

Fuel Injector Cleaner & Analyzer

User Manual



1. Introduction

It is used to test and clean the injector, its functions includes:

- (1) To test and analyze the injecting state and dribbling.
- (2) To test the injecting angle and atomizing.
- (3) To test the injecting volume and uniformity
- (4) To conduct the physical and chemical cleaning of the clogged or trouble injector, ultrasonic cleaning.
- (5) To test the open and close injecting pressure of the injector.

2. Features

- (1) Working capacity: It is capable of test the injecting angle, dribbling, atomizing, volume, uniformity, cycle by true simulation automatically or selectively.
- (2) Test range: RPM:0-9950r/min PULSE WIDTH:0-20ms COUNT: 0-10000; It is of standard test program, may perform automatic test and cleaning.
- (3) Exclusive test mode: It has many test modes such as: random changing value setting, imitating engine running, signal feedback of the loading, random STOP/continue during test, counting mode with high accuracy.
- (4) Cleaning system: May test and clean one or more injectors at same time, conduct ultrasonic cleaning.
- (5) Ultrasonic cleaning: Adopts high-Frequency ultrasonic technique to conduct accurate cleaning.
- (6) Memory program: May diagnose the changes of a group of injectors before and after cleaning.
- (7) Control panel: The control panel is designed with the latest international popular graphs.
- (8) Injector protection: With exclusive automatic device, it may regulate the current and voltage to ensure the test and cleaning of the high/low impedance injectors in normal condition.
- (9) Cycle test: By test the minimum open/close cycle of the injector, it may test the injectors quality and injecting uniformity.
- (10) Structure design: Adopts the light alloy material, high-accurate measuring glasses and new backlight technics.
- (11) Test and cleaning liquid: The chemical fluid is innocuous, has no peculiar smell, and meets standards of Montreal with high performance.

3. Specifications

Fuel tank capacity: 2.4L

Test tube capacity: 100-120ML

System flow: 4L/min

System pressure: 0-5.5kg/cm²

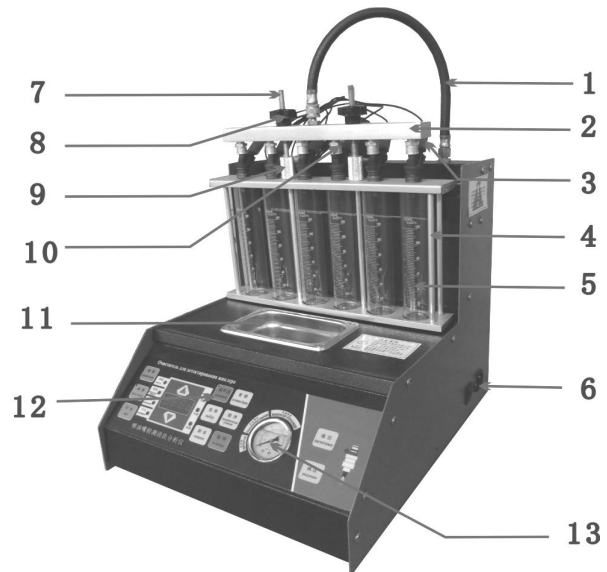
Working temperature: +5℃～40℃; Relative humidity: <85%;

