Device Es 3 For Cleaning Engine, Valves, Dpf Filter

User's Manual

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Chapter 1
"Introduction"

Through the years, there has been an excess demand in Pollution Reduction, Fuel Economy and Enhanced Performance for Consumer Engines (Automobiles & Motorcycles). Engine Manufacturers have gone a long way, since Carburetor Engines and Diesel Engines, to reach today at the revolutionary approach of Electronically Controlled Injection (Port Injection & Direct Injection) as well as Common-Rail Diesel. With this approach they have successfully reduced emissions and gained fuel economy through accurate injection of fuel and Diesel Atomization.

Through use, engines produce chronicle defects, such as: carbon, varnish and gum built-up in the combustion chamber (valves), exhaust system and catalyst. These faults in turn, produce an undesired effect which causes engine malfunction, increase in emissions, increase in fuel consumption, unstable engine operation, loss of engine performance and excessive air pollution.

Leading manufacturer in Automotive Engine Diagnosing, Testing & Cleaning Equipment, offers the ES Series units for the treatment of all types of fuel systems presently used (Carburetor, Diesel, MPFI, TBI, CIS, G-DI, Common-Rail Diesel), and provides upgradeability of the machine for Future Engine Types yet to come.

Components List

- ES.3 Machine.
- Standard Adapters & Fittings
- Engine Detergent
- DPF.01 (Diesel Particulate Filter Cleaning Adapter Kit)
- IMC.01 (Intake Manifold Cleaning Adapter Kit)

Technical Specifications

Mains Voltage (VDC)	12 VDC
Power Consumption Idle (W)	10
Power Consumption max (W)	160
Fuel pressure gauge (bar)	0-10
Power Supply Cord	12V Dc, 2.5m
Fuel Hoses Feed / Return lines (m)	2.5
Pump High Pressure (bar)	0-50
Pump Blow-off valve (bar)	8
Max. Fuel Pressure Electronically Adjusted (bar)	8
Output System Pressure (bar / psi)	0-10 / 0-145
Filter Type (Gasoline or Diesel)	FLEETGUARD FF5074 or Equivalent
Max. Filter Usage (Cleaning Cycles/Time)	25cycles/ 1year
Outer max dimensions W / D / H (cm)	39x37x98
Weight (kg): ES.3 / STD Adapters / Packaging	28.3 / 1.5 / 3
Max. Filling Volume per Tank (lit./ gal.)	3.0 / 0.8

ES.3 Main parts

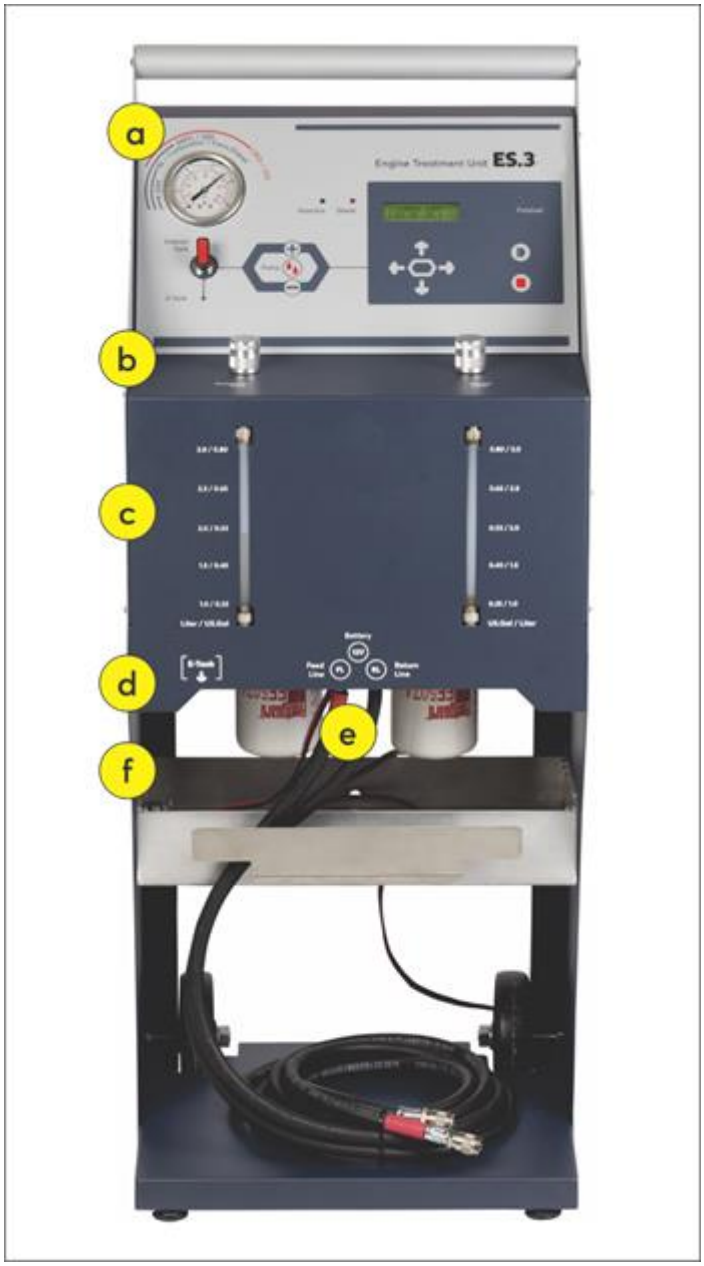


Figure 1, ES.3 Front View

a) Control Panel
b) Fuel Tank Caps
c) Fuel Tank Levels
d) E-Tank (External Tank) Port
e) Feed and Return Line and 12V Power Cord
f) Fuel Filters

a) **Control Panel (**Fig. 2), is the main interface between the user and the machine. Through the “Function Display” the user can find useful information, such as directions on how to proceed and select different operations by using the control buttons.

