CONTINUATION

Dear User,

Description in the manual is based on the newest products. Owing to improvement or other changes, contents of manual may differ from practical situation. Our company will reserve the right of recension at any moment. Please kindly forgive not to notify the revised place one by one.

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SUNDOO®
ADVANCED PRECISION INSTRUMENT

SD SERIES USER'S MANUAL

SD系列 使用说明书

电子数显弹簧拉压试验机 DIGITAL SPRING TESTER

CE

温州山度仪器有限公司
WENZHOU SUNDOO INSTRUMENTS CO.,LTD

Thank you very much for your patronage to purchase SD Series Digital Spring Tester.

SD Series Digital Spring Tester is special for testing tension & compression of spring distortion and measuring load and it also can be used to test the load of rubber and reed. This spring tester has the following features: high accuracy and high Resolution; displaying test direction ; blue background lamp; setting upper and lower limits ; automatic calculating average value; three units(N, kgf,lbf) conversion; holding peak function, auto-releasing peak and setting time ; auto power off and free time setting; printer inside; ten groups data memorizing; max and min value, average, qualified and unqualified value judgement etc. Before using the instrument, please read the manual carefully so that an accurate value can be got in the test.

CONTENTS

Packing List

Number	Parts Name	Quantity
1	SD Main body	1
2	Tension test stand(only SD50-500,SD50B-500B)	1
3	Adjustable Handwheel(only SD10-500,SD10B-500B)	1
4	Lock Handwheel(only SD10-500,SD10B-500B)	1
5	Hook(only SD10-500,SD10B-500B)	1
6	Lengthen Hook(only SD10-500,SD10B-500B)	1
7	M5 inner hexagon spanner(only SD50-500,SD50B-500B) M6 inner hexagon spanner(only SD1000-5000)	1
8	Foots(only SD50-500,SD50B-500B)	4
9	Lr44 Button Cell Battery	1
10	Power cable	1
11	Manual	1
12	Factory Inspection Report	1
13	Qualification Card	1

Specification

Model	SD-10 SD-10B	SD-20 SD-20B	SD-30 SD-30B	SD-50 SD-50B	SD-100 SD-100B	SD-200 SD-200B	SD-300 SD-300B	SD-500 SD-500B
Capacity	10N	20N	30N	50N	100N	200N	300N	500N
Load Resolution	0.001N	0.002N	0.01N	0.01N	0.02N	0.05N	0.1N	0.1N
Max Free Length	65mm			95mm				
Test Stroke	65mm			95mm				
Displacement Resolution	0.01mm							
Platen Diameter	Φ30mm			Φ49mm				
Accuracy	±1%							
Measuring Range	5%~100%FS							
Power	AC220±10%V，50Hz							

Model	SD-1000	SD-2000	SD-3000	SD-5000
Capacity	1000N	2000N	3000N	5000N
Load Resolution	0.2N	0.5N	1N	1N
Max Free Length	200mm			
Test Stroke	150mm			
Displacement Resolution	0. 01mm			
Platen Diameter	Φ108mm			
Accuracy	±1%			
Measuring Range	5%~100%FS			
Power	AC220±10%V，50Hz			

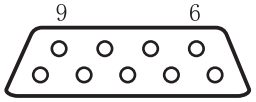
3. Add Paper
   (1) Open front cover by pressing cover button;
   (2) Add paper and pull out part of it, please note the direction of paper;
   (3) Close front cover;
   (4) Press " SEL " to make the lamp off, then press “LF” to make the printer turning, meanwhile, please check if the paper is askew. Press “SEL” again to make printer on-line.

Noted:SD-B doesn’t have printer inside.

Cautions and Maintenance

1. Do not apply with excessive load, or the device will be damaged;
2. Do not hit the digital screen or put anything on it;
3. Do not use nails or pointed tools to press the button;
4. Do not operate equipment near water, oil or other liquids. Please store the equipment in dry, cool and stable place;
5. Do not plug adaptor with wet hand to avoid electrical shock;
6. Clean this tester with soft cloth. First put cloth in the water with cleanser, then dry cloth and clean the tester. Do not use volatile chemical liquid, such as volatile oil, thinner, alcohol, etc;
7. Handle carefully while carrying and using the equipment;
8. Do not disassemble, repair or modify the tester by yourself, which may cause permanent malfunction.
9. If machine has something wrong, please contact with original purchase department or our company.

