



STE-V-60/80

Vertical Pressure Steam Autoclave

INSTRUCTION MANUAL



M.R.C.LTD.

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PREFACE

1. The purpose of this manual

As part of the equipment, this manual provides necessary information as follows:

- Notices to customers related to safety.
- Dispose the equipment safely.
- Install the equipment properly.
- Understandings about the operation and limits.
- Operate the equipment correctly and safely.
- Replace parts and maintain the equipment correctly and safely.

This manual is divided into several independent sections to be used by install, operation and maintenance personnel.

2. Preservation of this manual

This manual should be preserved properly; it should be kept with the equipment.

SAFETY MARK

!!! WARNING :

POSSIBLE SEVERE DAMAGE ON HUMAN OR EQUIPEMNT

!! CAUTION :

POSSIBBLE TRIVIAL DAMAGE ON HUMAN OR EQUIPMENT

! ATTENTION :

POSSIBLE OPERATION FAILURE OR UNQUUALIFIED QUESTION

Chapter I OVERVIEW

1.1. Manufacturer Information

MRC , LTD.

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1.2. Basic data

Manufacturer permission : 20050073

Product registration : 2004 2570057

Executive standard : YZB/ 0073-2003

ISO9001 ISO13485 have been passed

Design pressure : 0.26MPa

Rated work pressure : 0.22MPa

Design temperature : 150□

Rated work temperature : 134□

Water source: Pure water

Product Model	External dimension	Diameter× Depth	Volume	Power	Voltage	Net Weight
STE-V-60/80	688X546X1030	φ386x695	80L	4.5KW	220/380V	90Kg

1.3. Warranty

Your autoclave is manufactured with high quality. The warranty period is 1 year, during which if any trouble occurs, please refer to this manual, or contact the technical service departments in our company. We will provide a plan for the maintenance. We provide lifetime maintenance for the equipment, the service after warranty period is provided at a cost price

1.4. Attention

1. Open the package upon the receiving of the sterilizer, inspect if the appearance is damaged and the degree of damage. Notice the package before inspect the equipment and keep well the package material. Inspect if there is any damage in the surface, such as panel scuffing.

2. The sterilizer should be used in according to the instructions described in this manual. The possible difficulties are describe as clearly as possible so that the customers can analysis and solve the problems properly. If replacement parts are needed, please inform us the model and serial number.

Notice:

The autoclave should be used in a strict manner described in this manual. We describe the may-be troubles as clearly as possible so that customers may be able to diagnose the problem and take rapid action. If replacement parts are needed, stipulate the model and the quantity.

Chapter II Brief Introduction to the Equipment

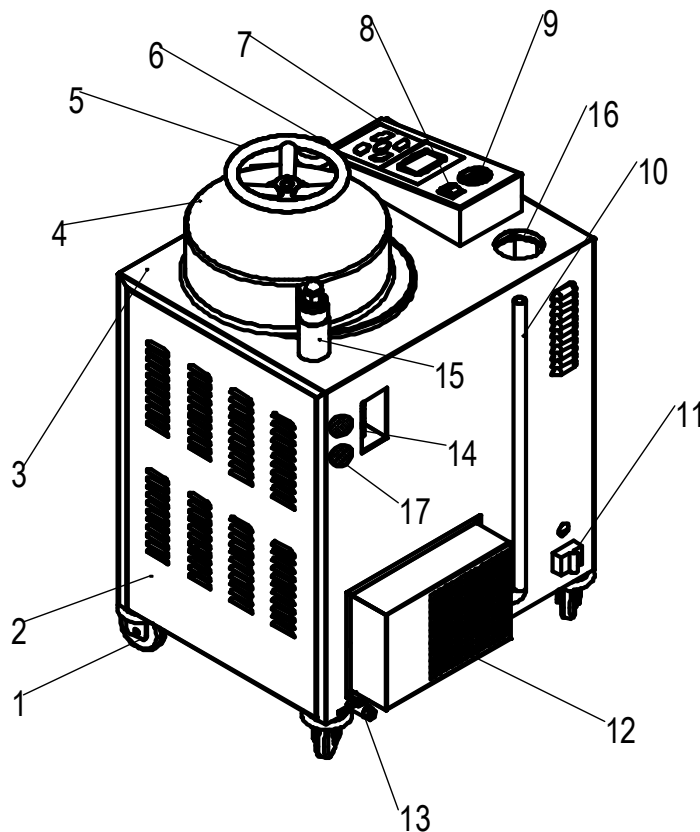
2.1. Principal and available usage.

