YELLOW JACKET®

Coolant Exchange Systems

MODEL

37500 Coolant Drain/Fill System

YELLOW JACKET®
RITCHIE ENGINEERING COMPANY, INC.

A. SHIPPING CONTAINER CONTENTS

Shipping Container Packing List

QTY	Description
1	Coolant Exchange System
1	Spec. Sheet for 37500 Model
1	Laminated Quick Reference Guide
1	Operations Manual with Quick Reference Guide
1	Hose Assembly (Black) 10’
1	Hose Assembly (Red) 10’
1	Pliers, Pinch Set
1	Probe/Bulk Filler
1	Drain-Fill Hose
1	Vacuum Cone Adapter
1	Accessory Bag

B. SAFETY SUMMARY

Congratulations on the purchase of your new engine coolant exchange system. The following safety information is provided as a guideline to help you operate your new engine coolant exchange system under the safest possible conditions. Any equipment that uses chemicals can be potentially dangerous when safety or safe handling instructions are not known or not followed during use. The following safety instructions will provide the user with the information necessary for safe use and operation. Please read and retain these instructions for the continued safe use of your engine coolant exchange system.

A step preceded by **WARNING** is an indication that the step contains a procedure that might be injurious to a person if proper safety precautions are not heeded.

A step preceded by **CAUTION** is an indication that the step contains a procedure that might damage the equipment being used.

A **NOTE** may be used before or after a procedure step to highlight or explain something in that step.

I. SAFETY INSTRUCTIONS

Every professional has respect for the tools with which they work. They know that the tools represent years of constantly improved designs and developments. The true craftsman also knows that tools are dangerous if misused or abused. To reduce risk of discomfort, illness, or even death, read, understand, and follow the following safety instructions. In addition, make certain that anyone else that uses this equipment understands and follows these safety instructions as well.

READ ALL SAFETY INSTRUCTIONS CAREFULLY before attempting to install, operate or service this equipment. Failure to comply with these instructions could result in personal injury and/or property damage.

RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.
Published standards on safety are available. They are listed in ADDITIONAL SAFETY INFORMATION at the end of this SAFETY SUMMARY.

Note: The following safety alert symbols identify important safety messages in this manual. When you see one of the symbols shown here, be alert to the possibility of personal injury and carefully read the message that follows.

II. MOTION HAZARDS WARNING

ENGINE PARTS THAT ARE IN MOTION AND UNEXPECTED MOVEMENT OF A VEHICLE CAN CAUSE INJURY OR DEATH.

- When working near moving engine parts, wear snug-fitting clothing and keep hands and fingers away from moving parts. Always stay clear of moving engine parts. Hoses and tools can be thrown through the air if not kept clear of moving engine parts.
- The unexpected movement of a vehicle can cause injury or death. When working on vehicles always set the parking brake or block the wheels of the vehicle being serviced.

III. FUME HAZARDS WARNING

GASES AND VAPORS CAN CAUSE DISCOMFORT, ILLNESS, AND DEATH!

- Breathing vehicle exhaust emissions can cause sickness, injury, or death.
- Always work in a properly ventilated area when servicing a vehicle with the engine running.
- Always perform vehicle service in a properly ventilated area. Never run an engine without proper ventilation for the exhaust. Stop the process if you develop momentary eye, nose, or throat irritation as this indicates inadequate ventilation. Stop work and take necessary steps to improve ventilation in the work area.

IV. HEAT HAZARDS WARNING

HOT COOLANT CAN BURN SKIN AND INJURE EYES.

- Hot vehicle cooling systems are under pressure.
- Opening a hot cooling system can cause hot coolant to be forcibly sprayed in all directions.
- Wait until the engine has cooled in the vehicle before removing the radiator cap, cutting a system hose or in any way opening the vehicle cooling system when the engine is hot.

V. POISONOUS FLUID HAZARDS WARNING

COOLANT IS POISONOUS.

- Ingesting coolant can cause serious illness and even death. If coolant is spilled on the skin or the clothing next to the skin, it can cause discomfort due to irritation.
- Keep coolant out of reach of children and pets.
- If coolant should be accidentally swallowed, take the person or pet in for medical assistance immediately. Be sure to identify to the doctor the type of coolant or chemical that was ingested.
- If medical assistance is not immediately available, call the local poison center.
- If someone is experiencing discomfort due to irritation from coolant coming in contact with the skin, use water with a mild detergent and/or rinse thoroughly with clean water.

