USER'S MANUAL

MC-600

SUCTION PUMP

13-2540002

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This machine is special medical equipment, which must be operated by the professionals who have taken the related safety operation training, according to the manual. Warnings are given where failure to observe instruction could result in injury or death to people.

This manual is providing the necessary product technical information to the users and guiding the users how to install and maintain; No information about Clinical Application and technology and whether the related regulations' applicability provided.

WARNING

1. **Please read this manual carefully before using and operate the machine according to the related requirements and attentions.**
2. **The machine must be operated by professionals.**
3. **Don't take the machine apart, unless be authorized. If there is any problem, please contact the manufacturer or local agents.**

CAUTION

- **Do not operate the machine with wet hands;**
- **Do not touch the plug with wet hands;**
- **Do not use the machine in the rain or bathtub;**
- **Do not place the machine in contact with water;**
- **Do not operate the machine under the atmosphere with flammable or explosive gases, liquids or mixtures;**
- **Do not expose the machine to high temperature or corrosive gas;**
- **Do not allow the children or laymen operate the machine;**
- **Please make sure the machine disconnect the power before cleaning;**
- **Cautions are found where failure to observe the instruction should result in damage to the equipment, associated equipment and process;**
- **Please use the power wires that are equipped.**

SPECIAL ATTENTIONS

The Machine should be used on a plane not inclined more than 10 degrees.

Please stop the drainage machine immediately when the drainage container is filled to 700mL, to avoid the liquid is sucked into the vacuum pump and cause a fault. Please pour out the fouling liquid and deal with the drainage container before use it again.

The Filter and liquid pipes provided with machine are disposable and do not reuse them. (Please refer to 7.2 for instruction for replacing the filter.)

Instructions for use

- ***The installation and working environment of MC-600 suction pump: Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%. Network Power quality should be that of a typical commercial or hospital environment. If the user of the MC-600 suction pump requires continued operation during power mains interruptions, it is recommended that the MC-600 suction pump be powered from an uninterruptible power supply or a battery. Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.***
- ***Portable and mobile RF communications equipment may affect MC-600 suction pump that they should be used no closer to any part of the MC-600 suction pump or should be powered off.***
- ***The power wire of the machine should have obtained "3C" certification and the length of it is less than 3 meters.***
- ***The MC-600 suction pump should be used no closer or stack to the other equipment of the same or similar operating frequency. If it is necessary, the MC-600 suction pump should be observed to verify normal operation.***
- ***Basic performance is negative output change. It meets the requirements of YY0636.1-2008***
- ***To make sure the MC-600 suction pump works normally, to avoid the emission to be increased and the immunity to be reduced, please use the provided connection cables and related accessories.***
- ***The other accessories, transducers and cables not mentioned here will increase the emission and reduce the immunity of the MC-600 when using with it.***

ATTENTIONS

ATTENTIONS ON INSTALLATION：

- Please check the items according to the packing list first after receiving a new machine and contact us if there is any non-conforming.
- Make sure the Drainage Container, anti-overflow device, filter is well installed and sealed. And the power cord is well connected. The vacuum port of the secondary anti-flow container must be connected to the anti-flow filter and the anti-flow filter is connected to the vacuum port of the container. A wrong connection will cause a failure. (Please refer to 7.2 for detail instruction.)
- Increase the negative pressure by rotating the button clockwise and block the inlet on the container and watch if the pressure display value is right. And release the inlet the pressure value displayed should be less than 0.01MPa (76mmHg). This means the systems is working right.
- The newly purchased machine should be carefully inspected after installation according to the requirements to make sure it is working right before use.
- Liquid pipes should be selected from the medical pipes those are suitable for the high negative pressure uses.

ATTENTIONS FOR OPERATION：

- Negative pressure is determined by the surgery. Please fold the liquid pipe (φ 8) to V-shaped to block it and tune the negative pressure to the value needed before uses. When used on children or special patients, the negative pressure should be tuned according to the real situation for the best level.
- If there is any tissue or grume blocking the pipes, please turn the working switch to “Stop” immediately and hold the Pressure Tuning Key anticlockwise till the vacuum is fully released. Then deal with or replace the blocked pipes before continuing.
- Please stop the drainage machine immediately when the drainage container is filled to 700mL, to avoid the liquid is sucked into the vacuum pump and cause a fault. Please pour out the fouling liquid and deal with the drainage container before use it again. (refer to 6.2(3)for detail instruction)
- If disposable liquid bag is used, please follow the relative instruction and watch the bag during uses in order to avoid its broking bring any adverse effect.