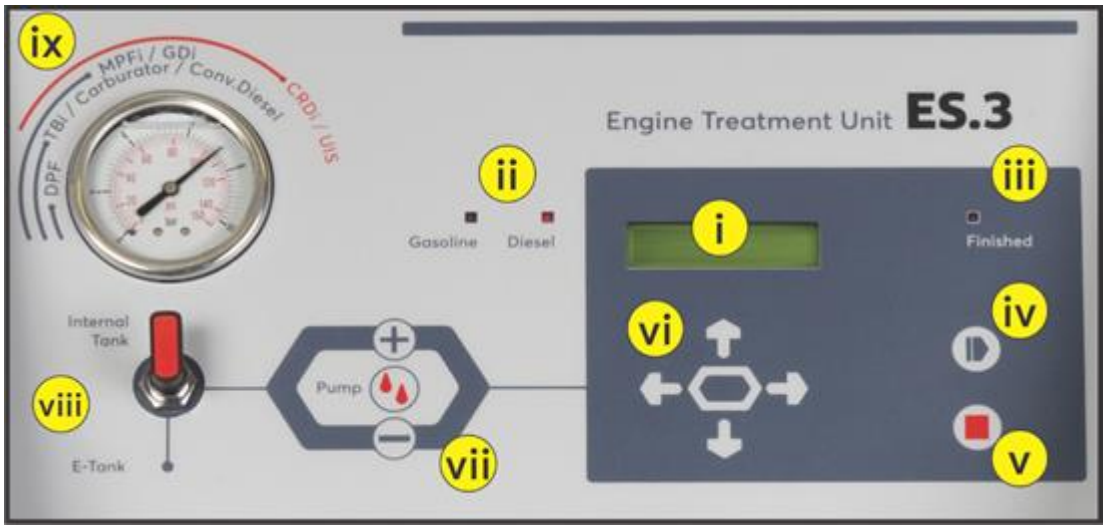


Fig. 2, ES.3 Control Panel

i. **Function Display**: provides useful instructions.
ii. **Operation Indication LED’s**: when in automatic mode: the specific led is lit.
iii. **Finished Indication Led**: lights up when cleaning process is done.
iv. **Enter/Select Button**: used to start an operation / go forward in the menus.
v. **Stop/Cancel Button**: used to end an operation / go backward in the menus.
vi. **Arrow Buttons**:
    - **Up Arrow**: used to increase / select upward in the menus.
    - **Down Arrow**: used to decrease / select downward in the menus.
    - **Left Arrow**: used to move left in the menus.
    - **Right Arrow**: used to move right in the menus.
vii. Pump Control Buttons:

- **Pump/Leak Test Button**: used to activate / deactivate the Machine Pump, or do a leak test.
- **(+) More/Increase Pressure Button**: used to increase the Machine Pump pressure.
- **(-) Less/Decrease Pressure Button**: used to decrease the Machine Pump pressure.

viii. **Tank Switch Valve (Internal / E-Tank):** When switched to Internal, the Gasoline / Diesel Internal Tanks are used. When Switched to E-Tank, the Operator must use his own External Tank on the E-Tank Port.

ix. **Fuel Pressure Indicato**r: Shows the operating pressure of the current system selected (Gasoline or Diesel). Always correct the pressure of the machine to the automobiles specified pressure (refer to automobile manual) using the MORE/LESS buttons on the machine control panel.

b) **Fuel Tank Caps,** remove to pour detergent and fuel in the specific tank.

c) **Fuel Tank levels,** indicate the tank contents.

d) **E-Tank Port** for connecting an external Tank to ES.3. Selectable through the Control Panel.

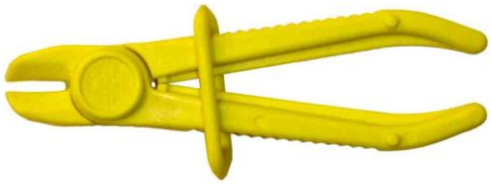
e) **Feed and Return Lines** are used to supply the automobile's engine with fluid mixture and also return that mixture to the machine (is applicable). **12V DC Power Connection** is used to power-up the ES.3 machine with any 12V Battery (DC). Always connect the RED CONNECTOR the positive pole (+) and the BLACK CONNECTOR to the negative pole (-) of the battery.

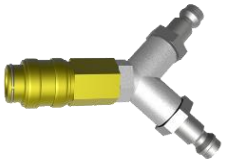
f) **Fuel Filters,** (FLEETGUARD FF5074 or equivalent) are used to filter the treatment mixture before feeding the automobile. It is important for the correct operation of the machine and the automobile engine to replace filter regularly (every 25 cleaning cycles). Two (2) filters are

provided with the machine. One is used explicitly for Gasoline type engines and the other explicitly for Diesel type engines.

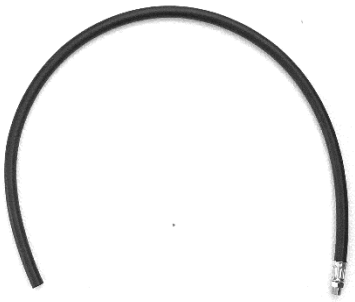
Adapters & Fittings

Table 1, ES.3 Adapters

ADAPTER FIGURE	DESCRIPTION	Qty
	Hose Crimping Pliers **"CPL-001"**	1
	Female Thread Connector **"FTC-14.1"**	1
	Female Thread Connector **"FTC-16.15"**	1
	Hose Fuel Line **"HFL-6"**	1
	Hose Fuel Line **"HFL-75"**	2
	Hose Fuel Line **"HFL-95"**	1
	Banjo Fitting **"BF-10"**	1
	Banjo Fitting **"BF-12"**	1

	Male-to-Male Fitting **“MTM-14”**	1
	Male Thread Connector **“MTC-14.15”**	1
	Male Thread Connector **“MTC-16.1”**	1
	Quick Connector **“QC-8A”**	1
	Quick Connector **“QC-8B”**	2
	Quick Connector **“QC-95B”**	1
	Special Adapter for all Banjo Fittings **“ADAPT-BF”**	1 (+2 seals)
	T-Piece Quick Connector **“ADAPT-T”**	1
	Hose **“H-75”**	1