VI. SPLASH HAZARDS WARNING

CONTACT WITH COOLANT CAN BE HARMFUL!

- Coolant spilled on the skin or the clothing next to the skin can cause discomfort due to irritation.
- Contact with the eyes may cause permanent damage. Be careful not to splash fluid in your eyes.
- Wear protective gloves and safety glasses or goggles when handling coolant.
- Flush eyes with water for at least 15 minutes and get medical attention immediately if coolant comes in contact with your eyes.

VII. ADDITIONAL SAFETY INFORMATION

For additional information concerning safety, refer to the following standards and comply with as applicable.

- ANSI Standard Z87.1 — SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION — obtainable from the American National Standards Institute, 11 West 42nd St. New York, NY 10036 (212) 642-4900, fax (212) 398-0023 www.ansi.org

C. INTRODUCTION

Thank you for selecting the YELLOW JACKET® Engine Coolant Exchange System. You have joined the many automotive service centers and fleet operators who use it to reduce the time and expense of changing coolant. This machine is easy to use, durable, and trouble-free:

- Fast coolant exchange.
- Facilitates vehicle repairs by draining and holding coolant.
- Allows used coolant to be pumped into a large container for mass recycling purposes.
- Saves money by reducing the time needed to change coolant.

I. ABOUT THIS MANUAL

This manual includes safety information, machine preparation and warranty information for engine coolant exchange system model 37500. Anyone intending to use this machine should become familiar with ALL the information included in this manual (especially the SAFETY SUMMARY) before attempting to use the engine coolant machine. In order to properly perform a complete service, follow the procedures in the order presented.

Please take the time to study this manual before operating the machine. Then keep this manual close at hand for future reference. The fluid used in a vehicle's cooling system is known as both antifreeze and coolant. Antifreeze gets its name by the properties in the fluid that prevents it from freezing at very low temperatures. It is also known as coolant, because of its ability to cool the engine during operation. Both terms are correct, however one or the other may be more commonly used in different geographical areas. From this point on in this instruction manual, we have elected to use the term coolant.

II. BENEFITS OF THE DRAIN, FILL PROCESS

Used coolant may damage a vehicle's cooling system in numerous ways. The Vacuum-Fill system can correct problems that might cause vehicle damage and can even prevent possible cooling system damage. Table 2 describes the potential cooling system problems, the damage that can be caused by that problem and the solution to the potential problem.

Cooling System Potential Problems and Solutions

POTENTIAL PROBLEM	Suspended Matter	**DAMAGE CAUSED**	Engine overheating from:
Metal		Plugged radiator	
Metal oxides (rust)		Plugged heater core	
Hard water scale		Plugged intercooler	
Solidified antifreeze		Premature engine wear	
Additives		Thermostat deposits and failure flush system	
		Water pump wear and failure	

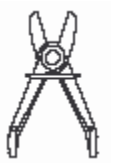
III. COOLANT DETAIL INFORMATION

CAUTION: <u>DO NOT BLEND DIFFERENT TYPES OF COOLANT</u>

Different types of inhibitors may react with one another, leading to engine damage.
Coolant can generally be divided into four classifications, which can be identified by color:

- **<u>Domestic Coolant</u>** is green to blue-green in color and may contain phosphate, silicate and molybdate inhibitors. Ideal pH range is 9.8 to 10.5.
- **<u>Dex-Cool</u>** is orange in color, contains organic acid inhibitors. Ideal pH is 8.3.
  Note: Many foreign vehicles will contain domestic coolant, depending on the manufacturing site and the vehicle port-of-entry into the United States.
- **<u>Asian Coolant</u>** is red in color, contains low level of silicate inhibitors, high level of molybdate inhibitors, and moderate level of nitrate inhibitors. Ideal pH range is 8.2 to 8.6.
- **<u>European Coolant</u>** is blue in color or colorless, and is free of phosphates. Ideal pH range is 9.8 to 10.5.

