
Syringe Pump User Manual



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Quality Assurance

Certified by:



Manufacturer's Responsibility

We assumes responsibility for the safety, reliability and performance of the instrument only in the following conditions:

- Assembly, extension, readjustment, improvement and repair are performed by the person our approved.
- Related electrical equipments meet the national standards;
- The instrument is operated in accordance with the operating instructions.

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Chapter 1 Safety Guide

1.1 Safety Instructions

In order to avoid any possible injury, please abide by the following safety instructions when operating this instrument:

warning: Avoid this pump working in the presence of flammable gases or anesthetic agent, may cause danger of explosion.

warning: Do not throw the battery into fire, may cause danger of explosion.

caution: This instrument must be serviced by authorized qualified engineer.

caution: Keep instrument clean, avoid shaking.

caution: Avoid high- temperature sterilization or electron beaming, γ radiation sterilization.

caution: Avoid this pump working in the environment with high-frequency interference devices, make sure it is not interfered by the strong electromagnetic interference, such as radio transmitter, mobile phone.

caution: Make sure this instrument is in good condition before use. Routine inspection should be performed every one month or shorter than that. If there's obvious damage on the instrument, please replace or broken parts before use.

caution: The following safety inspections must be performed by well-trained persons who have related knowledge and practical experience usually once every two years or according to the regulations specified by public institutions.

✧ Inspect if there's mechanical or functional damage on the instrument.

✧ Inspect if the safety labels are legible.

✧ Verify the instrument functions are still the same as the user manual describes..

caution: Expired products should be disposed according to discarding standard of electronic products or returned to the manufacturer for the purpose of recycle.

caution: Expired battery should be properly disposed according to related standard.

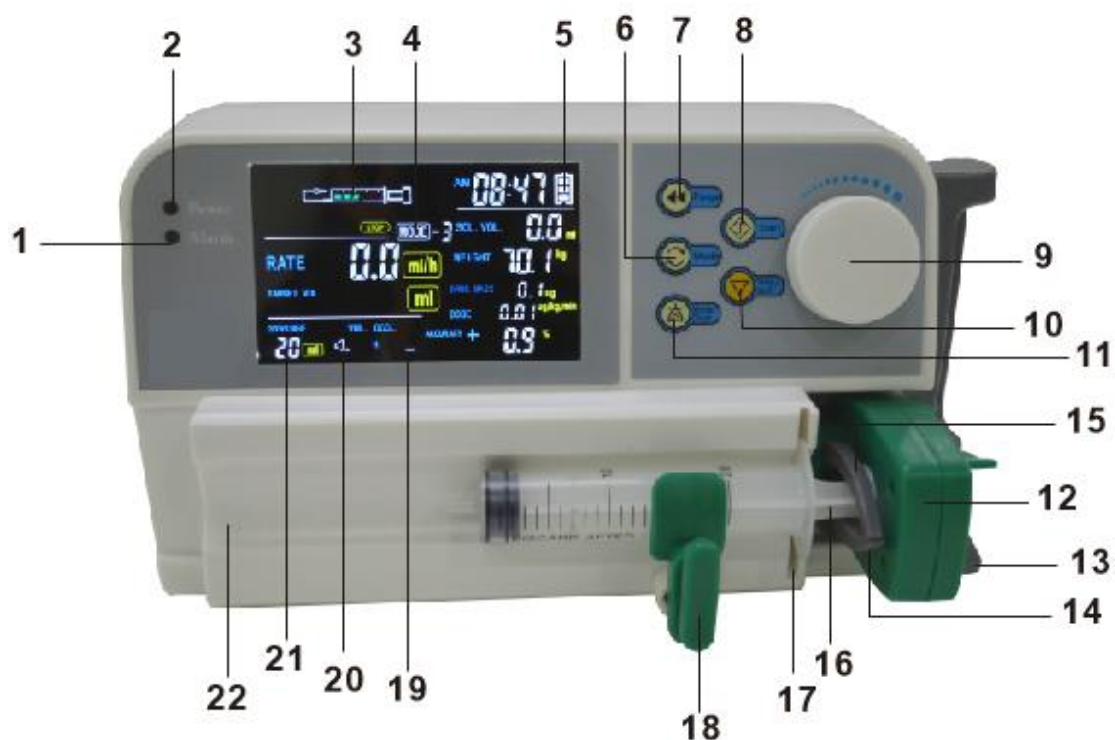
caution: Keep away from the patient when replacing battery (around 1.5 meters away from the patient).

