind. Since then, polyol ester oils (ESTERS or POEs) have been tested and also have been found to meet the the performance criteria. Although POEs have not been approved by the automakers or a/c compressor manufacturers, POEs are frequently used in a/c retrofits in the automotive aftermarket.

Refrigerant Oil Safety



Risk of irritation of mucous membranes.

Wear safety goggles and protective gloves, user and bystander. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses. If any refrigerant gets into the eyes, flush with water and seek a doctor's aid immediately, even though irritation may cease. Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. To remove HFC-134a from the A/C system, use service equipment certified to meet the requirements of SAE J2210 (HFC-134a Recycling Equipment). Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.

Exposure can irritate eyes, nose and throat.

Functional Description

Front View

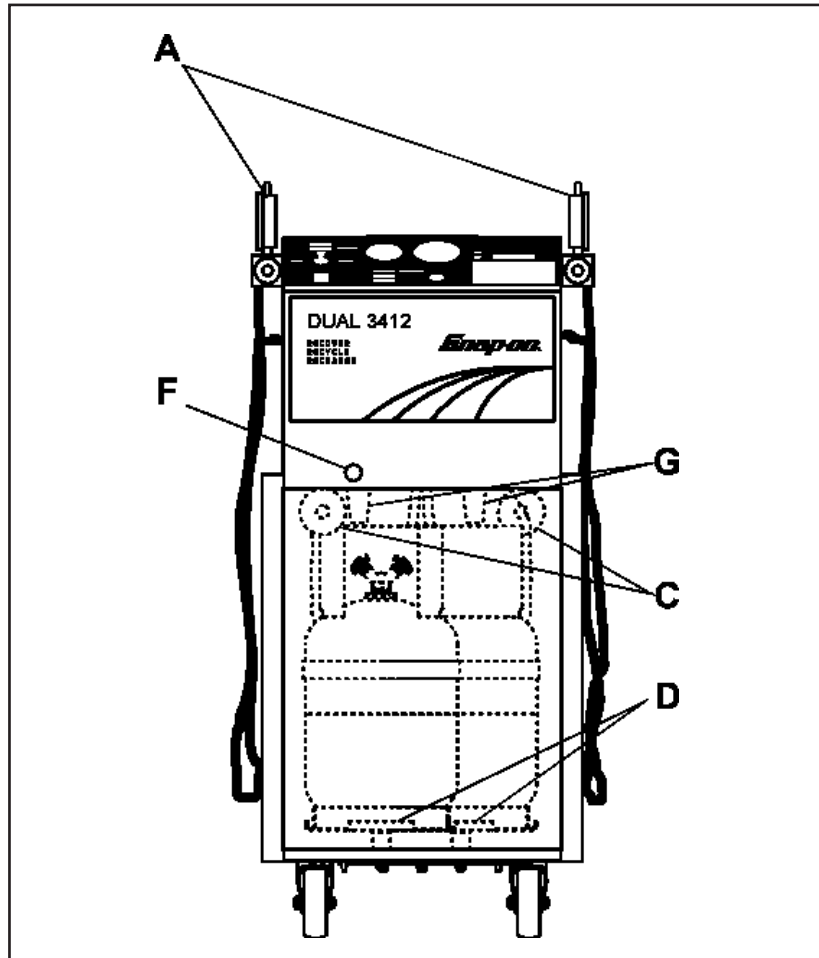


Figure 1-1: Front View

A Gauge Set

High and low pressure gauge manifold set for monitoring air conditioning system pressures. Right hand valve opens and closes the high-side service hose passage to your DUAL 3412 unit. Left hand valve opens and closes the low-side service hose passage to your DUAL 3412 unit.

Control Panel

Houses display screen and control buttons.

Mode Button

Changes LCD display between gross weight of recovery tank and tare weight, which zeroes the display for indication of charged or recycled amount.

Control Knob

Used to select Vacuum, Off, or Recycle.

Compressor Power Switch

Turns recovery compressor on and off. Must be on (I) for unit operation.

Unit On Indicator

Lights when power cord is connected to A.C. power.

Compressor On Indicator

Lights when compressor is running.

High Pressure Indicator

Lights when the recovery tank pressure is above 300 psi. Tank pressure above 300 psi typically means non-condensable gases should be vented from the recovery tank. For additional information refer to Chapter 2 Purging Non-condensable Gas.

Tank Full Indicator

Lights when the recovery tank weight reaches 40 pounds.

Overload Indicator

Lights when compressor approaches a stall condition. Stop procedure in process to prevent compressor damage when overload indicator lights.

Temperature Display

Shows the recovery tank temperature. Use this along with pressure/temperature chart on front panel when purging non-condensable gas. For additional information refer to Chapter 2 Purging Non-condensable Gas.

Pressure Gauge

Shows the recovery tank pressure. Use this along with pressure/temperature chart on front panel when purging non-condensable gas. For additional information refer to Chapter 2 Purging Non-condensable Gas.

Purge Button

Used when purging non-condensable gases from the recovery tank. For additional information refer to Chapter 2 Purging Non-condensable Gas.

LCD Display

Shows charged, recovered amounts or gross weight of the recovery tank. Also Indicates software version, "Tank Full" and "Tank Empty" conditions.

- B **Hour Meter (on sides of unit)**
Registers recovery compressor run time to guide master filter maintenance. For additional information refer to Chapter 3 Master Filter.
 - C **Master Filter**
Consists of a 10 micron particulate filter and desiccant to remove moisture. For additional information refer to Chapter 3 Changing the Master Filter.
 - D **Scale**
Electronically measures the amount of refrigerant dispensed, recycled, and remaining in the recovery tank.
- Oil Separator (internal)**
Removes oil and other contaminants from the refrigerant being recycled.
- E **Service Ports (on sides of unit)**
The yellow service hose from the gauge set attaches to the service port.
 - F **Oil Drain Valve**
Used to drain recovered oil from the unit after every recover/recycle operation.
 - G **Oil Cup**
Used to measure the amount of recovered oil.

