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CAUTION

**Important Safety Instructions:**

- Please read the manual carefully before using the instrument for proper operation!
- Be careful when touching the device or hot parts of the engine.
- If the power cord is broken, please do not turn the device on and use it. If the device is dropped or damaged, please use it after being inspected by a professional.
- Please do not hang the power cord on the edge of the table, chair or counter. Do not touch hot parts or rotating fan blades.
- If it is necessary to extend the power cable, the level of the power cord should be higher than or equal to that of the original power line. Overheat may occur if a power cable of inferior level is used.
- Do not connect the plug of power cord when not using the device. Do not remove the plug by pulling the power line. It should be unplugged by hand.
- The device should be cooled completely before storage and the line should be wound up.
- The cleaning agent for the device is a flammable and weakly volatile liquid. Smoking and lighting fires are strictly prohibited during the cleaning process.
- The instrument should be placed in a room that is not exposed to direct sunlight and is well ventilated, and signs "Smoking and lighting fires strictly forbidden" and "Danger warning of inflammables" should be posted.
- The operator's hair, clothes, fingers and other parts of the body should be kept away from the operating parts of the equipment.
- To prevent electric shocks, do you touch the operating equipment in wet areas or operate it in the rain.
- Please operate the device as described in the manual. Use accessories recommended by the manufacturer.
- It is strictly forbidden to open the ultrasonic system under the circumstances that ultrasonic cleaning agent has not been added into the ultrasonic cleaning pool. Otherwise, the ultrasonic equipment may be damaged easily.
- The housing of the device must be reliable and grounded.
- Automobile exhaust contains a variety of toxic and harmful gases (such as carbon monoxide, hydrocarbon, nitrogen oxide and etc.). During the test, the exhaust should be directed outdoors and the room should be well ventilated.
- The temperature of the exhaust pipe and water tank of the automobile's engine is high. Do not touch them to prevent burns.
- Please pull up the handbrake of the vehicle to be cleaned, shift the transmission to neutral position and block the front wheel before free disassembly cleaning.
- Wear safety glasses when operating. Daily wear glasses are not safety glasses.
- When disconnecting a pressurized fuel pipe union, please cover the union with a towel to avoid getting hurt by fuel gushing out and causing fires.
- Test solution is used by the main unit of the device uses, and ultrasonic cleaning agent is used for ultrasonic cleaning.

ⓘ: indicates where attention should be paid when operating the device.

⚠: indicates the possibility of product damage and personnel injury during operation.

Content

I. INTRODUCTION TO CNC-603A INJECTOR CLEANER & TESTER.....	1
1.1 Brief Introduction.....	1
1.2 Functions and Features.....	1
1.3 Working Environment and Specifications.....	2
II. STRUCTURE OF CNC-603A INJECTOR CLEANER & TESTER.....	3
2.1 Structure.....	3
2.2 Control Panel.....	3
III. INSTALLATION AND CONNECTION.....	4
3.1 Installation.....	4
3.2 Connection.....	4
IV. OPERATION PROCEDURES FOR CLEANING AND TESTING OF INJECTORS.....	5
4.1 Preparations.....	5
4.2 Cleaning and Testing Sequences.....	6
4.3 Cleanup after Operation.....	6
V. OPERATION PROCESSES.....	7
5.1 Uniformity / Sprayability Test.....	7
5.2 Leakage Test.....	8
5.3 Injecting Flow Test.....	9
5.4 Auto. Test.....	9
5.5 Ultrasonic Cleaning.....	12
5.6. On-Vehicle Cleaning.....	13
5.7. Language Selection.....	15
5.8. Version Information.....	16
VI. SERVICE AND MAINTENANCE.....	17
6.1 Handling, Storage and Installation Environment.....	17
6.2 Common Quick-Wear Parts and Consumables.....	17
6.3 Precautions and Solutions to Common Problems.....	18
VII. COMMISSIONING AND MAIN PARTS.....	19
7.1 Schematic Diagram and Parts List of Whole Structure.....	19
APPENDIX I: FUEL SYSTEM PRESSURE GAUGE OF TYPICAL VEHICLES.....	23

Special note: *The manual introduces in detail the structure, functions, operation method and related accessories of CNC-603A Injector Cleaner & Tester, and briefly explains the precautions in the process of using, maintenance and handling of abnormalities. SmartSafe reserves the right to change the design and specifications of the product. The actual configuration shall be subject to the packing list.*

I. Introduction to CNC-603A Injector Cleaner & Tester

Welcome to use CNC-603A Injector Cleaner & Tester manufactured by Shenzhen SmartSafe Tech Co., Ltd. It is a mechatronic product that combines ultrasonic cleaning technology with microprocessor oil pressure control cleaning and testing technology. It is capable to simulate various working conditions of engine and perform cleaning and testing for injector.

1.1 Brief Introduction

The User Manual is applicable to the following product:

- CNC-603A Injector Cleaner & Tester: a desk 6-cylinder injector cleaner and tester.

1.2 Functions and Features

Main Functions

- **Uniformity / Sprayability test:** to detect the uniformity of the fuel injection quantity of each injector and monitor the spray status of injectors thoroughly and carefully by using the backlight, and to backflush injectors.
- **Leakage test:** to test the leakage and dribbling conditions of injectors under system pressure.
- **Injecting flow test:** to detect the amount of fuel injected normally by injectors in 15 seconds.
- **Auto. test:** under specific working conditions and parameters, the precise simulation of test of injectors under various working conditions
- **Ultrasonic cleaning:** to perform ultrasonic cleaning on multiple injectors at the same time, removing carbon deposits on injectors completely.
- **On-Vehicle Cleaning:** Coming with a variety of disassembly-free cleaning connectors, the device can be used to perform on-vehicle cleaning and maintenance for various vehicle models.
- **Language selection:** the system supports multiple languages and users can choose the appropriate language according to their needs.
- **Version information:** to check the software version information of the current device.

Main Features

- Adopting ultrasonic cleaning technology, CNC-603A Injector Cleaner & Tester presents a strong cleaning ability;
- The product also adopts fuel pressure adjustment and control technology by microcomputer, which can ensure stable fuel pressure and wide adjustable range. It is applicable to vehicles equipped with a variety of gasoline injection systems. Meanwhile, the automation of injectors' cleaning and testing processes can be realized.
- Thanks to the adoption of microcomputer automatic control and digital display technologies, the cleaning and testing processes can be controlled automatically and the parameters of the main status can be monitored in real time.
- Automatic fuel drain during a certain test can be realized via a routine, owing to the adoption of automatic fuel drain control technology. Start or [stop] fuel drainage via the [Drain] button on the control panel in running or stop state.

1.3 Working Environment and Specifications

Specifications:

Power: AC110V-127V, 50Hz/60Hz 3Amax
AC220V-230V, 50Hz/60Hz 1.5Amax
Mechanical Power: 300W
Ultrasonic Cleaning Power: 100W
Speed Range for Simulation Test: 10~9990rpm
(step: 10rpm)
Timing Range: 1~9999s
Pulse Width Range: 0.5~25ms (step: 0.1ms)
Operating Volume: 3000ml
Packing Dimension: 458mm×433mm×537mm
Main Unit Dimension: 396mm×380mm×446mm
Net Weight: 16.5kg
Gross weight: 18.5kg

Working Environment:

Environment Temperature: 0°C~+45°C
Relative Humidity: < 85%
Strength of External Magnetic Field: <400A/m
Open fires is strictly prohibited within 2m.

II. Structure of CNC-603A Injector Cleaner & Tester

2.1 Structure

The schematic diagram of CNC-603A Injector Cleaner & Tester is shown in Figure 2.1:

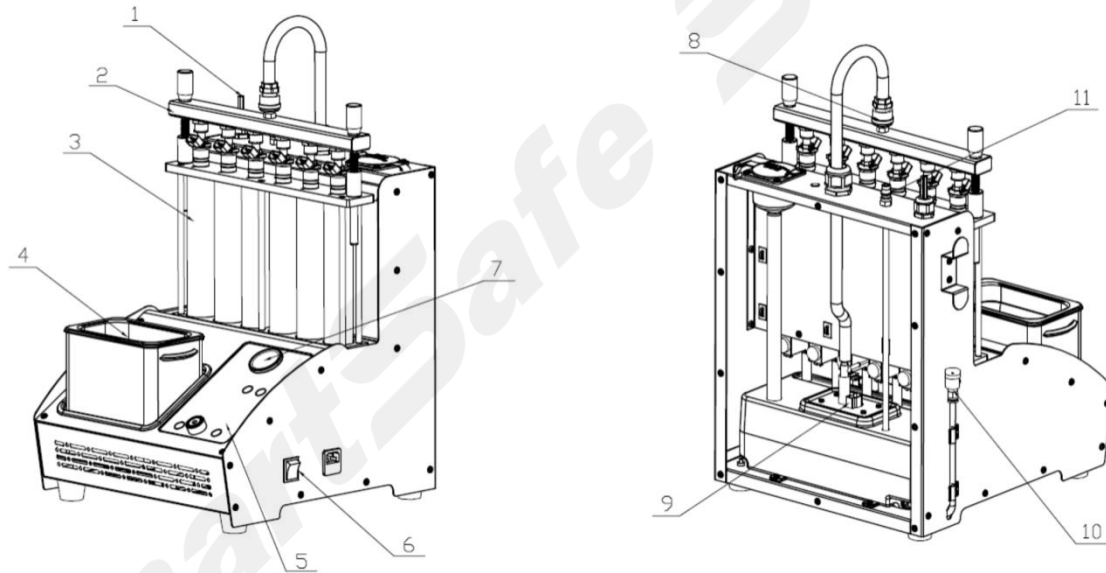


Figure 2.1 Schematic diagram of CNC-603A

1- Pulse line; 2-Fuel distributor assembly; 3-Observation window tube; 4-Ultrasonic cleaner; 5-Control panel; 6-Power switch; 7-Fuel pressure gauge; 8-Quick Connector ; 9-Fuel pump; 10-Fuel drainage pipe; 11-Automatic cleaning oil return port

ⓘ **Attention:** there may be slight difference between the illustrations in this manual and the actual product. The actual product prevails.