ATTENTION FOR SAFETY：

- The machine requires a working environment of temperature from 5 to 40℃, relative humidity no more than 80%, no high pressure no corrosive airs.
- In order to prolong its lifecycle, please apply careful maintenance and do not run it continuously for a long time.
- Release the negative pressure and shut off the power supply after uses.
- The system should be kept in a dry place, and do not wash it by dipping into water. Do not use it when the power plug or power switch is wet, and if needed, use the machine after being checked by qualified person.
- Inspection, maintenance, service or fuse replacement should be done when the power supply is cut off.
- The machine should be moved, operated, disinfected or placed carefully, horizontally placed and avoid any fierce vibration, crash or inversion.
- In order to keep the transparency, please do not use any hard objects when clean the Drainage Container.

ATTENTIONS FOR SANITATION AND ENVIRONMENTAL PROTECTION：

- Drainage Container should be immediately cleaned and disinfected after each use. Drainage Container, Container Cover and anti-flow device could be disinfected by the general disinfection method of the hospital.
- The filters and liquid pipes provided with machine are disposable.
- The machine and any accessories after lifecycle should be dealt according to the local environmental regulations to avoid pollution.

ATTENTIONS FOR MAIINTENANCE：

- If there is current leakage, overheating, abnormal pressure display or any other fault, please stop using it and contact us immediately. We will provide our instant instruction and service. Do not run the machine with any fault so as to avoid any effect to the rescue.
- If the housing was opened by the person no authority or the operation violated the instruction in this manual and caused machine failure, that will be out of the free-charge warranty even it is within the 1 year period.

1. Introduction

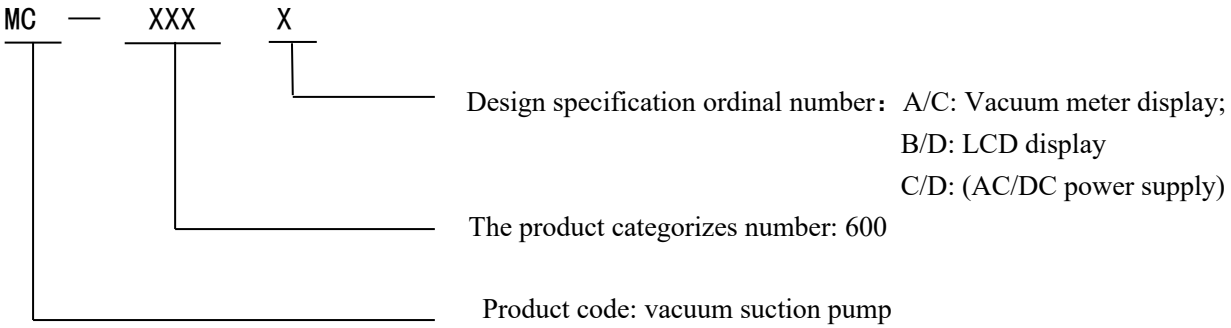
Dear users, Thanks for choosing our MC-600 suction pump. The machine consists of the Vacuum System, Pressure Display System, Main Control Circuit and the suction pipes.

2. Intended Use and Contraindications

It is intended for sputum suction for patient and suitable for portable suction in the hospital. It can also be used in first aid and lifesaving. It can't be used for abortion suction, chest drainage and is not applicable to field use.

The machine does not have the contraindication by now.

3. Product Model Explanation



Product code: vacuum suction pump MC-600A/B/C/D

4. Specification and Working

Technical Specification：

a) Max negative vacuum：≥0.08MPa
b) Suction rate：≥20L/min
c) Pressure range：-0.01MPa～-0.08MPa
d) Noise：≤60dB(A)

Structure Parameter:

a) Dimensions (L*W*H) cm: 36*18*30
b) Input power: ≤120VA
c) Net weight: 4.3kg
d) Protection Mode：Class II B
e) Vacuum output：Continuous
e) Operating mode: Continuous
f) Collection bottle: 1× 1000 ml

Vacuum suction pump is a suction device that provides high vacuum and high flow.

Note: the anti-overflow filter provided with the suction pump is a disposable device.

Working Conditions：

a) Ambient Temperature: 5～40℃
b) Relative Humidity: ≤80%
c) Atmospheric pressure: 0. 086MPa～0. 106MPa
d) Supply Power：AC230V±22V，50Hz±1Hz