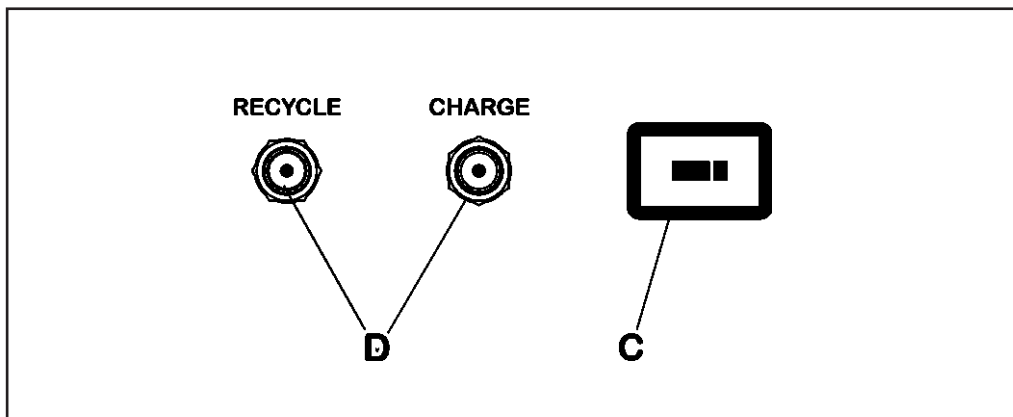


Figure 1-2: Typical Port Designation

R-12 Accessories

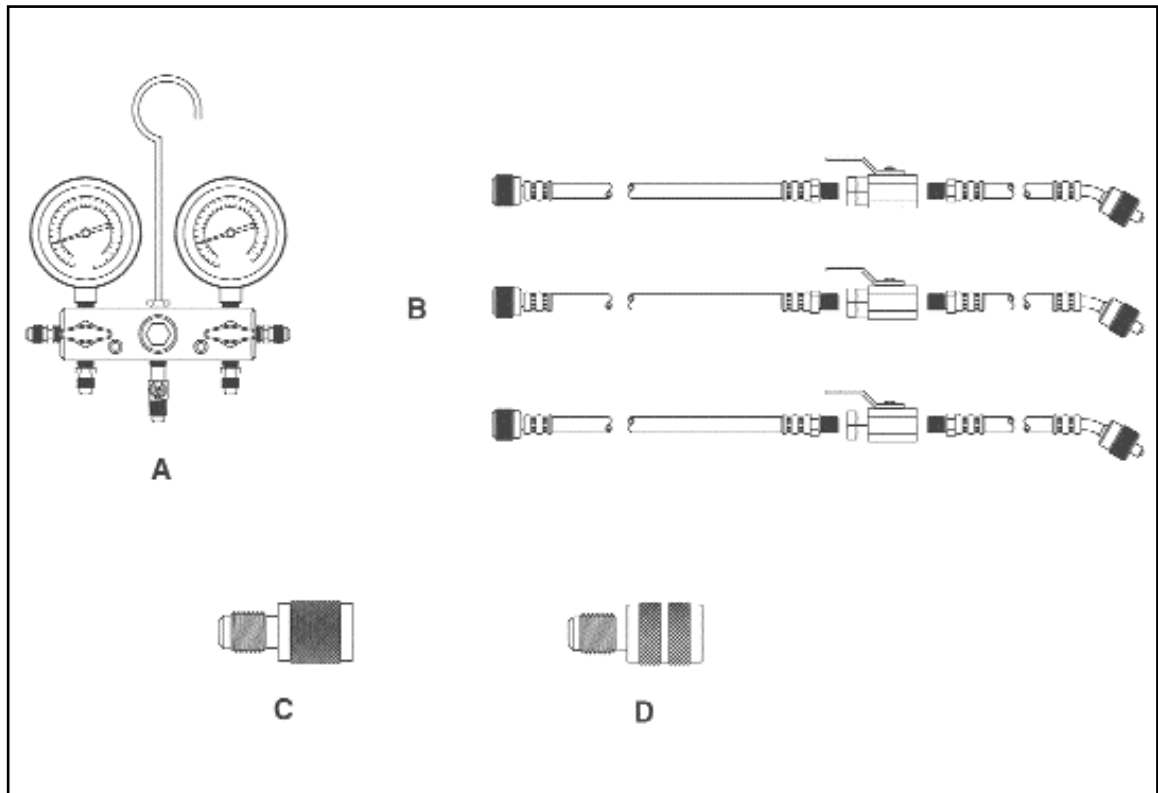


Figure 1-3: R-12 Accessories

- A Gauge Set
High and low pressure gauge manifold set monitors air conditioning system pressures. Right hand valve opens and closes the high-side service hose passage to your DUAL 3412 unit. Left hand valve opens and closes the low-side service hose passage to your DUAL 3412 unit.
- B Service Hoses
Red, blue and yellow hoses for connecting gauge set to the vehicle and your DUAL 3412 unit. For additional information refer to Chapter 2 Connecting Service Hoses to DUAL 3412 and Chapter 2 Connecting Service Hoses to Vehicle.
- C G M Adapter
Connects to the high-side service port on GM vehicles.
- D Ford Adapter
Connects to the high-side service port on Ford vehicles.

