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1. Introduction

The structure of motor became more and more complicated and precise during the delveopment of modern technology on vehicles. So that much more high performance was required by the components, espencially the injectors which already played an significant role within the complete motor.

Nowadays, the testing and maintaining of the working status of injector going to gain a top attention during driving life.

Our Injector Testing & Cleaning Machine was designed espencially for the testing,cleaning and maintaining of injectors. Which fast and easy testing under all kinds of simulated working condition, observing and recovering to the best working condition by using Ultrasonic Cleaning Machine.

Correct adjustments with cost effective which will bring you to a better and comfortable way of driving.

2.Safety precautions

1.1 Please read this Manual Book carefully and fully understand it before operation

1.2 Appropriate fire extinguishing equipments must be clearly marked and closed at hand, keep the testing liquids away from flame and smoke, and worksite in good air ventilation. After operation, please switch off the power supply and clean the machine.

1.3 Do not turn on and turn off the unit continuously, it must be turned on once again 5 minutes later while switch off the power.

1.4 In order to avoid the aging of the rubber parts, do not expose the machine in the sunshine; do not deposit the unit in a moist place, it must be stored in a dry place with good ventilation. Because of the multi functions, the machine is equipped with many accessories, it must be repaired by a qualifed technician.

1.5 This unit has been tested strictly before leaving our factory, it generally can be used for ten year, but the operator must obey our operation regulations. This unit is controlled by a micro-computer, there are many kinds of LSI in it, so please do not try to take apart and repair it by yourself, if you meet with any faults, please contact our local distributors or our company.

1.6 While working, sparks, smoke and fire are strictly prohibited in the working area.

1.7 The operator must wear blinkers to prevent the liquids spatter into eyes.

1.8 Avoid fuel and cleaning compounds spatter into electronic components of this machine.

1.9 Appointed test liquid and cleaning compounds must be used in the machine.

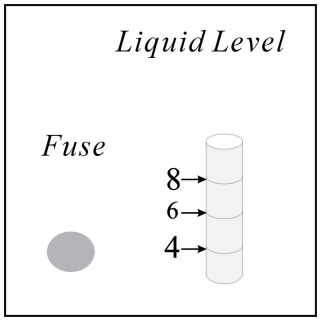
1.10 After finishing testing and cleaning process, always adjust the Pressure Valve to the min. position and switch off the power supply.

1.11If you have any inquiries, please contact our local distributors or service offices.

1.12 This machine is equipped with automatic temperature protection/control system, when the working temperature is over rated value, the machine will stop automatically and the Alarm rings, when the temperature gets normal, the machine restart.

1.13 Back Drawings

Please pour testing fluids according to the quantity of cylinder of each injector.(4/6/8 is number of cylinders)



1.14 If you meet with any faults, please contact our local distributors or service offices

3. General Information

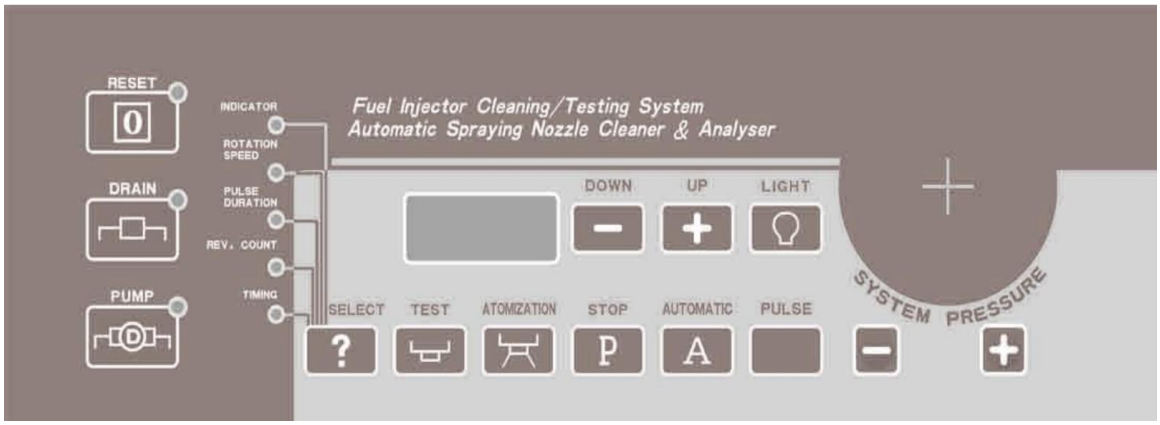
3.1 Description

Injector Testing & Cleaning Machine with microprocessor and ultrasonic cleaning technology. Testing injector atomization, spray ability and uniformity, spray capacity and leakage with many kinds of simulating engine working conditions. Cleaning with ultrasonic cleaning machine with timer and switch.

