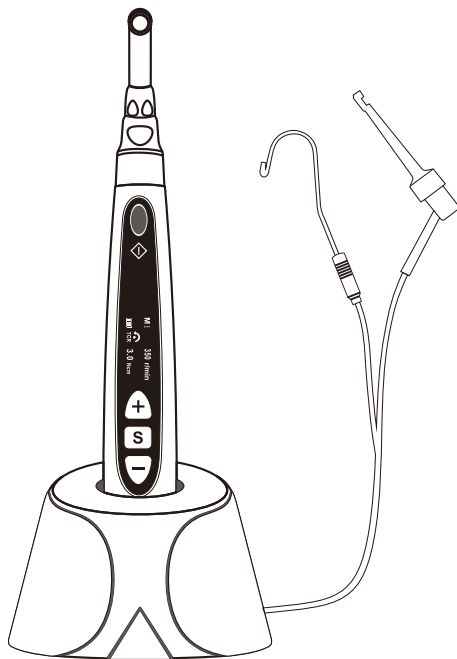


ENDOMOTOR & APEX

Product Manual

(please read this manual carefully before use)



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1. Product Introduction

1.1 Product Description

The endomotor is mainly used in root canal therapy process, and is a device for root canal formation and cleaning in the root canal preparation stage. It helps the dentist complete the root canal treatment.

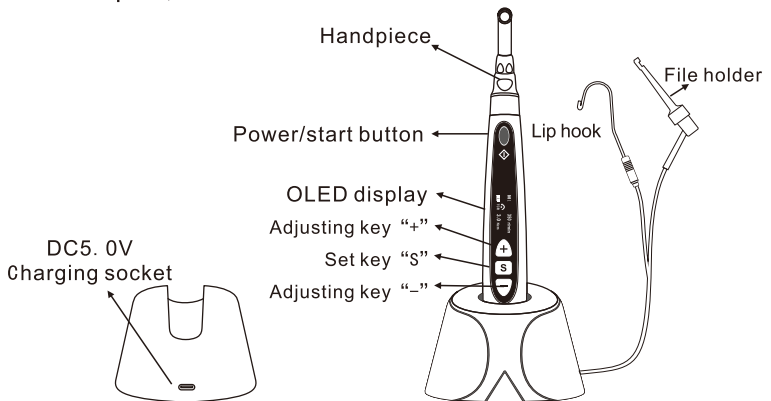
The features of this endomotor are as follow:

- a) HD OLED screen.
 - b) Wireless handle and more convenient operation.
 - c) Wireless charging to avoid poor contact of traditional contact type charging.
 - d) 10 custom programs and 6 working modes.
 - e) Large capacity battery and longer working hours.
 - f) Individual root measurement
 - g) Long press the “On / Start” key to enter into reverse function
 - h) Wired and wireless dual charging mode
 - l) Automatic start-stop
- ### 1.2 Specification

Please see the packing list for the machine configuration.

1.3 Performance structure and composition

It consists of a charging base, a handle, a handpiece and a power adapter, etc.



1.5.Scope of application

1.5.1.This product is suitable for root canal therapy, root canal formation and cleaning in root canal preparation stage.

1.5.2.This product is only suitable for hospitals and clinics, and must be used by qualified dentists.

1.6.Contraindications, if you are experiencing a patient with an implantable cardiac pacemaker (or other electrical equipment) and are warned not to use small appliances (such as electric shavers, hair dryers, etc.), it is recommended not to use this product.

1.7. Warning tips

1.7.1.Please read this manual carefully before you first use it.

1.7.2.The device must be used by a professional and qualified dentist at a suitable location.

1.7.3.Do not put the device directly or indirectly near the heat source.The device must be operated and maintained in a reliable environment.

1.7.4.This device requires special precautions regarding electromagnetic compatibility (EMC) and must be installed and used in strict accordance with EMC information. Do not use this device near fluorescent lights, wireless transmitters, remote controls, handheld and mobile HF communications equipment.

1.7.5.It may cause the handle to overheat if use the reciprocating mode for a long time. In this case, it should be cooled and then used again. If the handle frequently overheats, please contact your local dealer.

1.7.6.This device must use the original contra-angle handpiece, otherwise it will not be used or cause adverse consequences.