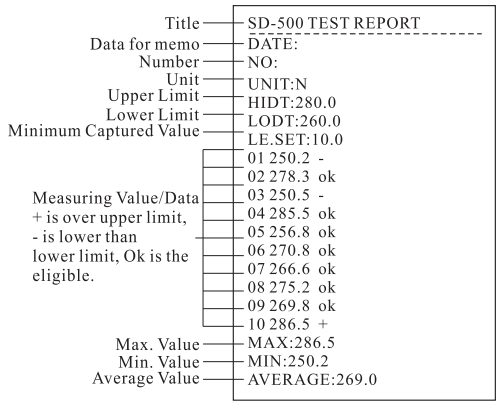
Illustration of Port



Needle	Signal	Illustration
2	TxD	output signal of SCM
3	RxD	accepted signal of SCM
5	GND	Earth signal
6	+2V	over upper limit lamp
7	+2V	OK lamp
8	+2V	lower than lower limit lamp

Picture 8

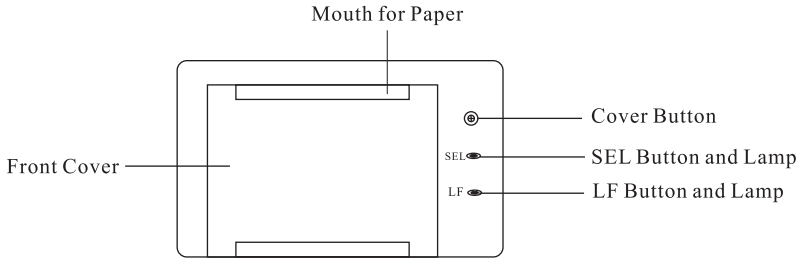
Print Proofs



Picture 9

Micro-Printer

1. Printer Panel



Picture 10

2. Button Function

This micro-printer has three buttons: SEL, LF and cover button.

When SEL button lights, the printer is on-line and is waiting for receiving data. When SEL button not lights, printer is off-line, and is treating the data. " SEL " , makes printer transition between this two states.

During printing process, press SEL to stop printer, and can add paper. The print will continue by pressing SEL again.

⚠ CAUTION Wrong operation may damage this equipment or even cause serious accident. There are important precautions and operation methods listed in our manual, so please read it before using the equipment. If shock load is tested, please choose spring tester which the capacity is double of the load.

⚠ WARNING

1. Please wear protective mask and gloves to protect you from scattering pieces during fracture test;
2. Do not use damaged or warped clamps to avoid them off or breaking down to cause hurt;
3. This equipment is used for testing tensile and compressive force of elastic objects after distortion, please do not release force in direction which makes the sensor and test stand curve or deformed;
4. Do not use this equipment with excessive load. In that case the sensor may be damaged because of wrong operation, a stopping device is inside but except for overload capacity and others;
5. If it appear “Error” on screen, it means that the sensor already exceed rated capacity, please reduce the load immediately. Do not overload 5% more than rated capacity when power on.

Function

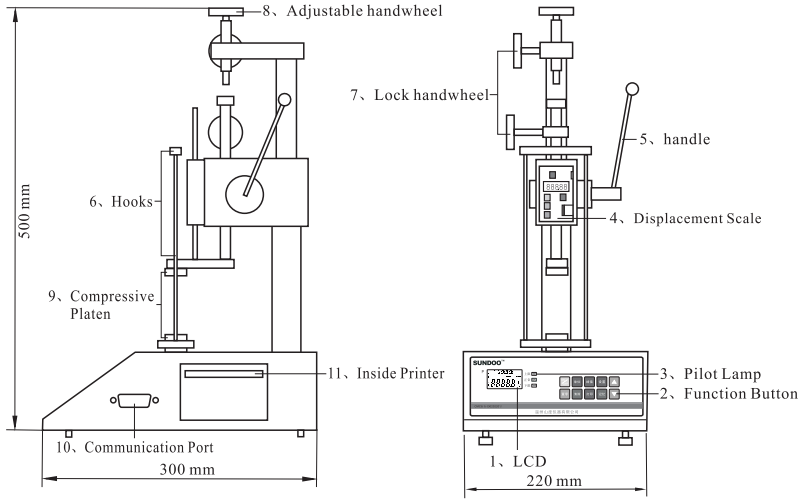
SD Series Digital Spring Tester is especially used to measure the load and deform extent of tensile and compressive spring. It is suitable for the load test of tensile and compressive spring under a certain working length. It can also be applied in spring load test for elastic components, such as rubber and reed, insertion and withdrawing and fracture tests for connecting components.