3.2 Specifications

1.Size of Out-carton: 56*56*75CM
2.N.W./G.W.: 60/75KGS
3.Power: AC220V 50/60Hz 360W
4. Pressure Range: 0~ 90PSI (6.4KG/C ㎡)
5. Work Temp.: -20℃~38℃
6. Injectors.No.: 2-6 (Min.clean 2 injectors in one time)
7. Injector Pulse (COUNT): 0-9950 pulses; variable in 50 pulses.
8. Injector Operating Frequency (RPM): 0-9950 rpm, variable in 50rpm
9. Injector Pulse Width (PMW): 0-20 ms in 0.1ms increments

3.3 Controls



Function testing buttons

1. **RESET**: Press this key to return to original working position for reseting. If the computer/machine dead, press this key to recover.
2. **DRAIN**: Press this key the testing fluids returns to bottom tank. Press it again to stop draining.
3. **PUMP**: Press this key to start the pump. Press it again to stop.
4. **LIGHT INDICATOR:** Light up when backgound light on.
5. **ROTATION SPEED:** Simulated the engine running operating frequency
6. **PULSE DURATION**-Injector Pulse Width(PMW)： 0-20ms in 0.1ms increments
7. **REV.COUNT**: Times of injector pulses, variable in 50rpm which can be adjusted. The figure of counting reducing automatically till to zero(the work for injector will stop)
8. **TIME:** Show the accumulated working minutes.
9. **SELECT**: Press this key for the selection of left-side five parameter. Press first time to set the first parameter. Adjust the parameter by "+" & "-". Press second time for set the second parameter. Press it the third time for set the third parameter. Then set the parameter one by one.
10. **TEST**: Press this key to start testing.Testing the injectors spray capacity, uniformity and spray angles automatically.
11. **Atomization**: Press this key to start atomization testing. The injectors are in the constant opening state, testing the injector's atomization and spray ability. Press once again for pause.
12. **Stop**: Press this key to pause the working of system. Press test key to continue previous working step.
13. **Automatic**: Press this key to enter automatic working modes.
14. **Pulse**: Press this key to begin ultrasonic cleaning. To start injector pulse.
15. **Display Window**: Show the setted parameters.
16. **Light**: The background light, press it on, press once more off. Adjust the light on time after "time" indicator light on by press "select" key. Adjust the light on time by "+" & "-" key. The

presetted time is 30 minutes.

17. **PRESSURE GAUGE**: Show the working pressure while pump is working. Set up system working pressures accordingly to each injector's needs.

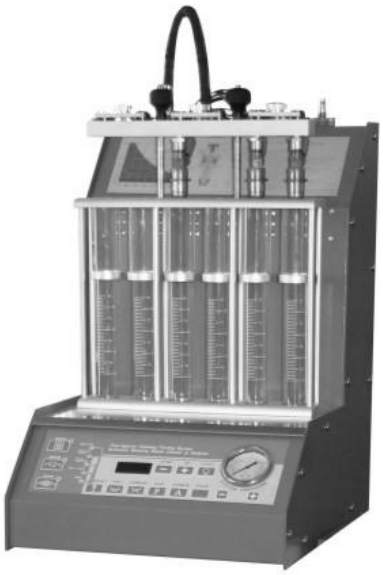
+ &－: Increase & Decrease the working pressure showed on the pressure gauge.

4. Preparation

Prepare for the working area.

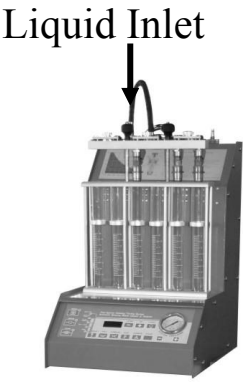
4.1 Power Supply

Connect this machine to the power supply AC-220V, turn on the power switch to check if the power supply is normal or not, when "0000" appear on the display window, this unit is ready to work.