R-134a Accessories

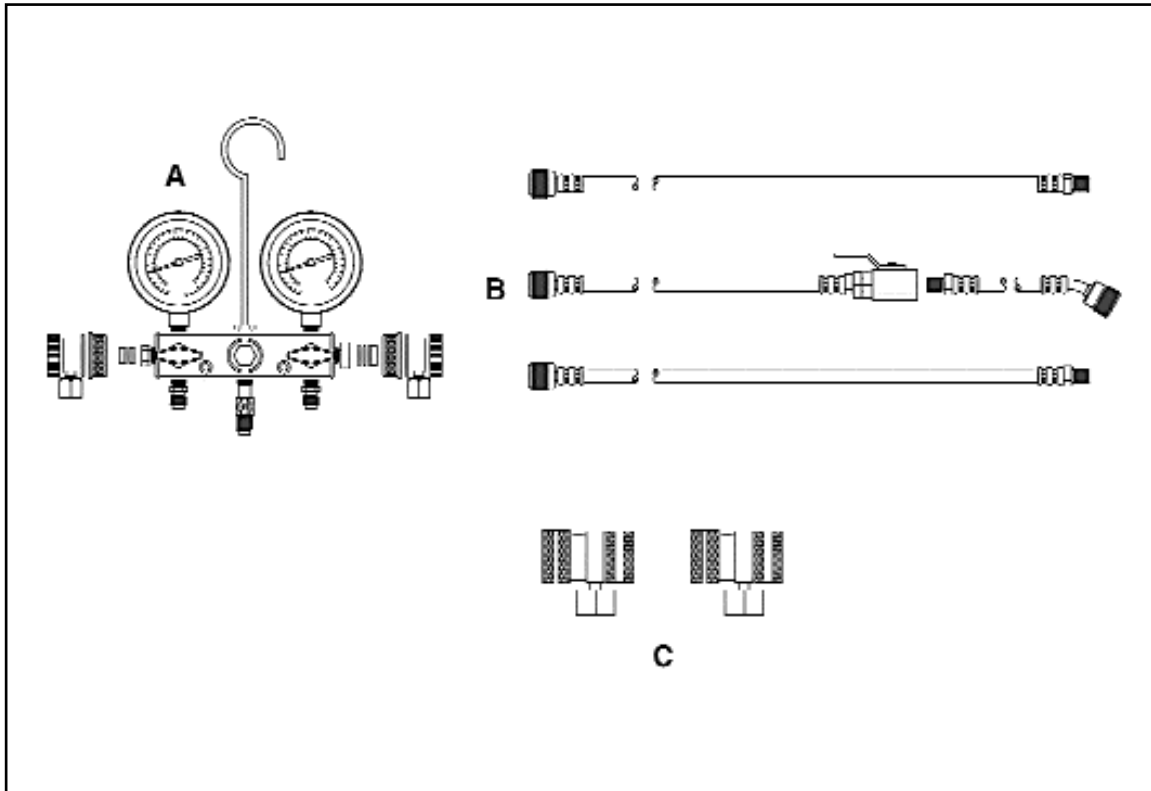


Figure 1-4 R-134a Accessories

- A Gauge Set
High and low pressure gauge manifold set monitors air conditioning system pressures. Right hand valve opens and closes the high-side service hose passage to your DUAL 3412 unit. Left hand valve opens and closes the low-side service hose passage to your DUAL 3412 unit.
- B Service Hoses
Red, blue and yellow hoses for connecting gauge set to the vehicle and your DUAL 3412 unit. For additional information refer to Chapter 2 Connecting Service Hoses to DUAL 3412 and Chapter 2 Connecting Service Hoses to Vehicle.
- C Shut-off Adapters
Connects to the high-side and the low-side service ports of the vehicle.

Specifications

General

Power
120 VAC, 50/60 Hz, 12 amps maximum

Shipping Weight
260 pounds

Dimensions
Depth 26"
Height 48"
Width 21"

Operating

Operating Temperature Range
50–120°F ambient

Maximum Operating Pressure
300 psig

Pressure Range
30 inHg–300 psi

Refrigerant Charge Amount
0–25 pounds

Recovery Amount
0–25 pounds

Recycled Refrigerant Tank
30 lb. with purge port for each tank

Storage

Temperature
-4–158°F (20–70°C)

Relative Humidity
Up to 80%, non-condensing

Capacities

Recovery
Up to 25 lbs total

Installation and Operation

Use the information in this chapter to:

- Prepare your DUAL 3412 unit for initial use,
- Recover vehicle refrigerant,
- Create a vacuum before recharging, and
- Recharge with recycled refrigerant.

Connecting Service Hoses to DUAL 3412

Use the following procedure to connect service hoses to your DUAL 3412 unit. Refer to Figure 2-1.



Do not use your DUAL 3412 unit or any leak detector equipment if R-12 substitutes are suspected. R-12 refrigerant substitutes may be flammable.

Read, understand and follow Safety Information in the front of this manual.

Refer to Page 1-4

- 3 Confirm refrigerant type in vehicle, and use the appropriate connections on the unit.
 - 3 Always lubricate rubber gaskets and seals at hose connections with fresh refrigerant oil before connecting.
 - 3 Tighten hose connections finger tight. Use electronic leak detector to insure connections are leak free.
1. Connect one anti-blowback valve, found in unit accessories, to end of each yellow service hose with hand valve.
 2. Attach end of yellow hose without hand valve to center port of manifold gauge assembly.
 3. Attach end of yellow hose with hand valve and anti-blowback valve to "Recycle" port on side panel.
 4. For R-12 – Attach the end of the blue hose, without hand valve, to the low side (left) port of the manifold gauge assembly. Attach the end of the red hose, without hand valve, to the high side (right) port of the manifold gauge assembly.
For R-134a – Connect the high (red) and low (blue) couplers to their respective hoses. Rotate coupler knobs fully CCW (closed).