This autoclave is controlled by pressure and temperature, mainly by temperature. PID control arithmetic, advanced control theory and constant temperature are adopted; it has high precision, stability and reliability. It is easy to operate due to multifunction and direct viewing display. It has a good adaptability; good control precision can be gained under different environmental temperature, heating power and voltage fluctuation.

Inner heating is adopted in this sterilizer, it can sterilize in short time effectively with saturated water steam being used as medium. Its main advantages include easy to use, sterilize completely, and beautiful appearance.

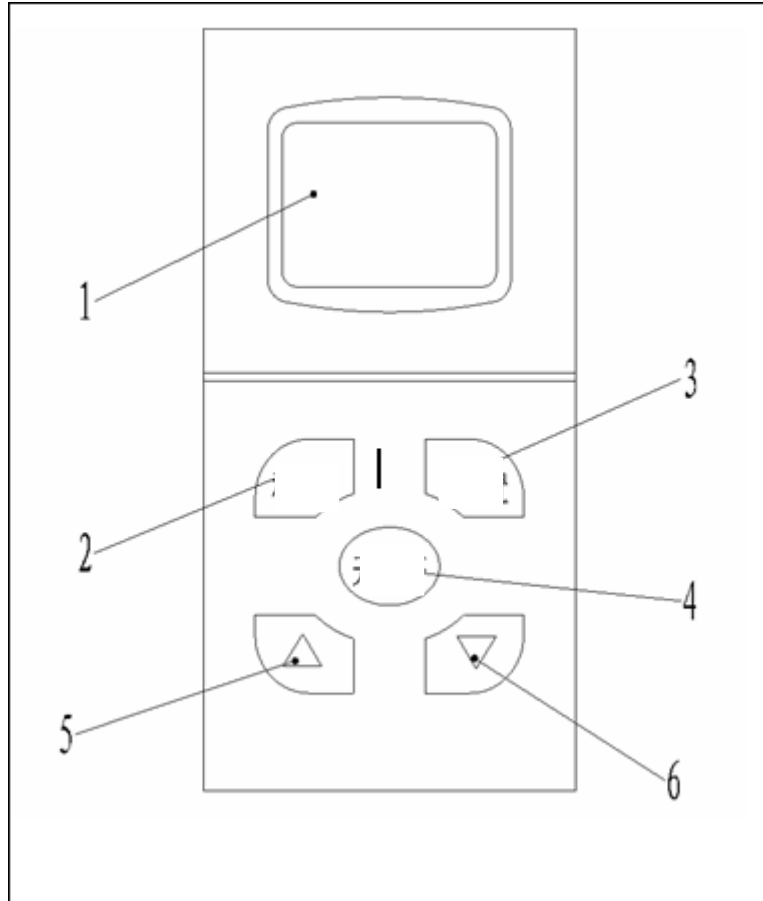
It is suitable to be used to sterilize medical instrument, dressing package, glass utensil, etc. in hospital, laboratory and biology medical research department.