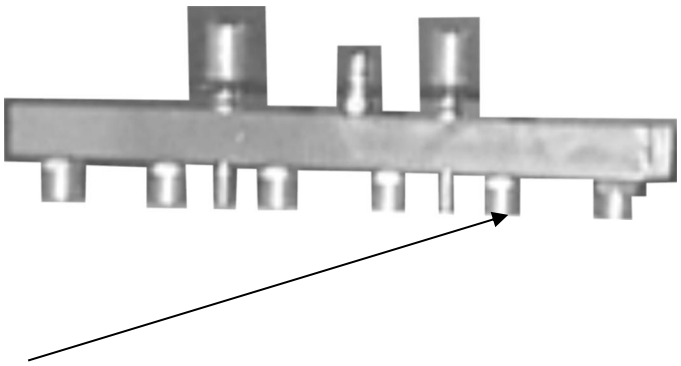
4.2 Pour solvents

Pour suitable quantity of testing liquid into the machine. If this machine is used for the first time, more than 2 L test liquid must be put into it. From the liquid level window, you can see the liquid level is above 6CLY. Do not mix the use of testing & cleaning solvents.

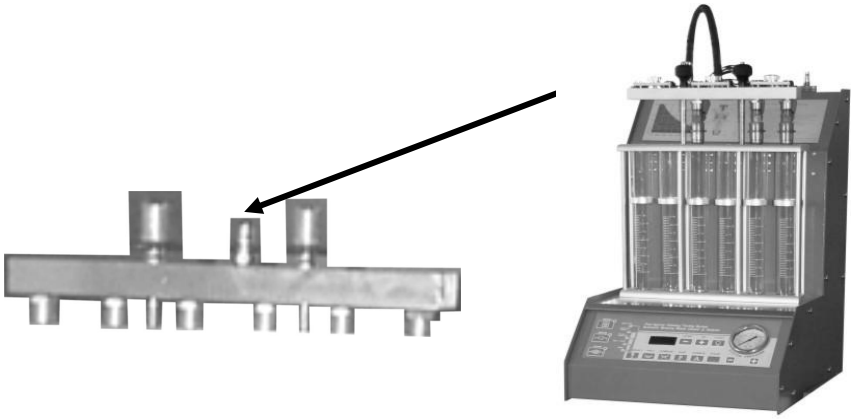


4.3 Installation & Connection

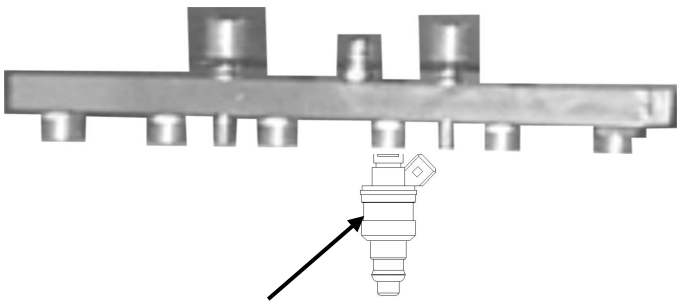
1. Choose the suitable adapters for the fuel injectors and connect them on the fuel injector distributor assembly. Special type adapters are optional.



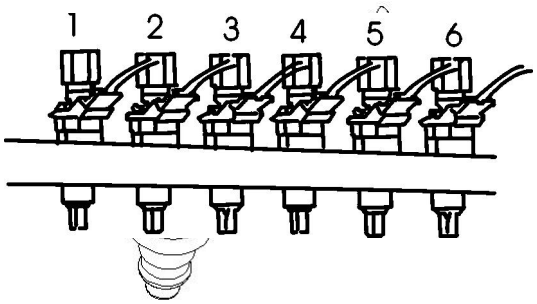
2. The oil hose is connected with the Oil Outlet on the Fuel injector distributor assembly.



3.Fix the injectors that will be tested. First check the injector resistance value, this value can not exceed 1Ω, if the resistance value is above 1Ω, this injector must be replaced.



4.Please insert the pulse cable into the injector socket and mark the injectors in order.



4.4 Seal Checking

Start the oil pump and adjust the pressure regulator slowly according to fixed pressure of each injector(please have a reference to the Customer Reference and Standards on page), if there is any leakage on the connection, please turn off the switch and refix it immediately.