Chapter 2 Brief Introduction

2.1 Overview

This pump is a stable speed syringe pump, a high-precision intelligent pump which is capable of accurately controlling the delivery rate of disposable Syringes(5ml,10ml,20ml,30ml,50ml) and monitoring the injection course, by means of sensors and microprocessor accurately controlling precise stepper motor, driving transmission mechanism to drive peristaltic fingers regularly squeezing the syringe against the back plate. standard disposable sterile syringes of qualified brand (hereinafter to be referred as syringes) is suitable for this pump, This pump has various sound and light alarm function, so that the user can make timely response to the pump to ensure the injection is safe. It is special suitable for clinical treatment which require continuously and precisely controlling injection at a constant rate, meanwhile, monitoring the injection course. It is widely used in conventional intravenous anticoagulant, anesthetic injection, injection and chemotherapy in cancer patients' drugs, or in internal medicine, surgical, pediatrics, obstetrics, ICU, CCU wards, operating rooms and other clinical infusion treatment

2.2 Appearance



1: Alarm Light	2: AC Light	3: Injection indication	
4: Mode Indicator	5: Battery level indicator	6: Mode key	
7: Fast forward button	8: Start button	9: Shuttle	10: stop / shift key
11: Mute / clear key	12: push block	13: Wrench	14: the hook
15: Lower hook	16: Syringe core rod	17: Syringe curling slot	
18: Lever	19: Pressure Indicator	20: Volume indicator	
21: Syringe size indication	22: syringe holder		

Chapter 3 Technical Specifications

Injection speed:

50ml speed: 0.1ml/h ~ 999.9ml/h (0.1ml/h step)

1000ml/h ~ 1800ml/h (1ml/h step)

30ml syringe: 0.1ml/h ~ 900ml/h (0.1ml/h step)

20ml syringe: 0.1ml/h ~ 600ml/h (0.1ml/h step)

10ml syringe: 0.1ml/h ~ 300ml/h (0.1ml/h step)

5ml syringe: 0.1ml/h ~ 150ml/h (0.1ml/h step)

Purge Speed: 50ml syringe 1800ml/h (bolus speed 1200ml/h)

30ml syringe 900ml/h (bolus speed 600ml/h)

20ml syringe 600ml/h (bolus speed 400ml/h)

10ml syringe 300ml/h (bolus speed 200ml/h)

5ml syringe 150ml/h (bolus rate 100ml/h)

Flow Precision: Within $\pm 2\%$

Mechanical precision: Within $\pm 2\%$

Syringe Volume Range: 0 ~ 1999.9ml

Power Supply: $\sim 100V-240V, 50/60Hz$; Internal Battery $\sim 11.1V$ Li-ion battery; Capacity $\geq 2000mAh$; the pump can work more than 4 hours at the flow rate of 5ml/h after

charging 10 hours (Medium rate specified by GB 9706.27-2005.)

Power Supply: AC/DC is available.

KVO Rate: 0.1~5ml/h (greater than 0.1ml/h).

Fuse: F1AL/250V ("F" indicate fast, L" indicate low breaking capacity), 2pcs (installed inside).

Type: The pump is Class I, internal power supply, BF continuous operation device.

Power: 40VA

Occlusion Alarm Threshold:

High: 800mmHg $\pm$ 200mmHg (106.7kPa $\pm$ 26.7kPa)

Medium: 500mmHg $\pm$ 100mmHg (66.7kPa $\pm$ 13.3kPa)

Low: 300mmHg $\pm$ 100mmHg (40.7kPa $\pm$ 13.3kPa)

Alarm: Liquid volume nearly; Syringe complete; Target volume complete;
Occlusion syringe off; Mis-operation; Low battery; AC power off

✧ Environment Requirements:

Conditions	Transport	Storage	Operation
Ambient Temperature	-30℃ $\sim$ +55℃	-30℃ $\sim$ +55℃	+5℃ $\sim$ +40℃
Relative Humidity	20% $\sim$ 95% (non-condensing)	20% $\sim$ 95%	20% $\sim$ 90%
Atmosphere Pressure	70kPa $\sim$ 106kPa	70kPa $\sim$ 106kPa	86kPa $\sim$ 106kPa

Attention: marks and their meanings

$\sim$ AC	 BF Type equipment	 Start
$\equiv$ DC	 Attention	 Stop
OFF Turn Off	 Mute	 Purge
ON Turn On		

Chapter 4 Basic Setting

4.1 Install pump

Fix the syringe pump to the Syringe stand or put it on the table flatly, The pump can not be used as portable. Put it on the table or patient bed is prohibited. Make sure it is firmly fixes before actual use.