2.2. DESCRIPTION OF COMPONENTS



APPERANCE VIEW

S/N	PARTS	FUNCTION
1	universal-joint wheel	Support equipment, and make equipment move on the ground smoothly.
2	Cover2	Supporting cover to protect the inside parts.
3	Cover1	Supporting cover to protect the inside parts.
4	Door cover	Cover the door parts to isolate the heat and protect the operator.
5	Handle wheel	Used for opening or closing the sterilizing door.
6	arrester	When the door is closed, stop the arrester at the correct position.
7	control panel	operation panel of the equipment
8	power switch	convenient operation on power on and off
9	pressure gauge	while equipment is running, display the inside the pressure of the main body in real time
10	water level detect joint pipe	Observe the water quantity in the water tank.
11	breaker	Once exceed the rated electricity, auto cut off the electric circuit.
12	condense system	Cool the water and steam with high temperature from inside of the equipment.
13	water discharge valve	Discharge the sewage for cleaning the equipment.
14	safety valve	Once exceed the designed pressure, the valve will open for protection
15	rotation axis	for open the door and close the door
16	water tank	Provide enough water with equipment and also for cooling the water steam.
17	air filter	Filter the gas exhausted from the main body.



S/N	Part	Function
1	LCD display	for display the program type, status and data
2	“program”button	change the program type
3	“Set”button	Enter the parameter setting and confirm the amended parameters.
4	“On/off”button	For start and stop the program
5	“Up select”button	For increase the value
6	“Down select”button	For reduce the value

2.3 Running environment requirement :

The autoclave should be put in the room with clear, dry, no sunray, ventilation, and small temperature difference.

1. room temperature 5℃—40℃。
2. Max relative humidity 85%。

3. Permitted voltage wave range $\pm 10\%$ 。

4. Without power and pollution。

2.4 Safety device introduction :

The vertical autoclave has safety device as follows :

- ✧ (1) Over temperature automatic protection device: It cuts off power automatically when the designed temperature is surpassed, and has a sound and light alarm
- ✧ (2) Door safety interlock device: if there is pressure in the chamber, the door cannot be opened. Power cannot be switched on and program cannot start until the door is firmly closed.
- ✧ (3) Empty heating alert device: When the water level is higher than the preset temperature from thermostat, the system will cut the heating power automatically, and show alert information
- ✧ (4) Safety valve of auto release pressure: It opens when pressure is too high.
- ✧ (5) Overflow protection device. When the heater has a short circuit, the overflow protection switch functions, the system will cut the electricity automatically.

Chapter □ Installation

3.1 Installation procedure

3.1.1 Location :

Locate the autolave on the stable, clear and roomy ground, adjust the equipment foot to make it horizontal with the ground, and make sure it stable. The distance between the backside and other items is no less than 25cm, and make sure good ventilation.

3.1.2 Circuit :

Choose the wire and socket according to the power of the equipment. Local rules and regulations on installation and safety should be abided.

The voltage vibration is $\pm 10\%$.

3.1.3 Power switch installation :

Insert the power line into the power socket or into the breaker directly, and make sure correct and reliable.

!!! Warning :

The power lines have three: one is live line, one is zero line (blue) and one is earth line(yellow and green)

The power supply must be grounded!

3.1.4 Water resource preparation :

Water quality:

- ◆ Conductivity less than $15\mu\text{S}/\text{cm}$
- ◆ Bleacher content is less than $2\text{mg}/\text{l}$, and the hardness is less than $0.02\text{mmol}/\text{l}$
- ◆ PH value 5—7

Chapter □ PREPARATION BEFORE USE

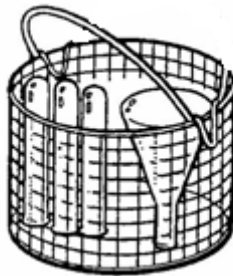
4.1 Instrument and utensil sterilization preparation:

Before sterilization, clear the instrument to avoid the damage to the autoclave and instrument itself caused by the residue on the instrument.

For example: blood and other impurity.

The clean suggestions by are as follows: :

- 1) After the instrument is used, the residue on the instrument should be washed cleaned immediately. The washing mahine, distilled water and purificant are recommended to clear the instrument.
- 2) After cleaning, wash it by clear water again to make sure it clean.
- 3) Put different items into different lifting baskets. For example: stainless steel, carbon steel, and gap between instruments should be left. If there is carbon steel instrument, before put it into the basket, put several layers of disinfecting paper or ceiba papers into the basket to avoided the direct contact between the carbon steel and stainless steel.