Component Identification

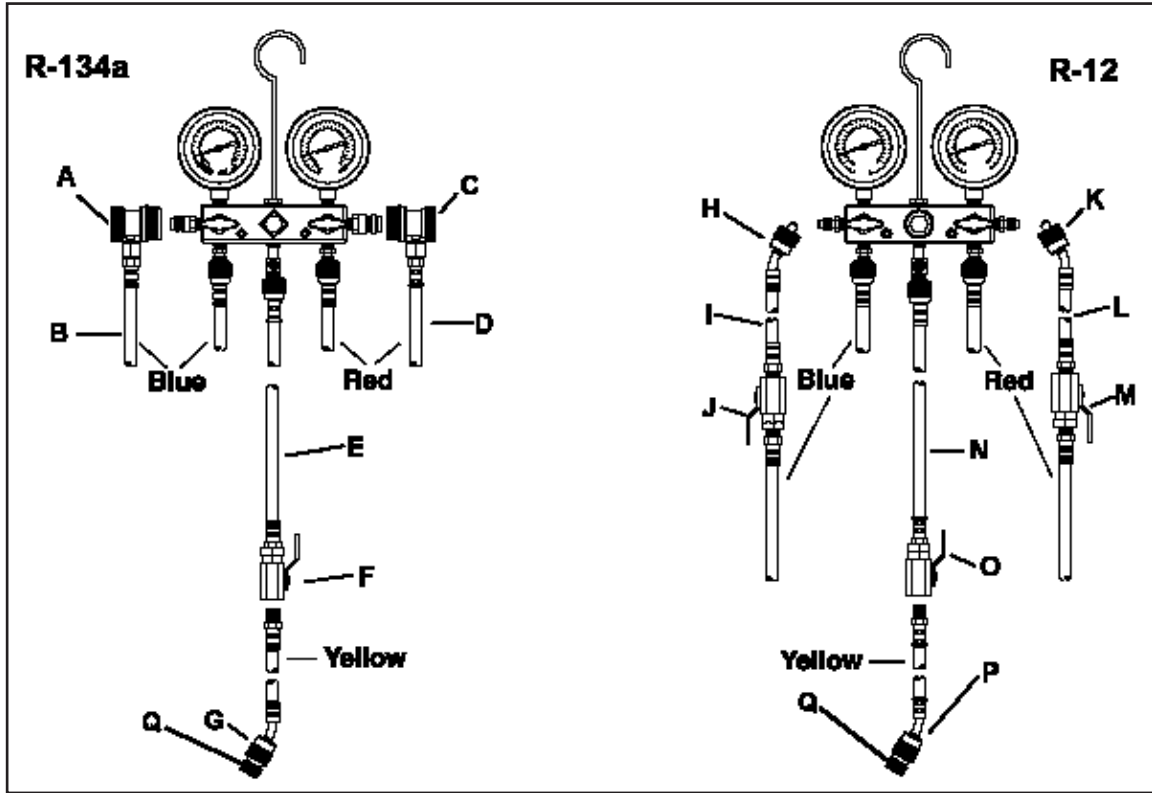


Figure 2-1: Service Hoses and Gauge Sets

R-134a

- A Low-Side Blue Hose Coupler with valve
- B Blue Hose
- C High-Side Red Hose Coupler with valve
- D Red Hose
- E Yellow Hose
- F Hand Valve
- G Service Port Fitting
- Q Anti-Blowback Valve

R-12

- H Low-Side Blue Hose Fitting
- I Blue Hose
- J Hand Valve
- K High-Side Red Hose Fitting
- L Red Hose
- M Hand Valve
- N Yellow Hose
- O Hand Valve
- P Service Port Fitting
- Q Anti-Blowback Valve

Preparing and Installing Recovery Tank

The recovery tanks are shipped with a dry air charge. The charge must be vented and the tanks evacuated before use. Use the following procedure to evacuate the dry air from the recovery tanks and install a tank for each refrigerant in your DUAL 3412 unit.



Do not use any tank with this equipment other than part number EAA0157C00A for R-12 or EAA0158C00A for R-134a. These tanks are D.O.T. certified for refilling. D.O.T. certified tanks are marked "D.O.T. 4BA 350" or "D.O.T. 4BA 400". Read, understand and follow Safety Information in the front of this manual.



Vent and evacuate the recovery tanks before first use. An unprepared tank can cause compressor burnout.

- 3 The recovery tanks must have a minimum of 25 inHg vacuum when evacuation is complete. If there is not 25 inHg vacuum, check connections and repeat the procedure.

Tank Preparation

Follow this procedure to install new recovery tanks in your DUAL 3412 unit. New recovery tanks are charged with dry air which must be vented before using.

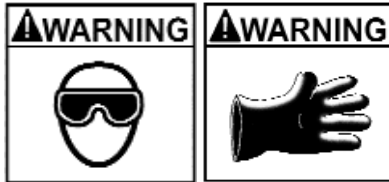


Wear safety goggles, user and bystander. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses. Cover the blue hand valve port with a shop towel to help prevent debris from becoming projectiles. Read, understand and follow Safety Information in the front of this manual.

1. Vent dry air by slowly opening blue hand valve on the recovery tank.
 2. Gently set the recovery tank on the scale with the hand valves up, facing the respective front of the unit.
 3. Place an elastic strap around each recovery tank so that the bottom of the strap is 2" above the tank center weld.
 4. Slide the temperature probe, extending from the cabinet, between the tank and the strap.
-

5. Connect the end of the yellow hose with hand valve and anti-blowback valve to "Recycle" port.
 6. Connect the end of the blue service hose leading from the bottom of the manifold gauge assembly to the blue (liquid) tank port.
 - 3 For R-134a, install the supplied tank adapter, part number 1-15080, between the tank valve and the blue hose.
 7. Open the blue (liquid) tank valve, by turning fully counterclockwise.
 8. Identify the red hose leading from the bottom of the unit. Connect the hose end with the anti-blowback valve to the red (vapor) tank port.
 9. Close the red (vapor) tank valve, by turning fully clockwise.
 10. Identify the yellow hose leading from the bottom of the unit. Connect the hose end with the anti-blowback valve to the tank purge port. Rotate the tank so the yellow hose goes straight up into the cabinet.
 11. Close the hand valve on the red service hose.
 12. Open the following:
 - Yellow service hose hand valve,
 - Blue service hose hand valve, or coupler (CW)
 - High side manifold hand valve, and
 - Low side manifold hand valve.
 13. Turn both compressor switches OFF.
 14. Turn both vacuum/recycle valves OFF.
 15. Connect the power cord to the proper wall outlet with the correct voltage for the unit. For additional information refer to [Chapter 2 Specifications](#).
The UNIT ON indicator illuminates.
 16. Turn the compressor switch ON.
The COMPRESSOR ON indicator illuminates and the compressor activates.
 17. Turn the vacuum/recycle valve to VACUUM.
The low side manifold gauge shows vacuum increasing.
 18. Monitor the low side manifold gauge until a minimum of 25 inches of mercury is reached.
-