2.2 Control Panel

The control panel is shown in Figure 2.2:



Figure 2.2 Diagram of control panel

III. Installation and Connection

3.1 Installation

1. The installation steps of CNC-603A are as follows:

- 1) Move the packaged machine to a flat surface;
- 2) Check if the packaging, machine, accessory box, user manual, power cord and etc. are complete.

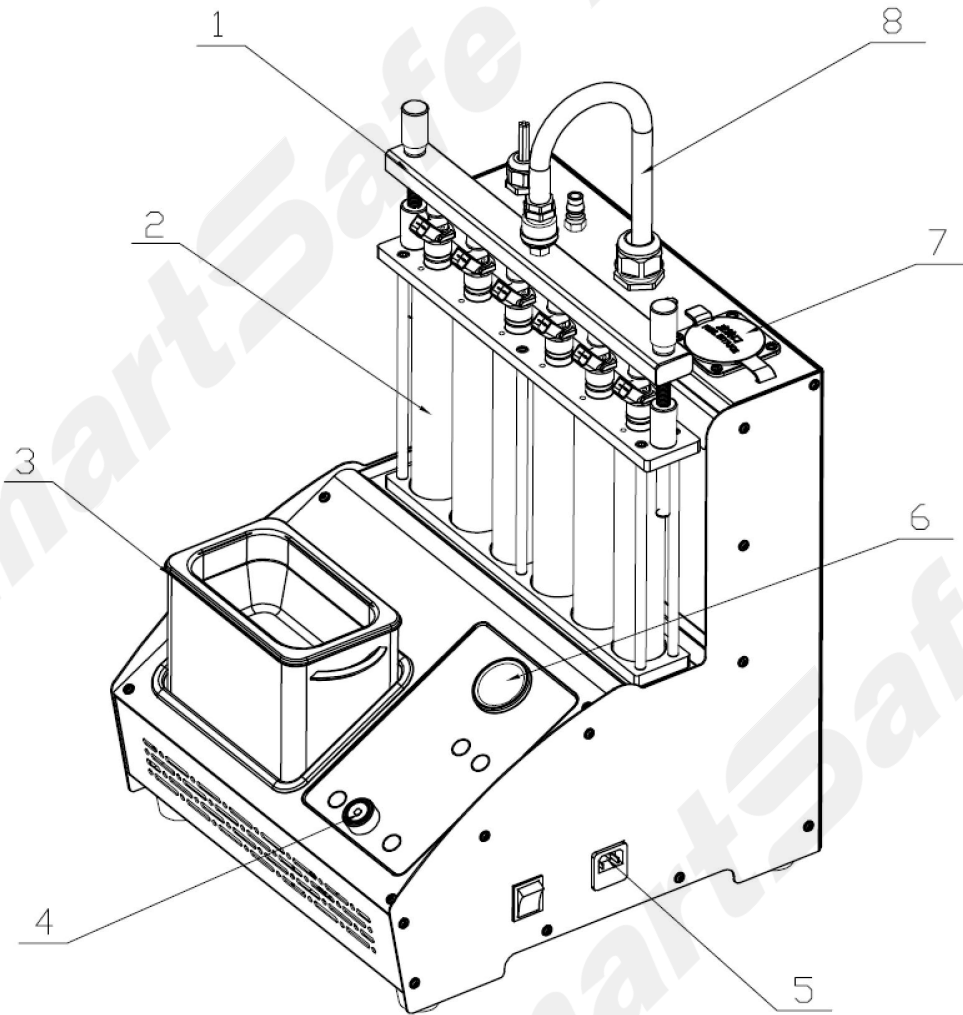


Figure 3.1

- 1- Fuel distributor assembly; 2- Observation window tube; 3- Ultrasonic cleaner; 4-Rotary knob;
5-Power outlet; 6- Fuel pressure gauge; 7-Fuel filling port; 8-Fuel pipe

3.2 Connection

Connection of the main unit: take the power line out of the packaging box and plug it into outlet in the bottom right corner of the machine.

IV. Operation Procedures for Cleaning and Testing of Injectors

4.1 Preparations

- 1) Remove the injector from the vehicle and check if the rubber seal of the injector is damaged. If it is damaged, replace it with a seal of the same type before cleaning and testing to avoid leak. Put the injector into gasoline or detergent, carefully remove the greasy dirt outside and then wipe it with a soft cloth.
- 2) Check and add test solution. Open the lid of fuel filling port and fill 2000ml of test solution into the fuel filling port (pay attention to the control of the filling speed to prevent the test solution from overflowing from the fuel filling port), as shown in Figure 4.1.
- 3) Turn on the power switch on the right side of the main unit, enter the main interface and press [Drain] button to drain fuel.
- 4) Repeat Step 2 and 3, observe the level of the fuel pipe on the left side, pay attention to the filled test solution shall not exceed the red line.
- 5) Add an appropriate amount of cleaning agent into the ultrasonic cleaning tank to immerse the needle valve of the injector.
- 6) Put the injector into ultrasonic cleaning tank (with the end connecting the line facing up and the pointed end facing down).
 - ① **Attention: The main unit of the device uses test solution for uniformity / sprayability test, leakage test, injecting flow test and auto. test. The ultrasonic cleaner uses the cleaning agent. Test solution and cleaning agent are not included in the standard configuration and can be purchased separately.**

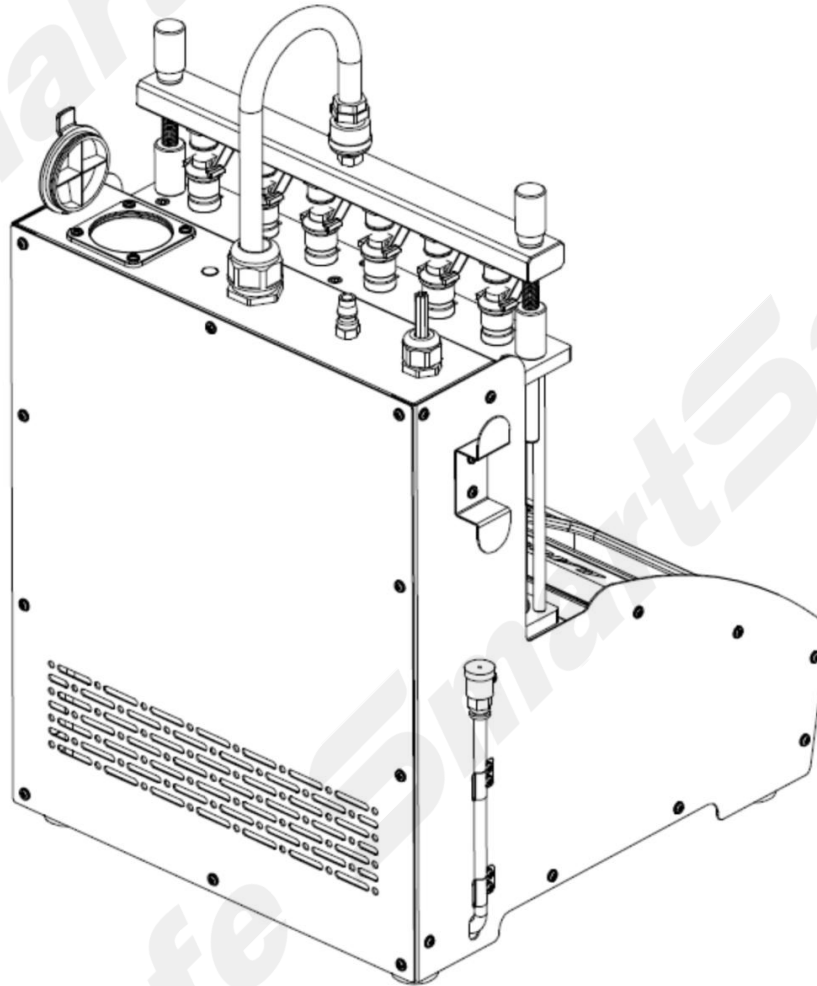


Figure 4.1

4.2 Cleaning and Testing Sequences

It is recommended to carry out the complete cleaning and testing procedures in the following order.