- 4) Put one piece of indicator card in each basket.
- 5) Monthly once, put biological spore indicator into the loads to inspect the sterilization result.



! Attention :

- 1) Do not overload sterilizer trays. Overloading will cause inadequate sterilization and drying

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- 2) Select sterilization bag or paper, or muslin etc. which is helpful to dry as package for the instrument needed to be packed
 - 3) All instruments must be sterilized in an open position and down to ground vertically to convenient the gas discharge and steam in.

4.2 Rubber Tubing sterilization preparation

Clean tubing and rinse with warm water. Ensure that both ends of the tubing are open, without any sharp bends, twists or kinks.

4.3 Dressing sterilization preparation

Put dressing package into the tray vertically, avoid touching with the inner wall of the sterilizer.

4.4 Liquid sterilization preparation

Only for the glass bottle and test tube that can stand high temperature. The load quantity should not exceed the 1/2 of container to avoid out. The ventilating cap should be used to seal the container, or loosen the cap totally.

Chapter V OPERATION

Operating process

5.1 Make sure the water level between the lowest and highest.

5.2 Power on, wait the LCD indicates to open the door, after the door is opened, then into the program choice picture.

5.3 Put the items into the chamber of the autoclave, and then close the door.

5.4 Choose different program according to different items.

Press "Program", 1# instrument, 2# dressing, 3# rubber, 4# user defined, 5# liquid, 6# parameter setting, 7# module setting picture will be displayed in order, see the table below:

Program type	sterilization temperature (dissolve temperature)	Sterilization time (dissolve temperature)	Dry time (Heat preserve temperature)
1# instrument	134□	8min	10min
2# dressing	134□	12 min	18min
3# rubber	121□	20 min	10min
4# user defined	105 ~ 134□	0 ~ 99min	0 ~ 30 min
5# liquid	60 ~ 134□	0 ~ 99 min	30 ~ 60□
6# parameter setting	non professional person don't change it		
7# module setting picture	user can set date and time		

If sterilize special items, but 1# ~ 3# parameters can not meet the needs, please set the sterilization temperature, sterilization time and dry time as follows:

1) Press "Program", select 4# user defined program;

2) Press "Set", "Sterilization temperature" will be lighted in the screen, it can be amend now, Press "▲" once, the sterilization

temperature will be increase 1 ; press “▼”once , the sterilization temperature will be reduced 1。 The amend range is 105 ~ 134℃。

3) After amend, press “set”button , “Temperature time”back ground will be lighted again , now press “▲”and“▼”to amend sterilization time , The amend range is 0 ~ 99 minutes。

4) After amend on sterilization time, press “set” , “Dry time”is lighted , now dry time can be amended , the range is 0 ~ 99。

5) After dry time amending, press “set” , the background is light off , user defined setting is finished , now press“begin”to run the program.

If sterilize(dissolve) the culture medium, select 5# program, and the sterilization(dissolve) temperature, sterilization(dissolve) time, heat preserve can be amended, and the method is the same as mentioned above.

5.5 After selected proper program, press “On/Off” button, the program begins to run.

1 ~ 4#programs have six stages in order : “water filling” , “heat” , “sterilization” , “discharge” , “dry” , “Over”etc。

5#program have six stages in order : “water filling” , “heat” , “sterilization” , “natural cool” , “heat preservation” , “Over” etc.

5.6 During program running, water filling, heat, sterilization and dry timing can be observed from the touch sreen.

5.7 During program running, if there are “excessive temperature”“water leakage” happened, the system will stop the program and alert. When alert, wait until the pressure inside and outside the autoclave is balance, the buzzer alert, and the screen displays “press stop to

quit”, the open the door.

5.8 When the screen displays “sterilization finished, please open the door” and at the same the buzzer alerts, the door can be open and take out the items.