1.7.7.Please do not make any modifications to the device. Any changes may violate the safety regulations and cause harm to the patient. Any modifications will not be guaranteed.

1.7.8.Please use the original power adapter, other power adapters will cause damage to lithium batteries and control circuits.

1.7.9.The handle cannot be autoclaved and the surface can only be wiped with a neutral disinfectant or alcohol.

1.7.10.Do not press the pressing cover of the handpiece before the

handpiece stops rotating, otherwise it will damage the handpiece.

1.7.11.The handpiece cannot be removed until the handle stops rotating, otherwise it will damage the handpiece and the inner gear of the handle.

1.7.12.Before starting the handle, make sure that the file is installed and locked.

1.7.13.The continuous rotating file can not be used in the reciprocating motion system program, and the reciprocating file can not be used in the continuous rotating system program.

1.7.14.Please set the torque and speed of the endomotor according to the parameters recommended by the files manufacturer .

1.7.15.The forward rotation mode is suitable for the continuous rotating file, the reciprocating motion mode is suitable for the reciprocating motion file (that is, one file), and when the continuous rotating file lock in the root canal,inversion can take out the files.

1.7.16.Do not start the handle motor before properly installing the handpiece, so as to avoid damage caused by the operator touching the gear.

1.8 .Device Security classification

1.8.1.Classified by running mode: continuous running device.

1.8.2. Classified by type of electric shock: Class II equipment with internal power supply.

1.8.3.Classified by degree of protection against electric shock: BF type application part.

1.8.4.Degree of protection against liquid intake: ordinary equipment (IPX0).

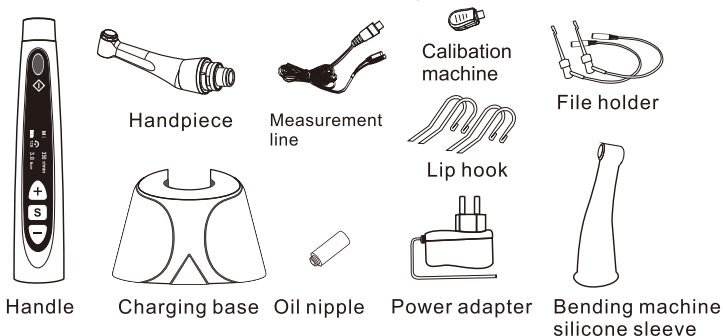
1.8.5.The degree of safety when used in the case of a flammable anesthetic gas mixed with air or a flammable anesthetic gas mixed with oxygen or nitrous oxide: a device that cannot be used in the presence of a flammable anesthetic gas mixed with air or a flammable anesthetic gas mixed with oxygen or nitrous oxide.

1.9 Main technical parameters

- 1.9.1. Handle lithium battery: 3.7V./1500mAh
- 1.9.2. Power Adapter
Input: ~100V-240V..50Hz/60Hz..0.4A.Max
Output: DC5V/1A
- 1.9.3. Range of torque: 0.5Ncm-4.0Ncm (5mNm~40mNm)
- 1.9.4. Range of speed: 120rpm~1000r/min
- 1.10 Operational environment
 - 1.10.1. Environmental temperature: -5°C ~+40°C
 - 1.10.2. Relative humidity: 30%~75%
 - 1.10.3. Atmospheric pressure: 70kPa~106kPa

2.Product Installation

2.1Product basic accessories drawing



2.2 Handpiece instructions

- 2.2.1. The inside of this handpiece is driven by a precision gear with a transmission ratio of 1:1.
- 2.2.2. Before the first use and after each use, please clean and disinfect the contra-angle handpiece with the commonly used neutral disinfectant, then use the special cleaning oil for oiling maintenance, and then carry on the high temperature and high pressure sterilization with the temperature of 134°C and the pressure of 2.0bar / 2.3bar. (0.20MPa~0.23MPa).
- 2.2.3. This contra-angle handpiece can only be used in conjunction with this device. It cannot be used in conjunction with another device. Otherwise, the contra-angle handpiece may be damaged.

2.2.4. The service life of the contra-angle handpiece is 1 year. According to the frequency and time of clinical use, and the degree of difficulty of different patient's oral root canal during treatment, and its life span is also different.