- Ultrasonic cleaning;
- Uniformity / Sprayability test;
- Leakage test;
- Injecting flow test;
- Auto. test.

Select the corresponding parameter according to different test items and set it. See “V. Operation Processes” for details.

4.3 Cleanup after Operation

After the end of cleaning and testing, a cleanup should be done, which includes:

- Press [Drain] button on the control panel to drain test solution to a fuel container.
- Switch off the power switch and unplug the power plug.
- Take out the ultrasonic cleaning pool and pouring out all cleaning fluid completely shown in Figure 4.2, and wipe the ultrasonic cleaning unit with a soft dry cloth.
- Wipe the table top of the machine with a soft dry cloth.
- To avoid volatilization, all the test solution in the fuel tank should be discharged. If it can be used again, store it in a safe place. If it is dirty and cannot be used any more, dispose it according to relevant regulations.

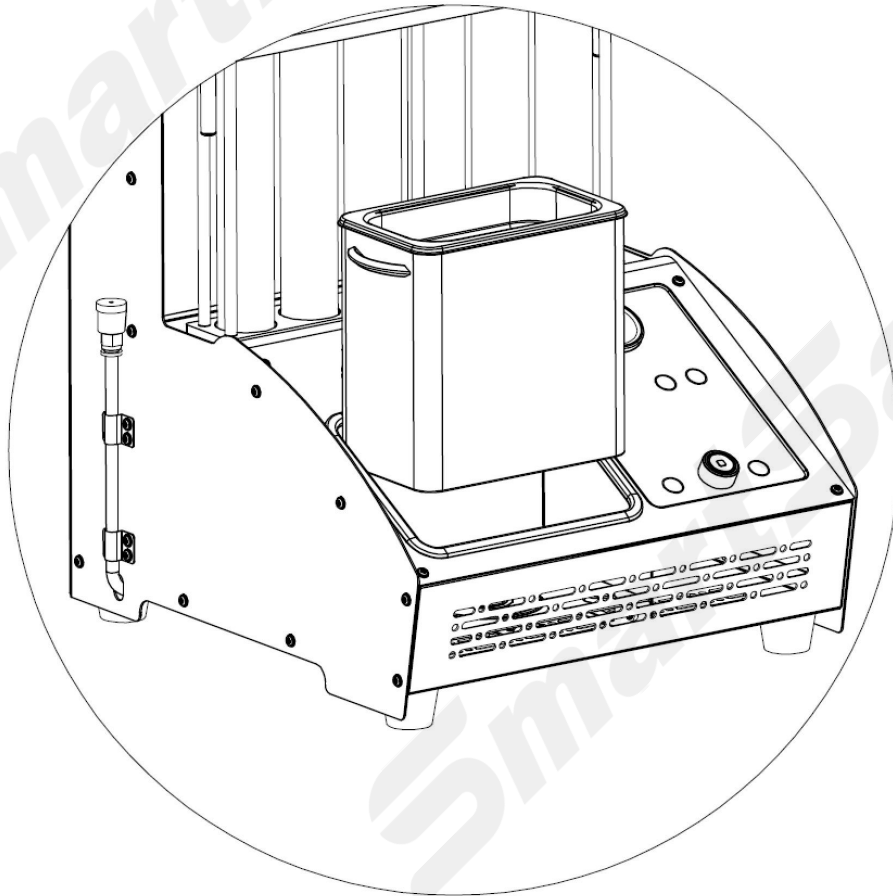


Figure 4.2

V. Operation Processes

5.1 Uniformity / Sprayability Test

Uniformity test is to detect whether the differences between the injection quantities of injectors meet the requirements or within the specified error range under the same working conditions of the injectors on the same vehicle. The test can reflect the electrical characteristics and the change in orifice diameter of the injectors, as well as the combine effects of the blockage and other factors on the injector. Sprayability test is to detect the atomization performance of injectors by observing the injection condition and atomization of injectors when operating under certain working conditions.

5.1.1 Installation Method and Test Steps for Injectors

- 1) Select the appropriate connector according to the type of injector, install the sealing ring (check if the sealing ring of the connector is in good condition) and then mount the connector with sealing ring at the corresponding coupling element below the fuel distributor.
- 2) Install the injector in the forward direction (apply a little lubricant on the "O" ring of the injector).
- 3) Adjust the screws to fix the fuel distributor and injector assembly in the oil filler hole of the upper cover and tighten the compression screws on both sides evenly. The installation diagram is shown in Figure 5.1.
- 4) Connect the pulse signal line of the injector properly. If there is test solution in the fuel tube, press [Drain] button to drain the test solution out of the transparent tube.
- 5) As shown below: select [Uniformity / Sprayability test] on the main interface, pressure as shown in Figure 5.2; set corresponding operating parameters, as shown in Figure 5.3; press [Run] button (Note: press [Drain] button during the operation to drain or stop draining oil); the system pressure can be adjusted by [Pressurization] and [Depressurization] buttons on the control panel, as shown in Figure 5.4.
- 6) The system will stop automatically after completion of the test.

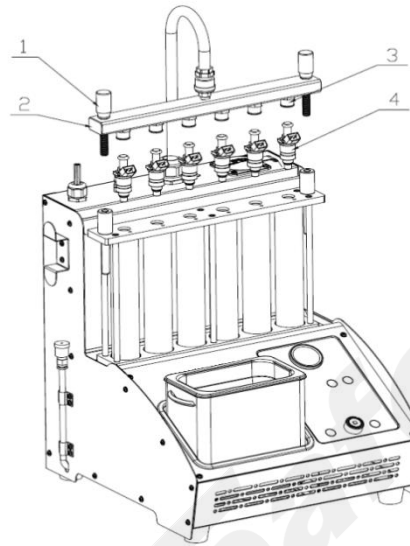


Figure 5.1

1-Fuel distributor compression screw; 2-Fuel distributor assembly; 3-Connector; 4-Injector.

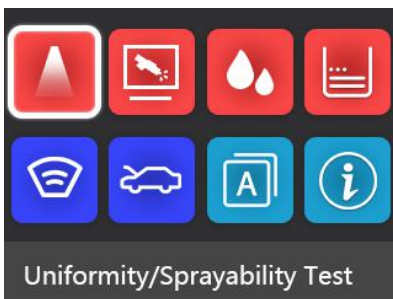


Figure 5.2

Setup	
Speed	1500 rpm
Pulse Width	10.0 ms
Cyl.No.	0
Timing	100 s
Exit	

Figure 5.3

Uniformity/Sprayability Test	
Speed	1500 rpm
Pulse Width	10.0 ms
Cyl.No.	0
Timing	100 s
Draining	

Figure 5.4

5.1.2 Backflushing

Backflushing is limited to the top-supply injector by connecting the backflushing connector under uniformity / sprayability test. Test solution enters from the outlet of the injector and flows out from the inlet during backflushing. Backflushing can wash away the dirt inside the injector and dirt attached to the filter.

Method and Steps:

- 1) Find the backflushing connector (and select a supporting "O" ring to install it on the connector) installed below the fuel

distributor;

- 2) Install the top-supply injector in reverse direction (outlet up, inlet down);
- 3) Select the corresponding coupling element under the injector according to the shape of injector
- 4) Adjust the screws to fix the fuel distributor and injector assembly in the oil filler hole of the upper cover according to the height of injector and tighten the compression screws on both sides evenly, as shown in Figure 5.5;
- 5) It is recommended to press [Drain] button to drain the remaining fuel in the transparent tube to avoid overflow of test solution before backflushing.
- 6) Connect the pulse signal line of the injector properly; set the operating parameters and press [Run] button to execute backflushing function; the system pressure can be adjusted by [Pressurization] and [Depressurization] buttons on the control panel during backflushing.
- 7) The system will stop automatically after completion of the cleaning.

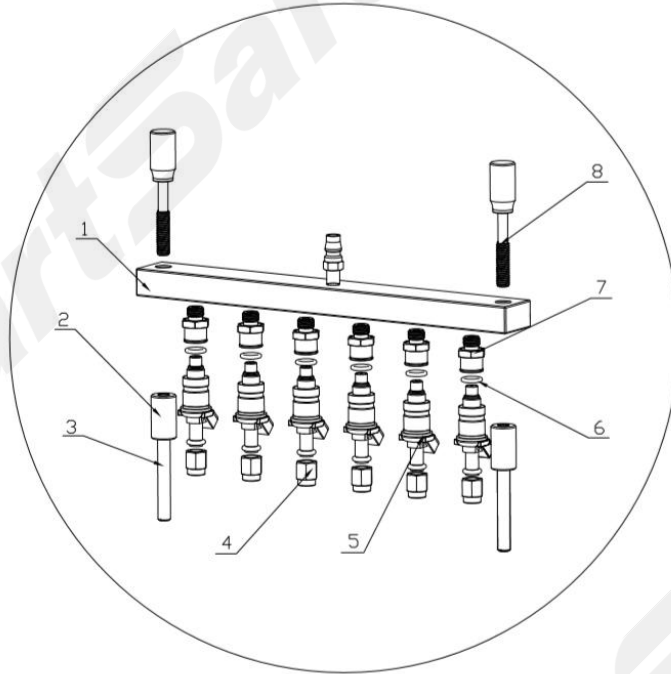


Figure 5.5

1-Fuel distributor; 2-Knurled nut; 3-Adjustable screw; 4-Couplers;
5-Injector; 6-O-ring; 7-Reverse adaptor; 8- Compression screw.