19. Close the following:
 - Blue (liquid) tank hand valve, and
 - Blue service hose hand valve, or coupler (CCW).
 20. Turn the vacuum/recycle valve OFF.
 21. Turn the compressor switch OFF.
The COMPRESSOR ON indicator goes out and the compressor stops running.
 22. Remove the blue service hose from the tank. Remove the tank adapter 1-15080 if used.
 23. Identify the blue hose leading from the bottom of the unit. Connect the hose end with the anti-blowback valve to the blue (liquid) tank port. Position this hose end at 3 o'clock at the tank.
 24. Open the red and blue valves on the recovery tank.
 25. Connect the blue service hose from the manifold gauge assembly to the tank of virgin refrigerant.
 - 3 Position the virgin tank with the valve up. Do not use the virgin tank with the valve underneath the tank.
 - 3 For R-134a, install the supplied tank adapter between the tank valve and the blue hose.
 26. Open the:
 - Virgin tank valve,
 - Blue service hose hand valve, or coupler (CW), and
 - Blue manifold hand valve.
 27. Turn the compressor switch ON.
The COMPRESSOR ON indicator illuminates and the compressor activates.
 28. Turn the vacuum/recycle valve to RECYCLE.
The refrigerant flows from the virgin tank through your DUAL 3412 unit and into the prepared recovery tank.
 - 3 Press the mode button until Tare Weight is displayed. Monitor the weight on the LCD display until the desired amount of virgin refrigerant has been transferred. Refer to Tank Full/Empty in this Chapter.
 29. When the desired amount of refrigerant has been transferred into the recovery tank, close the virgin tank hand valve.
-



Risk of expelling refrigerant under pressure.

Always close the tank valves before removing the hoses or fittings.

Wear safety goggles and protective gloves, user and bystander. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses. If any refrigerant gets into the eyes, flush with water and seek a doctor's aid immediately, even though irritation may cease. Prevent refrigerant from contacting the skin.

Expelled refrigerate can cause injury.

30. Allow the recycler to run until 15 inHg vacuum is reached. Then close the blue service hose valve or coupler.
31. Turn the vacuum/recycle valve OFF.
32. Turn the compressor switch OFF.
The COMPRESSOR ON indicator goes out and the compressor stops running.
33. Compare the recovery tank pressure/temperature relationship with the chart and bleed off any non-condensable gases by pressing the PURGE button. Refer to Purging non-condensable gas in this chapter.

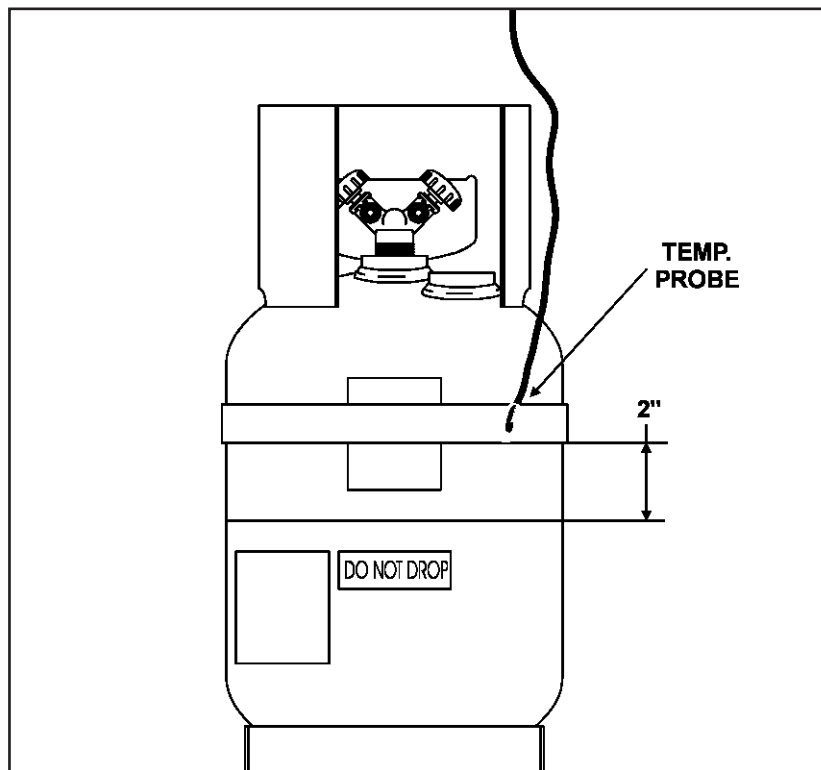


Figure 2-2: Recovery Tank and Temperature Probe

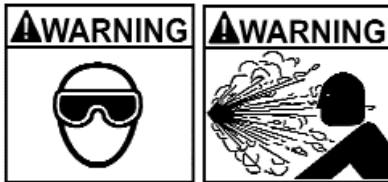
- 3 Use only the 30 pound capacity recovery tank supplied with your DUAL 3412 unit or one indicated by the warning label on the back of the unit. Using any other type or capacity tank could create the danger of explosion and potential for personal injury. Inaccurate refrigerant amount may display if the correct tank is not used.

Operation

This section contains:

- Procedures for connecting the service hoses to the vehicle, and
- Procedures to:
 - Recycle vehicle refrigerant,
 - Create a vacuum in the A/C system before recharging, and
 - Recharge the A/C system with recycled refrigerant.

After performing all of the installation procedures, follow these recommended vehicle service procedures before using your DUAL 3412 unit for A/C work.



Keep the service hoses away from moving or hot engine parts. The service hoses can not withstand high temperatures or severe mechanical stress.

IMPORTANT

Close the tank valves when not using your DUAL 3412 unit. Leaving tank valves open may result in refrigerant loss from tank.

Do not use your DUAL 3412 unit outside of the following limits:

Warmer than 49 C (120 F),

Colder than 10 C (50 F), and/or

Relative humidity greater than 80%.

Stabilize your DUAL 3412 unit to a moderate temperature and inspect for abnormalities.

Contact your Snap-on representative before operating if unsure of condition.

Operating your DUAL 3412 unit with the following conditions may reduce its functionality:

Visible evidence of damage,

Has been subjected to prolonged storage under unfavorable conditions, or

Has been subjected to severe transportation stresses.

Preliminary Checks

Successful use of your DUAL 3412 unit depends on several external factors. The following information explains these.

Precondition Vehicle

The refrigerant in the vehicle A/C system is recovered faster and more completely when the components are warm.

1. Connect the service hoses.

To efficiently recover refrigerant, the vehicle should be at normal operating temperature. Run the engine until normal operating temperature is reached, with

- The A/C system off, and
- The hood lowered as much as possible without damaging or crimping the service hoses.