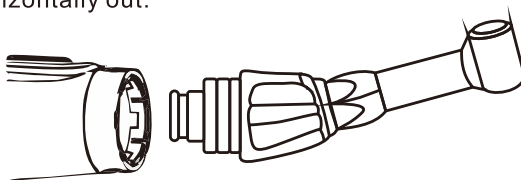
2.3 Installation and disassembly of handpiece

2.3.1 Installation

Point the positioning pin of the handpiece to the positioning hole of the handle, push it horizontally into the handpiece, and when you hear the sounds of "crack" , it indicates that it is installed in place. Three positioning pins on the handpiece are matched with 6 positioning holes on the handle. Handpiece can be installed at multiple angles.

2.3.2 Disassembly

When the handle is not started, pull the handpiece horizontally out.



2.4 Installation and disassembly of files

Insert the files into the rotating shaft hole of the handpiece, gently rotate, find the position corresponding to the semicircular part of the files, when you find the position, insert a part of it first, do not press the button above the handpiece, and then press the files into the handpiece with a little greater force. When you hear the "crack", the file is connected to the handpiece.

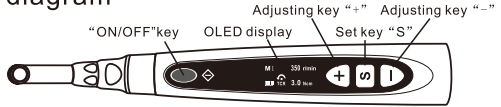
If you need to remove the files, hold down the button above the handpiece and pull the files out of the handpiece at the same time.

When installing the needle, please press the files several times, and make sure the files is installed.

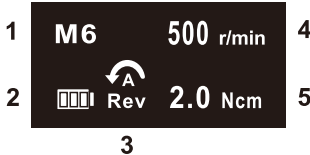
Please keep the files clean, if dirt, etc. enter into handpiece, will cause the vibration of the files.

3.Product Function and Use

3.1.Handle machine diagram



3.2.OLED display



- ①. The sequence number of the custom program, the serial number is 1-10, and there are 10 custom programs.M0 is individual root measurement
- ②. Battery capacity
- ③. Working mode
- ④. Set speed
- ⑤. Set torque

4. Operating Instructions

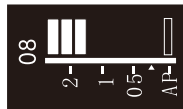
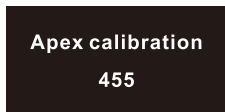
4.1 Start and stop of the handle

In shutdown mode, long press the “On / Start” key to put the handle into standby mode; then short press the “On / Start” key to put the handle into working state; press the “On / Start” button again to return the standby mode.

4.2 Calibration

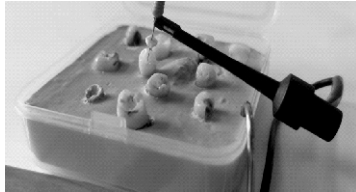
(After plugging in the calibration kit, the root measurement value is displayed as 08. Our company has calibrated before leaving the factory. If 08 is not displayed, please recalibrate)

Press “+” and “-” at the same time in the M0 interface, as shown on the left figure below, the value is displayed between 400-500, and then press the start key, calibration is completed, at this time continue to press the start key, it will display 08 interface.



4.3 Individual root test

Connect them according to the product manual, hook the patient's lips with the lip hook, and clamp the file with a file holder, as shown in the following figure:



In M0 mode, press the start key to measure, the root measurement interface will display as follows, the left side 0.5, 1 and 2 represent the actual distance to the root tip, in millimeters (mm), and 00-30 above is the digital code for the root tip distance:

	<p>10-30 means that the root tip distance is over 2mm, there is no alarm sound</p>
	<p>07-10 means the root tip distance is about 1-2mm, the sound is a continuous beep 05-06 means that the root tip distance is about 0.8-1mm, and the sound is two consecutive beep 03-04 means that the root tip distance is about 0.5-0.8mm, and the sound is three consecutive beep 01-02 means that the root tip distance is about 0.1-0.5mm, and the sound is a continuous beep.</p>
	<p>00 means that the it has reached the root tip and the alarm sound is long</p>
	<p>OVER means root canal perforation, the sound beep is continuous and rapid</p>

4.4 Root measurement and treatment mode

In the M1-M10 interface, in Fwd, Rev, TCF and TCR modes, first use the S key to set the root measurement reference point and root measurement function, and then connect the measuring line for testing. During the process of measuring and expanding, there will be a delay of about 1 second due to the contact problem during the rotation of the root canal files. When the reference point threshold is reached, the motor works according to the preset function:

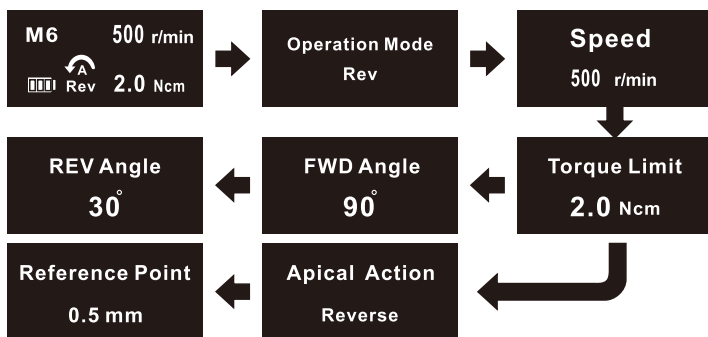
Automatic start and stop: The motor stops when it reaches the preset point and resumes rotation when it is greater than the threshold

Stop: the motor stops at the threshold

Reverse: The motor reverses when it reaches the threshold, and resumes when it is greater than the threshold

5. Function Selection

Press the function setting key “S” on the standby interface to set the working mode, the speed, torque and the automatic round-trip angle. After setting, press the “Power on/Start” button to return.



Operation Mode:

In this interface, use the adjustment key "+/-" to select the following six working modes:

Fwd: Forward 360° automatic movement, positive rotation plus torque reversal, remove the torque and resume normal rotation.

Rev: Reverse automatic continuation: reverse 360 °automatic motion, reverse plus torque forward rotation, remove the torque and resume the reversal.

A F: Forward reciprocating motion, continuous cycle between forward rotation and reverses

A R: Reverse reciprocating motion, continuous cycle between reverses and forward rotation.

TCF: Automatic reverse close: forward 360 °,when encounter torque , will stop,it is used to remove the broken files with Anti-bearing knife.

TCR: Automatic forward rotation close: reverse 360°, when encounter torque, will stop, it is used to remove the broken files with positive knife.

Speed:

In this interface, use the adjustment key "+/-" to select the speed, the range is 120-1000r/min.

Torque Limit:

In this interface, use the adjustment key "+/-" to select the torque, the range is 0.5-4 Ncm. When the torque is R.L, the speed and mode are not controlled by the torque, that is, there will be no resistance reversal or stop. Note that when the speed is greater than 600 rpm, the torque range is 0.5-2.0 Ncm; when the speed is lower than 280, the torque range is 0.5-1.5 Ncm.

Fwd/Rev Angle:

This option interface appears only in AF and AR modes. Use the adjustment key "+/-" to select the round-trip angle from 30° to 370 °

Apical Action:

In this interface, use the S key to select the following functions

Auto:Automatic start and stop

Reverse: Reverse

Stop: Stop

Off:Turn off this function

Reference Point:

In this interface, use the S key to adjust the threshold point from 0.3mm to 1mm.

6. Option setting

In the standby interface, press and hold the adjustment key “+” to enter the setting interface, then press the “S” key and the adjustment key “+/-” to set the auto power-off time, buzzer volume, left and right hand mode, power-on default program and reset. After setting, press the “Power On/Start” button to return.

Auto Power OFF 3 Min	Beeper Volume Vol 3	Habit hand Right	Startup Mode M10	Reset Mode OFF
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7. Reset

After reset and in default mode, the parameters of M1-M10 are as follows:

Function	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
Mode	Fwd	Fwd	AF	TCF	Rev	Rev	AR	TCR	Fwd	Rev
Speed	350	500	300	350	350	500	300	350	800	1000
TQ	3	2	90° / 30°	2	3	2	90° / 30°	2	1.5	1

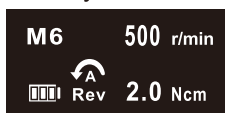
8. Built-in root canal files parameters

In the standby interface, long press the adjustment key “-” to enter the built-in parameter interface. The software has built-in our DS model root canal files parameters and some common root canal files parameters at home and abroad and press the “+/-” key to select. After selecting, press the “Power on/Start” button to confirm and return. At this time, the interface parameter lock and cannot be adjusted. You can switch the root canal model by adjusting the “+/-” key. If you want to exit, you need to press and hold the “-” key again. The details of built-in root parameters are shown in the following table:

Files size	Speed	Torque	Mode
DS(Pro)-Dx	300	3	Fwd
DS(Pro)-Path	350	1.5	
DS-D1	350	2	
DS-D2/D3	350	1.5	
DS-Pro-D1/D3	350	2	
DS-Pro-D2/D4	350	1.5	Fwd
DS-M-Path	300	1.5	
DS-M-D1/D2/D3	350	1.5	
DS-R	400	2	
DS-Path-DP1/2/3	350	1.5	
M3-Open	300	3	
M3-Path	350	1.5	
SANI-S3	500	2.5	
Protaper-SX/S1	250	3.0	
Protaper-S2		1.0	
Protaper-F1		1.5	
Protaper-F2/F3		2.0	
Protaper NEXT	300	2.0	
TF	450	2.5	
Mtwo	280	1.5	
Hyflex.CM	500	2.5	
Hyflex.NT	400	2.5	
WaveOne	150	30.0	AF
Reciproc	150	30.0	

9. Battery and charging

Battery indication



There is a real-time power indication in the lower left corner of the screen interface:

- Indicates that the battery is full or about to be full
- Indicates that the remaining power is 30%-80%
- Indicates that the remaining power is less than 30%
- Indicates that the battery is low, flashing prompt, please charge.

Note: It is normal for the battery to change when the host adds load. For safety, the motor automatically turns off when charging.

10. Charging

The endomotor has a built-in 1500mA large-capacity battery, which can be charged wirelessly and wired. The charging time is about 4 hours.

Insert the charging base into the adapter, and make sure that the main body of the charging base is no any foreign objects. Wireless charging is to plug the Type cable into the dock's interface. When wired charging, you need to plug the micro USB cable directly into the USB port on the back of the host.

After the placement is correct, let the main unit handle be put into the charging base, then the buzzer "didi" twice, and the words "CHG" is displayed on the LCD screen. It is indicated that charging is in progress; meanwhile, the screen power is animated.

After charging for a period of time, two beeps of "beep" appear on the LCD, and the word "FUL" is displayed on the LCD screen, indicating that the battery is fully charged.

11. Shutdown

Two ways to shut down

Automatic shutdown without operation, and the shutdown time can be selected for 3-15 minutes in the setting.

Press and hold the function key “S”, and press the “Power On/Start” button to turn off the host; after shutdown, the host will store the parameter settings before shutdown for the next use.

12. Notes

- a) The forward rotation function and the reciprocating function mentioned in this instrument use different root canal files.
- b) Do not use curved cracked files that do not conform to specification. If such files are used, the files will be suddenly interrupted during the rotation, causing injury accidents.
- c) When using, please follow the speed and torque of the files specified by the files manufacturer.
- d) Do not use or place this product in high temperature places such as strong sunlight, fireside or stove.
- e) When placing the main unit into the charging base, please pay attention to the direction of the loading (the operation panel is outward). If the direction is incorrectly placed, it may cause damage or cannot be charged.
- f) Do not lubricate the main unit with oil injection and sterilize the main unit with high temperature and high pressure.
- g) This product is an electronic product and does not have a waterproof function.
- h) Do not drop the main unit and charger base, and place the charging base in a stable place.
- i) Please do not turn it on and use while charging.
- j) Please use the handpiece provided or approved by our company, otherwise it may lead to misoperation of the machine.
- k) This instrument will not cause electromagnetic interference to equipment in the same environment, and will be subject to electromagnetic interference in

general use environment. Please avoid using it in the electromagnetic environment and strong electric field.

- l) The charger plug shall be removed from the power socket after charging.
- m) This device should not be used in the presence of flammable anesthetic gas mixed with air or flammable anesthetic gas mixed with oxygen or nitrous oxide.
- n) This endomotor cannot be repaired on site.

Contraindication:

- a) please do not use with high frequency surgical equipment and heart patients should be used with caution!
- b) patients who use implantable electronic devices such as pacemakers should not be advised to use this product if they do not have doctor's advice!