	Fuel / Detergent Funnel	1
Filter MANN	FLEETGUARDFF5074	2
	**AEAK.1** Automobile exclusive adapters kit. Quick connectors-USA models (Optional Kit)	8
	**DPF.01 / DPF.2L** DPF adapter (optional) DPF Specific Detergend (optional)	2

	**IMC.01** IMC adapter (optional)	1
	CE285 Engine Detergent (Sold in Box of 24 items)	24
	**E-TANK Hose** Hose for connecting E-Tank Port to External Tank (1/8” male / 75cm)	1

Chapter 2
"Operation"

SAFETY PRECAUTIONS

ALWAYS

- Check fuel system for leaks.
- Consult the automobile's manufacturer manual for connection instructions.
- Check automobile for correct level of engine oil and water coolant.
- Check automobile for other problems that may cause overheating while operating.
- Use a high temperature exhaust ventilation hose.
- Fender covers to protect automobile paint from spills.
- Wear rubber gloves for protection from petroleum based fluids.
- Handle machine detergent with caution, as other petroleum based products.
- Have a fire extinguisher nearby.
- Wear eye goggles.

NEVER

- Operate the machine when leaking fluid.
- Permit the hoses and/or power cable to come in contact with exhaust or moving parts of the engine.
- Disconnect machine under system pressure.
- Run engine at NOT well-ventilated areas.
- Smoke nearby machine.
- Operate close to open flame or sparks.
- Operate Machine without Fluid. **PUMP WARRANTY WILL VOID.**

CAUTION: ***An EFI Fuel Pump is capable of delivering at least 2 liters (1/2 gallon) of fuel flow per minute at a pressure greater than 10bar (150psi)***

IMPORTANT: ***Always observe the automobile for fuel leaks or evidence for potential fuel leaks. "To avoid disaster and personal injury, take care when working on fuel systems"***

Setup Machine

1. Unpack the Machine and its components.
2. Connect the machine to a 12VDC power source
3. The ES.3 machine is now ready for operation.

Change the language

1. Power up the ES.3 machine.
2. Press the STOP/CANCEL and the UP ARROW buttons simultaneously for more than 3 seconds.
3. Use the UP or DOWN Arrow buttons to choose the desired language.
4. Press ENTER/SELECT button to

Switching Tanks (Internal / External)

Use the Manual Switch on the Control Panel to Switch Tanks.

Always take care for correct connections and Tank Contents.

Instructions and Tips

Before the Cleaning Cycle begins

- Assure engine is at normal operating temperature.
- Check oil level to be within the manufacturer's specs.
- Check water coolant level to be within the manufacturer's specs.
- Assure that engine coolant system is working properly.
- Do not do this cleaning process if engine suffers from major damages or malfunctions.
- Automobile should be at well-ventilated areas or use a high temperature exhaust ventilation hose.
- Do not smoke while operating this machine.
- Do not operate close to open flame or sparks.
- It is recommended to refer to the automobile manufacturer's manual for connecting to the fuel system.
- It is recommended to periodically supervise the engine temperature to be within normal operating range.
- **Connect the ES.3's power cords to the automobile's 12V battery (Red wire indicates "+" positive sign).**
- The user should always follow the instructions on the ES.3 's Display for correctly filling the tank with mixture. Usually for an engine capacity of less than 2200cc use ½ bottle (125ml) of Cleaning Detergent Fluid with Gasoline and 1 bottle (250ml) with Diesel to ½ of the tank. Otherwise, use 1 bottle with Gasoline and 2 bottles with Diesel with full tank.
- Remove automobile Fuel Tank Cap, to release Tank Pressure.
- Refer to the specific schematic in Chapter 3, for correctly connecting the ES.3 machine to the different fuel system types.

After the Cleaning Cycle ends

1. Turn off the automobile ignition.
2. Allow 3 minutes for system to cool down and release pressure.
3. Carefully disconnect the machine fuel lines from automobile.
4. Re-connect automobile fuel lines as shown at automobile manual.
5. Where applicable, restore power to the fuel pump.
6. Disconnect machine's power cord from automobile.
7. Test drive automobile for 10-15 minutes or 5-10 km (3-6 miles) at different speeds to burn-out whatever is left inside the engine and stabilize system from the cleaning cycle.
8. Change engine oil and oil filter after the previous step is completed (Engine oil may be diluted by the detergent mixture gases that have passed through the piston rings (blow-by gases).
9. It is recommended to replace the spark plugs. Applicable only for gasoline engines. On older technology engines, this step is mandatory.
10. On older technology engines, you should reset the HC and CO levels to normal. Also, adjust the spark advance to manufacturer's specifications.

IMPORTANT NOTES:

- ***The machine tank should always have fuel left up to ¼ of the tank level for maintenance of the fuel pump. Pour clear fuel (gasoline / diesel) inside tank and close tank cover.***
- ***Do not run the ES.3 's pump without fuel in the tank. The fuel cools the pump.***
- ***Cars equipped with automatic transmission, check automobile manufacturer's recommendation for prolonged high idle speeds.***

Table 2, Useful Conversion Table

150 Psi	10 Bar (1000 KPa)
100 Psi	7 Bar (700 KPa)
50 Psi	3,5 Bar (350 KPa)
35 Psi	2,4 Bar (240 KPa)
18 inHg	-65 kPa
2 Psi	15 kPa
2 liters	0.53 US gallons

FUEL SYSTEM TYPE	NORMAL OPERATING PRESSURE	MAX. ADJUSTED PRESSURE BY ES.3	RECOMMENDED ENGINE OPERATING RPM's
Multi Point Injection (MPFI) {Return Type}	0.5 – 4.0 Bar	2.5 – 4.8 Bar	1750 - 2350 RPM
Multi Point Injection (MPFI) {Return-less Type}	0.5 – 4.0 Bar	3.2 – 4.8 Bar	1850 - 2500 RPM
Throttle Point Injection (TBI)	0.5 – 3 Bar	0.8 – 2.2 Bar	1400 - 2100 RPM
CIS or mechanical systems	3.6 – 5.6 Bar	3.6 – 5.6 Bar	1550 - 2200 RPM
Carburetor	0.5 – 3 Bar	0.3 – 0.6 Bar	1300 - 2000 RPM
Diesel tunes {Conventional}	0.5 – 3 Bar	0.3 – 0.8 Bar	1200 - 1700 RPM
Diesel tunes {CRDI}	2.0 – 8.0 Bar	2.5 – 4.0 Bar	1300 - 1900 RPM