5.2 Leakage Test

Leakage test is to detect the leakage of the needle valve of the injector under system pressure and to detect whether the injector is dribbling.

Method and Steps (See 5.1 Uniformity / Sprayability Test for Installation Method)

- 1) Before leakage test, if there is test solution in the transparent tube, press [Drain] button to drain the solution out of the transparent tube.
- 2) Select [Leakage test] on the main interface and press [Run] button. The system will start to work. Judge the leakproofness of the injector by observing whether the injector is dribbling or not. Typically, the dribbling should be no more than one drop in one minute (or technically). The time set in the system is 60 seconds by default, and the pressure value set for leakage test function should be 10% higher than that set by the manufacturer. At this time, the pressure can be adjusted via [Pressurization] and [Depressurization] buttons, as shown in Figure 5.6.

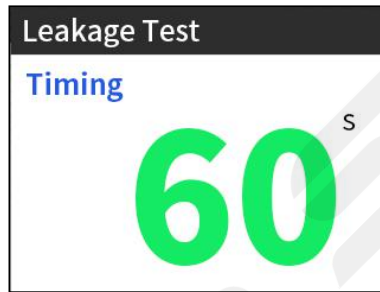


Figure 5.6

- 3) The system will stop automatically after completion of the test.

5.3 Injecting Flow Test

Injecting flow test is to detect the amount of fuel injected normally by injectors for 15 seconds and then determine if it is consistent with the injection quantity of standard injectors (or within its error range), referring to the relevant technical manual of the injector). The change or deviation of the change reflects the change (wear) in the orifice diameter or blockage of the injector, eliminating interference due to changes in electrical parameters of the injectors.

Method and Steps (See 5.1 Uniformity / Sprayability Test for Installation Method)

- 1) Before the test, if there is test solution in the transparent tube, press [Drain] button to drain the solution out of the transparent tube.
- 2) Select [Injecting flow test] on the main interface and press [Run] button. The system will start to work. At this time, the pressure can be adjusted via [Pressurization] and [Depressurization] buttons, as shown in Figure 5.7.

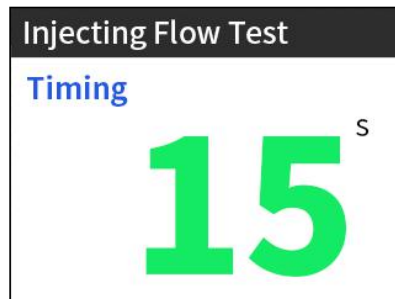


Figure 5.7

- 3) The system will stop automatically after completion of test.

5.4 Auto. Test

Auto. test includes the afore-mentioned tests (injecting flow test (15 seconds of normal injection, idle speed, medium speed, high speed, acceleration and deceleration change and pulse width change test). The function can simulate various working conditions of the engine more precisely and comprehensively, and can detect various performance parameters of the injector.

Method and Steps (See 5.1 Uniformity / Sprayability Test for Installation Method)

- 1) Before the test, if there is test solution in the transparent tube, press [Drain] button to drain the solution out of the transparent tube.
- 2) As illustrated in the following figure: Select [Auto. Test] on the main interface and then select a cleaning and testing mode in the [Cylinder No./Mode] parameter selection menu, referring to the performance parameter table of the injectors on the vehicle (setting is shown in Figure 5.8). The default mode is mode 1 (See "Flow Chart of Auto. Test" for details on modes). Press [Run] to start the test, as shown in Figure 5.9. Mode 2 is shown in Figure 5.10.

Setup	
Mode	1
Exit	

Figure 5.8

Auto. Test	
Speed	650 rpm
Count	2000

Figure 5.9

Auto. Test	
Speed	450 rpm
Draining	

Figure 5.10

- 3) The system is running and at this time, the pressure can be adjusted via [Pressurization] and [Depressurization] buttons. Automatic cleaning and draining is shown in the following figures:

Auto. Test
Draining
30 ^s

Auto. Test
Draining
9 ^s

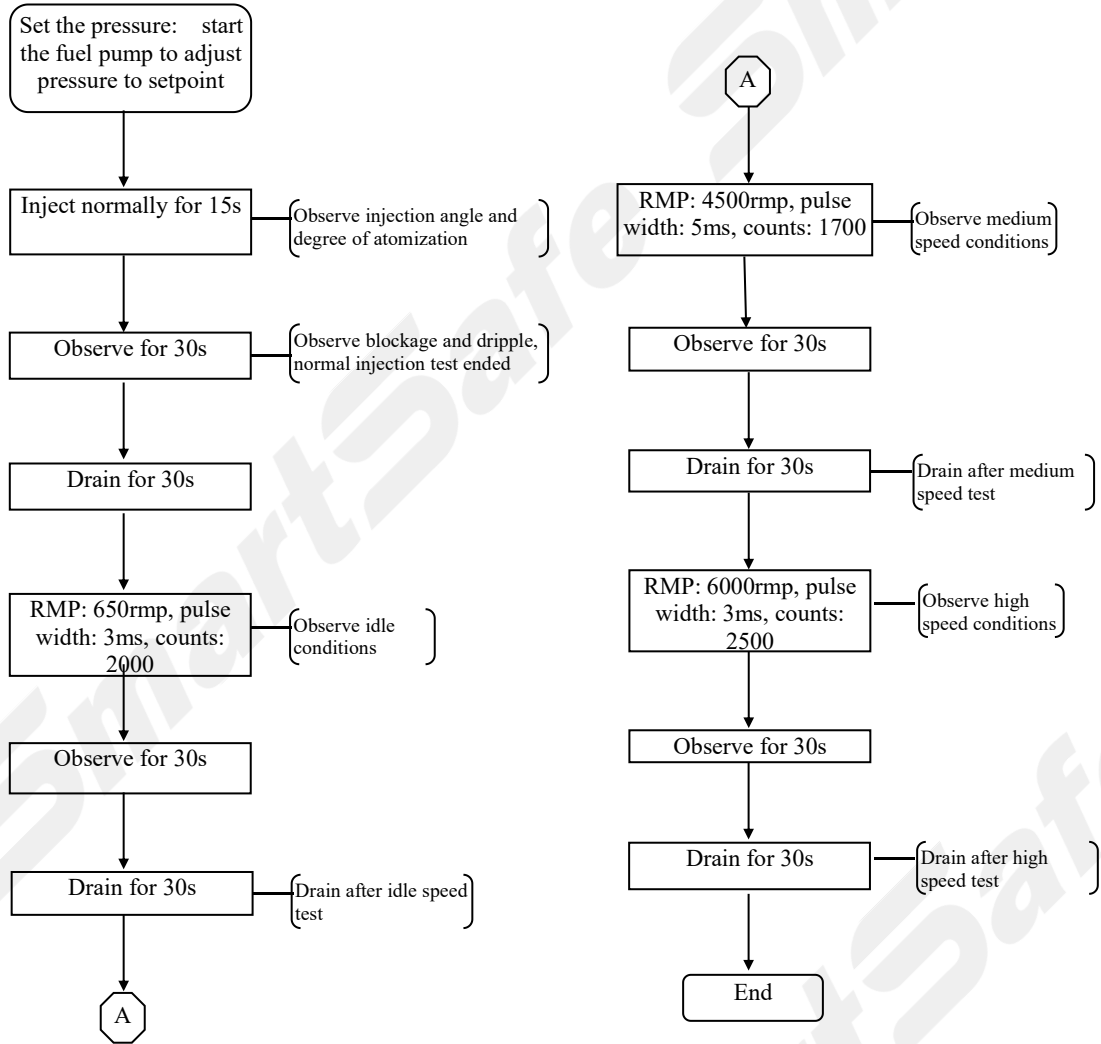
Auto. Test
Draining
3 ^s

- 4) The system will stop automatically after completion of test.