13. Troubleshooting guide

Common faults and treatment methods

NO	Troubles	Possible problems and solutions
1	Can't turn on the device	Lack of power. Please charge
		Press the power button for short time. Please long press it over 1s
2	No display when charging	Poor contact between the adapter and the charging base. Properly rotate the plug that connects the adapter to the charging base
		There is a foreign object on the bottom of the main unit and the charging base. Please clean up.
		The main unit is not properly placed on the charger base

14. Maintenance

- a) Products that are not used for a while, be sure to check that the product is operating properly and safely before reusing it.

- b) when the battery is not used for a long time, it should be charged once a month to ensure the service life of the lithium battery.
- c) The working life is approximately 5 years from the date of purchase.
- d) when there is a stain on the surface of the main body, apply some neutral detergent to the soft cloth and wipe it with a wet cloth.
- e) Lubricate the machine with a lubricant for more than once a day after treatment or before autoclaving. Rotate the E-shaped nozzle into the outlet of the cleaning lubricant, remove the burs, and then insert it into the outer sheath of the handpiece and spray at least 2 seconds.
- f) When the handpiece is repeatedly steam-sterilized, it is recommended to perform regular maintenance to ensure that the handpiece is in good working condition and weekly maintenance is recommended.

- Notes:**
- 1. It is strictly forbidden to wipe with ethanol (alcohol), banana water, light grease (light gasoline) and so on.
 - 2. It is strictly forbidden to place the machine under the sun or beside the fire to avoid battery explosion.
 - 3. Do not disassemble the endomotor if there is any quality problem.

15. Cleaning and Disinfection

Please sterilize the handpiece, root canal file and LED light only.

- a. Please brush away the dirt attached to the surface with a brush (metal is strictly prohibited) and wipe it clean with a soft cloth stained with disinfection alcohol.
- b. During disinfection, the temperature shall not exceed

135°C(134°, 3.5mins recommended).

- c. When not in use, please seal it in a sterile bag and place it in a dry, well-ventilated place.
- d. Please sterilize the handpiece, root canal file and LED light only.
- e. Because the bottom layer of the pyrolysis rack is close to the heat source, the local temperature will be high, so the vessel should be placed in the middle or upper layer as much as possible.
- f. It is strictly forbidden to use chlorinated water (strongly acidic water, super acid water) or sterilizing liquid to wash, impregnate and wipe the vessel.
- g. Wrap it with a sterilized bag and mark it.

16. Storage and Transportation

Storage conditions:

storage temperature:- 40° C~ +55° C

Relative humidity: ≤95%

Air pressure: 50kpa~-106kpa

Environmental conditions:

It should be stored in places without light, rain, dust, corrosive gases, chemicals and good ventilation.

Transportation: 1. Prevent excessive shock and vibration during transportation, handle with care and avoid inversion.

2. It should not be mixed with dangerous goods during transportation.
3. The sun or rain and snow should be avoided when transporting.

17. Symbol description

 : Note! Please check the random file

 : Type B application part

 : class II equipment

 : The product complies with the WEEE Directive

18. Environmental protection

The metal part of the product is treated as scrap metal. Synthetic materials, electrical components and printed circuit boards are treated as waste electrical appliances. The handling of related materials must be handled in accordance with local regulations and should be negotiated with the local company that specializes in the disposal of waste products.

19. Packing list

1. Main body 1
2. Charging base 1
3. Adapter 1
4. Handpiece 1
5. Operating manual 1
6. product certification 1

20. After-sales service

The product can be replaced due to quality problems within seven days and free maintenance within one year. If you buy this product over one year, you need to pay the charge of maintenance accessories. About accessories, we provide free maintenance for six months. If accessories(such as endomotor shell,LED light,etc.) damage or run out, you can purchase from our company.

Product Warranty Certificate

Client information	
Client information	
Contact number	
Address	
Postcode	
Sales information	
Name of marketing unit	
Contact number	

Address	
Factory number	
Invoice number	
Sales date	
Seal of marketing unit	

Maintenance Records

Date	The diagnosis	Fault cause	Examination Date	Maintenance Engineer
Treatment				

Date	The diagnosis	Fault cause	Examination Date	Maintenance Engineer
Treatment				

Date	The diagnosis	Fault cause	Examination Date	Maintenance Engineer
Treatment				

Special Note:

The company reserves the right to modify the machine design, product technology or accessories, instruction manual and machine packaging contents at any time without further notice. The product is subject to the actual product, and our company reserve all the right for the final explanation.