Table 3, Fuel System Operating Characteristics

Table 4, DPF / IMC Parameters

DPF		
IMPORTANT NOTE ES.3 machine Operation Characteristics: • Pressure: 6 bar • Time: 75 min • Engine Speed: 1500-2000 RPM First heat-up Engine to maximum operating temperature in order to heat up the DPF, or make a re-generation of DPF if possible, using a scantool.		
<2000cc	**2000-4000cc**	**Heavy Duty** **Truck, Bus etc.**
6’ ON / 7’ OFF	**11’ ON / 7’ OFF**	**17’ ON / 7’ OFF**
IMC		
IMPORTANT NOTE ES.3 machine Operation Characteristics: • Pressure: 6 bar • Time: 75 min • Engine Speed: 1500-2000 RPM		
<1600cc	**1600-2500cc**	**>2500cc**
5’ ON / 10’ OFF	**8’ ON / 10’ OFF**	**12’ ON / 10’ OFF**

Main Operation

Configure a Simulation

The ES.3 unit is completely Automatic and provides step-by-step instructions on how to proceed.

Once the unit is powered-up by 12 VDC power source, the user will be asked to select PUMP MODE; Here you can select the regular Engine Cleaning Cycle, or the DPF-IMC Cycle for Cleaning the DPF or Intake-Manifold. Then Select the System GASOLINE/DIESEL and AUTOMATIC or MANUAL mode (Using the arrow *Left / Right* & the *Enter/Start Buttons*).

In AUTOMATIC mode, the unit will guide the user by providing simple questions on what type of Engine the automobile has, e.g.:

- Diesel / Gasoline
- MPFI / TBI / G-DI / CARBURETOR etc.
- Less than 2000cc / greater than 2000cc
- V-Type / In Series Engine Type
- etc.

Once the user configures the type of engine, unit will ask the user if further instructions on connections and mixtures are needed or not.

If the user selects ‘yes’, the unit will provide useful instructions on how to proceed, otherwise the unit will built-up the appropriate pressure and continue with the cleaning process.

The user should always take care on how to connect the unit on the automobile by consulting the illustrations in this manual, as well as the automobile’s instructions manual.

<u>IMPORTANT</u>: When selecting MANUAL mode, the ES.3 machine activates its fuel pump for a specific amount of time (no instructions are provided). The user is also responsible to set / fine tune the pressure, using the pressure more/less buttons in the control panel.

<u>INFORMATION</u>: For DPF and IMC Mode, you can adjust the parameters like time, as per the DPF/IMC Table. Use the Right/Left Arrows to select Time and ON/OFF Timers and use the Up/Down Arrows to Change the values. Start/Stop buttons begins and ends the test.

Chapter 3
"Connections"

Below are different connection diagrams for the following systems:

1. MPFI, TBI, CIS Gasoline Engines
2. Return-less Gasoline Engines
3. G-DI / FSI Gasoline Direct Injection Engines
4. COMMON-RAIL and Conventional Diesel Engines
5. Carburetor Gasoline Engines