REQUIRED ACCESSORIES



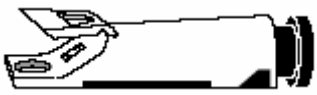
Pinch-Off Pliers Set – Part # 375175

Pinch-Off Pliers: These special pliers (one set of 3 sizes) are used to pinch off the vehicle's heater hoses and prevent excessive fluid loss during service. They are also used to direct the flow of coolant during other processes.

Vacuum Cone – Part # 375093

Vacuum Cone: This cone is the single connection to the radiator or overflow reservoir during the vacuum exchange process. It is connected to the RED hose by a quick coupler adapter for fast and easy attachment spill free attachment.

OPTIONAL ACCESSORIES



Refractometer – Part # 69000

Refractometer: This professional tool is not supplied with your machine and must be ordered separately. The refractometer (Figure 5) determines the freeze point of coolant. It is a delicate instrument. Handle it with care and do not expose it to extreme hot or cold conditions. Do not drop it or misuse it.

D. MACHINE PREPARATION

Although minimal, the machine requires some assembly and setup before use. The following instructions describe the necessary steps to prepare your new machine for use.

Power Requirements

- 12 Volt DC
- Shop Air /100 psi Max

I. INSTALL COMPRESSED AIR FITTING

The only assembly required for this machine is the installation of a fitting to the machine AIR INLET for connecting the shop compressed air to the machine and connecting the two hoses.

1) Apply one or two wraps of Teflon tape to the threads of a 1/4" pipe thread nipple that threads into the machine AIR INLET port (Figure 1) and mates with the quick-connect couplers on your shop compressed air line. Make certain that the Teflon tape is on the fitting threads only and does not block the air flow path. (The fitting is not supplied due to the variety of fittings for compressed air.) Tighten fitting securely.

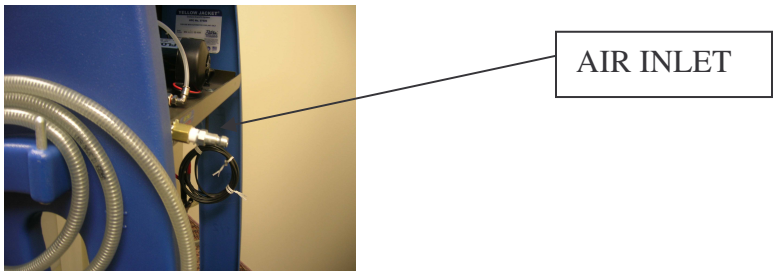


Figure 1: Machine Hose Port Connection Locations

2) Connect the compressed air line to the nipple connection.

CAUTION: Compressed air that supplies more than 100 psi may damage the machine. Never connect a compressed air line that is in excess of 100 psi to this machine. The compressed air supply must be fairly dry and free from oil and other debris. If the machine pump speed slows dramatically or becomes erratic (slowing down and speeding up, repeatedly), you may need to install a water trap or drying device in your compressed air system. Failing to heed this caution could damage the pump.

WARNING

Coolant can cause severe skin irritation or burns, on contact. If coolant is spilled on the skin or the clothing next to the skin, it can cause severe discomfort due to irritation. When opening orifices or any portion of system that could potentially contain coolant, take special care not to spill the fluid on skin or clothing. If a spill should occur, flush with large quantities of cool or lukewarm fresh water immediately. Wear safety glasses or goggles and latex gloves while handling coolant.

II. CONNECT HOSES

Connect the black hose to the left side machine port and connect the red hose to the right side machine port and verify that the quick-connect couplers are attached to the other end of each hose.

Note: The machine's hoses have screen washers in the hose fitting at the machine. This is to collect debris from the vehicle's cooling system. The screens should be removed periodically and cleared of debris so that the hoses do not become plugged, which will cause high system pressure.

E. OPERATING INSTRUCTIONS

These operating instructions were written to reflect normal circumstances. It is assumed that the vehicle being serviced will be a passenger car or light truck with the thermostat mounted on the top of the engine block connected to the upper radiator hose and the standard pressure relief cap is mounted on the radiator. Vehicles with larger cooling system capacities may require adjustments, such as longer processing time during the flush process.

I. CONTROLS AND INDICATORS

Figure 2 defines and explains the controls and indicators on the control panel that are used to operate the machine.