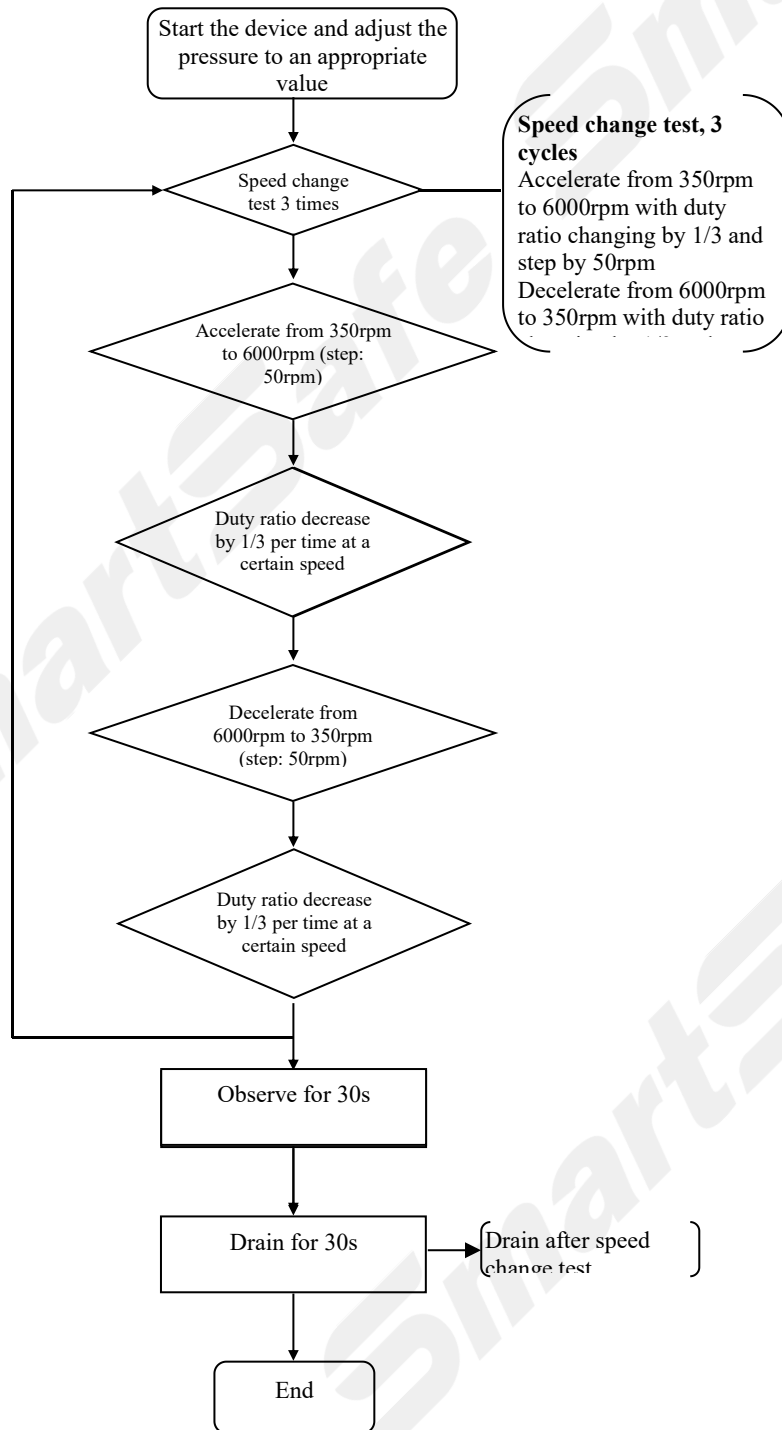
Flow Chart of Auto. Test

There are 3 modes for auto. test: Mode 1, Mode 2 and Mode 3. Mode 1 and Mode 2 are shown below; while Mode 3 is to run Mode 2 after running Mode 1.

Mode 1 of Auto. Test



Mode 2 of Auto. Rest



5.5 Ultrasonic Cleaning

Ultrasonic cleaning is an advanced cleaning method that uses the penetration and cavitation shock waves generated by the propagation of the ultrasonic waves in the medium to run a power cleaning on objects with complex shapes, cavities and pores, in order to remove stubborn carbon deposits on the injector thoroughly.

Method and Steps:

- 1) Put the externally cleaned injector on the cleaning bracket in the cleaning tank;
- 2) Add an appropriate amount of cleaning agent into the ultrasonic cleaning machine (generally, the level of cleaning agent

- should be some 20mm above the needle valve of the injector);
- 3) Connect the pulse signal lines with injectors properly;
 - 4) Select [Ultrasonic cleaning] on the main interface and set the time according to the demand (the default time is 600s), as shown in Figure 5.11. Press [Run] button and the operation interface is shown in Figure 5.12.

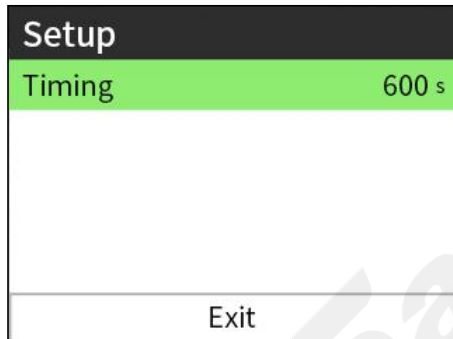


Figure 5.11



Figure 5.12

- 5) The system will step automatically when the cleaning ends.
- 6) Take the injectors out of the cleaning tank and wipe off the cleaning agent on them with a soft cloth to prepare for the next operation.

Note:

- 1) ***It is strictly forbidden to open the ultrasonic system under the circumstances that cleaning agent has not been added into the ultrasonic cleaning pool. Otherwise, the ultrasonic equipment may be damaged easily.***
- 2) ***It is strictly prohibited to immerse the pulse signal line connector along with the injector into the ultrasonic pool for cleaning. Otherwise, the pulse signal line connector can be damaged easily.***

5.6. On-Vehicle Cleaning

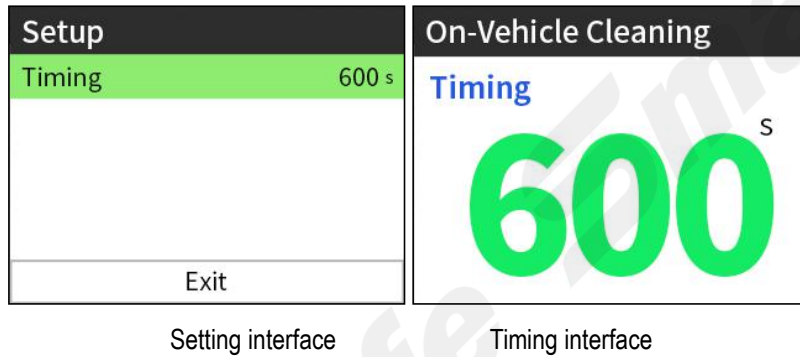
After the engine has been in operation for a period of time, its fuel flow may be blocked or become un-smooth owing to buildup of dust and impurities in fuel channel. In addition, the carbon deposits and gum made by combustion can easily adhere to the injectors, inlet and outlet ports, inlet and outlet hoses, throttle and combustion chamber. So the fuel supply system, combustion chamber and injectors of the engine must be cleaned on a timely basis. On-vehicle cleaning is a solution that can save your time and labor.

5.6.1 Procedures

- 1) Please check if the liquid inside the fuel tank is test solution or detergent before performing on-vehicle cleaning. If test solution is in the tank, it is necessary to replace it with detergent. Drain the test solution inside fuel tank into a pre-prepared container. If the drained test solution contains lots of impurities and cannot be reused, please dispose it in a proper way and then add a small amount of test solution to clean the fuel tank. If the drained test solution is relatively clean, please store it for later use.
- 2) Blend the detergent with the fuel at a certain ratio, and fill the mixture into the fuel tank. (Consult the user's manual of detergent for blending ratio.) Refer to the following table for filling amount:

No. of cylinders	6 cylinders
Amount	about 1500ml

- 3) Connect the pipeline of CNC-603A Injector Cleaner & Tester with that of the vehicle. For details, see "5.6.2 Line Connection".
- 4) As shown in the following figures: Choose [On-vehicle cleaning] function on main menu, set the time, press [Run] button and then start the engine for cleaning. Refer to the technical requirements of various vehicle models to adjust the pressure via [decrease pressure] and [increase pressure] keys. Press [Stop] button at any time to stop the cleaning.



Setting interface

Timing interface

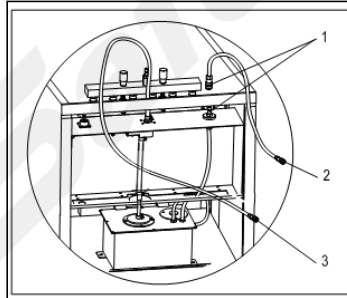


Figure 5.13 Installation diagram

1- Fuel-return connector; 2- Fuel-return hose from engine; 3- Fuel-inlet hose to engine

5.6.2 Line Connection

There are two cases for the line connection: one is the connection with fuel-return hose and the other is the connection without the fuel-return hose.

Connection with fuel-return hose

- 1) Disconnect the fuel supply hoses (C, D) and fuel return hoses (A, B) of the engine fuel system (when disconnecting the fuel line connectors, cover them with towels). Choose proper connectors and connect them to the B end and C end separately, and then connect the other ends to corresponding return hose and outlet hose of the device. See Figure 5.14.
- 2) Connect the two other disconnected ends (A, D) with a proper hose, or remove the fuel pump fuse, or disconnect the power cable of engine fuel pump.