MPFI, TBI, CIS Gasoline Engines

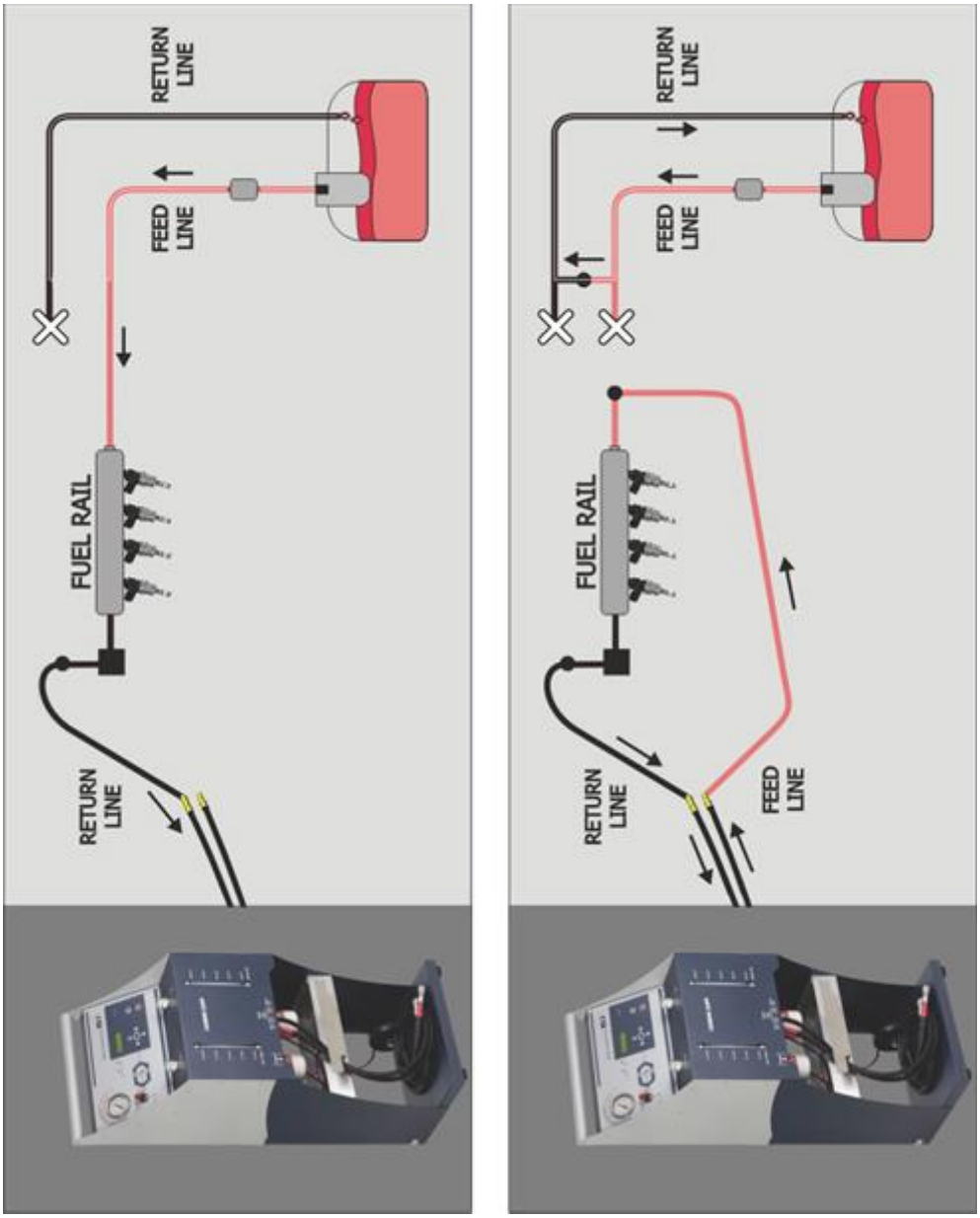


Figure 3, Gasoline Fuel Injection Systems, (Left Figure) Using Automobile's Fuel, (Right Figure) Typical Connection.

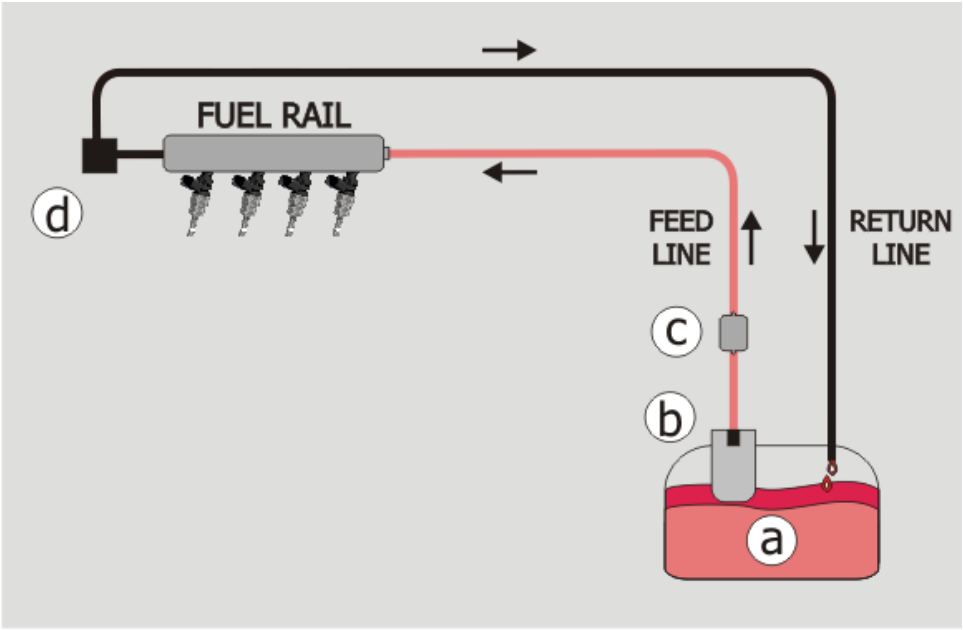


Figure 4, Typical Fuel Injection System

LEGEND
a. Automobile Tank b. Electrical Pump with retention valve c. Fuel Filter d. Pressure Regulator

IMPORTANT: ***Always bypass (loop) automobiles fuel lines using the adapters provided, if applicable, OR disconnect electrical power to the pump (Remove Pump RELAY or FUSE)***

Return-Less Gasoline Engines

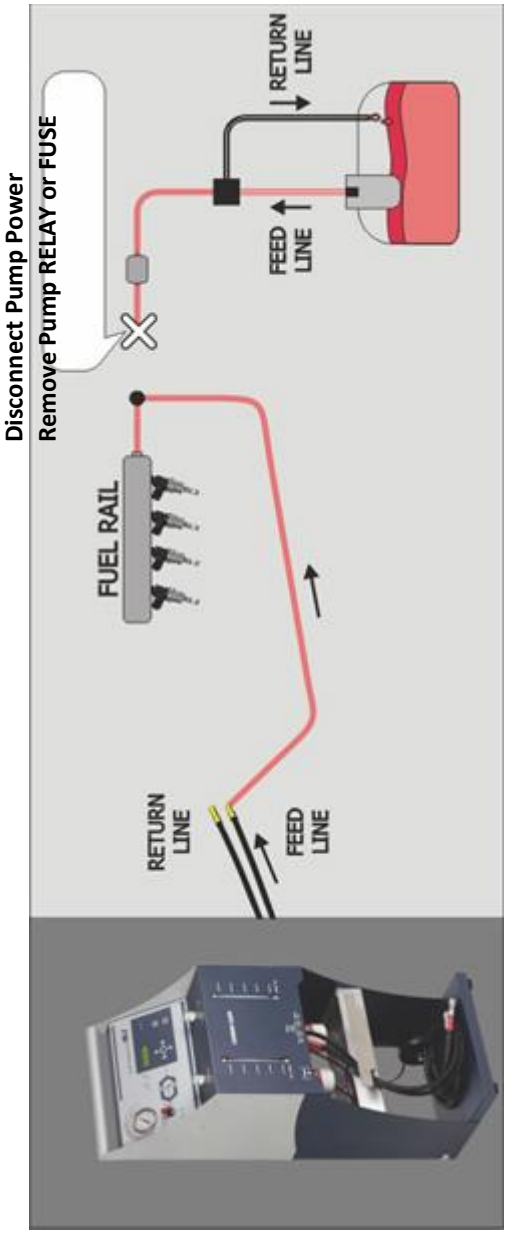


Figure 5, Gasoline Fuel Injection System (Return-less Type), Typical Connection.