Characteristics

1. High accuracy and resolution;
2. Upper and lower limit setting, red, green lamp and alarm indication of result;
3. LCD displaying test direction;
4. Blue background illumination;

5. Memorizing10 groups of tested data and auto calculating the average;
6. Three units(N,kgf,lbf) conversion;
7. Peak holding and auto-releasing and time setting freely;
8. Automatic power off and time setting freely;
9. Inside printer, printing 10 groups of tested data, max and min value, average, qualified and unqualified value.(SD-B doesn't have this function)

Parts and Functions

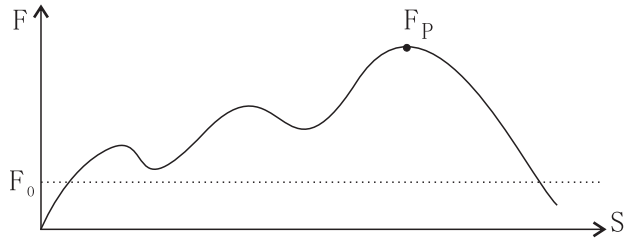


(SD-10~30 SD-10B~30B)
Note:SD-10B~30B is without printer inside

Picture 1

Memory, Reserved Value, Minimum Captured Value

Under peak holding mode, choose suitable minimum captured value "Fo" according to tested value. During testing, the memory function will be available when measuring value exceeds minimum captured value "Fo", and the peak value will be memorized. When the value is less than "Fo", that test is completed(Picture 7). The peak value "Fp" will be saved, and "√" will show in the left memory position on the screen with "►"rising one case. When the minimum captured value is higher than measuring force, the memory function will not be available.



Picture 7

This equipment can memorize 10 value and the first value will be replaced by value of the 11th test. You can choose the memory grid by pressing "▲▼" and measuring value saved in that grid will be showed in the small digital frame.

Port Output and Print

This equipment output is RS-232C , the matched micro-printer must support RS-232C.After testing, press "PRINT" key can print measuring data, including upper limit, lower limit, minimum captured value , max value, min value and average value(Picture 9).

SD-B doesn't have RS-232C port output and inside printer.

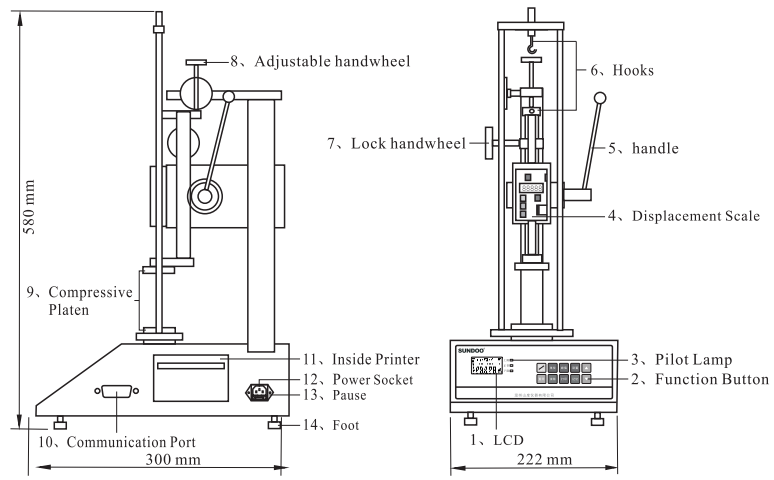
time to use. If do not use with long time, please plug out power socket, and cover equipment with dust-proof cloth.

① The load sensor adopts resistance transducer, so self-distortion may happen under the load. For reducing the error, while zero the distortion, the force value of the spring so as to eliminate the distortion error of the load test sensor (Relationship between distortion and load sensor table below). In the general precision measuring, the load value should be 10%-20% of the capacity while the distortion is set at zero.

② When the distortion is set at zero, the handle is at the lowest position, opposite to the tensile test. So the displayed value is negative but the positive value should be adopted.