2. Turn off the engine when normal operating temperature is reached. The unit and vehicle are ready to recover and recycle refrigerant.

Allow Adequate Evacuation Time

Evacuate the vehicle system for a minimum of 30 minutes. This helps ensure vehicle A/C system is free of non-condensable gases (mostly air) and moisture.

- 3** Sometimes a small amount of refrigerant is left in the vehicle A/C system that is not practical to recover. If recovery time is too short or if vehicle components are cold, this parasitic refrigerant can expand during a vacuum hold cycle, a leak test, and falsely report a leak condition that does not really exist.

Follow Vehicle Manufacturer s A/C Service Procedures

When charging, a slow charge condition may occur due to pressure equalization between your DUAL 3412 unit and the vehicle A/C system. Finish charging by:

- Closing the high-side manifold valve,
- Starting the engine, and
- Turning the A/C system ON.

- 3** Never operate the vehicle A/C system with the high-side manifold valve open.

- 3** It is the technicians responsibility to be familiar with vehicle manufacturer recommended service procedures.
-

Connecting Service Hoses to Vehicle

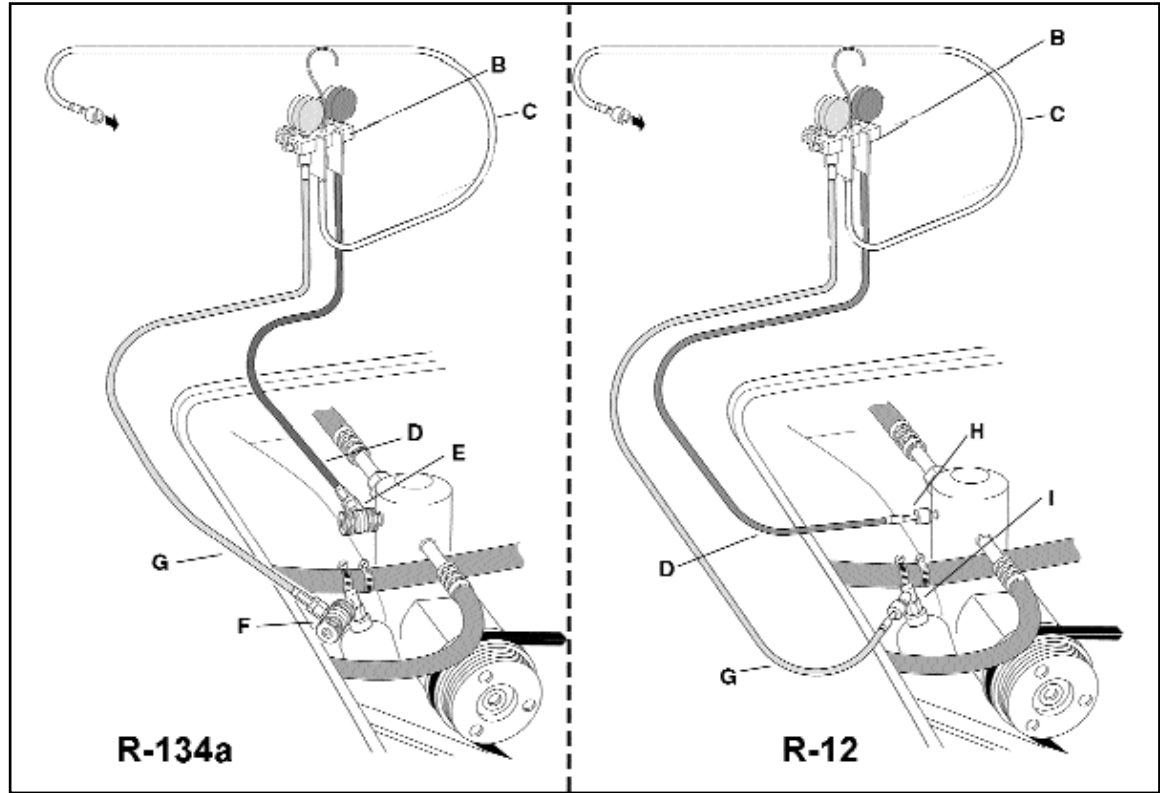


Figure 2-3: Service Hose Connections to Vehicle

- B Manifold Gauge Set
- C Yellow Hose
- D Blue Hose
- E Low-Side Blue Hose Coupler
- F High-Side Red Hose Coupler
- G Red Hose
- H Low-Side Blue Hose Fitting
- I High-Side Red Hose Fitting

Follow this procedure to connect the service hoses to the vehicle.

1. Connect the red high-side hose with the service fitting adapter, if applicable, from the manifold gauge set to the high-side service port on the vehicle.
2. Connect the blue low-side hose with the service fitting adapter, if applicable, from the manifold gauge set to the low-side service port on the vehicle.
3. If the vehicle has more than one low-side service port, use the service port closest to the evaporator.
3. Open the hose hand valves or service couplers.
 - Refer to the vehicle manufacturer's service manual for proper diagnostic procedures and specifications.

Recover/Recycle Refrigerant from Vehicle

3 Be sure that the vehicle is at operating temperature before recovering refrigerant.

1. Open the red (vapor) recovery tank valve.
2. Connect the service hoses to the vehicle. For additional information refer to *Connecting Service Hoses to Vehicle* in this chapter.
3. Open the:
 - High (red) side service hose valve or coupler,
 - Low (blue) side service hose valve or coupler,
 - High (red) manifold hand valve,
 - Low (blue) manifold hand valve, and
 - Yellow service hose hand valve.
4. Turn the compressor ON.
The COMPRESSOR ON indicator illuminates and the compressor activates.
5. Turn the vacuum/recycle valve to RECYCLE.
Refrigerant flows from the vehicle, through your DUAL 3412 unit, and into the recovery tank.

As refrigerant is recovered, the low side manifold gauge shows increasing vacuum. Continue recovering until the low side manifold gauge indicates 15 inHg.

6. Close the:
 - High side manifold hand valve, and
 - Low side manifold hand valve.
7. Turn the vacuum/recycle valve to OFF.
8. Turn the compressor switch OFF.
The COMPRESSOR ON indicator goes out and the compressor stops running.
9. Monitor the low side manifold pressure gauge for about 2 minutes.
 - No change indicates recovery is complete. Continue with system repair and/or evacuation.
 - A pressure increase indicates more recovery time is required or the vehicle A/C system has a leak. Repeat steps 3 through 9.