Attention:

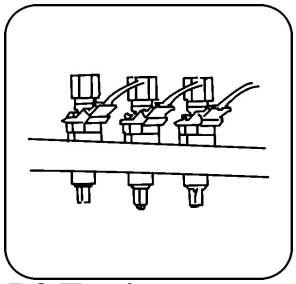
1. **Pressure Regulator was fixed on minimum position in factory**
2. **Please adjust pressure by yourself according to the pressure of each injector**
3. **Press "+" key to increase, press "-" to decrease the pressure.**

5. Operation

Turn on the switch.
Press "pump" key and adjust the pressure according to the rated working pressure
of each injector.

5.1 Leakage Checking.

While the injectors being connected, press **PUMP** key, regulate the pressures to the rated working pressure of the injectors, (10% higher than normal one is suggested) observe the injector, if there is one drop from the injectors within one minute, the injectors must be cleaned or replaced.



5.2 Testing spray capability and angles

press **"ATOMIZATION"** key, and then observe the injector atomization status and spray angles. Injectors atomization must be symmetrically equal and the spray angles must be identical, otherwise the fuel injectors must be cleaned in the ultrasonic bath or changed.

Comparison

Before cleaning After cleaning

5.3 Parameter Setting

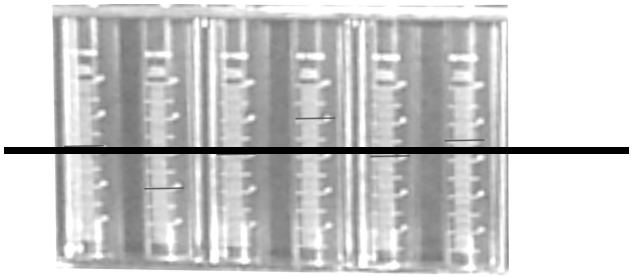
Setting the three parameter **COUNT、RPM and PMW** by press "**SELECT**" key then press"**+ or －**" key to adjust them, then press "**TEST"** key, the injectors begin to spray.

5.4 Testing Injector Spray Capacity

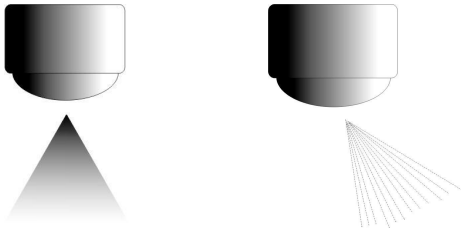
Press the **TEST** key, regulate the pressures to the rated working pressure of the injectors, after the automatic programs stop, observe the test tubes, if the liquid level difference is less than 10%, the injector is regular; if the difference is above 10%, the injector must be cleaned or replaced.

5.5 Comparison

Meanwhile observe the injector spray angles, if the angles are not equal, please clean or replace the injector.



Observe the Spray Angles



Right Wrong

5.6 Automatic Modes

Press “Automatic” key the machine start for testing automatically according to the preseted 3 Automatic modes in the program.

Mode 1

Spray pulse program

Injector Operating Frequency：（ Simulate multi spot spray and idle speed working status）: **650rpm**
Injector Pulse Width: **3ms**
Injector Pulse: **2000 pulses**
After the program stops, there are 10 seconds for observing the spray capacity. After 25 seconds, the testing liquid all returns to the bottom tank inside. Mode 1 program finish.
This program is for observation of idle working status then begins the next program for load test and high speed test.

Mode 2

(Simulate the heavy load status)

Spray pulse works as followings:
Injector Operating Frequency （ Simulate multi spot spray and heaviest load working status）: **2400rpm**
Injector Pulse Width: **12ms**
Injector Pulse: **1000 pulses**
After the program stops, there are 10 seconds for observing the spray capacity.After 25 seconds, the testing liquid all returns to the bottom tank inside.Mode 2 program finish.
This program is for observation of heaviest load working status. If the spray difference is within 12%, the injectors are in good conditions, otherwise, the injectors must be cleaned or replaced. After this program is over, the next program starts automatically.

Mode 3

(Simulate the high speed working status)
Spray pulse works as followings:
Injector Operating Frequency(Simulate multi spot spray and high speed working status)**: 3600rpm**
Injector Pulse Width: **6ms**
Injector Pulse: **1000 pulses**
The program stops for 10 seconds and observe the spray capacity, the liquid returns, 25 seconds later, the programs stops.
This program is for testing the high speed working status and fuel supply status, and also for testing the injector working status once more Turn on the Return Switch, all the liquid returns 25 seconds later, Return Switch is off automatically, all the program is over.