5. Indicators


Pressure from low to high


Type B apply part


Date of manufacture

CE Mark


Class II device


Refer to user's manual

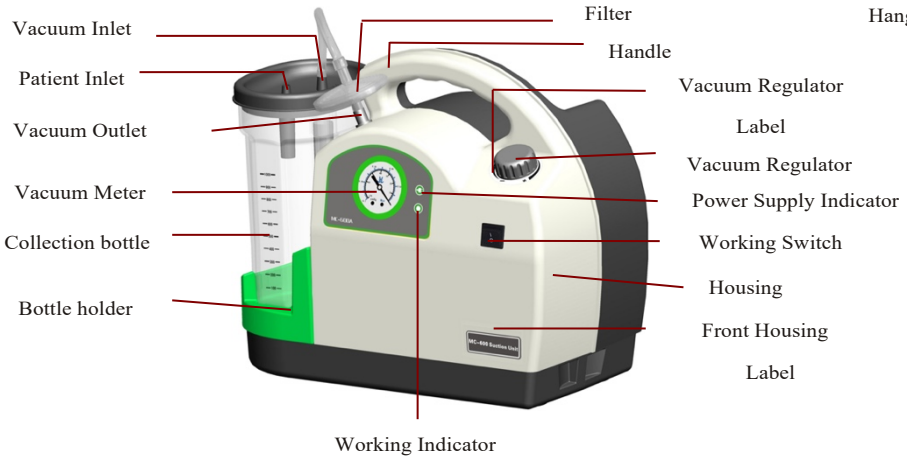

Manufacturer

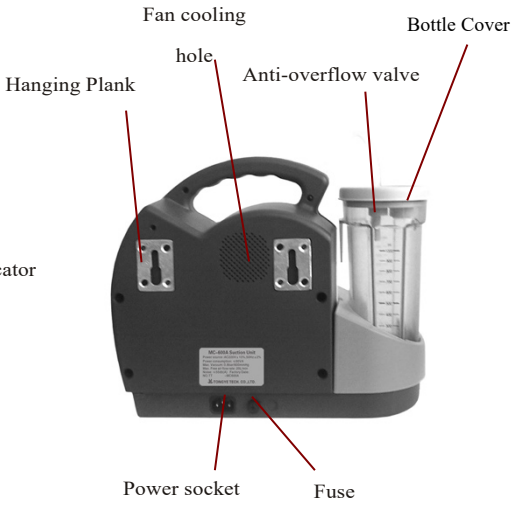

Functional Earth

6. Structure and Operating instruction

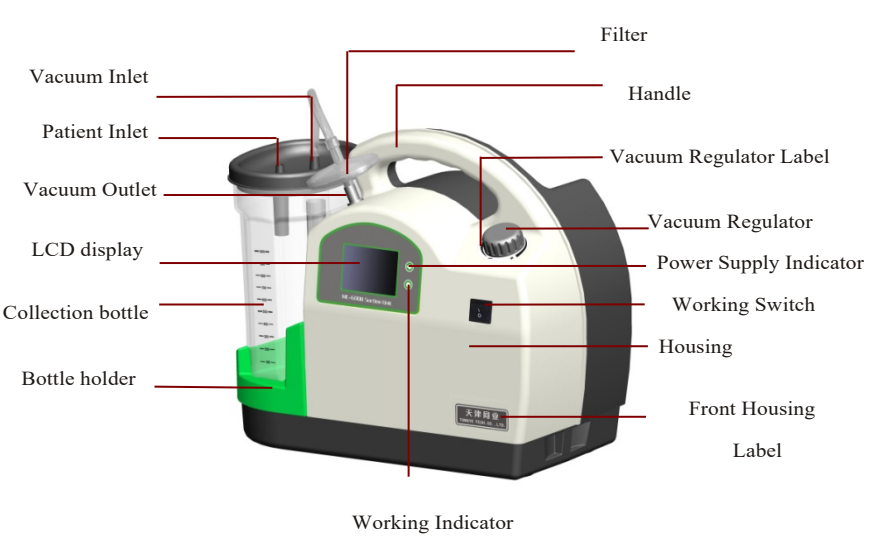
6.1 Structure

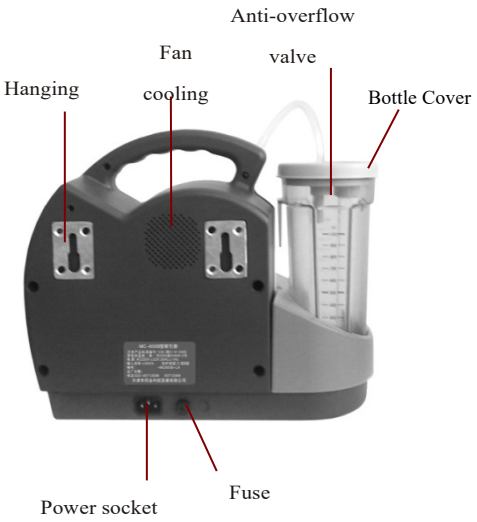
MC-600A



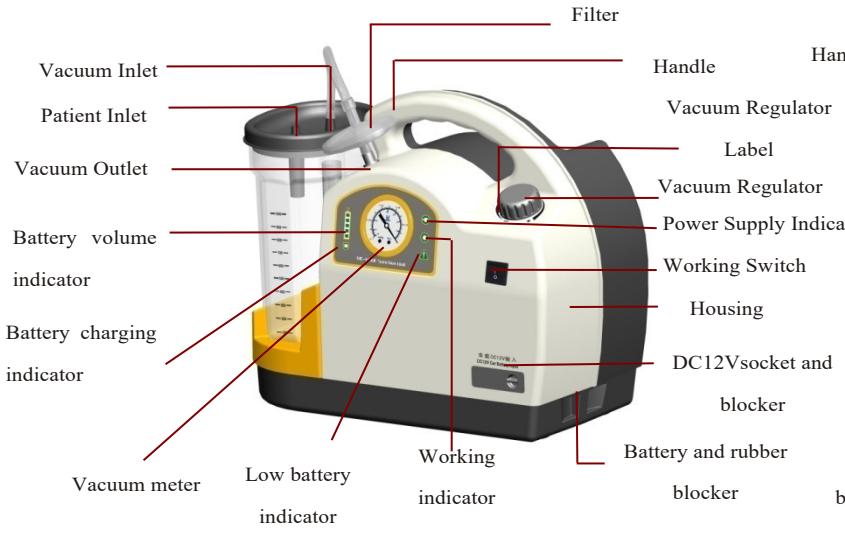


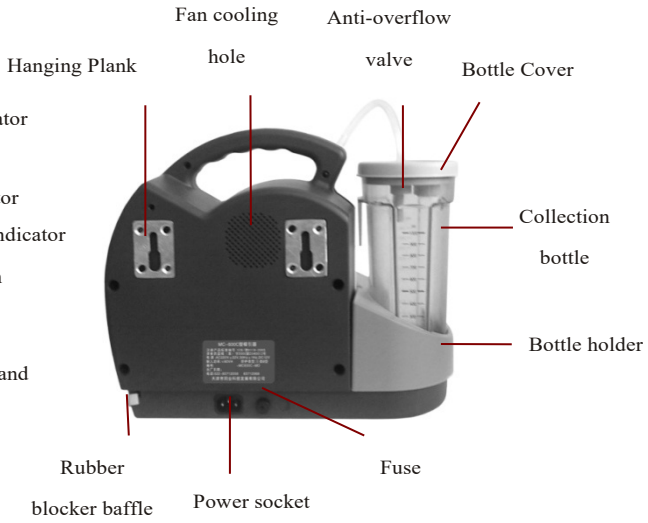
MC-600B



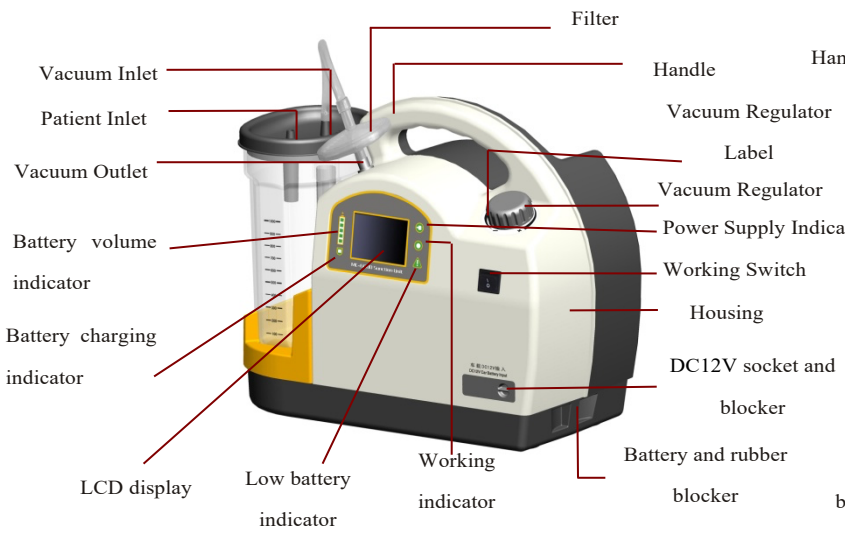


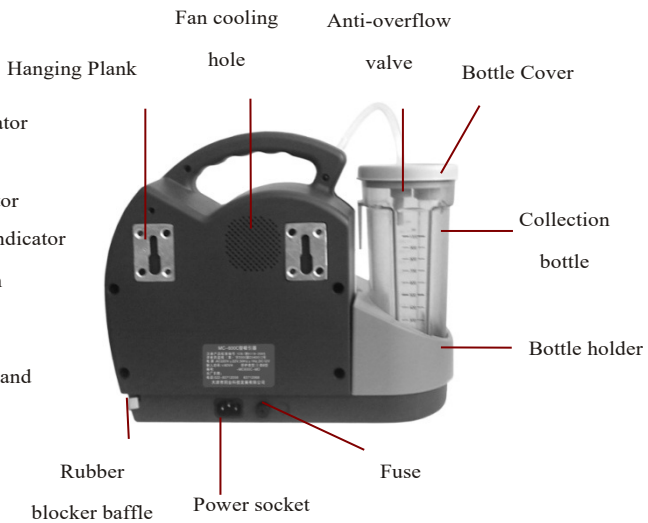
MC-600C





MC-600D





6.2 Operating Instruction

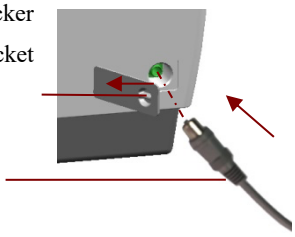
(1)Connect the main unit to 230V supply using the power cord, the power supply indicator will light up; then press the “Start” to turn on the power supply and the working indicator will light up. Press the “Stop”to turn off the power supply and the working indicator will light off.