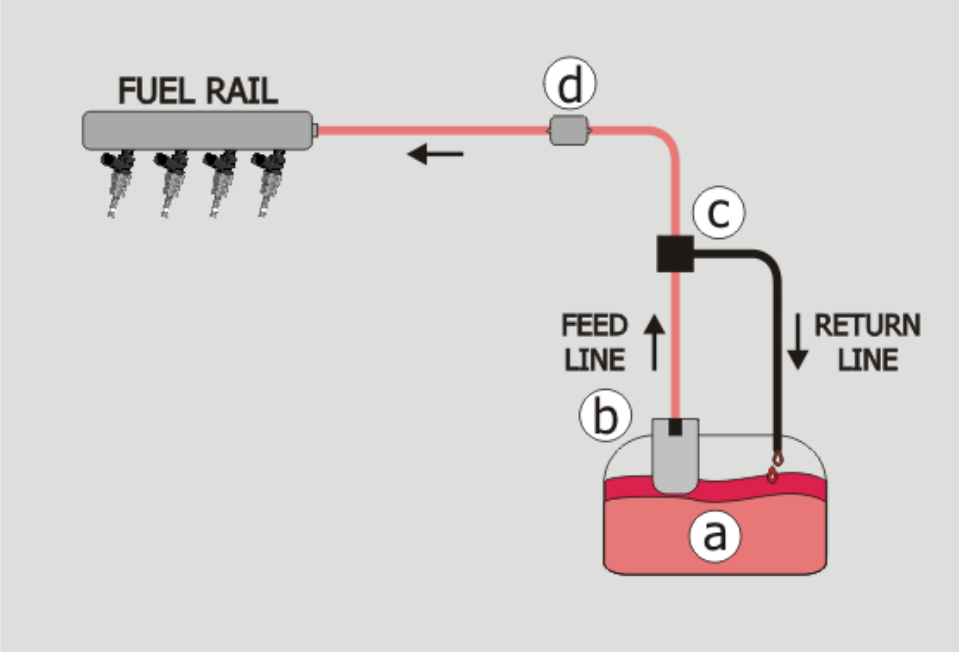


Figure 6, Typical Gasoline Fuel Injection System (Return-less Type)

LEGEND
a. Automobile Tank b. Electrical Pump with retention valve c. Pressure Regulator d. Fuel Filter

***IMPORTANT:** Always bypass (loop) automobiles fuel lines using the adapters provided, if applicable, OR disconnect electrical power to the pump (Remove Pump RELAY or FUSE)*

G-DI / FSI Gasoline Direct Injection Engines

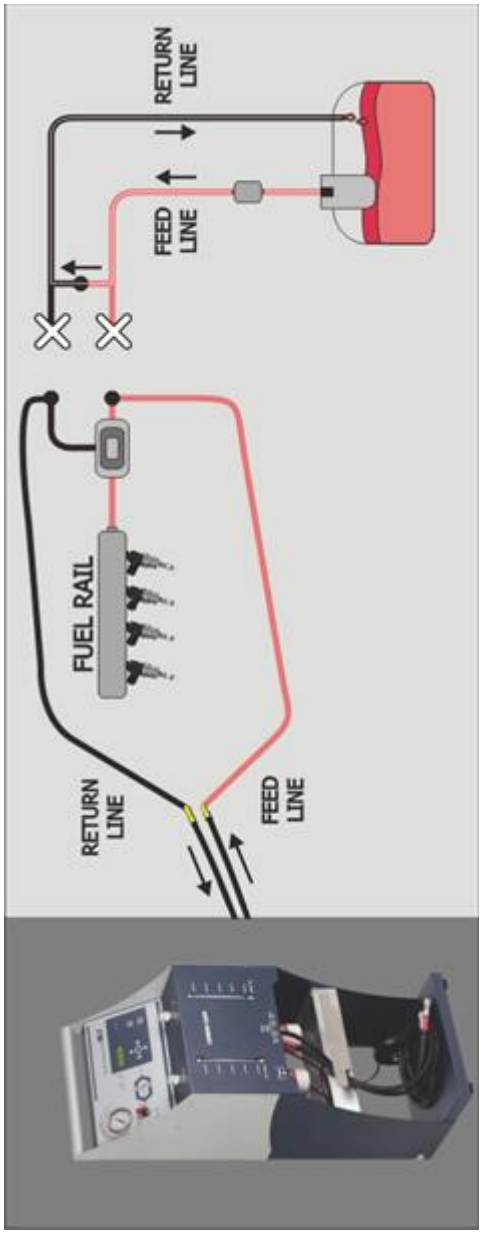


Figure 7, Gasoline Direct Injection System (G-DI), Typical Connection.

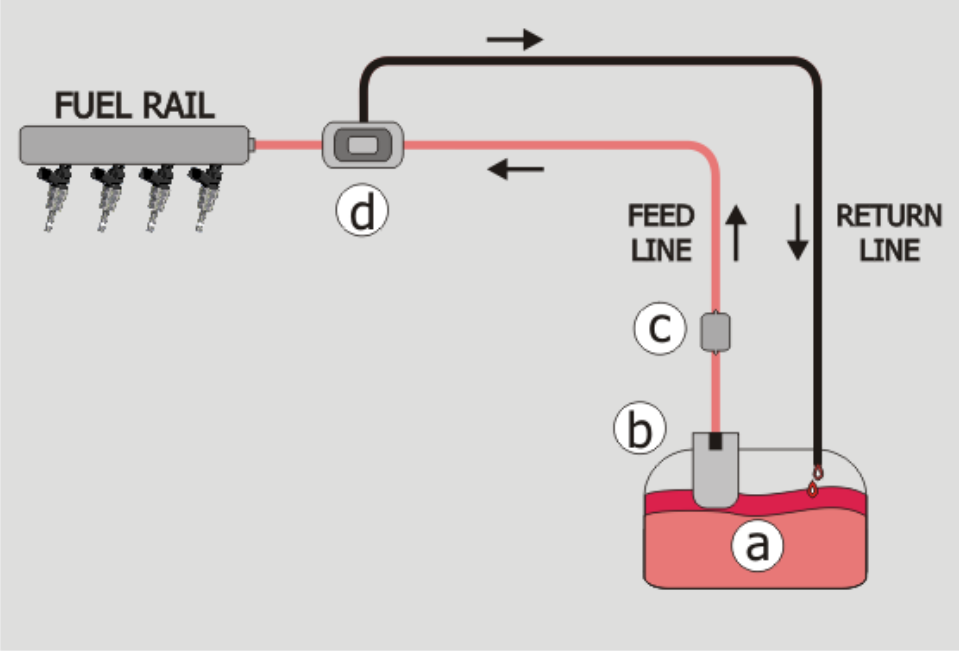


Figure 8, Gasoline Direct Injection System (G-DI)

