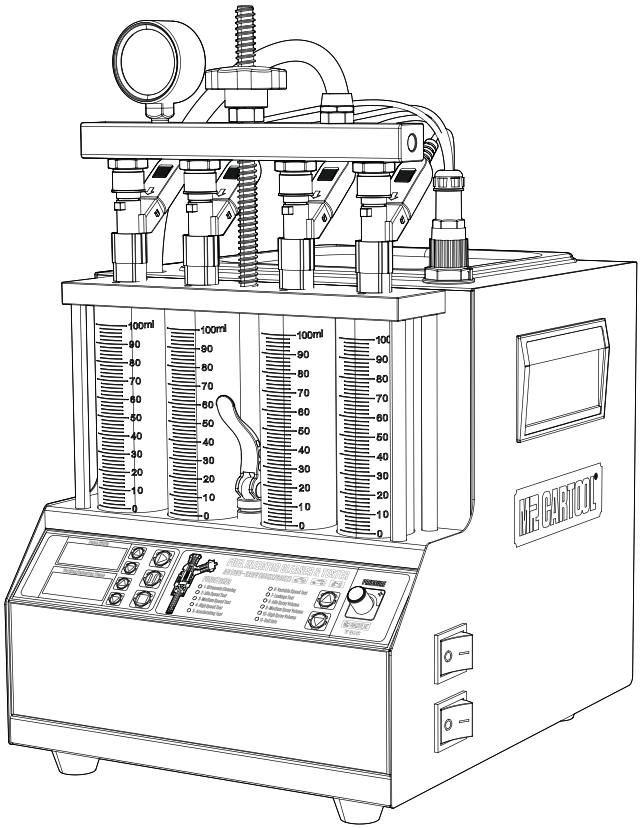
V 308

Injector Cleaner & Tester

User Manual



MR CARTOOL®

www.mrcartool.net

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1 Overview

1.1 Functions and features

Fuel injector diagnostic and cleaning equipment is a mechatronics product that combines ultrasonic cleaning technology and microcomputer oil pressure closed-loop control cleaning and detection technology. This product simulates various operating conditions of the engine, and cleans and inspects the fuel injectors of various automobiles and motorcycles. This equipment is the necessary and preferred equipment for the automobile and motorcycle repair and maintenance industry, research and teaching and training departments.

Main functions

- **Ultrasonic cleaning:** Ultrasonic cleaning can be performed on single or multiple injectors at the same time, which can remove the attachments and internal blockages on the injectors.
- **Uniformity detection:** to detect the uniformity of the injection volume of each injector.
- **Atomization observation:** Using the background light, you can observe the spray atomization situation of the nozzle in a comprehensive and careful manner.
- **Tightness test:** It can detect the tightness and dripping of the fuel injector under high pressure.
- **Fuel injection volume detection:** It can detect the fuel injection volume of the fuel injection nozzle under specific working conditions (such as the same time and the same number of times).

Main features

- Using ultrasonic powerful cleaning technology, strong cleaning ability.
- Using electronic pressure regulating control technology, stable oil pressure and wide adjustable range.
- Use high-quality oil pump to ensure long-term stable use.
- The use of high-definition digital tube display makes the operation clear and easy to learn.
- The oil tank liquid level is displayed visually, and the detection liquid can be recycled.
- Bright background light, you can clearly see the various situations of the fuel injector when it is working
- It has replaceable composite joints suitable for a variety of vehicle types.
- Within the allowable adjustment range, the test time, working frequency, fuel injection times, shortest switching period, etc. of the fuel injector can be adjusted arbitrarily.

1.2 Working environment and technical parameters

Working environment

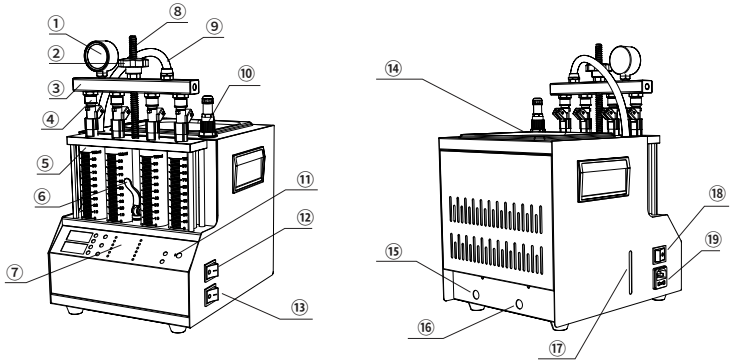
Power supply: AC220V±10%
Frequency: 50HZ±0.5
Relative humidity: <85%
Environment temperature: 0℃～＋40℃
External magnetic field strength: <400A/m
No open flames are allowed around