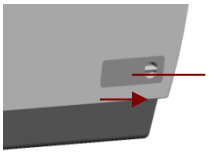
(2) Besides the AC230V power supply, the suction pump can also work with the internal DC12V power or External DC12V Power. When working, if the AC230V power is cut off, it will automatically switch to the internal DC12V power and work without being interupted. And when the Power Switch is turned to “Stop”, the suction pump is shut off. On the display panel there is Battery Volume indication and there will be indication for a low battery volume.

(3) When External DC12V Power is needed, please follow these steps, see Fig. A:

1、Hold the DC12V blocker and pull it out till the socket can be seen

2. Plug the DC12V power cord into the DC12Vsocket



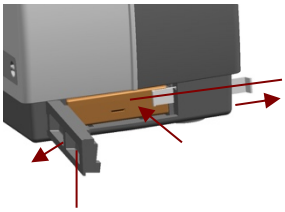


After use, pull out the DC12V power cord connector and close the lighter socket.

Figure A

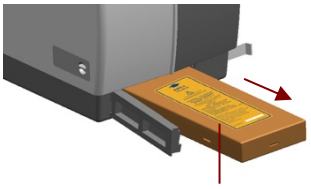
(4) The internal battery could be charged in the machine or using the optional battery charger. Other chargers cannot be used to charge the battery. To charge the battery in the machine, please keep the battery inside and power off the working switch. When charging, the working indicator will light up. And the working indicator will light off, when it fully charged.

Follow the Fig B to take out the battery before charging it with the charger provided:

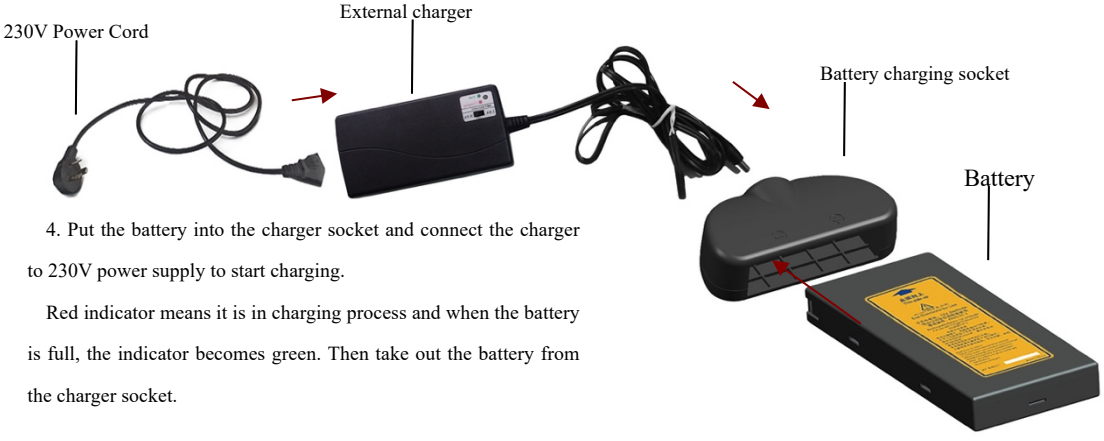


1、 Hold the right side of the rubber cover of battery cabin and pull out, till it allows the battery goes out easily.

2、use one hand to push the battery inside gently, and use the other hand to pull out the battery blocker.。

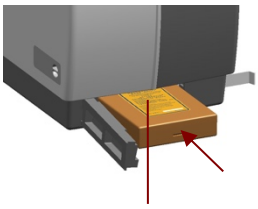


3、pull out the battery blocker to its limit position and release the battery, the battery will jump out.