LEGEND
a. Automobile Tank b. Electrical Pump with retention valve c. Fuel Filter d. High Pressure Mechanically Driven Pump

IMPORTANT: ***Always bypass (loop) automobiles fuel lines using the adapters provided, if applicable, OR disconnect electrical power to the pump (Remove Pump RELAY or FUSE)***

COMMON-RAIL and Conventional Diesel Engines

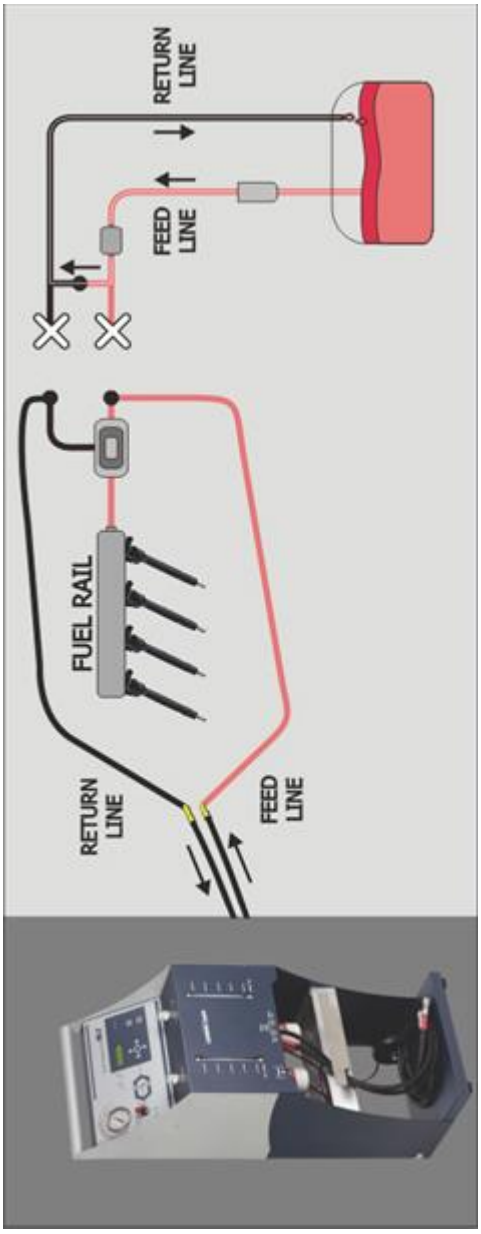


Figure 9, Diesel Injection System {CRDI}, Typical Connection.

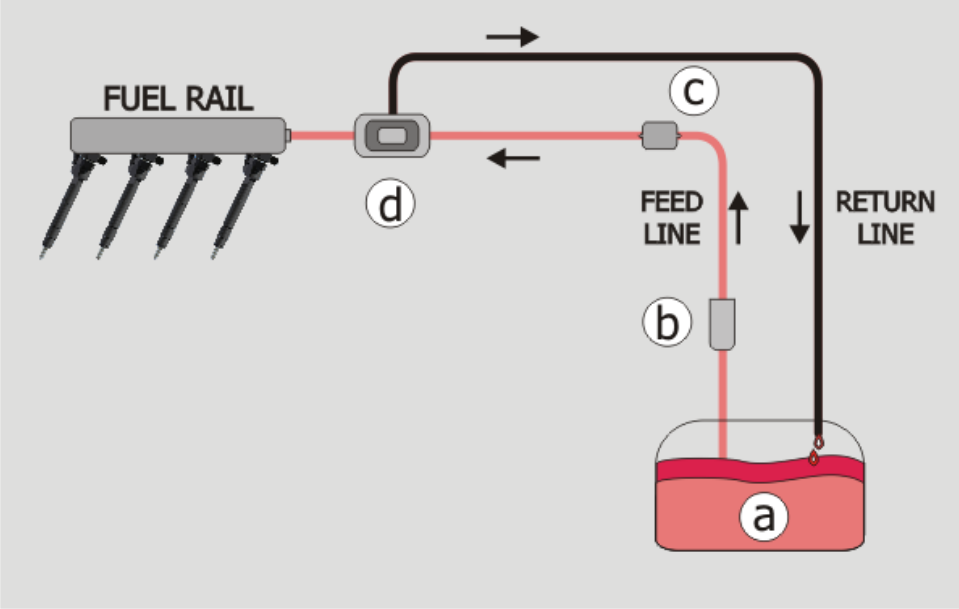


Figure 10, Diesel Injection System

LEGEND
a. Automobile Tank b. Electrical Pump with retention valve c. Fuel Filter a. High Pressure Mechanically Driven Pump

IMPORTANT: ***Always bypass (loop) automobiles fuel lines using the adapters provided, if applicable, OR disconnect electrical power to the pump (Remove Pump RELAY or FUSE)***