Appendix: Self-distortion form of load sensor:

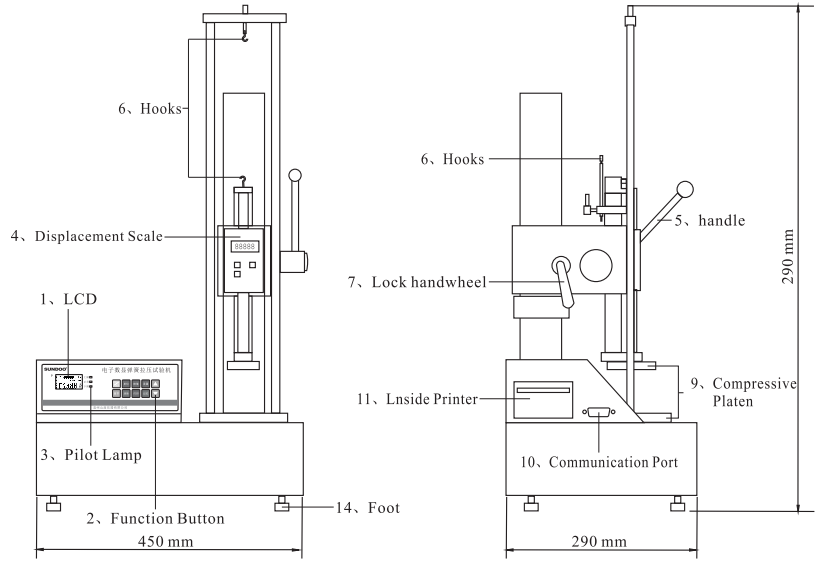
Load range (N)	SD-10	0~0.2	0.2~1	1~2	2~4	4~7	7~10
	SD-10B						
	SD-20	0~0.4	0.4~2	2~4	4~8	8~14	14~20
	SD-20B						
	SD-30	0~0.6	0.6~3	3~6	6~12	12~15	15~30
	SD-30B						
	SD-50	0~1	1~5	5~10	10~20	20~30	30~50
	SD-50B						
	SD-100	0~2	2~10	10~20	20~40	40~60	60~100
	SD-100B						
	SD-200	0~4	4~20	20~40	40~80	80~120	120~200
	SD-200B						
	SD-300	0~6	6~30	30~60	60~120	120~150	150~300
	SD-300B						
	SD-500	0~10	10~50	50~100	100~200	200~300	300~500
	SD-500B						
	SD-1000	0~20	20~100	100~200	200~400	400~600	600~1000
	SD-2000	0~40	40~200	200~400	400~800	800~1200	1200~2000
	SD-3000	0~60	60~300	300~600	600~1200	1200~1500	1500~3000
	SD-5000	0~100	100~500	500~1000	1000~2000	2000~3000	3000~5000
Distortion(mm)		0	0.02	0.05	0.10	0.20	0.40



(SD-50~500 SD-50B~500B)

Note:SD-50B~500B is without printer inside

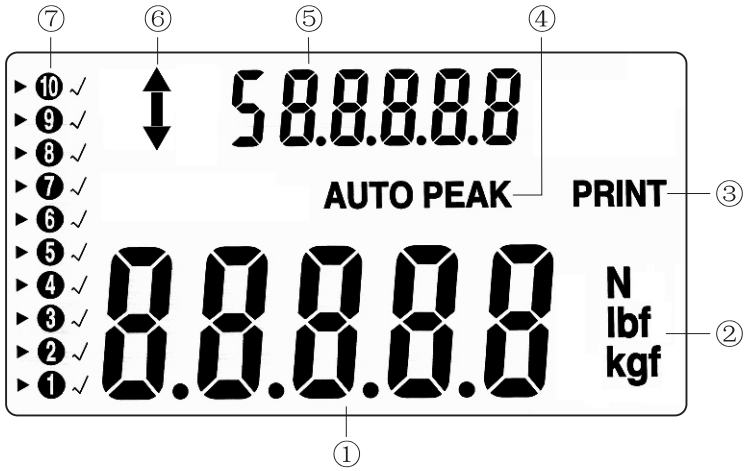
Picture 2



SD-1000~5000

Picture 3

1. LCD



Picture 4

①Displaying measuring value, and showing setting value in setting mode.