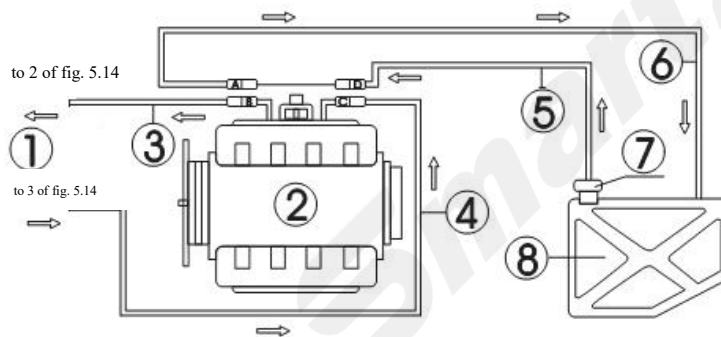


Figure 5.14 Line Connection 1

1-CNC-603A Injector Cleaner & Tester; 2-Engine; 3- Fuel-return hose from engine; 4- Fuel-inlet hose to engine; 5-Engine fuel supply hose; 6-Engine fuel return hose; 7-Fuel pump; 8-Fuel tank

Connection without fuel-return hose

- 1) Disconnect the fuel supply hoses (E, F) of the engine fuel system (when disconnecting the fuel line connectors, cover them with towels), and then choose a suitable connector, connect it to the E end and reconnect the fuel outlet hose of the device. Hang the fuel return hose. See Figure 5.15.
- 2) Block the other end of the disconnected end (F) with a stopper (for fuel pump with fuel return function only) or remove the fuse of fuel pump or disconnect the power cable of engine fuel pump.

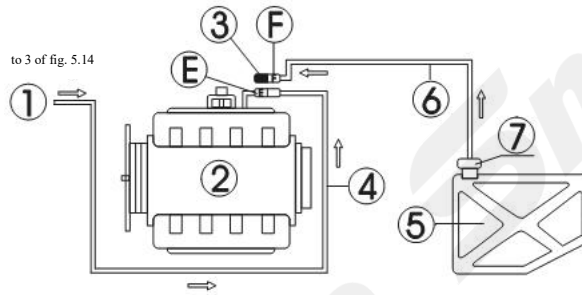


Figure 5.15 Line Connection 2

1-CNC-603A Injector Cleaner & Tester; 2-Engine; 3-Stopper; 4- Fuel-inlet hose to engine; 5-Fuel tank;
6- Engine fuel supply hose; 7-Fuel pump;

5.6.3 Tidy up after on-vehicle cleaning

- 1) After the on-vehicle cleaning is completed, turn off the ignition switch of the vehicle. Restitute the hose connection, start the engine and accelerate properly to check if there is any fuel leakage at the connectors or in the hoses.
- 2) Please clean the fuel tank and the lines of the device with test solution at the end of the on-vehicle cleaning, the specific procedures are: drain the detergent left in the fuel tank first and dispose it according to its cleanliness. Add a small amount of test solution into the fuel tank, connect the fuel outlet hose of the device to the oil return port and power on the device. Select "Leakage test" item and press [RUN] button to run the device for about 2~3 minutes. After the running has stopped, drain the test solution from fuel tank and dispose the drained liquid according to relevant regulations.
- 3) Clean up the site and tidy up the washing machine for later use.

① Note:

- 1) **When cleaning, care must be taken as the detergent is inflammable. Prepare at least one effective fire extinguisher.**
- 2) **Be sure that all lines are well connected and there is no leakage before performing cleaning.**

5.7. Language Selection

To adapt to the needs of different countries, multiple languages are available. Users can choose the appropriate language according to their needs.

Method and Steps:

- 1) Move the cursor to the language selection icon on the main interface and press the knob to enter the language selection interface, as shown in Figure 5.16.
- 2) Turn the knob to select the corresponding language, as shown in Figure 5.17. Press the knob and the system will automatically change the language and exit the language selection interface automatically.

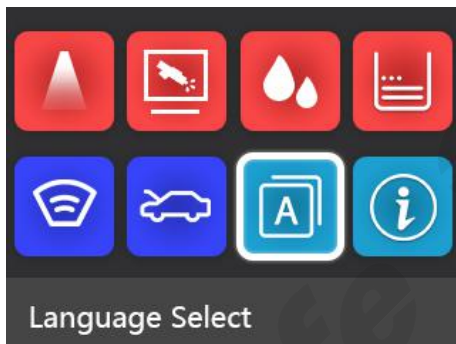


Figure 5.16



Figure 5.17

5.8. Version Information

Select version information icon on the main interface, as shown in Figure 5.18, and press the knob to check information of the current software version, as shown in Figure 5.19.



Figure 5.18

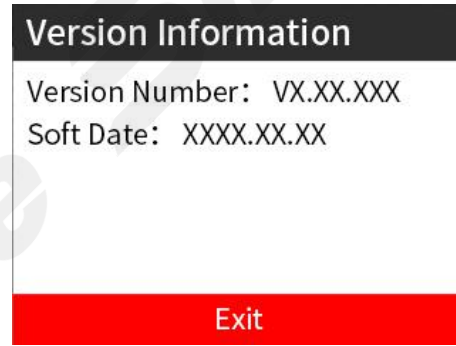


Figure 5.19

VI. Service and Maintenance

6.1 Handling, Storage and Installation Environment

It is recommended to lift and carry the device with a manual or motorized forklift.

1. Handling

- A. Mechanical handling and long-distance transportation are strictly prohibited when unpackaged.
- B. When unpackaged, use a soft sling for lifting or handle it manually to avoid scratching the body.
- C. The fluid in the fuel tank should be drained before packaging and handling to prevent spillage due to shaking.
- D. The device should be placed on the base and put in the packaging box before handling. Violent vibrations and impacts should be avoided. The machine should be wrapped with materials similar to plastic bags. After placing it into the packaging box, a type of filling materials, such as foam or sponge, should be added between the device and the inner wall of the packaging box to preventing from being scratched by shaking.
- E. The maximum angle of inclination for the device must not exceed 45°. Keep upright!

2. Storing

- A. The device should be stored in a dry place that is not exposed to the rain before unpacking.
- B. The bar machine should be placed in a room that is not exposed to direct sunlight and is well ventilated to avoid rain.

3. Installation Environment

- A. The distance between the equipment and the surrounding walls or other objects should be more than 200mm. The machine should be placed in a ventilated environment with the ambient temperature between 0°C and 45°C. Keep it away from fire.
- B. To ensure safe operation, make sure that the power outlet is grounded before switching on the power supply.

⚠ Warning!

If you use the equipment with the power cable being replaced with another one, the level of the power cord should be higher than or equal to that of the original power line.

6.2 Common Quick-Wear Parts and Consumables

1. Selection and Replacement of Cleaning Agent and Test Solution

Test solution is used when the device is testing and cleaning agent is used for ultrasonic cleaner. Test solution and cleaning agent are not included in the standard configuration and can be purchased separately.

ⓘ Note:

When the test solution has been used for a period of time, a lot of impurities will be accumulated in it. Test solution containing lots of dirt cannot be used. Otherwise, the fuel pump and injectors may be blocked. When replacing the test solution, unscrew the plug at the bottom of the machine to drain the solution. It is best to drain the residual liquid and then inject a small amount of clean test solution in order to clean the interior.

2. Replacement of “O” Ring

The “O” ring will deform after many times of use, which can cause leakage easily. Therefore, it should be replaced frequently.

3. Replacement of Purification Accessories

Fuel pump filter is a purification accessory and needs to be replaced regularly. The replacement cycle should be decided according to the service condition and frequency of use. It is recommended to replace the filter once every three months to ensure the normal operation of the system. After replacement, leak tightness test should be carried out to check if there is any leak at the interface.

4. Replacement of Fuel Pump Filter

Fuel pump filter is located in the fuel tank at the bottom of fuel pump. During replacement, it is necessary to remove the fuel pump cover, take off the fuel pump and fuel pump sleeve, unplug the fuel pump filter at the bottom of fuel pump, install a new fuel pump filter, put the fuel pump and fuel pump sleeve back into the fuel tank and put the fuel pump cover back on.