5.7 Manual Testing Modes:

Press **“ SELECT”** key to set up required paramenter, when indicator light up, adjust the parameter by “+” & “-”. Press **“PUMP”** key to start the pump, adjust the pressure to required one. Then press **“TEST”** key to do setted testing modes.

6. Ultrasonic cleaning

6.1 Ultrasonic cleaning is not only for general cleaning, but also for cleaning the faulty injectors.

6.2 Pour the cleaning solvenets into the ultrasonic bath to the position of 1/2, connect the injectors with the pulse cable and put the injectors on the kickstand then into the bath.

6.3 Turn on the ultrasonic cleaning machine. Switch is at the side of machine.

6.4 Input the cleaning time by pressing +/ − .

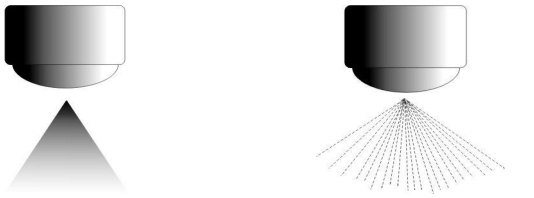
6.5 Press the Test to start cleaning.

Attention:

Ordinarily cleaning process lasts 20-30minutes.

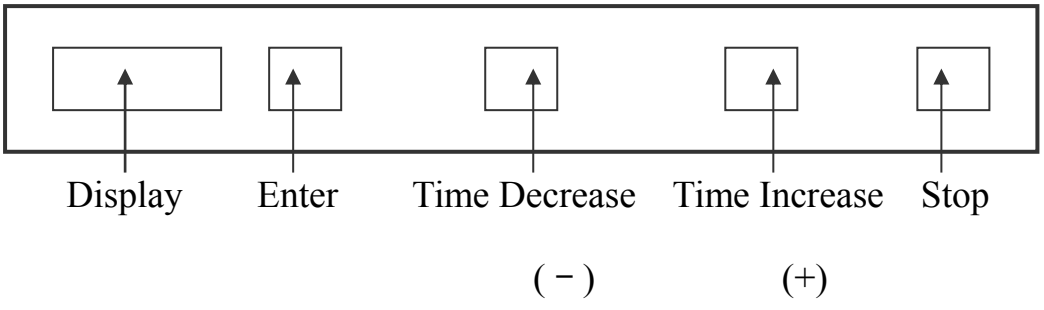
Be sure that cleaning solvents cannot be mixed with test liquid.

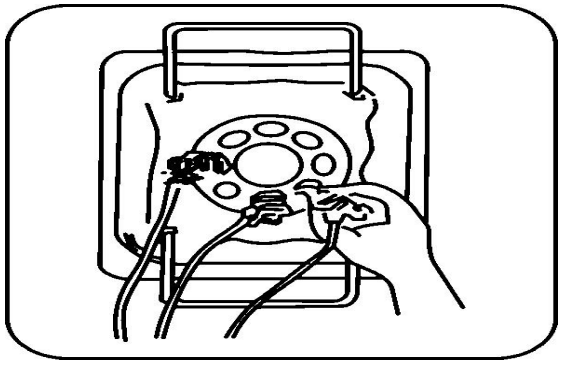
comparison



Before cleaning **After cleaning**

6.5 Ultrasonic Keyboard & Functions





7.Customer Reference & Standard

Pressures of all vehicle fuel systems

Brand	Models	Pressures （KG/CM2）
MAZDA	323	2.0-2.2
	626	2.5-2.9
	929	2.5-2.9
BMW	528	2.7-2.9
VOLVO	VOLVO	2.7-2.9
NISSAN	NISSAN	2.5
	NISSAN	2.5
	300ZX	2.06-2.55
FORD	Tempo2.3L	2.8
	Lincoln City	2.06-3.08
GM	Buik Century	2.9-3.3
	Buik	2.9-3.3