4.2 Turn on

AC power line will be on after AC is connected, press the switch at the rear of the pump to **ON** position, parameter setting interface appears on the display When use DC power supply, DC power line will be lit , while the AC power line will be not lit.

4.3 Load, purge, Replace Syringe

4.2. Make the full drug tube connect the extending tube and the scalp needle, and get rid of the air for the syringe, and put the syringe into the syringe place, and the syringe edge must be pressed into the syringe injector coat place.

4.2.2 Pinched blocks and wrench, move block to the syringe hands, then loose the core rod end wrench, and push the block and hook turn back hook hand syringe.

4.2.3 After setting all the parameters (see infusion set method mode), holding down the purge button for the second time in a row, the second time, after waiting for scalp needle point out the potion to loose, insert the needle into the patient static (dynamic) pulse, and then press the boot key, the pump start injection.

4.2.4 Pump cannot be adjusted after the start injection while all the parameters are lock.

Caution: ※If in the use process needs to replace or reinstall syringes and extend line, please stop injection after finishing injection, then get out the syringe , install or change the extending tube in the same way.

※ after the syringe is installed to the pump and clean the extending tube, before the scalp needle is get into, please make the needle head up in vertical, in order to prevent the liquid return or flow.

※ The syringe and the extending tube will be replaced after in a complete injection.

4.4 Calibration

Caution: Before calibration please use the empty syringe.

Please press the “OK” key, then press the “ON” key under the pump off, and the system will come into the standard interface.

Steps: 1. Please do as the 4.3 steps, install or load the syringe, put the syringe piston to the Zero scale line, then press “OK” key.

2. Then push the syringe piston into the max scale line(50ml scale), then press “OK” key , then it is over.

3. Change or go on to set, please press “stop” key, and return back.

Note: if there is no calibration on the syringe, the system will keep the latest time

for calibration of numerical value, use different syringes before calibration again (with former parameters, it can be used any syringe mode)

4.5 Start

After checking, the injector installation does not show error indication, press the start key.

The injection can be started at this time, but it can't adjust to various values is displayed on the screen. As in normal and fast forward button in addition to the stop button, the button is locked.

4.6 Clear Accumulated Volume

Clear the accumulated volume: Press and hold Mute key, then the syringe target volume and drug volume can be adjusted. (It can clear the accumulated volume directly when under 0 mode)

4.7 Turn off

Press the switch at the rear of the pump to off position, the backlight will be off.

Chapter 5 Working Mode

5.1 mode-1: Simple and Constant Speed Mode

Before Boot system default, please choose the last injection and injection speed, and press the mode key for pattern transformation.

Shuttle function description: the main interface rotating shuttle can move the cursor position, when moved to the need to adjust the options, press the shuttle, the data can be adjusted.

5.1.1 Mode for choice: Key mode, please change the mode into -1 mode, that is Simple and Constant Speed Mode.

Caution: Injection value only before starts to work for the first time please clear accumulate then reset.

5.1.2 Adjustment of simple constant speed mode

Press the shuttle key into the speed adjustment interface, the speed adjustment can be changed in turn from high to low level bit by bit (with stop key to shift), rotating the shuttle key can set the speed value. Value setting method: clockwise, value increase; Rotate counterclockwise, value decreased.

5.2 Mode-2: Time -Volume Mode

Mode selection, press the mode key, converts the pattern into the pattern - 2 is Time Volume Mode

Time –Volume Mode parameter Settings:

※Time Setting: Time unit as "min", The default system time is the last setting time, the user can set the parameters by rotating the shuttle according to the needs of clinical therapy (time step is 1 min). Rotating shuttle and make the cursor stop on the word of time, time, press the shuttle to stop the cursor on time value, rotating shuttle can increase or decrease the value of time.