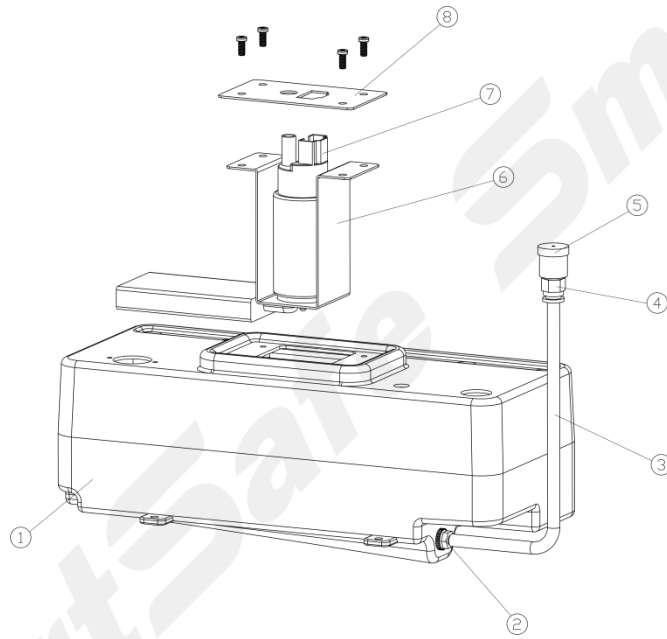


Figure 6.1

1, Fuel tank. 2, outer silk pagoda connector. 3, oil return pipe. 4, self-locking connector. 5, oil outlet pipe connector cover. 6, Fuel pump bracket. 7, Fuel pump. 8, Fuel pump cover.

6.3 Precautions and Solutions to Common Problems

6.3.1 Precautions

- 1) The transparent tubes are made of glass. So, do not place other items around the device to avoid scratching and fragmenting the tubes.
- 2) Disassembly of the tubes should be performed after the system pressure is displayed as zero.
- 3) It must be ensured that the power supply provided is grounded well.
- 4) Take good care of the machine. If the protective film on the control panel is stained with cleaning agent, please wipe it off in time. Also, keep the pulse signal lines away from the cleaning agent and test solution.

⚠ Warning!

Blind and imprudent overhauls can lead to the expansion of the fault area of the device, causing difficulties for formal maintenance. When the device is powered on, the electrical system inside the machine contains factors that can cause danger! Careless operations can result in personal injury accidents, which can lead to physical disability and even death in serious accidents.

6.3.2 Solutions to Common Problems

1. No response on startup

Check if the fuse at the bottom right side of the machine is damaged. If it is damaged, please change it.

2. Fuel leak at coupling element of fuel distributor

Fuel leaked at coupling element of fuel distributor. Please check whether the "O" ring installed matches and if it deformed or damaged. If it does not match or is damaged, please change it. The two adjusting screws should not be too tight, which may also cause the coupling element of fuel distributor to leak fuel.

3. Test solution in the transparent tubes can be drained completely by pressing [Drain] button twice.

The solenoid valve of the machine has a 60-second automatic shutoff function; Multiple drainages may be required if there is a large amount of test solution in the transparent tube.