Figure 2: Controls and Indicators

Process Controls

1. Valve A & B selects the operation to be performed.
2. Valve C, the "Tank Selector" selects which tank coolant is being extracted and discharged into the desired location.

Hose Placement

- Left Hose – used for top off operation
- Right Hose - used for all operations

1. SYSTEM ON/OFF CONTROL: This toggle switch turns the machine on or off.
2. The COOLING SYSTEM VACUUM gauge indicates the vacuum that will build up within the vehicle's cooling system
3. Storage compartments provide space to keep flushing tees and cross flow adapters.
4. The NEW COOLANT TANKS are used to hold new coolant only.
5. The RED hose (TO VEHICLE) is the active line through which coolant is pumped out of the machine
6. The BLACK hose (FROM VEHICLE) is a passive line that allows the coolant to return to the processing tank when fluid is pumped to the vehicle.
   The black hose is used to top off cooling system and to pump coolant from machine.
7. The WASTE TANK is used to hold used coolant from the vehicle and is also used in the flushing process.

II. PRIMING THE MACHINE

Whenever this machine is used, make sure that a minimum amount of coolant is available in the processing tank. If there is not sufficient coolant in the tanks, air will be pulled into the machine's system as well as the vehicle's cooling system during operation.

CAUTION: Compressed air that supplies more than 100 psi may damage the machine. Never connect a compressed air line that is in excess of 100 psi to this machine.

- Verify that the AIR INLET port is connected to your shop compressed air line.
- Control Positions
    1. Set controls to fill new coolant tanks
    2. Select desired tank for coolant
    3. Turn ON PUMP switch to start the pump and allow it to run until coolant steadily flows into the desired tank (about 1 minute). This will purge air from the internal tubing and the pump, allowing it to work more efficiently.

III. FILL NEW COOLANT TANKS

1. See valve placement per illustration
2. Select the tank to be filled
3. Insert probe into cone adapter
4. Turn on valve located at Red hose end
5. Insert Red hose into bulk coolant container
6. Connect DC leads to 12 volt power source
7. Turn on DC pump switch
8. Monitor level of coolant. **IMPORTANT: DO NOT OVER FILL !!**
9. **Fill to desired level**
10. **Remove Red hose from bulk with valve open to clear the hose.**
11. Shut off DC pump switch.
12. Close valve at end of Red hose
13. Disconnect cone from dry break coupler
14. Remove Bulk fill tube.

WARNING

Engine parts that are in motion can cause injury or death. When working near moving engine parts, wear snug fit clothing and keep hands and fingers away from moving parts. Always stay clear of moving engine parts. Hoses and tools can be thrown through the air if not kept clear of moving engine parts.

The unexpected movement of a vehicle can cause injury or death. When working on a vehicle, always set the parking brake or block the wheels of the vehicle being serviced. Move the vehicle into servicing position and shut off the engine. Set the transmission in park or neutral and set the parking brake or block all four wheels.

WARNING

Hot engines, exhaust systems, and hot cooling systems can cause severe burns. Do not remove the radiator cap, cut a system hose, or open the vehicle cooling system in any way while the engine is hot. Always wait until the engine cooling system is cooled down before attempting service.

I. INSPECT THE VEHICLE

Always inspect the vehicle before starting the coolant change.

1. Check fan belts for wear and adjust to the proper tension, if necessary.
2. Check for damp spots or rust near or on the hose clamps, water pump, or other areas that might indicate possible leakage.
3. Check hose clamps for tightness and inspect all hoses for swelling, hardness, cracks, soft spots, or other signs of wear or aging.
4. Inspect radiator cap for signs of damage or wear. Also, find and note the pressure rating printed on the radiator cap.
5. Repair or replace damaged parts as necessary.

WARNING

Hot coolant can burn skin and injure the eyes. Hot vehicle cooling systems are under pressure. Opening a hot system can cause hot coolant to be forcibly sprayed in all directions. Never attempt to open a vehicle radiator cap, cut hoses or open the system in any way if it is hot. Wait until the system cools down before attempting to open the system.

WARNING

Make certain the vehicle exhaust system is properly vented to the outside and that the work area is properly ventilated with fresh air. Automobile exhaust fumes are poisonous and can cause sickness and death.