Technical parameters

Tank capacity:1300 ml
Range of rotation:0-7500r/min
PWM pulse width:0～20.0ms step0.1ms
Time:0～20min
Cleaning frequency:40 kHz
Cylinder volume:180 ml
Injection times:0～9900 times, step 100ms
System pressure:0～0.6Mpa
Ultrasonic cleaning power:70W
Package dimensions:340*295*360mm

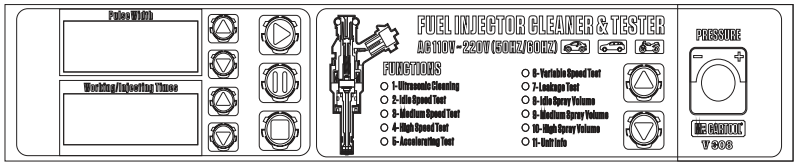
2 Structure and composition

2.1 Structure



1-Pressure gauge; 2-Lock nut; 3-Oil rail; 4-Top oil inlet connector; 5-Glass measuring cylinder; 6-Oil drain handle; 7-Operation panel; 8-Lock pole; 9-Oil outlet pipe; 10-Signal wire; 11-Pressure regulating knob; 12-Heating switch; 13-Ultrasonic switch; 14-Ultrasonic cleaning tank; 15-Cleaning agent drain valve; 16-Testing agent drain valve; 17-Testing agent liquid level; 18-Power switch; 19-Power socket

2.2 Operation panel diagram



Pulse width/function window: display the selected function item when the function is selected, and display the pulse width of the injector when working.

Time window: display the working time of the fuel injector and the number of fuel injection.

Pulse width adjustment button: Adjust the pulse width of the injector when working

- Press up to increase the working pulse width of the injector when cleaning the injector.
- Press down to clean the injector to reduce the working pulse width of the injector.

Time/time adjustment button: adjust the working time of the injector and the number of injections.

- Press up to increase the working time of the injector/the number of injections.
- Press down to reduce the working time of the injector/the number of injections.

Start button: Press to execute the selected work item.

Pause button: temporarily stop the selected work item after pressing.

Stop button: stop the selected work item and return to the selected work item.

Function selection button: select work item.

- Press up to select work item.
- Press the down to select the work item.

Pressure adjusting knob: adjust pressure change.

- Turn clockwise to increase the pressure value.
- Turn counterclockwise to decrease the pressure

3 Operation process

3.1 Ultrasonic cleaning

Ultrasonic cleaning is to use the penetrating and cavitation shock waves generated when ultrasonic waves propagate in the medium, and powerfully clean objects with complex shapes, cavities and pores to completely remove stubborn carbon deposits on the fuel injector.

3.1.1 Preparation

1) Remove the fuel injector from the vehicle and check whether its rubber seal is damaged. If it is damaged, it should be replaced in time before the cleaning test to avoid leakage during the test. Then put the fuel injection nozzle into the cleaning agent, carefully remove the external grease and wipe it with a soft cloth.

2) Turn on the power and turn on the power switch on the side of the main unit.

3) Put the cleaning bracket in the accessories into the ultrasonic cleaning tank, and place the wiped fuel injector in the cleaning bracket positioning hole of the ultrasonic tank.

3.1.2 Methods and steps

1) Add an appropriate amount of cleaning agent to the ultrasonic tank and spread the cleaning agent over the bottom of the cleaning stand.

2) Insert the plugs of the drive wires into the injector sockets in turn. (Special fuel injectors need to be connected with an adapter cable)

3) Press the item selection up and down keys to select the "01 ultrasonic cleaning" item, and then press the working time up and down keys to set the time. (The system defaults to 10 minutes, if you need to modify the time, you can use the up and down keys to change)

4) Press the start button and turn on the ultrasonic cleaning switch on the side of the device to start cleaning. When working, you can press the pause button to suspend work or press the stop button to exit.

5) During the cleaning process, the heating switch on the side of the equipment can be turned on to improve the cleaning effect.

The working time gradually decreases. When it is 0, the system automatically stops.