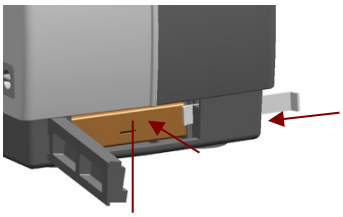


4. Put the battery into the charger socket and connect the charger to 230V power supply to start charging.

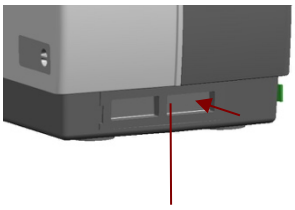
Red indicator means it is in charging process and when the battery is full, the indicator becomes green. Then take out the battery from the charger socket.



5. To install the battery, please place it in the right side and push it gently into the battery cabin.



6、Push the battery till it exceeds the blocker, push the blocker fully into its position to hold the battery.



7. Push the battery cabin cover into its position.

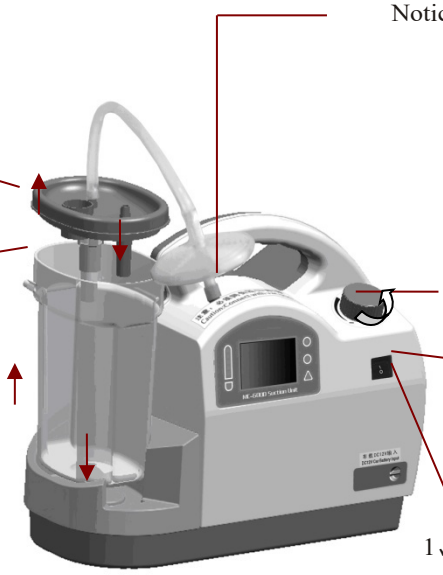
Figure B

(5) Rotate the Vacuum regulator clockwise to increase the pressure gradually, rotate the Vacuum regulator anticlockwise to decrease the pressure gradually. The pointer of gauge will accurately point to the pressure value.

(6) During the operation, please stop the suction pump immediately when the collection bottle is filled to 700mL and make the following step as figure C that below.

3、Take off the soft pipe of the collection bottle, sway the bottle and take it off, then open the bottle cover.

4、Pour out the fouling liquid. Clean, disinfect and dry the bottle, bottle cover, anti-overflow device, soft pipe and then re-install them according to Fig 7.1 Installation of collection bottle.



2、Rotate the Vacuum regulator anticlockwise to release pressure.

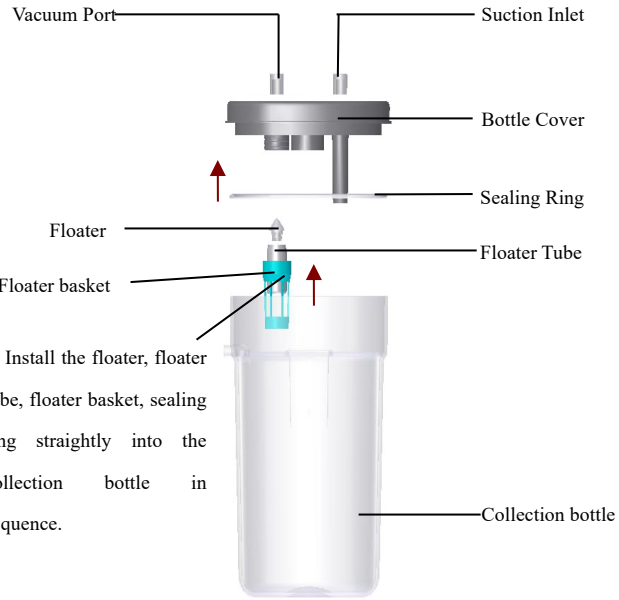
5、Fix the bottle after assembly into the bottle holder, connect the soft pipe, and turn on the Power Switch and Working Switch to continue.

1、Turn off the working switch to stop working.

Figure C

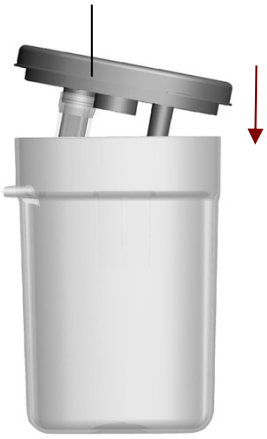
7. Installation Instruction

7.1 Installation of collection bottle



1. Install the floater, floater tube, floater basket, sealing ring straightly into the collection bottle in sequence.

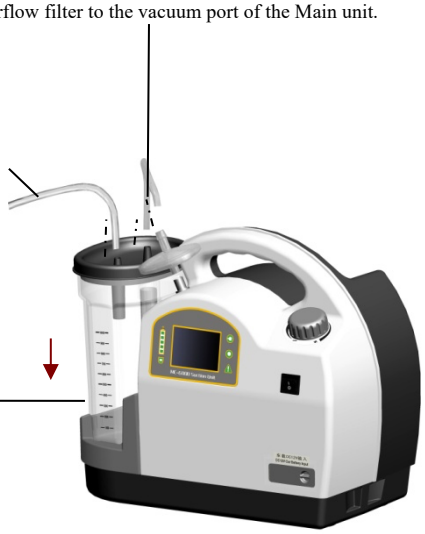
2. Put the bottle cover with anti-flow device in an inclined angle into the bottle, and then rotate it fully into the bottle