5.9 Power off and cut off the electricity.

Chapter VI Maintenance

The operations described in this chapter must be followed to keep the sterilizer in good condition and to reduce the breakdown time to a minimum.

Something must know:

Before maintenance, make sure the equipment is cut off. At the same time, there is no pressure in the chamber.

Daily

- Clean the door gasket with a soft cloth or a sponge.

Weekly

- Take out the trays. Clean the chamber, tray holder and trays with gauze with detergent and water. Do not use steel wool or steel brush as this can damage the chamber.
- Clean out and remove scale in the chamber.
- Use a soft cloth to clear the cover of the autoclave.

Monthly

- ◆ Monthly once, clean the valve core (at the base).
- ◆ Monthly once, Check the air trap jet valve.
- ◆ Monthly once, Check the safety valve

Periodical test

- Once a year tighten the electrical connections and test the whether is available. It should be done by an authorized electrician.
- Every 5 years the locking device must be tested for excessive wear.

Chapter VII Routine and Emergency Maintain

CAUTION:

Instructions in this chapter are provided to professionals. When trouble occurs, look up the instruction manual first, check and maintain the equipment follow the instructions. The maintain methods have been described as clearly as possible.

7.1. Lifting and carrying

(1) Disconnect the power supply.

(2) *Before moving the sterilizer, make sure that the electric cord is disconnected from the power supply and that there is no pressure in the chamber.*

(3) Drain the water from the reservoir and vessel. The lifting and carrying should be done by several peoples.

7.2. Failure Shooting

Symptom	Possible Cause	Correction
The power supply is switched on, but the power supply indication lamp does not light	1.The breaker is not close 2.Main power switch is broken	1.Close the breaker 2.Change power switch
Screen display : The door has be The door has been opened	1.The door isn't closed to position 2.The door position switch loosen, and mal position	1.Close the door tightly and try again 2.adjust the door position switch
Screen display : Excessive temperature in autoclave	1.short circuit of the heat controller	1.ask professional electrician to change the controller
Filling water stage, Water is infused slowly.	1.block in the water inlet valve	1.Clear the impurity in the filter valve core
Heat status, pressure, temperature don't go up or go up slowly	1.The control circuit of the heater is broken or be burnt 2.Severe leakage in the	1.Check and change the damaged parts 2. Check, fasten the pipe

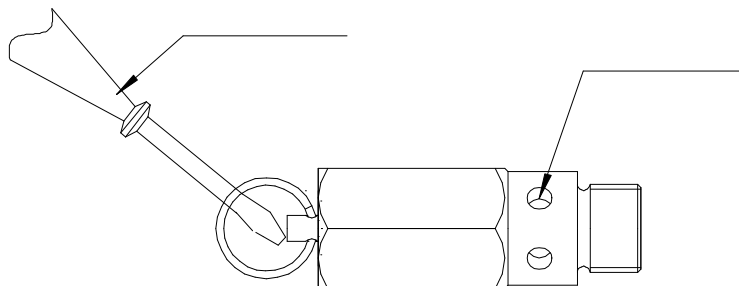
	pipe joint or in the safety valve	joint and safety valve.
Water discharge status , the pressure, temperature don't descend or descend slowly.	1. Blockage in the discharge filter valve	1. Clear impurity in the filter core

7.3. Water replace

Caution : Before starting, ensure that the electric cord is disconnected and that there is no pressure in the sterilizer.

1. Take down the silica gel, the water can be drained from the reservoir.
2. Fill distilled water into the water tank

7.4. How to check the safety valve



It is located back upside of the autoclave

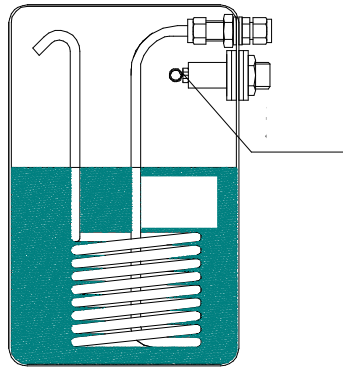
In order to prevent the safety valve from blockage, every month, under ordinary usage, it is necessary to allow the steam pressure to escape through it.