Vacuum Test

The purpose of the vacuum test is to check if the radiator cap will allow coolant to be pulled from the overflow tank back into the cooling system. If this test is successful, it also gives the benefit of draining the coolant from the overflow tank so that it will be exchanged as well.

- Set valve per illustration
- Place cone adapter in radiator neck
- Turn on vacuum switch
- Pull vacuum on system to 20-28 in Hg
- During this operation you will be removing engine coolant in preparation of the vacuum-fill
- Hold vacuum on system for 2-3 minutes and monitor vacuum gauge that system holds vacuum.

Note: Before beginning this next step, perform the “DRAIN ACCUMULATOR TANK” process, to make sure that the Accumulator Tank is empty.

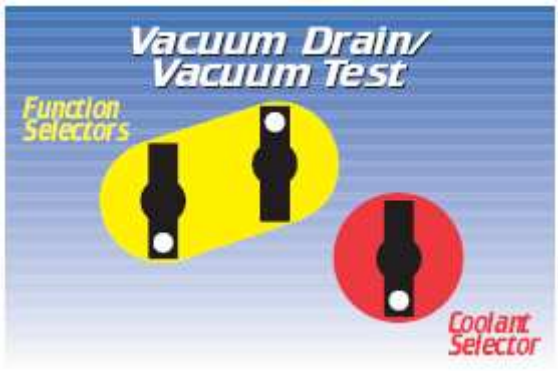
Drain Accumulator Tank

- Set controls per illustration
- Turn on DC Pump switch
- When Liquid stops flowing, Turn-OFF DC Pump switch
- If Used/Old coolant tank is full, perform “Drain Old Coolant” process.

Note: VEHICLE ENGINE MUST BE HOT AND THERMOSTAT OPEN FOR NEXT STEP.

Vacuum/Drain System

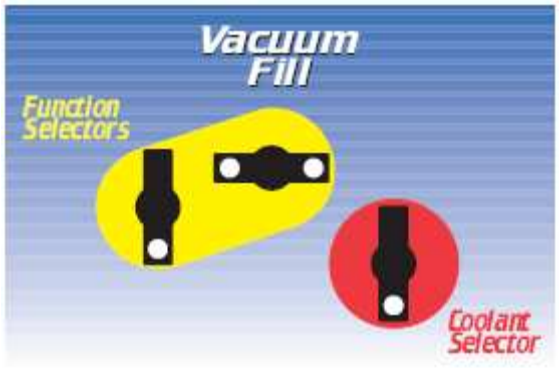
- Set valve per illustration
- Attach cone adaptor to Red hose
- Place cone adapter in radiator neck
- Turn on vacuum switch
- Open valve on Red hose
- Pull vacuum on system to 20-28 in Hg
- During this operation you will be removing engine coolant in preparation of the vacuum-fill
- Pull vacuum on system for 4-5 minutes and monitor vacuum gauge that system holds vacuum.
- Close valve on Red hose



Note: Valve "B" serves as Tank Selector in this process.

Vacuum/Fill System

- Turn-Off Vacuum switch
- Set valves per illustration
- With cooling system under vacuum
- Select coolant tank
- Open valve on Red hose
- Coolant will fill cooling system by the vacuum process.
- Shut-Off valve
- Remove Cone adaptor from radiator or overflow tank
- Perform Top-Off System / Overflow function if necessary.



Note: Valve "A" serves as Tank Selector in this process.

Top off System/Overflow

- Set valves per Illustration
- Connect to 12 volt DC
- Connect Cone Adaptor to Black hose
- Insert probe into cone adapter
- Insert probe into reservoir
- Select coolant tank
- Turn on pump
- Open hose valve
- Close hose valve when system / radiator is topped-off.
- Turn off pump

MAINTENANCE

You can keep the coolant exchange system looking good and operating efficiently by performing regular maintenance. Coolant will occasionally splash and deposit on the exterior of the machine. Periodically wipe down the coolant exchange system with cloth and mild cleaner.

Filter

This unit has a screen element to protect the unit from damage from debris in the coolant system. This screen should be cleaned periodically. Before each use you should examine the filter to determine if the screen is clean. If the screen is not clean follow these steps to clean and replace it.