②Unit

Three units "N","lbf","kgf" are optional.

③Print all the reserved data.

④Peak indicates,"PEAK"means it is in the state of holding peak, "AUTO PEAK" means it is in the state of auto releasing peak.

⑤Displaying saved measuring value, and function symbol of setting mode.

⑥Symbol of force direction.

"⬇" means compressive test, and "⬆" means tensile test.

⑦Memory test value

"❶❷❸❹❺❻❼❽❾❿ " is total 10 grids, every grid memory one test value;

"▶" means the grid is the saving and showing value;

"√" means the grid has saved the test value.

the number frame shows current lower limit. Press "▲▼" key to change the current value;

The third time pressing " SET " button, the display shows "LE.SET" , the number frame shows current min captured value, press " ▲▼ " key to change the current value;

The forth time pressing " SET " button, the display shows "P. OFF", the number frame shows current automatic power off time, press"▲▼" key to change the current value;

The fifth time pressing " SET " button, the display shows "A. PE", the number frame shows current set time of auto-releasing time, press"▲▼" key to change the current value;

The sixth time pressing " SET " button, all set value will be saved and return to the test state.

Note: During setting process, pressing "ZERO" can save settings and return to test state .

Test

1. Distortion and Load Test of Tensile Spring

(1) Turn the tester on, and make it in normal working state;

(2) Press "ZERO" button;

(3) Drive the handle upward, connect the upper and lower hooks, and adjust adjustable handle. When the displayed load approaches the capacity of spring①, press the zero button on displacement scale;

(4) Please hitch the tested spring and turn the handle to the measuring distortion, then read the displayed value, which is the working load value of the spring.

2. Distortion and Load Test of Compressive Spring

(1) Turn the tester on, and make it in normal working state;

(2) Press " ZERO " ;

(3) Drive the handle downward to make platen touch each other, and adjust adjustable handle. When the displayed load approaches the capacity of spring②, press the zero button on displacement scale;

(4) Place the tested spring and turn the handle to the measuring distortion, then read the displayed value, which is the working load value of the spring.

Finish Test

After finishing testing, take load off slowly, and turn power off for next

Test

Begin Test

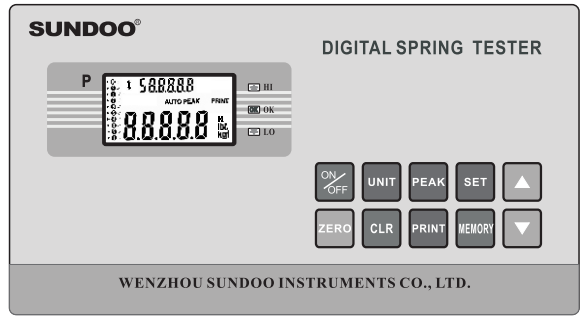
1. Power on
   When the power is off, connect the power and press " ON/OFF " button to make the power on. The equipment will enter into self-checking procedure, and after screen showing "SUNDOO" and model name, the equipment is in normal condition. If clamps are installed on compressive platen, and weight is not over 5% of the load capacity, the screen will clean to zero automatically. But if the weight is over 5% of the load capacity, error may happen, so please use light clamps.
   Power off: under state of power on, press " ON/OFF " to turn off; the tester will auto-turn off according to the setting time of power off if there no testing.

2. Clean Zero
   After switch on, press " ZERO " to clean to zero after the reading is steady. The range of cleaning zero is ±5% of the capacity. Pressing " ZERO " cleans the peak while it is in peak holding mode and to save the setting value in setting mode.

3. Choose Test Mode
   The equipment provides three kinds of test modes: tracking mode, holding peak mode and auto-releasing peak mode. The tracking mode is default when the equipment is turned on and there is no "PEAK" on the screen. After pressing " PEAK ", the screen will show "PEAK" and it is in holding peak mode, and the value showed on the equipment is the max value the sensor bears. Pressing " PEAK " again makes the screen show "AUTO PEAK" and enter into auto-releasing peak mode. The reading is the max value the sensor can stand. The reading will be cleaned to zero according to the set time, and wait for next peak . The three mode can be exchanged by pressing" PEAK " button.