- 1). Operate the sterilization cycle according to the manual.
- 2). Allow a pressure of approximately 0.21Mpa to build up in the chamber.
- 3). Pull the ring of the safety valve using a screwdriver, and lift the safety valve for 2 seconds.
- 4). Switch off the power supply to interrupt the operation, and exhaust steam from the chamber.
- 5). Wait till the pressure goes down to zero, then open the door.

7.5. Gas release valve clean procedure :

The drawing below shows the position

!!! Warning: before beginning, cut off the power and make sure there is no pressure in chamber



- 1) Move the water tank cap
- 2) By pulling the gas release core and wash the release valve hole.
 - 1) If necessary, change the gas release valve. Before change, wait until the equipment is cooled, and the pressure descends to 0 Mpa.

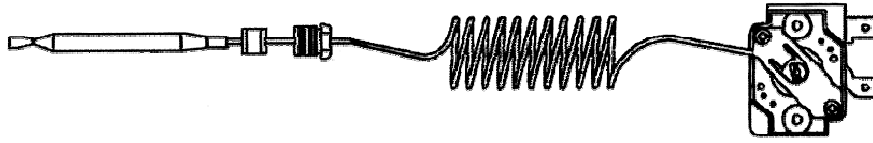
7.6. How to replace the safety valve

Precautions

This method can be used only by professionals. Otherwise, you should consult the operating manual, and operate according to the manual in order to avoid electric shock and equipment failure. Maintenance methods have been described as clearly as possible in this manual.

- 1) It locate on the back upside of the autoclave.
- 2) Remove the fasten screw of the safety valve with a screwdriver, take down the valve from base.
- 3) Replace it with a qualified safety valve. (Ensure it opens at a pressure ≤ 0.26 Mpa.) Test the sterilization process.

7.7 Temperature thermostat



It is located inside the autoclave. Two thermostats are equipped with the autoclave: one for dry plate, one is for preventing empty heat. The principle as follows:

- This device automatically disconnects the heating elements in case of the temperature exceeds the permitted value.
- The power supply is automatically reconnected when the chamber cools down to below permitted value..

7.8. How to raise the working temperature of the safety thermostat

!! Caution: This can be done only by professionals.

Unscrew the rear cover of the sterilizer.

With a screwdriver, turn the central screw slightly clockwise to raise the temperature.

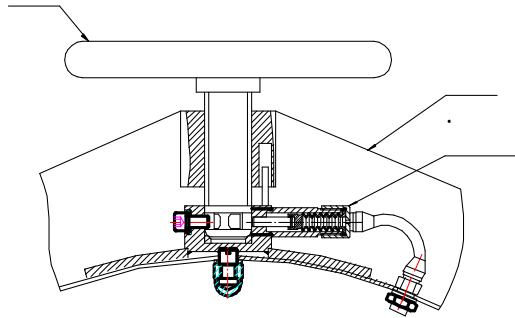
7.9. Heater replacing procedure

!!! Warning: Before starting, ensure that the electric cord is disconnected from the power supply and there is no pressure in the chamber.

- 1) Dismantle the sterilizer cover.
- 2) Release the terminal wires from the heating element
- 3) Remove the heater tightening bolts.
- 4) Replace the damaged heating element with a new one and reconnect the terminal wires.
- 5) Fit on the sterilizer cover.
- 6) Test all the sterilizer cycles.

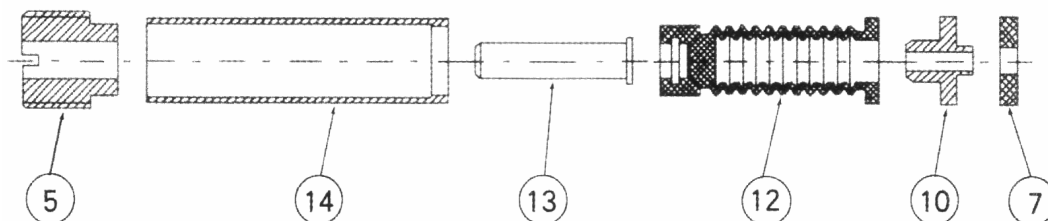
7.10. Door lock safety system replace procedure

Caution: Before starting, ensure that the electric cord is disconnected from the power supply and there is no pressure in the chamber.