7.2 Main unit installation instruction

2. Cut 200mm φ8 pipe to connect the vacuum port of collection bottle with anti-overflow filter. And connect the other side of anti-overflow filter to the vacuum port of the Main unit.

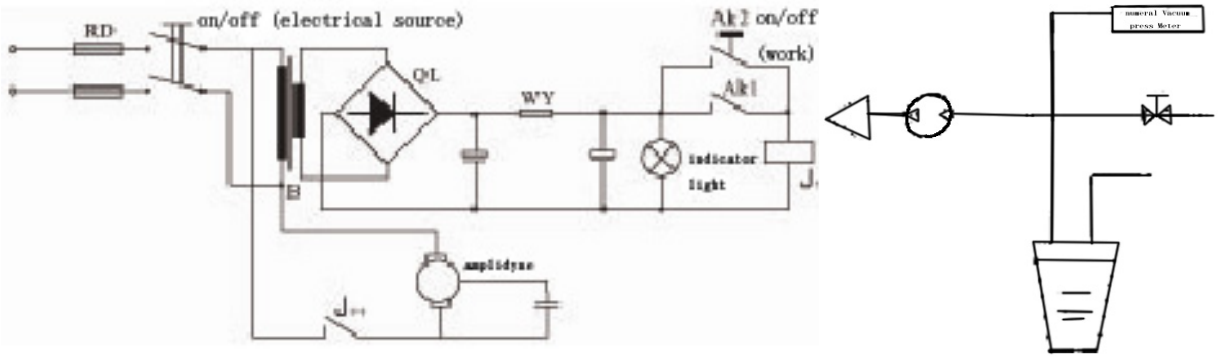
3. Use a φ8 pipe of suitable length to connect the patient Inlet of the collection bottle. And the other side of the pipe connects to the disposable suction catheter.



1. Make sure the bottle is well fixed into the holder.

4. Connect the power cord to the power socket of on the Main Unit.

8. Principle Diagram



9. Fouling Liquid

A) Turn off the Working Switch; take out the Collection Bottle, keeping it straight up away from the Suction Machine.

B) Open the cover and pour out the fouling liquid. And clean the Collection Bottle.

10. Cleaning and Disinfection

After each clinical use, the Collection Bottle should be cleaned and disinfected immediately.

1. Soaking disinfection could be used to the Collection Bottle and the tubes;
2. Use a disinfectant-soaked cloth to clean the housing;
3. Disinfectant could be selected under the requirements of local medical department.

11. Disposition

All the disposed accessories and the scrapped parts should be treated as the requirements from local regulations about Waste Disposal.

The expectant life of the suction pump is 5 years. The scrapped unit should be treated as the requirements from local regulations about disposal.

12. Regular Inspection

Operator shall check following points before uses:

A) Check for vacuum: make sure the regulator is turned to the high vacuum position.

Then block the vacuum port and observe whether the LCD screen or meter gauge shows the maximum vacuum value. And also check if there's a leak somewhere.

B) Check the reliability of the anti-overflow device.

13. General Fault Shooting

Fault	Reason	Measure
Maximum vacuum is too low	Sealing ring is missing or damaged	Install a good sealing ring
	Collection Bottle cover is not tight	Make the cover tight
	Filter is not sealed well.	Replace the filter
	Leakage of the connection	Connect the pipes well
	Floater in wrong position blocks the inlet.	Manually reset the floater
	Haven't rotated the vacuum regulator clockwise	Rotate the vacuum regulator clockwise to the maximum vacuum
	Vacuum regulator is damaged	Fix the machine by professionals

	Leakage of negative pressure unit	
Indicator lights, Unit doesn't work	The plug is loose	Connect the plug well
	Fuse is broken	Replace the fuse
	Abnormal voltage	Fix the machine by professionals or contact your distributor or TONGYE TECHNOLOGIES DEVELOPMENT CO., LTD
	Load of unit exceeds the limit	
If any other failure, please contact TONGYE or your local distributor, this guarantees the safety after the maintenance.		

Note：Please stop using it if there is any liquid penetrate into inside of the main unit. And contact the distributor for necessary maintenance.