4. Set of upper and lower limit, min captured value, auto power off time and peak auto-releasing time.
   The first time pressing " SET " button, the display shows "HIDT" , the number frame shows current upper limit, press " ▲▼ " key to change current value;
   The second time pressing " SET " button, the display shows "LODT" ,

2. Function Button



Picture 5

ON/OFF Power On/Off button.

ZERO
Zero Button
Press to back to zero, clean peak value or save setting value.

UNIT
Unit Button
→N→kgf→lbf

CLR
Clear Button
Press this button to clear the data " ▶ " points at. All the served data can be cleared by pressing the button all along.

PEAK
Peak Button
Switch of peak holding mode, auto-releasing peak mode, and tracking mode. The default is tracking mode when power on.

PRINT
Print Button
Print data at current state(view "Port Output and Print").
Note:SD-B Series digital spring tester is without printer inside, so “print” is useless.

MEMORY
Memory Button
Only when peak mode is not set and the tested value is not "0", measuring value can be saved by pressing this button. When under peak holding mode, the button is not available.

SET Set Button

A. Upper and lower limits auto-alarm setting;
B. Minimum captured value setting;
C. Automatic power off time setting(1-60 minutes free setting but 0 will not power off automatically);
D. Set time of auto-releasing peak (1-10 seconds is free to set).

▲ Add Button

A. While the instrument is operating, pressing the " ▲ " one time makes the symbol" ► " forwards one case. If there is "√" near the case, it means the case has reserved the tested value. So if the test continues, the former value will be replaced by the new one.
B. In setting mode, pressing "▲" button one time increases value, pressing above 2 seconds will increase value continuously.

▼ Reduce Button

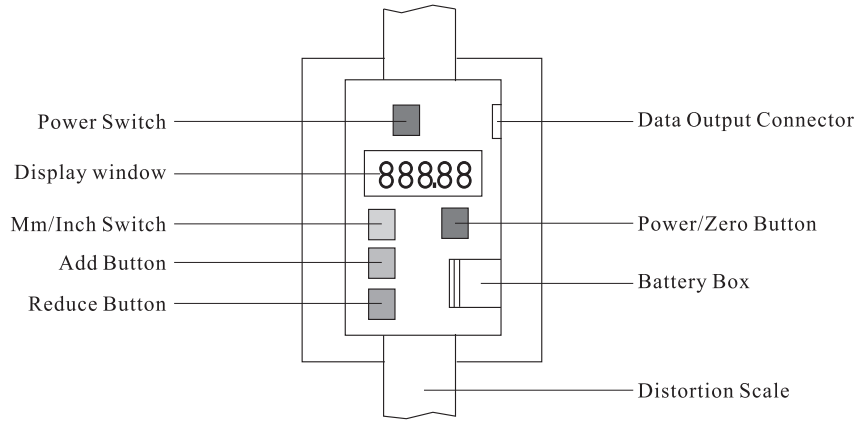
A. While the instrument is operating, pressing the " ▼ " one time makes the symbol"►" backwards one case. In tracking mode, press"MEMORY"to save the test value in this case. If there is "√" near the case, it means the case has reserved the tested value. So if the test continues, the former value will be replaced by the new one.
B. In setting mode, pressing "▼" button one time decreases value. Pressing above 2 seconds will decrease value continuously.

3. Pilot lamp of upper and lower limit with alarm.

▲ Pilot lamp of upper limit with alarm
OK Pilot lamp of normal
▼ Pilot lamp of lower limit with alarm(Power indicating lamp when turning on)

Under working state, when measuring value is in the set range of upper and lower limit, the normal pilot lamp " OK " lights indicating qualified value. When measuring value exceeds upper limit, the upper limit lamp " ▲ " lights with alarm indicating failure value. When measuring value belows lower limit, the lower limit lamp "▼" lights with alarm indicating failure value to remind users that this is not in the test scope.

4. Displacement Scale



Picture 6

Add Button: increase one scale to the current reading;
Reduce Button: decrease one scale to the current reading.

5. Handle;
6. Hooks;
7. Lock Handwheel;
8. Adjustable Handwheel;
9. Compressive Platen;
10. RS-232C port output;
(SD-B doesn't have this port)
11. Inside Printer;
(SD-B doesn't have)
12. Power Socket;
13. Fuse;
14. Foot.

Working environment

1、Working Temperature:0~40℃；
2、Relative Humidity:35%RH~65%RH;
3、No shock and corrosivity material around.