Take out the fuel injection nozzle from the ultrasonic tank, wipe the cleaning liquid on it with a soft cloth, and prepare for the next job.

NOTICE

- During the cleaning process, you can hear the intermittent (approximately 5 seconds) vibrating sound when you take the fuel injector out and put it to your ear, so you can judge whether the fuel injector is working normally.
- Ultrasonic cleaning is strictly prohibited when there is no cleaning agent in the ultrasonic tank to avoid equipment damage.
- Only the ultrasonic cleaning agent dedicated to cleaning the fuel injection nozzle can be added to the ultrasonic tank, and other reagents cannot be used instead, otherwise any malfunctions and damages caused will not be covered by the warranty.

3.2 Injector diagnostic

This function is to detect the atomization, dripping, blockage, fuel injection angle status of the fuel injectors and the size and balance of the fuel injection of each fuel injector at different speeds.

3.2.1 Preparation

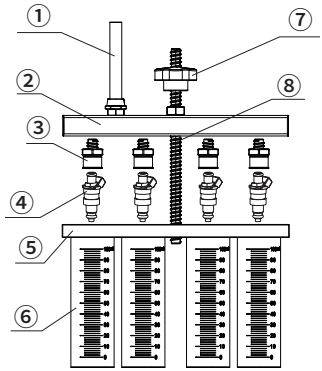
1) Confirm that the oil drain handle is open, use the funnel in the accessories to

add the test liquid to the equipment through the glass window, and pay attention to control the flow rate during the addition to avoid overflow.

2) Add 1 bottle (about 1000ml) of testing agent each time.

3) Install the fuel injector.

1-Oil outlet pipe;
2-Oil rail;
3-Top oil inlet connector;
4-Injectors;
5-Upper plate seat;
6-Glass measuring cylinder;
7-Lock nut;
8-Lock pole



Top-in fuel injector installation diagram

- Select the top oil inlet connector from the accessories and install it into the oil separator.
- Install the fuel injector in the forward direction (apply a little grease on the "O" ring of the fuel injector)
- Put the horizontal end of the oil separator and the fuel injector on the upper plate seat, and tighten the two ends with the locking rod. Ready to test.

3.2.2 Methods and steps

02 Idle speed test

1) Confirm that the injector to be tested has been installed properly and the signal wire has been plugged in.

2) Select "02 Idle Speed Test".

3) Press the working time up and down keys to set the time. (Generally set to 2 minutes)

4) Press the start button to start work.

5) Turn the pressure adjustment knob to adjust the pressure to 0.25~ 0.3 MPa. (In the electronic injection system, the general oil pressure works at 0.25-0.3MPa)

6) Press the up and down keys to select the appropriate pulse width. (The system default is 3ms).

7) The working time gradually decreases. When it is 0, the system automatically stops.

03 Medium speed test

1) Select "03 Medium Speed Test".

2) Press the start button.

3) The rest of the operation steps are consistent with item 02

04 High speed test

1) Select "04 High Speed Test".

2) Press the start button.

3) The rest of the operation steps are consistent with item 02

05 Accelerating test

1) Select “05 Accelerating Test”.

2) Press the start button.

NOTICE

- The fuel pressure, working time and pulse width are automatically set by the system. The time system defaults to 10s as a cycle period, and the user does not need to set it separately.
- The system will automatically and continuously cycle three times to simulate the working condition and fuel injection volume of the fuel injector when the engine is accelerating uniformly at 750 to 7500 rpm.

06 Variable speed test

1) Select “06 Variable Speed Test”.

2) Press the start button.

NOTICE

- The fuel pressure, working time and pulse width are automatically set by the system. The time system defaults to a cycle of 10s, and the user does not need to set it separately.
- The system will automatically and continuously cycle three times to simulate the working condition and fuel injection volume of the fuel injector when the engine is idling (750 rpm), medium speed (4500 rpm), and high speed (7500 rpm).

07 Leakage test

1) Select "07 Leak Test".

2) Press the working time up and down buttons to set the time. (Generally set to 1 minute)

3) The rest of the operation steps are consistent with item 02.

NOTICE

- The pulse width system defaults to 3ms, no need to set it again.
- Whether the fuel injection nozzle is dripping and leaking when the simulated oil pressure is 0.3Mpa

08 Idle speed spray volume test

1) Select "08 Idle Spray Volume".

2) Press the up and down buttons to set the number of times. (Generally set to 2000 times)

3) Press down on the oil drain handle to observe the fuel injection volume.