1. Locate the screen housing in the rear of the unit in the unit upper left hand corner.
2. Perform the vacuum drain operation to remove as much coolant as possible.
3. Unscrew the clear filter housing.
4. Pull the filter element out of the housing.
5. Clean with warm water use a soft bristle brush if necessary.
6. Insert the filter element into the clear filter housing.
7. Reattach the clear filter housing.
8. Check for leaks.

Replacement filters are available; see the replacement parts section of the manual on Pg. 22 for the correct part number.

REPLACEMENT PARTS

QTY	Description	Part Number
1	Hose Assembly (Red) 10’	#375154 (includes (1) Red Grip # 375152)
1	Hose Assembly (Black) 10’	#375154 (includes (1) Black Grip # 375153)
1	Pliers, Pinch Set	#375175 (set of three different size pliers)
1	Probe/Bulk Filler	#375026 (½” OD X 41” LONG Nylon Tube)
1	Drain-Fill Hose	#375026 (½” OD X 16 ¼”” LONG Nylon Tube)
1	Vacuum Cone Adapter	#375093 (includes (1) #375176 Quick Conn.)
1	Accessory Bag	#375168

LIMITED WARRANTY

We guarantee Ritchie YELLOW JACKET products to be free of defective material and workmanship which would affect the life of the product under normal use for the purpose for which it was designed for a period of one year.

This warranty does not cover items that have been altered, abused, misused, improperly maintained, or returned solely in need of field service maintenance. If found defective, we will replace or repair, at our option, the defective product provided it is within one year of the date of factory shipment. Correction in the manner provided above shall constitute a fulfillment of all liabilities with respect to the quality, material and workmanship of the product.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF QUALITY, WHETHER WRITTEN, ORAL OR IMPLIED.

Returns (Warranty)
For Coolant Exchange Equipment call 1-800-769-8370 for instructions for service, repair, or return.

Hose placement

a. Only uses one hose

Power Requirements

a. 12 Volt DC
b. Shop Air /120 psi Max

Features

Fill New Coolant Tanks

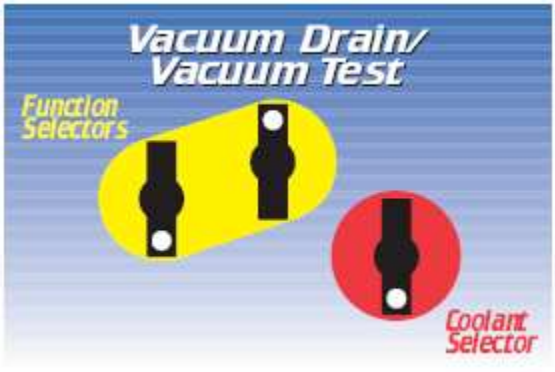
1. See valve placement per illustration
2. Select the tank to be filled
3. Insert probe into cone adapter
4. Turn on valve located at Red hose end
5. Insert Red hose into bulk coolant container
6. Connect DC leads to 12 volt power source
7. Turn on DC pump switch
8. Monitor level of coolant. **IMPORTANT: DO NOT OVER FILL !!**
9. **Fill to desired level**
10. **Remove Red hose from bulk with valve open to clear the hose.**
11. Shut off DC pump switch.
12. Close valve at end of Red hose
13. Disconnect cone from dry break coupler
14. Remove Bulk fill tube.

Drain Overflow reservoir

1. Attach probe to Hose with cone adapter in place
2. See valve placement per illustration
3. Open Hose Valve
4. Turn on air switch
5. Remove probe from cone assembly

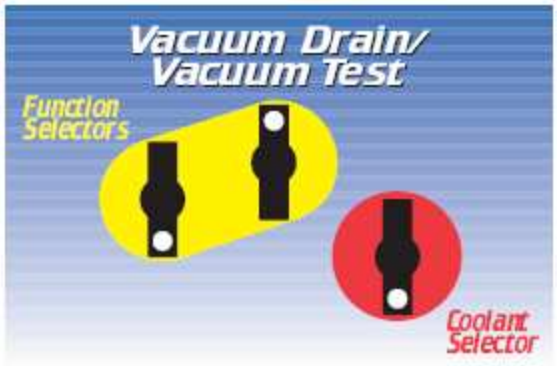
System pressure relief

1. Place cone adapter on over flow reservoir opening
2. See valve placement per illustration (Use Vacuum test Settings)
3. Turn on Air /Vacuum switch
4. Continue applying vacuum until a stream of coolant is viewed exiting from the radiator.
5. Turn off air switch
6. Continue applying vacuum until a stream of coolant is viewed exiting from the radiator
7. Turn off Air Switch