VII. Commissioning and Main Parts

7.1 Schematic Diagram and Parts List of Whole Structure

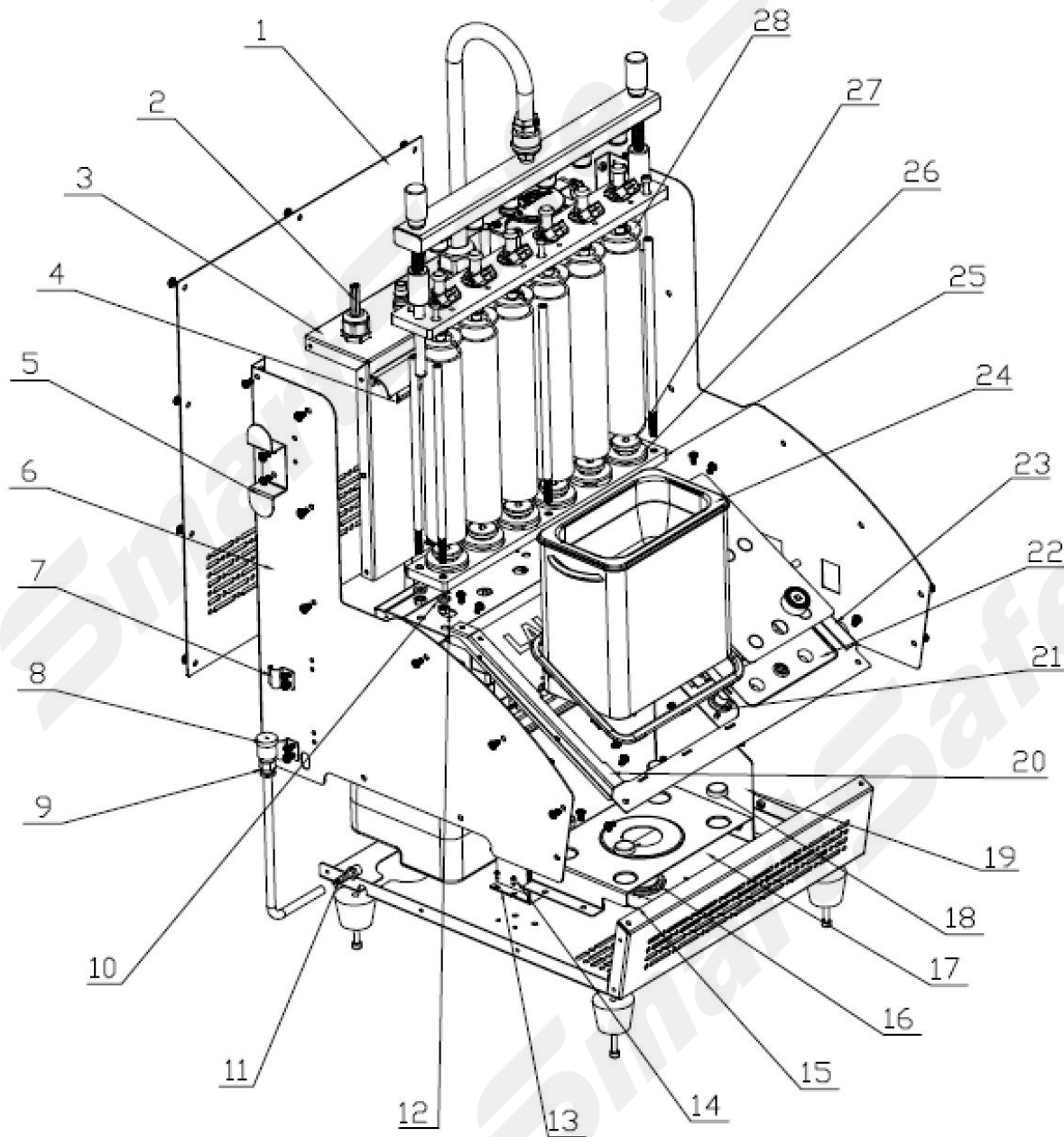


Figure 7.1

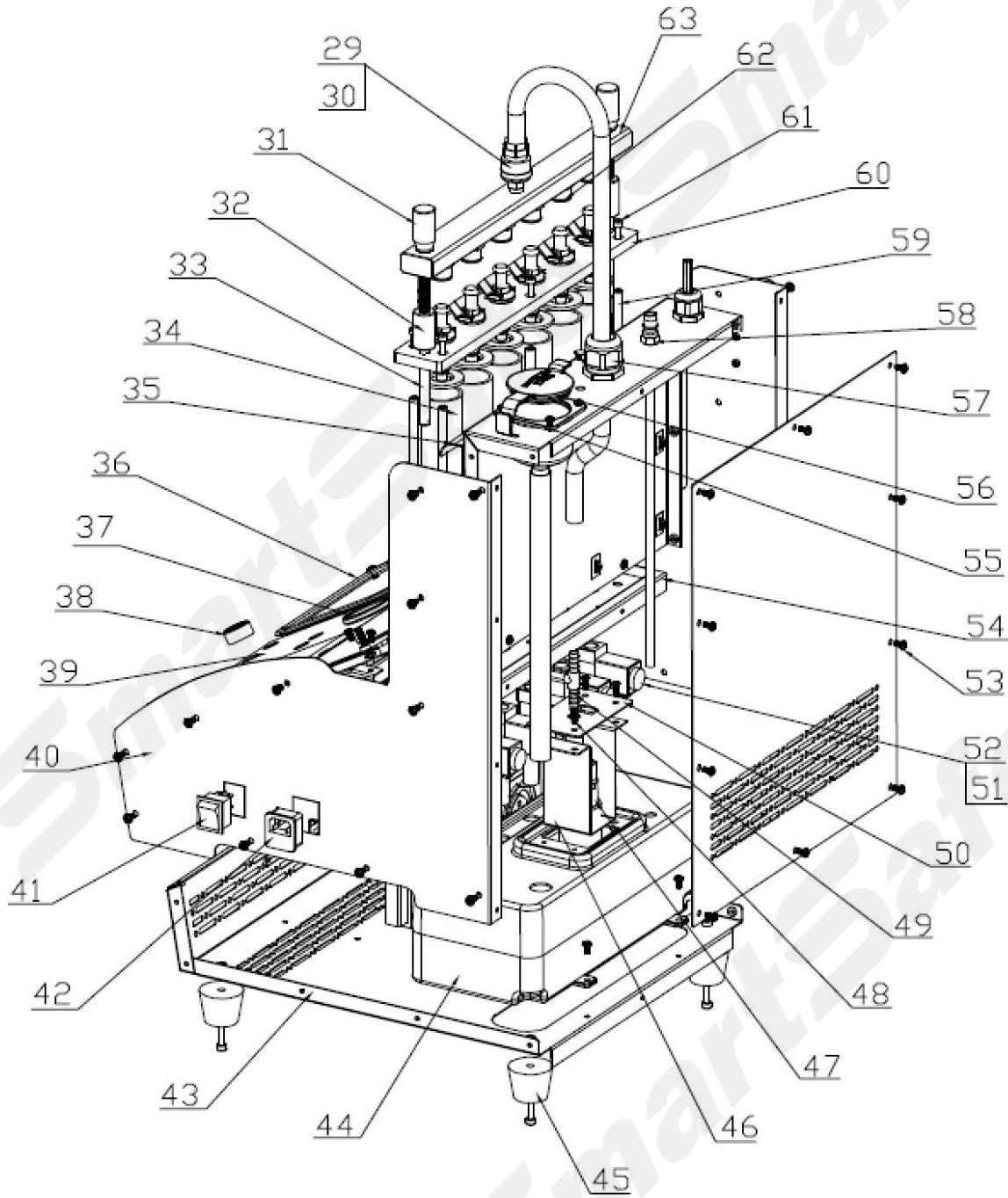


Figure 7.2

Parts List of Whole Structure

S/N	Material Code	Material Name	S/N	Material Code	Material Name
1	503200184	CNC-603A Back plate	23	503200186	CNC-603A Right strut CNC-603A
2	505020023	CNC-603A Pulse signal connection	24	503260020	Ultrasonic cleaner 220V
3	503200183	CNC-603A Top cover	25	503230063	CNC-603A Base board
4	502190007	LED light strip	26	504130002	CNC-601 Lower sealing washer φ40.2*15*3
5	502190007	CNC-603A Wire-wrap board	27	503200003	CNC series hex socket sleeve
6	503200194	CNC-603A Left side plate	28	504130001	CNC-601 Upper sealing washer φ40.2*22*3
7	503200196	CNC-603A Level tube clamp	29	503240073	Pagoda-shape connector (straight external thread), G1/4", ODφ10
8	503230020	CNC Fuel outlet tube connector cover	30	503100004	Quick connector female SH20
9	503240002	Cleaning device connector PC8-02	31	503250007	CNC-601, Compression screw 2
10	503040008	External teeth lock washer, GB/T862.1-1987,6	32	503250006	CNC-601, Knurled nut
11	505020038	CNC-603A External threading pagoda connector, G1/8, 6mm	33	503230018	CNC-601 Backflushing adjusting stud 2
12	503030003	Hex nut, GB/T41-2000, M6	34	504110001	CNC-601 Glass tube
13	502210010	Switch mode power supply	35	503200185	CNC-603A Light strip casing
14	503010060	Cross recessed pan head screw, GB/T818-2000, M3*6	36	504110006	CNC-603A Rubber guard ring
15	503200188	CNC-603A Ultrasonic pressing strip	37	598050007	CNC-603A Axial direction fuel pressure gauge
16	503200197	Ultrasonic cleaner power supply holder	38	504020018	CNC-603A Plastic knob
17	503200191	CNC-603A Ultrasonic base	39	507040004	CNC-603A Operation panel PC protective film
18	504010003	Integrated charger pad, 20*5	40	503200193	CNC-603A Right side plate
19	503200192	CNC-603A Ultrasonic guard	41	502100003	Rocker switch, R210-C5L-BR
20	503200187	CNC-603A left strut	42	502160020	Power outlet with safety card
21	504110005	CNC-603A Silicone button in cylinder-shaped	43	503200180	CNC-603A Base board
22	503200181	CNC-603A Panel	44	504040021	CNC-603A Blow molding fuel tank

S/N	Material Code	Material Name	S/N	Material Code	Material Name
45	504130020	Rubber pad	55	504020019	CNC-603A Fuel filling funnel
46	503200189	CNC-603A Fuel pump bracket	56	504020020	CNC-603A Fuel filling plastic cover
47	502990005	JJDB-6 Fuel pump	57	504010039	PG21 Water-proof cable connector
48	503010065	Cross recessed pan head tapping screw, GB/T846-1985 ST4.2*9.6	58	503100009	Self-locking quick insertion trachea quick connector , Model PP30
49	503100010	CNC-603A Fuel pressure gauge copper pipe	59	503250017	CNC-601, Supporting screw
50	503200190	CNC-603A Fuel pump cover	60	503230062	CNC-603A Upper pressing plate
51	502240002	Miniature direct acting solenoid valve	61	503010053	Hex socket head cap screw, GB/T70.1-2000,M5*20
52	503240073	Pagoda connector,G1/4	62	503250012	CNC-601, Fuel direct discharge connector 2
53	503010058	Cross recessed pan head screw with pad, GB/T9074.5-2004,M4*8	63	503230064	CNC-603A Fuel distributor
54	503200182	CNC-603A Middle wall			

Appendix I: Fuel System Pressure Gauge of Typical Vehicles

Manufacturer	Model	System Pressure (kg/cm ²)
Toyota	Toyota 3.0	2.84
	Toyota Previa	2.7-3.3
	Lexus 300 400	2.65-3.04
	Camry 3.0	2.65-3.04
	Land Cruiser	3.0
	Corolla	2.7-3.1
Honda	Accord 2.0 2.2	2.85
	Civic 1.5L	2.55-2.85
	Legend 3.2L	2.7-3.04
Nissan	Nissan	2.5
	Maxima	2.5
	300EX	2.06-2.55
Mitsubishi	V63000	3.5
Mazda	323	2.0-2.2
	626	2.5-2.9
	929	2.5-2.9
BMW	528	2.7-2.9
Mercedes-Benz	2.3L	2.04-4.08
	2.6L	2.04-4.08
	3.0L	2.04-4.08
Volvo	Volvo	2.7—2.9
Volkswagen	Santana 2000	2.2—26.5
Audi	6-cylinder	2.4—2.7

Manufacturer	Model	System Pressure (kg/cm ²)
	5-cylinder, 4-cylinder	4.5—5.0
GM	Buick Century	2.9—3.3
	Buick Park Avenue	2.9—3.3
	Cadillac 5.7	2.9—3.3
	Chevrolet LuminaAPV	2.3—3.0
	Chevrolet Corsica	2.5—3.0
Ford	Tempo 2.3L	2.8
	Lincoln TownCar	2.06—3.08
Chrysler	Beijing Cherokee 213	2.73
	Dodge 3.3L Sanxing Dodge	3.37
Hyundai	Sonata	265—2.75
DAEWOO	Daewoo	2.8—30
FAW-VW	Jetta King	2.7-2.9
	Golf	2.5-2.8
	Hongqi	2.5-3.0
FAW Jetta	Jetta AT	2.6-2.9
FAW Audi	A6	2.5-2.8
Shanghai Volkswagen	Era Superman	2.8-3.0
Shanghai Passat	B5	2.7-3.1

Warranty

This warranty applies only to users and distributors who have purchased SmartSafe's products through regular procedures.

SmartSafe shall provide a warranty against material or craftsmanship defects for 15 months from the date of delivery on its electronic products. Damages to the device or its components caused by abuses, unauthorized modifications, uses for a purpose other than for which it is intended, or operations not following the manner specified in the manual, etc. are not covered by this warranty. Compensation for the damage to instrument of the automobile due to the defect of the device is limited to repair or replacement, SmartSafe is not responsible for any indirect or accidental loss. SmartSafe will judge the attributes of the equipment damage according to its specified test method. None of SmartSafe's dealers, employees and business representatives has the authority to make any confirmations, reminders or promises related to the company's products.

Disclaimer Statement

The above warranty can substitute warranties in any other forms.

Order Notice

Replaceable and optional parts can be ordered directly from SmartSafe authorized distributors. Your order should include the following information:

Order quantity

Part number

Part name

Customer Service Center

Customer Service Center

For any problem met during the operation, please call +86-755-89589810.

If the device needs to be repaired, please send it back to SmartSafe, and attach the Warranty Card, Product Qualification Certificate, Purchase Invoice and problem description. SmartSafe will maintain and repair the device for free when it is within warranty period. If it is out of warranty, SmartSafe will charge the repair cost and return freight.

SmartSafe address:

3F, Building B, Qiao'an Technology Industrial Park, Guanlan, Longhua New District, Shenzhen, Guangdong, P. R. China

Zip code: 518110

SmartSafe Website: <http://www.newsmarketsafe.com>

Statement:

SmartSafe reserves the rights to make any change to product designs and specifications without notice. The actual object may differ a little from the descriptions in the manual in physical appearance, color and configuration. We have tried our best to make the descriptions and illustrations in the manual as accurate as possible, and defects are inevitable, if you have any question, please contact local dealer or after-sale service center of SmartSafe, SmartSafe does not bear any responsibility arising from misunderstandings.