- 1) Loosen the screw, take off the handle wheel, take off the door cover
- 2) Uninstall and open the fuse holder.
- 3) draw the safety pin (13) from the fuse holder.
- 4) Insert it into the new corrugated pipe (12)
- 5) Put the corrugated pipe and safety pin back into the conductor pipe (14) and install the cushion (7) (10)
- 6) Install the parts mentioned above back into the fuse socket.
- 7) Fasten the fuse holder again, and fix it on the door
- 8) Test the sterilization procedure.

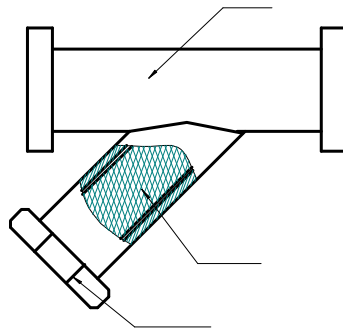
It is a safety device that prevents the door being opened when there is pressure in the chamber. It is set up on the base of pressure formed in the chamber. The pressure in chamber pushes the active clutch moving upward closes and joggles with the fixed clutch. It can prevent operators open the door by mistake. When the steam is discharged, this device comes back to original position, and the door can be opened.



7.11. Cleaning of the filtrate

Below is the sketch map of the filter.

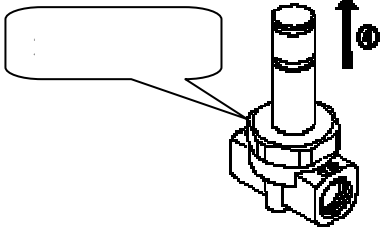
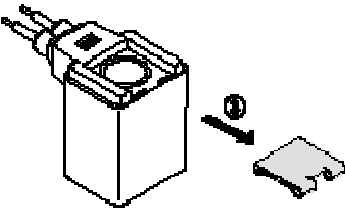
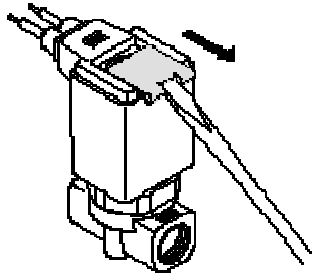
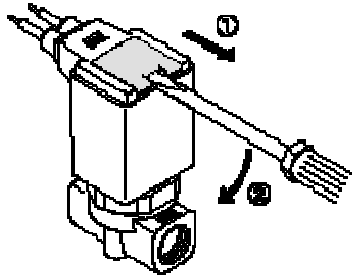
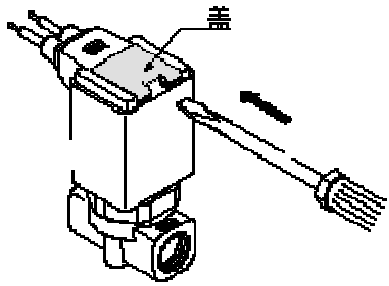
It is installed on the base of the equipment and is used to filter the impurity to guarantee the pipe unblocked and electromagnetic valve airproof. You can only unscrew the nut 4 of the filter, take out the filter core, then clean off the impurities on the filter web, then install it again. Once per month.



7.12. Cleaning the magnetic valve.

1. Dismantle the sterilizer cover.
2. Poke the pressing disc with screwdriver.
3. Take out the loop of valve.
4. Open the valve with spanner.
5. Clean the valve with water.
6. Assemble the valve.

Dissemble method is as follows:



Dissemble :
According to the
procedures in the
left, use spanner to
rotate the
hexa-copper-nut to
open the valve core.