※Volume setting: The default system content is the measured volume value, and the unit is "ml". It also can adjust the volume value large or small by manual way, the method is the same as time setting (the step is 0.1ml, also can stop the shuttle key to shift).

※The system will calculate the speed of the drugs and dose according to the time and the dose parameters after setting the time.

※To make sure the safe injection, please check again all the setting information of the interface, after confirmation, please press start key to inject.

5.3 Mode- 3&4: Dose- Weight Mode

Mode-3 and Mode-4 are both Dose Weight Mode, Mode-3Dose unit is ug/Kg/min ,while drugs units is ug, Mode-4 Dose unit is mg/Kg/min ; while drugs is mg. You can select Mode-3 or Mode-4 according to your requirement.

Drugs, liquid, dose can be set according the requirement of clinical, the weight can beset according to the patient weight (unit is Kg),

The setting method please see the mode-2.

After setting all the parameters, the system will calculate the flow rate automatically, then make confirmation, then start to inject.

5.4 Mode-0

Under mode-0, the user can adjust the KVO rate, time, room, bed NO., accuracy, Occlusion, alarm voice. This mode is not working mode, it only for adjusting all kinds of parameters, under this mode, press mute key to clear

accumulate volume.

Chapter 6 Other Function

6.1 Injection volume limit setting

Injection volume limit function is mainly used in the injection process to control the injection volume of liquid, it can be set in any pattern in the fifth chapter introduces the Settings, but it must be cleared accumulate volume before the start of the work mode for the first time, then reset. When the drug value reaches the injection volume setting value, the device will send out alarm, and stop the injection.

6.1.1 When on main interface, rotate the rotary key make the cursor stop on the Injection Volume

6.1.2 Press the rotary key to move the cursor to volume value (the default volume is 0 ml, volume limitation function is unavailable at this moment), rotate the key to set the injection volume. Stop/Shift key can be also assisted to set in turn.

6.1.3 After finishing injection volume setting, press rotary key, back to main interface.

6.2 Purge

6.2.1 This function is used for perfusion and venting.

In Non-working status, press 'Purge' key double times and holding it, the machine enter purging status.

6.2.2 Purge rate (see Technical specifications)

Note: Before starting injecting, the air in the syringe and its extension tube must be drained completely, to protect air be into patients.

During purging the air, don't put syringe needle into patients, or make danger.

6.3. Bolus Mode

6.3.1 This function is used for increasing the injection volume.

In working status, press 'Purge' Key double times and holding it, this pump into Bolus Mode, a word 'Bolus' displays on screen, at this moment, the cumulant showed on screen is the injection volume increased under this bolus mode, after releasing Purge key, the increased volume add to total volume

automatically, the injection speed return to the pre-set rate automatically.

6.3.2 Bolus injecting rate (see technical specifications)

6.4 KVO (Keep Vein Open)

In normal working status, pump will go into KVO after injecting complete, system default working date is 0.1ml/h, to keep vein open, preventing blood backflow or blood coagulation. (KVO rate can be adjusted under Mode- 0, adjustment range is 0.1~5ml/h)

6.5 Syringes Calibration

Press rotary key and holding it after starting the machine, system will into calibration interface. (See calibration way in item 4.4 above)

Chapter 7 Alarms & Clearing

7.1 Nearly empty alarm

When the remaining injecting volume is only 6% of syringes target volume, 'injection going to finish' will display on screen, along with sound alarm. (Sound alarm occurs only once, the description indicates will keep displaying).

7.2 Injecting empty alarm

When the target volume is completed, 'Injection Finished', 'Syringe empty' is displayed, sound and light alarms occur, press 'Mute/Clear' key can cancel the alarm sound, or return to main interface by pressing rotary key.

Note: 'Mute/Clear' key can only cancel the alarm sound temporary, it will occur again after 1 minute.

7.3 Pre-set volume injecting complete alarm

When the injecting volume reach the pre-set volume, 'Injection finished' is displayed, the pump switch to KVO, sound and light alarm occur, press 'Mute/Clear' key can cancel the alarm sound, or return to main interface by pressing rotary key.

Note: If user didn't pre-set injection volume (the default injection volume is 0ml after starting the pump), such alarm will not occur during injecting.