Intensity of outside magnetic field: <400A/m

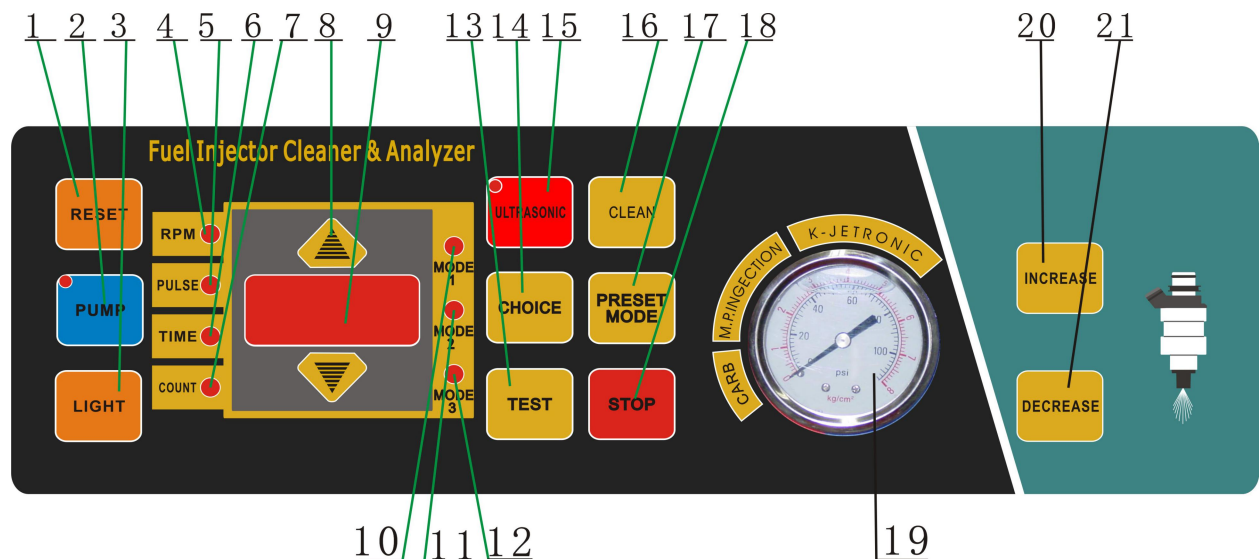
Rotate speed: 0-9950r/min; step: 50 r/min
 Pulse width: 0-20ms; step: 0.1 ms
 Count (time): 0-9950; step: 50
 Dimensions (mm): 600*510*780

4. Appearance

1. Fuel hose
2. Standard feed fuel board
3. Adapter of pulse pick up
4. Stand of test tube
5. Test tube
6. Switch
7. Standing bolt
8. Standing nut
9. Turnbuckle
10. Connector of injector
11. Ultrasonic cleaner
12. Keypad
13. Pressure gauge



5. Keypad



- (1) [RESET] key: Press the key, the unit will turn back to its initial setup.
- (2) [PUMP] key: Press the key, the pump indicator comes on, pump start work. Press it again, the pump stops and the indicator turns off.

- (3) [LIGHT] key: Press it, the backlight comes on. Press it again, the backlight turns off.
- (4) [RPM] indicator: When the indicator comes on, the screen will display the frequency value of speed.
- (5) [PLUSE] indicator: When the indicator comes on, the screen will display the pulse width value.
- (6) [TIME] indicator: When the indicator comes on, the screen will display the time value.
- (7) [COUNT] indicator: When the indicator comes on, the screen will display the injecting counts.
- (8) [^] key: Press the key to increase the value.
- (9) [V] key: Press the key to decrease the value.
- (10) [MODE 1 / **LOW SPEED**] key: When the indicator comes on, and the screen display 0750rpm, 3ms for pulse width, 320 for time (seconds), 4000 for counts.
- (11) [MODE 2 / **MID SPEED**] key: When the indicator comes on, and the screen display 3200rpm, 12ms for pulse width, 37 for time (seconds), 2000 for counts.
- (12) [MODE 2 / **HIGH SPEED**] key: When the indicator comes on, and the screen display 5600rpm, 5.8ms for pulse width, 32 for time (seconds), 3000 for counts.
- [13] [TEST] key: Press the key, the unit will begin to conduct the memory program.
Press [STOP] key to STOP during test. And press [TEST] key again to continue the test.

[14] [CHOICE] key: Press the key to display the in-order parameters: rpm, pulse width, seconds, count. When the indicator comes on, the screen will display the corresponding value. For example, when the [PULSE] indicator comes on and the screen displays 03.00, it means the pulse width is 3ms; when the [RPM] indicator comes on and the screen display 0750, it means the RPM is 750r/min. Press [^] key to increase the value, and press [V] key to decrease the value.

[15] [ULTRASONIC] key: Press the key, pump stop work, start ultrasonic cleaning.

[16] [CLEAN] key: Press the key to test and rinse injector. Press it again to stop.

[17] [PRESET MODE] key: Press the key to choose the memory value of low speed: 750rpm, mid speed value: 3200rpm; high speed: 5600rpm; The corresponding pulse width is 3ms, 12ms and 5.8ms. The corresponding time is 320s, 37s, 32s. The corresponding count is 4000, 2000, 3000.

[18] [STOP] key: Press the key to stop the system running.

[19] Pressure Gauge: Display the fuel pressure of system.

[20] [INCREASE] key: Press the key to increase the value of the system pressure.

[21] [DECREASE] key: Press the key to decrease the value of the system pressure.