Vacuum Test

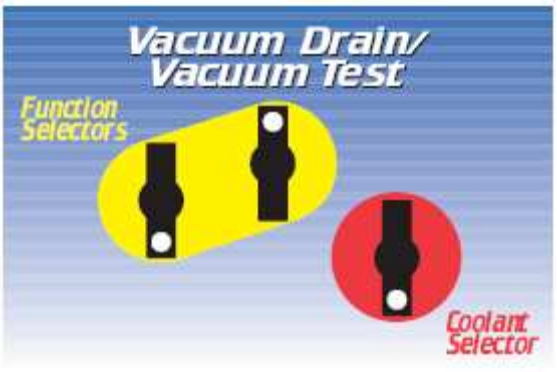
1. Set valve per illustration
2. Place Cone adapter in radiator neck
3. Turn on Vacuum switch
4. Pull vacuum on system to 20-28 in Hg
5. During this operation you will be removing engine coolant in preparation of the VAC-U-Fill
6. Hold vacuum on system for 2-3 minutes and monitor vacuum gauge that system holds vacuum.



Note: VEHICLE ENGINE MUST BE HOT AND THERMOSTAT OPEN FOR NEXT STEP.

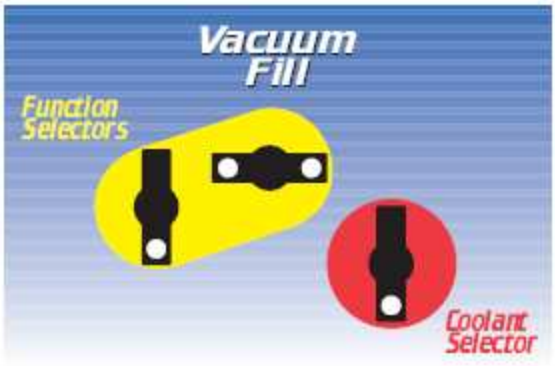
Vacuum/Drain System

1. Set valve per illustration
2. Attach cone adaptor to Red hose
3. Place cone adapter in radiator neck
4. Turn on vacuum switch
5. Open valve on Red hose
6. Pull vacuum on system to 20-28 in Hg
7. During this operation you will be removing engine coolant in preparation of the vacuum-fill
8. Pull vacuum on system for 4-5 minutes and monitor vacuum gauge that system holds vacuum.
9. Close valve on Red hose



Vacuum/Fill System

1. Turn-Off Vacuum switch
2. Set valves per illustration
3. With cooling system under vacuum
4. Select coolant tank
5. Open valve on Red hose
6. Coolant will fill cooling system by the vacuum process.
7. Shut-Off valve
8. Remove Cone adaptor from radiator or overflow tank
9. Perform Top-Off System / Overflow function if necessary.



Top off System/Overflow

1. Set valves per Illustration
2. Connect to 12 volt DC
3. Connect Cone Adaptor to Black hose
4. Insert probe into cone adapter
5. Insert probe into reservoir
6. Select coolant tank
7. Turn on pump
8. Open hose valve
9. Close hose valve when system / radiator is topped-off.
10. Turn off pump

Drain Vehicle

See Vac-U-Drain Feature

Drain New Coolant – Note: Use the Black hose

1. Set Valves per Illustration
2. Connect to 12 Volt DC
3. Insert Probe into Cone adapter
4. Insert probe into BULK CONTAINNER
5. Select coolant tank
6. Open Black hose valve
7. Turn-On DC Pump switch
8. Turn Off pump
9. Close Back hose valve when tank is empty

Drain Old Coolant

1. Set controls per illustration
2. Place hose assembly into bulk container
3. Turn on DC Pump
4. Run until desired amount of coolant has been removed from the storage tank

Drain Accumulator Tank

- Set controls per illustration
- Turn on DC Pump switch
- When Liquid stops flowing, Turn-OFF DC Pump switch
- If Used/Old coolant tank is full, perform “Drain Old Coolant” process.