	Catilac 5.7	**2.9-3.3**
	Chevelette	**2.3-3.0**
	Chevelette	**2.5-3.0**
MITSRBISHI	**V6**	**3.5**
VW	**VW**	**2.7-2.9**
VW	**Santana 2000**	**2.2-2.65**
DAEWOO	**Dawoo**	**2.8-3.0**
HYUNDAI	**Sonata**	**2.65-2.75**
TOYOTA	**Toyota3.0**	**2.84**
	Toyota	**2.7-3.3**
	Lexus300 LS400	**2.65-3.04**
	Cammary 3.0	**2.65-3.04**
	Land Cruiser	**3**
	Corrolla	**2.7-3.1**
HONDA	**Accord 2.0 2.2**	**2.85**
	Cittizen1.5L	**2.55-2.85**
	Legent3.2L	**2.7-3.04**
CHRYSLER	**Beijing Cherrichee 213**	**2.73**
	3.3L	**3.37**
AUDI	**6 Cylinders**	**2.8-3.0**
	4 & 5 cylinders	**4.5-5.0**

8.**Overview Operation**

1、Connect with Power Supply.

↓

2 Pour relevant testing solvents and turn on the power.

↓、

3、Choose the suitable adapters, connect with injectors.

↓

4、After installing, set the working pressure of the injectors.

↓

5、Checking the leakage.

↓

6、Select functions or manual adjusting three parameter value.

↓

7、Tesing & Comparing.

↓

8、Ultrasonic Cleaning.

↓

9、Retesting and cleaning again.

↓

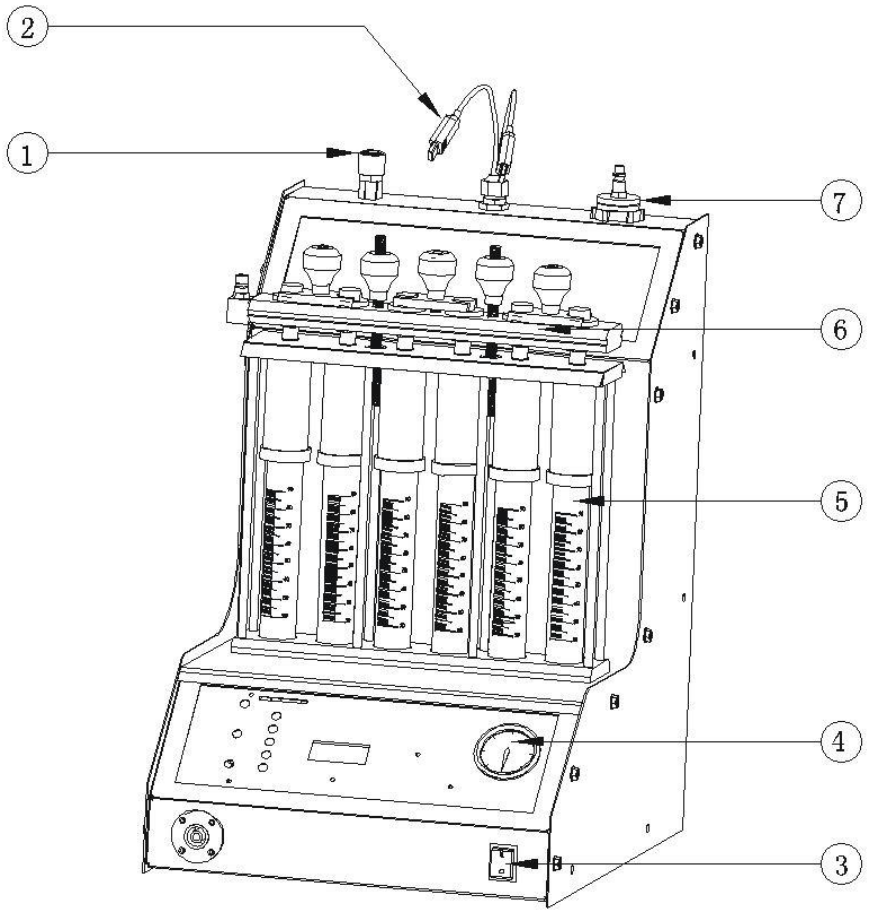
10、After test, determine replace to a new one or not.

↓

11、All process is finished, turn off the power supply.

↓

12、Cleaning the working place.



NO.	Description	Model
1	Quick Cowpler	A010
2	Pulse wire	A012
3	Switch	A007
4	Guage	A019
5	Glass tubes	A018
6	Fuel stage	A023
7	Fluit inlet	A003