If the gauge reading still increases, add a partial charge to the system and leak test with an electronic leak detector to find the leak.

10. Close the red and blue service hose hand valves or couplers.
11. Purge the non-condensable gases.
 - 3 For additional information refer to Purging Non-condensable gas in this chapter.
12. Compare the recovery tank pressure/temperature relationship with the chart and bleed off any non-condensable gases by pressing the Purge valve button.
13. Hold the graduated cup under the Oil Drain valve.
14. Slowly open the oil drain valve. Any accumulated oil expels into the cup.
15. Close the valve immediately when all of the oil is expelled. The amount indicated on the cup is the amount to add back into the vehicle system when recharging.
 - 3 Discard refrigerant oil in accordance with the laws in your area.

Purging Non-condensable Gas

- 3 Be sure to purge non-condensable gases immediately after each recovery and before each charge.
 1. Using the pressure/temperature chart located on the front panel of the unit, find the temperature that is the same as the reading on the temperature gauge. Next to the temperature is a pressure reading. That pressure reading should be what the pressure gauge indicates.
 2. If the pressure is higher, press the purge button on the front of the unit until the pressure on the gauge is the same as what is on the chart.
 3. Wait a minute and monitor the temperature and pressure again. If they do not correspond to the chart, purge again until they do.
-

Evacuating A/C System

Use this procedure to remove non-condensable gases and moisture from the vehicle A/C system.

3 If the gauges indicate pressure, recover refrigerant from the service hoses before proceeding. Refer to *Evacuating Service Hoses* in this Chapter.

1. Open the following:
 - Red service hose hand valve or coupler,
 - Blue service hose hand valve or coupler,
 - High side manifold hand valve,
 - Low side manifold hand valve, and
 - Yellow service hose hand valve.
2. Turn the Compressor switch ON.
The COMPRESSOR ON indicator illuminates and the compressor activates.
3. Turn the vacuum/recycle valve to VACUUM.
The low side manifold gauge shows vacuum increasing.
- 3** Follow the manufacturer recommendations for evacuation time, usually at least 30 minutes.
4. Close the manifold hand valves when the desired vacuum and duration have been reached.
5. Turn the Vacuum/Recycle valve OFF.
6. Turn the compressor switch OFF.
The COMPRESSOR ON indicator goes out and compressor stops running.
7. Monitor the low side pressure for 5 minutes.
Any rise in vacuum indicates a leak in the vehicle system.
- 3** If the source of the leak cannot be determined, partially charge the system and perform a leak test using an electronic leak detector.
8. When the leak is identified, repeat Recover/Recycle procedure, repair the leak and attempt the Evacuation procedure again.

Evacuation is complete.

Charging A/C System

1. Close the yellow service hose hand valve.
2. Remove the yellow hose with the anti-blowback valve from the “Recycle” port and connect it to the “Charge” port.
3. Open the blue (liquid) tank valve.
4. Press the Mode Button so a tare weight of 0.0 is displayed.
5. Connect the service hoses to the vehicle. Open the manifold hand valves.
6. Open the yellow service hose hand valve. Refrigerant flows from the tank into the vehicle.
7. Monitor the tank weight. When the desired charge amount is reached, close the yellow service hose hand valve or couplers. The refrigerant flow stops.

3 If the desired charge amount cannot be reached:

- Close the high and low side manifold hand valves,
- Run the A/C system,
- Open the low side manifold hand valve,
- Monitor the tank weight and close the hand valve when the desired charge amount is reached.

3 When charging, a slow charge condition may occur due to pressure equalization between your DUAL 3412 unit and the vehicle A/C system. Finish charging by:

- Closing the high-side manifold valve,
- Starting the engine, and
- Turning the A/C system ON.

3 Never operate the vehicle A/C system with the high side manifold valve open.

8. Close the blue (liquid) recovery tank hand valve.
 9. Monitor the high and low side system pressures. Refer to the manufacturers specifications for proper operation and diagnosis.
- ### 3 When charging a vehicle after evacuation, allow for the capacity of the hoses. Each hose holds approximately two ounces, so the charge amount should be increased by two ounces for each hose used.
-

- If there is not enough refrigerant in the tank to charge, refer to *Adding Refrigerant to DUAL 3412* in this chapter.

10. Remove the yellow hose with the anti-blowback valve from the “CHARGE” port and connect it to the “RECYCLE” port.

Charge is complete.

Displaying Refrigerant Amount

Use this procedure to determine the amount of refrigerant in the recovery tank and the amount able to be charged.

1. Press the Mode button until Gross weight displays on the LCD.
2. This is the total weight of the recovery tank plus recycled refrigerant. The tank itself weighs approximately 16 lbs.. Approximately 3 lbs of refrigerant is needed to meet the quill tube in the tank. This makes the “Tank Empty” point 19 lbs. Any refrigerant over this amount is usable for charging.

Tank Full/Empty

Messages display when the recovery tank is full or empty.

- 3 The unit may only be used to evacuate and charge an A/C system when the recovery tank is full.
- 3 The unit may be used to recycle or evacuate an A/C system when the recovery tank is empty.
- 3 “Tank Empty” is displayed when the Gross weight of the recovery tank is less than approximately 19 lbs.
- 3 “Tank Full” is displayed when the Gross weight of the recovery tank is 40 lbs.

Removing Recovery Tank

1. Close both valves on the recovery tank.
 2. Disconnect the hoses from the recovery tank.
 3. Remove the elastic band and the temperature probe from the recovery tank.
 4. Gently remove the recovery tank from the scale.
-

Evacuating Service Hoses

Evacuate the service hoses before removing them from the manifold gauge assembly and whenever contamination is suspected. Service hoses are not connected to a vehicle during this procedure.

1. Close the red and blue service hose hand valves.
2. Open the manifold valves.
3. Plug the power cord into a properly grounded A.C. outlet. See the ID plate on the back of the unit for the correct A.C. voltage.
4. Turn the Compressor switch ON. The COMPRESSOR ON indicator illuminates and the compressor activates.
5. Turn the vacuum/recycle valve to RECYCLE. Refrigerant flows from the vehicle, through your DUAL 3412 unit, and into the recovery tank.
6. Monitor the manifold gauges.