Carburetor Gasoline Engines

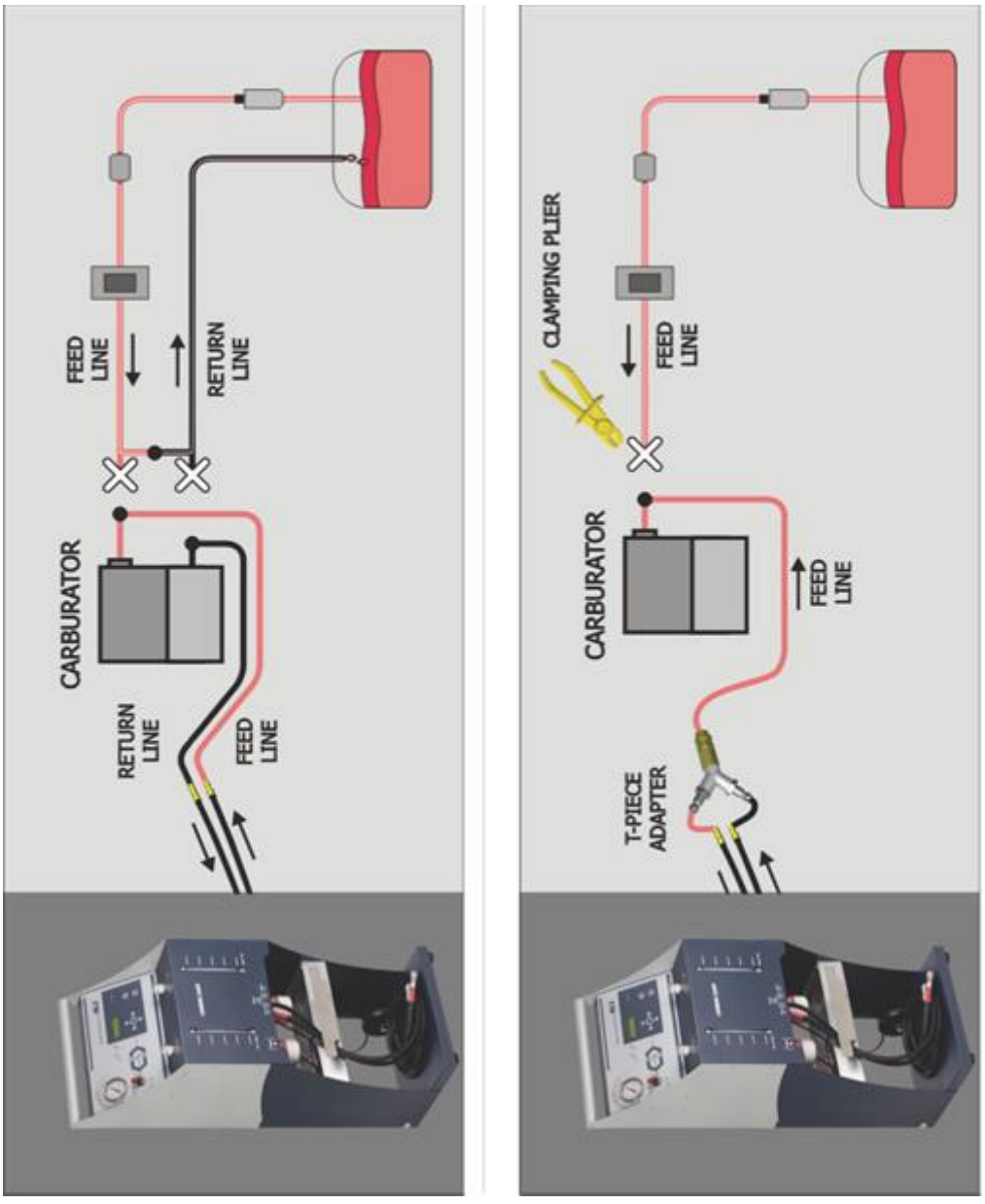


Figure 11, Carburetor System,
(Left Figure) Return Type, (Right Figure) Return-less Type.

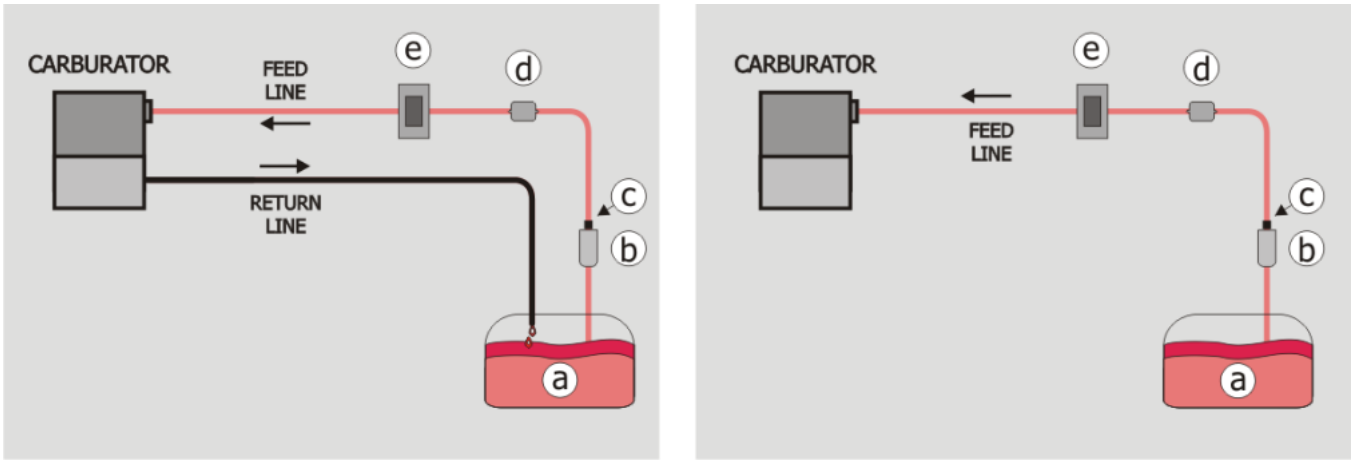


Figure 12, Carburetor System,
(Left Figure) Return Type, (Right Figure) Return-less Type.

LEGEND
a. Automobile Tank b. Electrical Pump c. Retention valve d. Fuel Filter e. Low Pressure Mechanically Driven Pump

***IMPORTANT:** Always bypass (loop) automobiles fuel lines using the adapters provided, if applicable, **OR** disconnect electrical power to the pump (Remove Pump RELAY or FUSE)*

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