7.4 Occlusion Alarm

The pump stops working when the syringes, syringe extension tube or needle is blocked, 'Injection occlusion' is displayed, sound and light alarm occur. (Please see alarm pressure threshold in technical specifications)

Note: When the occlusion alarm occur, please check the reason in syringe tubes or needles first, before problem resolved, please stop to inject on patients.

7.5 Fall off alarm

During working, if press 'start' key before the rod holding well the syringes, or the syringe rod is out of the syringe mounting position, the pump will stops working, 'Syringe fall off', 'Error' is displayed, sound and light alarm occur. Press 'Mute/Clear' key can cancel the alarm sound, or return to main interface by pressing rotary key.

7.6 Setting Error Alert

In working status, when syringe core pole is not on top of the push block, 'Setting Error', 'Error' will be displayed, this pump keeping working, without any sound alarm. If such error displayed before starting the pump, pump can not start to work.

7.7 Low Battery alarm

When the electric quantity displayed on screen is only one grid, 'Low battery' will be display, sound alarm occur in 1 minute in interval, this alarm will be cancel after connecting with AC.

Note: When low battery alarm occurs, please connect with AC timely, to prevent any abnormal injecting.

Chapter 8 Cautions

- ◎Please read the user manual before using the pump.
- ◎Use the recommended syringes to ensure the accuracy.
- ◎Please check the setting speed before starting working
- ◎Do not use Benzene, Ethylketone and other organic solvents to clean the

pump.

◎Do not use the pump near the high-frequency interference devices, such as mobile phones. Please turn it off when don not use it to extend its life and protect the internal battery.

◎Shutdown to charge the internal battery to 6~8 hours, the battery can work independently for more than 4 hours.

◎When using this pump, don not add any injection control device to same syringe, otherwise, may cause dangerous.

◎For safety, every time before starting this pump, please check every parameter, to make sure that all parameters are setting under requirement of clinical treatment, or may cause dangerous

◎Only professional personnel who be trained can maintain this pump.

◎After longtime using, there may be operating Mask button at the concave, should contact the manufacturer timely to replace it, or may cause false triggering.

◎When the push block ruptures on its upper and lower hook, should be replaced promptly, otherwise the siphon will make the residual solution flow by itself into patient body, cause harm to patients.

◎Syringe outside crimping must be inserted into the crimping slot, otherwise the liquid can not output, or the siphon cause over injection, which will harm patients.

◎When using the pump, must use the specified brand syringes or calibrated syringes, if use not suitable syringe brands or setting specifications not match the requirements, may cause inaccuracy injection rate, remaining time or residual volume.

◎The built-in battery should be charged and discharged for checking once a month , to avoid low battery condition. When low battery with sound and light alarm, please connect this pump with AC to be charged for put it off, or this condition will damage the battery.

◎Normal discharge time with for its battery is 4 hours, but by the influence of using time, the environment and incomplete charge etc, working time of this battery may not be guaranteed four hours.

◎Internal battery charge for 6-8 hours when power off. Battery can work more than 4 hours independently.

◎When use this product, it can not add other injection control equipment on the same injection syringe, Or, it will case danger.

◎To ensure safety, please check various parameters term by term and confirm the parameters as demand of clinic treatment before starting work every time. Or it will cause danger.

◎ To maintain the machine must through the professional maintenance personnel who have been trained.

◎If the pump be used for a long time, It will disappear operating mask button concaved, it shall contact with manufacture to change, or it will cause spurious triggering.

◎When the on and down hook breakage, it shall change in time. or it will cause siphon makes the residual solution of syringe flow automatically to patients' body ,and happen excessive dosage, cause harm to patients.

◎Syringe coat edge must inset Volume had slot of Syringe pump. Otherwise, no liquid output or caused large doses output by siphon to harm to patients.

◎When use the pump, you must use the specified brand manufacturers syringe or calibrated syringe. If the syringe brand choice, parameter setting does not match the actual, may cause speed, residual time remaining and residual volume of syringe are not inaccurate.

◎Pump built-in battery should be conducted once a month to charge and discharge tests.

To avoid impact due to lack of battery when using it. Battery lack of sound, light alarm, should shut down the pump connected to the ac power for charging in time. Otherwise, insufficient battery may be damage to the battery or affect use.