6. Installation



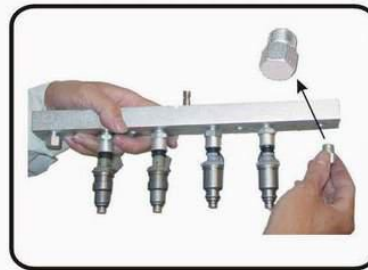
1. Connect fuel hose



2. Fit injector



3. Fit side-feed connector



4. Fit plug

7. Operation

Step 1: Clean the service injectors and then wipe them with soft cloth. Check the breakage and distortion of the O-ring of the injectors. In case of breakage or distortion, must replace them before use, thereby can avoid leakage.

Step 2: Remove the serviced injectors from vehicle and mark them by sequence. Measure the impedance value of each injector using digital multimeter, and the impedance difference of each nozzle should not be more than 1Ω , or replace them.

Step 3: Connect the power cable (220V), turn on the power switch on the side of unit, and check all warning devices.

Step 4: Check the minimum liquid level indicator, if the level is too low, it is necessary to charge test fluid for standard use.

V-66: Need to charge 1800ml.



Never mix detergent into test liquid, especially not to take detergent as test fluid to use, other wise it will result in damage of pump and other components.

Step 5: Start test and cleaning as following procedure.

8. Selective test and cleaning

(1) Dribbling test

Firstly check the breakage and distortion of the O-ring of the injectors (replace it if damaged), select the corresponding connectors and fit them on the injectors. Put the injectors on the test stand, and then connect them well.

Press [PUMP] key to start pump running.

Set the pressure to the manufacturer specified value (10% higher is the best) by pressing [INCREASE] or [DECREASE] to observe the dribbling state.

Replace the injector if it dribbles one more drop in 1 minute (or identify it according technical standard).

(2) Injecting angle and atomization states

Press [CLEAN] key to start the injecting, and observe injecting angles and atomizing states. Injecting angles should be identical (or identify it according technical standard), and injecting well distributed (without jetting), otherwise replace the injectors.

(3) Injecting volume

Close [PUMP] key (indicator turns off); press [CLEAN] key, 15 seconds latter the injecting volume should be up to 34-38ml (or test it according technical standard), otherwise replace the injectors.

(4) Test opened and closed pressure

Observe the opening and closing pressure of injectors from the pressure gauge.

(5) Injecting uniformity

Press [PRESET] key, the unit defaults low RPM as 750r/min, mid RPM as 3200r/min, high RPM as 5600r/min; and the corresponding Pulse width as 3ms, 12ms, 5.8ms, the corresponding COUNT as 4000, 2000, 3000 times.

Start pump running, and set the fuel pressure up to the specified value.

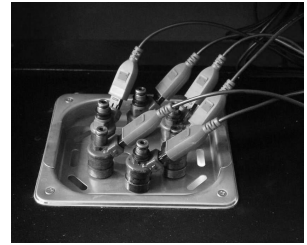
Press [TEST] key to start the test.

When COUNT displays “0000”, observe the injecting volume of each injector, the uniformity less than 9% in each test tube is good (or test it according technical standards), replace it if the volume is more than 9%.

(6) Ultrasonic cleaning

Connect injectors to signal cables and put them on the cleaning launder supporter.

Charge the detergent up to standard liquid level (the liquid level is 3/5 of depth of launder), set the RPM as 350r/min, PULSE WIDTH as 3ms, COUNT as **4000**.



Press [ULTRASONIC] key, automatically start ultrasonic cleaning for 25-30 minutes.



After cleaning the injectors, remove the dirty in injectors with air gun, wipe them with soft cloth, then put them on the analyzer and perform complete automatic test program.



Never start ultrasonic system without the detergent in the launder, otherwise the audion of virator board will be damaged.

(7) Repeated Test

Perform the test as above [1]-[5] step, and then observe the quality of injectors by the test result.

9. Safety Precaution

- (1) Read the operating instruction before attempting to operate the unit.
- (2) After continually running for long time, the unit must be off intermittently, other wise the unit's life will be shorten.
- (3) The cabinet must be connected to earth while using.
- (4) Use only the recommended test fluid and detergent. Never mix detergent into test liquid.
- (5) Keeping sparks, flames or other ignition sources away from workshop.
- (6) Never remove the unit cabinet to check and repair without authorization. If the trouble in use is happen, please contact the dealer for help.
- (7) Subject to any information make change without prior notice.