4) Press the start button to start the test.

5) After the test, raise the drain handle and put the testing agent back into the tank.

Description: Simulate the working conditions and fuel injection volume of the engine when the fuel injection nozzle works for a certain number of times when the engine is idling.

09 Medium speed spray volume test

1) Select “09 Medium Spray Volume”.

2) The rest of the operation steps are consistent with item 08.

10 High speed spray volume test

1) Select “10 High Spray Volume”.

2) The rest of the operation steps are consistent with item 08.

NOTICE

- Flow balance Test the flow balance at different speeds. When the liquid level in the measuring cylinder is 2/3 of the measuring cylinder, pause or stop work to observe the balance of the fuel injection volume. The deviation of the fuel injection volume of all fuel injection nozzles on a vehicle should not exceed 2%. Or refer to the relevant technical manual of the fuel injector to judge the flow balance of the fuel injector.
- Observation of fuel injection shape Observe whether the fuel injection shapes and angles of all fuel injection nozzles on the same car are uniform at various speeds. At the same time, you can adjust the opening pulse width of the fuel injection nozzle to check whether the minimum opening pulse width of the fuel injection nozzle is consistent.
- Leak detection test Leak detection test is to detect the tightness of the injector needle valve under the high pressure of the system. (Observe the tightness of the fuel injector, generally there should be no leakage within one minute)

11 Unit info

Display the product number and date of manufacture of the device.

4 Storage and maintenance

4.1 Storage

1) Turn off the power and unplug the power plug.

2) Put all connectors back into the accessory box for storage.

3) Drain the ultrasonic cleaning agent. Wipe the equipment clean with a dry soft cloth.

4) If the machine needs to be stored for a long time, discharge the testing agent into a bottle and seal it.

4.2 Maintenance

- Replacement of testing agent After the testing agent has been used for a period of time, a lot of impurities will accumulate, and the agent containing dirt cannot be used, otherwise it will easily block the fuel injector. When replacing the agent, first open the testing agent drain valve to empty the tank, and then inject a little testing agent to clean the interior of the tank. After cleaning, drain the fuel tank again and then pour 1L of new testing agent into the tank.
- Fuse replacement there is a square box marked with a fuse on the power socket on the left side of the device, and the fuse can be seen by opening the box. If it is blown, replace it with a new one.

5 Precautions

Since the test device is part of quartz glass, it is easy to break, so do not place other objects around the equipment to avoid bumping and breaking.

- If there is no digital display after power on, please check whether the power supply is powered; if so, check whether the plug is connected firmly, or whether the fuse is blown. If it is not broken, and the switch is still invalid after pressing the switch several times intermittently, please contact the manufacturer and must not disassemble it by yourself, otherwise our company will not provide warranty.
- When no cleaning agent is added to the ultrasonic tank, it is strictly prohibited to open the ultrasonic cleaning item to avoid damage to the ultrasonic system.
- Every time the test solution is changed, it must be cleaned up, and then 1L of new test solution should be added.
- The use of unqualified testing agent will cause corrosion of the oil pump, oil supply pipeline and failure of the pressure gauge.
- Using other cleaning agent and testing agent will cause the equipment surface coating to peel off.
- It is strictly forbidden to use kerosene, gasoline or other testing agent and cleaning agents as testing agent and cleaning agents for this machine. Otherwise, the "O" ring and pipeline rubber parts in the equipment will be damaged, causing leakage.
- The cleaning agent and testing agent should not be mixed up.

6 Warranty

1. Thank you for choosing our products, we will provide you with the following services and promises.

2. The warranty period of this product is 1 year.

3. After the warranty period expires, repairs will be charged for replacement parts.

4. After the failure, please contact the manufacturer, we will give you the most complete service in the shortest time.

The following items are not covered by the warranty:

1) Vulnerable parts are not covered by the warranty, including: glass tube, signal sire, stickers, connectors pressure gauge, oil outlet pipe.

2) When no cleaning agent is added to the ultrasonic tank, turning on the ultrasonic cleaning switch will damage the ultrasonic system, which is not covered by the warranty.

3) If the testing agent is not replaced in time after long-term use, the oil pump filter screen is blocked and the oil pump is burned out of the warranty.

4) The use of fuel injector cleaning agent as fuel injector testing agent will cause the fuel pump to burn out, which is not covered by the warranty.

5) Man-made faults are not covered by the warranty.

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