◎Battery discharge time is about 4 hours, but affected by the battery charging time, using the environment, or incomplete charging etc, work time of battery can't guarantee 4 hours for pump.

◎ Pump is not used for a long time, it shall charge every 3 months, to avoid the built-in battery automatic discharge and scrap.

◎ Pump is not used for a long time, battery will self-discharge. When reuse, the time system shall resent; Speed, Mode, Pressure and syringe brand system will save to the last value.

◎ Environmental protection: The service life of expire Equipment and

accessories (including battery) need to do good disposition according to environmental regulations.

◎ Pump can not be used under the situation of any flammable anesthetic gas and air mixture, or a mixture of nitrous oxide and oxygen.

◎ Pump need clamping or reliable fixed on its own according to demand, it can not be placed on the bed no fences on the tablet. Avoid the pull line makes the pump slide, pose a danger to a patient.

◎ This pump will not work by the patient's family, to prevent the incorrect operation bring risk to the patient.

◎ This pump is the same with other equipment, must be reliable grounding.

◎ Is this products appear fault when using, please shutdown stop work immediately and contact manufacturer!

Chapter 9 Maintenance

◎ If need to change fuse body, please contact our company, When change fuse body, firstly unplug the power cord loose screw of pump housing, open the pump and power supply board, remove the fuse body cover, can be replaced. Replacement shall be for the same specification fuse body

◎ The surface of pump shall be wiped by wet cloth added with right amount of detergent or 84 disinfectant, then use wet cloth to wipe surface. Finally use clean cloth dry, and placed on the shelf.

◎ Rechargeable battery maintenance: When not use, Please turn off the power switch, to prevent damage to the battery due to excessive discharge.

◎ Taking into the lifetime of components and medical devices safety. Advice that the lifetime of medical devices not more than 7 years. Expired products, should be in accordance with the norms of electronic scrap processing. If you continue to use, may be unreliable equipment operation and dangerous.

◎ The following are not free maintenance range:

1. Due to customer installation, application, maintenance, damage caused by improper storage;
2. More than replacement, product warranty period;
3. Valid certificate, warranty certificate is not fit or altered;
4. Without our permission, the disassemble;
5. Human factors result damage to the product;

6. Damage caused on the way of customers repair, caused by transportation, loading and unloading;

7. Caused by force majeure such as earthquakes, floods, fires, lightning damage etc. natural disasters.

Note: In order for your performance to get the company's services, to protect your rights, please carefully read the following after the purchase, and strictly followed:

1. Please refer instruction manual before using, according to the requirements specified in the operation and use;

2. Since purchase within one month of performance problems, and the appearance of no damage. Detected by the company's technical staff confirm, replace same type and number of new products.

3. Due to improper use or maintenance over the warranty period, our company charged for the cost the accessories.

4. Power lines, packaging and accessories (manual, warranty card, certificate) does not belong to replacement warranty.

5. Customers Rework note transit packaging product, in order to avoid damage to the product

6. This warranty applies only to territory China (excluding Hong Kong, Macao and Taiwan) use of the product.

© The company accepted from time to time provide technology security to consult.

Chapter 10 Trouble Shooting

Trouble	Cause Analysis	Solutions
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Rate Inaccurate	Syringe edge is not inserted into the syringe circle had slot or not installed correctly.	Re required to install
	Infusion set is not calibrated	Calibration the IV sets
Piping drip when down state	The infusion set is not installed correctly or not meet the requirements of the infusion.	Re-adjust the infusion
	Parts damage, deformation or screw is loose	Re-adjust or replace parts (adjusted by professionals)
Battery voltage alarm	Placed too long or batteries electricity shortage	Timely charge
	Not proper use of the built-in battery, the battery damage or failure	Replace the battery
push block is not smooth	The main pump moving rod liquid stick	Clashes with alcohol
Blood appear when start the injection	Needle inserted into a vein before did not press the fast forward to eliminate mechanical clearance	The prolongation of the air in the tube, press the fast forward button, push the blood into the vein
No display when power on	Battery voltage is too low	To recharge or replace new battery
	System error	1.Restart after shutdown 2. Contact manufacturer to repair

Chapter 11 Appendix

11.1 Packing List

Completed Packing including:

Main Unit	1 unit	Certificate	1 pcs
Power Cable	1 pcs	Warranty Card	1 pcs
User Manual	1 pcs		



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