Service hose evacuation is complete when 15 inHg of vacuum is reached.

7. Turn the vacuum/recycle valve to OFF.
8. Turn the compressor switch OFF. The COMPRESSOR ON indicator goes out and the compressor stops running.

Service hose evacuation is complete.

Adding Refrigerant to DUAL 3412

Follow this procedure to add virgin refrigerant to your DUAL 3412 unit.

3 The recovery tank should have at least six pounds of refrigerant or the charge procedure may not be completed.

1. Refer to *Preparing and Installing Recovery Tank* in this chapter.
 2. Open the red (vapor) valve on the recovery tank.
 3. Connect the blue service hose from the manifold gauge assembly to the tank of virgin refrigerant.
-

- 3 For R-134a, install the supplied tank adapter between the tank valve and the blue hose. The virgin tank should be upright (valve up).
 4. Open the:
 - Virgin tank valve,
 - Yellow service hose hand valve,
 - Blue service hose hand valve, and
 - Blue manifold hand valve.
 5. Turn the compressor switch ON.
The COMPRESSOR ON indicator illuminates and the compressor activates.
 6. Turn the vacuum/recycle valve to RECYCLE.
Refrigerant flows from the virgin tank through your DUAL 3412 unit and into the prepared recovery tank.
 - 3 Monitor the weight on the LCD display until the desired amount of virgin refrigerant has been transferred.
Refer to Tank Full/Empty in this Chapter.
 7. When the desired amount of refrigerant has been transferred into the recovery tank, close the virgin tank hand valve.
 8. Allow the recycler to run until 15 inHg vacuum is reached, then close the blue service hose valve.
 9. Turn the vacuum/recycle valve OFF .
 10. Turn the compressor switch OFF.
The COMPRESSOR ON indicator goes out and the compressor stops running.
 - 3 Compare the recovery tank pressure/temperature relationship with the chart and bleed off any non-condensable gases by pressing the PURGE button.
Refer to Purging Non-condensable Gas in this chapter.
-

Master Filter

Change the master filter when the hour meter has accumulated 20 additional hours since the last master filter change. Any hours already showing on the meter when the unit is originally un-boxed and setup should be noted on the next page as the first entry. These should not be included in the first filter change interval, but considered the starting point. Complete the *Master Filter Maintenance Schedule* on the following page to keep track of when to change the master filter.

8. Mount the master filter securely by tightening the hook and loop strap.
9. Check for leaks.

Pump

The oil in the pump assembly must be changed quarterly to prolong pump life. The optional oil change kit is recommended. For additional information refer to *Replacement Parts* in this chapter. All of the parts necessary to change the pump oil are included in this kit.

Maintaining the Pump

1. Perform a Recycle on the service hoses, if necessary. For additional information refer to *Chapter 2 Evacuating Service Hoses*.
2. Unplug your DUAL 3412 unit from the electrical outlet.
3. Remove the screws holding the top cover.
4. Remove the top cover.
5. Remove the screws holding the front cover.
6. Remove the front cover.

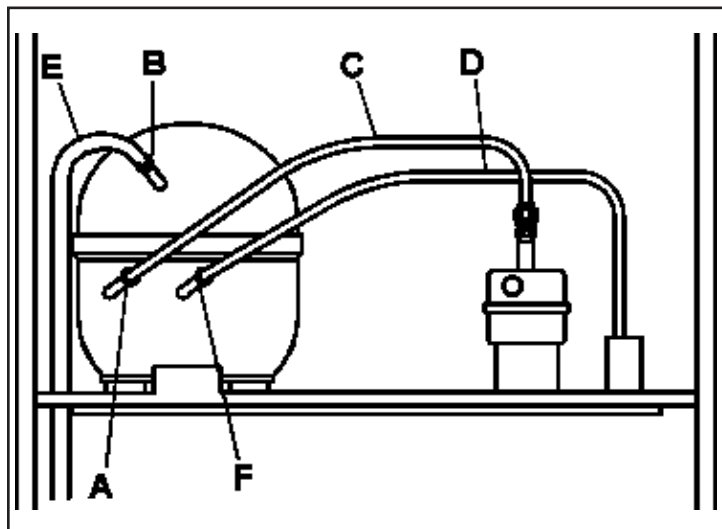


Figure 3-4: Pump

- A Outlet Line Connection at Pump
- B Input Line Connection at Pump
- C Outlet Line (Tube)
- D Process Line (Tube)
- E Input Line (Hose)
- F Process Line Connection at Pump

Troubleshooting

Symptom	Possible Cause	Remedy
Machine does not turn on	• Power cord not plugged in	– Plug in the power cord
	• No power in A.C. outlet	– Check power source
Refrigerant not being removed from vehicle	• Hand valves not open	– Open hand valves
	• Recovery tank full.	– Change tank or Charge refrigerant
Excessive purging of non-condensable gases	• Fitting(s) not properly connected to master filter	– Tighten fitting(s) finger tight
	• Leaky service hose or adapter connection drawing in air	– Tighten fittings or replace seals in finger tight fittings
Does not charge	• Blue hand valve on recovery tank not open	– Open blue hand valve
	• Fitting not properly connected to recovery tank	– Tighten fitting finger tight
	• No refrigerant in tank	– Fill tank with refrigerant
Machine does not draw a vacuum	• Loose hose connection	– Tighten loose hose connections
	• Oil drain valve open	– Close oil drain valve
Hissing noise from oil separator during recycle and/or vacuum mode	• Oil drain valve open	– Close oil drain valve
Refrigerant losses from tank on scale over time	• Leaky hand valve(s) on tank	– Make sure hand valves are either open completely (CCW) or closed completely (CW) and leak test
	• Leaky fitting(s)	– Oil seal with refrigerant oil and reconnect OR, replace fitting, oil seal and reconnect
Long recycle times	• System being recycled is cold and has components that hold a substantial amount of liquid refrigerant	– Heat A/C system by running engine with A/C OFF and keep hood closed as much as practical to hold in heat