10. Trouble Sheet

Item	Malfunction	Cause	Solve measure
A	Turn on the power switch, the control panel and all the indicators don't light.	A1- The plug of electrical wire is loosen. A2- No power supply. A3- Fuse is burn out. A4- Switch is not work.	- Check the connection of plug. - Check the electric power. - Replace it. - Replace it.
B	Press [ON/OFF PUMP] key, no pressure display.	B1- Pump adapter is loosen. B2- Pump is fault. B3- The pump pressure are set to the lowest value. B4- Volt regulating board is fault.	- Check the connection screw of pump. - Replace it. - Press [+] key. - Replace the board or power tube.
C	Backlight is not work.	C1- The plug of electrical wire is loosen. C2- The light is fault. C3- Main board is fault.	- Check plug and adapters. - Replace it. - Replace it.
D	Pressure is too low.	D1- Pump pressure is low.	- Check the pump and filter net. -Check the volt regulating board and switch. - Replace it. -Check oil pipe, fuel feed board
E	Turn on the power switch, digital tube and indicators display unstably.	E1- Switch is not well connected. E2- Contact piece is not well connected.	- Check the lead of switch. - Check the contact piece of the circuit board.
F	Press the key of control panel, the corresponding indicator display unstably.	F1- Key is fault. F2 - Not well connection.	- Replace it. - Check the contact piece.
G	Leakage of fast socket on oil pipe or fast plug on test stand.	G1- Leakage of fast plug. G2- Leakage of fast socket.	- Turn the fast socket to proper position. - Turing the fast socket.
H	Test fluid in test tube appear milk white.	H1- Test fluid and detergent is mixed.	- Turn off the power, unscrew the bolt under the bottom of cabinet to discharge the test liquid, then circularly clean with test liquid.
I	Low pressure and high noise after pressing pump key.	I1- Pump is clogged. I2- Pump is fault.	- Check the filter net of pump. - Replace it.

11. Daily Maintenance

(1) Guard against dust

- After operation must put the dust guard on the analyzer to avoid clog in the valve.
- Every time finish use, need to cover the unit to avoid dust gather in the unit.
- Every time finish use, need to wipe the control panel and cabinet.

(2) Pump protection

- It is necessary to use unit constantly. If stop use or rarely use, must perform a test to the unit at least per six days. It means that need to charge the test liquid into the tank per six days. Press [PUMP] key, it will be off after 10 minutes.
- When the test liquid is turbid, must discharge the waste liquid immediately, then charge the new test fluid.
- If not use for long time, need to discharge the test liquid into the bottle to keep well.

(3) Electric power

- The electric wire must be connected to earth.
- If not use for long time, must turn off the power switch to avoid long time electrify.

(4) Selective use of test fluid

- Must choose non-corrosive, non-water, nontoxic, non-flammable test fluid.
- Not to mix use with the detergent. Never put the detergent into the tank of analyzer.

(5) Change the test fluid

- After many test and cleaning, the test fluid and detergent will be turbid.
- Using socket wrench to unscrew the tap on the rear of instrument, and the waste fluid will be flowed from the bottom of instrument.
- Pour the new test fluid into the inlet of tank.
- Turn on the tap of ultrasonic cleaning machine to discharge the waste detergent.



Test fluid is used for injector analyzer, and detergent is used for ultrasonic cleaner.

12. Parameter of Fuel System Pressure

Brand of Car	Model	System Pressure (kg/cm ²)
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
VOLKSWAGON	SANTANA 2000	2.2-2.65
VOLVO	VOVLE	2.7-2.9
AUDI	SIX CYLINDER	2.8-3.0
	FOUR/FIVE CYLINDER	4.5-5.0
CHRYSLER	CHEROKEE 213	2.73
	DODGE 3.3L	3.37
FORD	TEMPO 2.3L	2.8
	LINCOLN TOWEN	2.06-3.08
GM	BUICK CENTURY	2.9-3.3
	BUICK AVENUE	2.9-3.3
	CADILLAC 5.7	2.9-3.3
	CHEVROLET LUMINA	2.9-3.0
	CHEVROLET CORSICA	2.5-3.0
MITSUBISHI	V63000	3.5
MAZDA	323	2.0-2.2
	626	2.5-2.9
	929	2.5-2.9
TOYOTA	CROWN 3.0	2.84
	PREVIA	2.7-3.3
	LEXUS 300, LS400	2.65-3.04
	CAMRY 3.0	2.65-3.04
	LAND CRUISE	3.0
	CORONA	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	BLUE BIRD	2.5
	MAXIMA	2.5
	300ZX	2.06-2.55
DAEWOO	DAEWOO	2.8-3.0
HYUNDAI	SONATA	2.65-2.75