14. Transportation and Storage

The Suction pump with package should be stored in a well-ventilated room with a temperature from -10℃to 50℃， relative humidity not exceeding 80%, without corrosive airs;

It shall be with the right side upward during the transportation. No fierce impact, vibration allowed and don't expose the machine to the rain and snow.

15. After-sale Service

The Vacuum Suction pump is packed and the stated requirements for storage and the instruction for uses are well followed, if there is any fault happens to the machine and causes failure to work normally within one year, TONGYE provides a free-of-charge warrant. But the other accessories, such as Collection Bottle, Bottle Cover (with anti-overflow device), disposable anti-overflow filter, pipes are not included in the warranty.

After-sale service: ZONE MEDICAL PTY LTD
After-sale Tel:1300 009 663

16. Accessories pictures and details

The packaging figure list of MC-600D：

Number	Name	Spec	quantity	Number	Name	Spec	quantity
1	Main Unit		1 unit	5	φ8 draining tube	2m	1 piece
2	Collection bottle	1000ml	1 piece	6	230V power wire		1 piece
3	Collection bottle cover (with anti-overflow device)		1 set	7	DC12V power cord		1 piece
4	Disposable anti-overflow filter		1 piece	8	Fuse	T2AL 250V Φ5mm ×20mm	2 pieces

Notice: NO.10 Battery charger socket and NO.11 External charger is an optional, so it isn't in the standard configuration list.

Note: TONGYE reserves the right of interpretation of the above content.

Packing List

Product Name：Vacuum suction pump

#	Item	Spec.	Qty
1	Main Unit		1 unit
2	Collection bottle	1000mL	1 piece
3	Collection bottle cover (with anti-overflow device)		1 set
4	Disposable anti-overflow filter		1 piece
5	φ8 draining tube	2m	1 piece
6	AC230V Power Wire		1 piece
7	DC12V power cord		1 piece
Accessories			
8	Fuse	T2AL 250V Φ5mm×20mm	2 pieces
Documentation			
9	User Manual		1 copy
10	Packing list		1 copy
Optional			
13	Battery charger socket		1 piece
14	External charger		1 piece

Appendix A:

Guidance and manufacture's declaration – electromagnetic emissions for all EQUIPMENT and SYSTEMS

Form 201

Guidance and manufacture's declaration – electromagnetic emissions		
The MC-600 suction pump is intended for use in the electromagnetic environment specified below. The customer or the user of the machine should assure that it is used in such an environment that below:		
Emission test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	The MC-600 suction pump uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emission CISPR 11	Class A	The MC-600 suction pump is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies building used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Not applicable	

Form 202

Guidance and manufacture's declaration – electromagnetic immunity			
The MC-600 is intended for use in the electromagnetic environment specified below. The customer or the user of the suction pump should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment guidance
Electrostatic discharge (ESD) IEC61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst	±2 KV for power supply lines	±2 KV for power supply lines	Mains power quality should be that of a

IEC61000-4-4			typical commercial or hospital environment.
Surge IEC61000-4-5	±1 KV line to line ±2 KV line to ground	±1 KV line to line ±2 KV line to ground	Network Power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 sec	Network power quality should be that of a typical commercial or hospital environment. If the user of the MC-600 suction pump requires continued operation during power mains interruptions, it is recommended that the MC-600 suction pump be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields Should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE: U_T is the a.c. mains voltage prior to application of the test level.			

Form 203

Guidance and manufacture's declaration – electromagnetic immunity			
The MC-600 suction pump is intended for use in the electromagnetic environment specified below. The customer or the user of the MC-600 suction pump should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment -guidance
Conducted	3 V (rms)		Portable and mobile RF communications equipment should be used no closer to any part of the MC-600 suction pump, including cables, than the recommended separation distance calculated from

RF IEC61000-4-6 Radiated RF IEC61000-4-3	150 KHz ~ 80 MHz 3 V/m 80 MHz~ 2.5 GHz	3V(rms) 3 V/m	the equation applicable to the frequency of the transmitter. Recommended separation distance that below: $d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80 MHz~800 MHz $d = 2.3\sqrt{P}$ 800 MHz~2.5GHz Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters. Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range [b.] Interference may occur in the vicinity of equipment marked with the following symbol: 
NOTE 1：At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2：These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the MC-600 suction pump is used exceeds the applicable RF compliance level above, the MC-600 suction pump should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the MC-600 suction pump . b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Form 204

Recommended separation distances between portable and mobile RF communications equipment and the MC-600 suction pump.
The MC-600 suction pump is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the MC-600 suction pump can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the MC-600 suction pump as recommended below, according to the maximum output power of the

communications equipment.

Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 KHz ~ 80 MHz $d = 1.2\sqrt{P}$	80 MHz ~ 800MHz $d = 1.2\sqrt{P}$	800 MHz ~ 2.5GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. NOTE2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.