3ctest
Quality & Service for EMC

Hand-held Electrostatic Discharge Simulator

EDS 10IC

Catalogue

1. Overview

Because the generation of ESD has different destroy modes to integrated circuit and semi-conductor, to completely evaluate the sensitiveness of components to ESD, standard procedure must be strictly followed to conduct ESD test. International organizations to compile and amend electrostatic discharge test industrial standard are mainly: Electrostatic Discharge Association ESDA, US Mihtary Standard MIL-STD, Automotive Electronics Council AEC. Related ESD test is specified in ESD ANSI and EIA/JEDEC. The range contains test, comment, rank difference of component according to ESD sensitiveness of three different models. The purpose is to establish a repeatable test method to provide reliable and accurate results for judgment of sensitiveness of components to ESD. Moreover, fault caused by ESD can also be reappeared.

HBM simulates in time of human body motivation or after human body accumulates electrostatic due to other factors, then human body touches IC, electrostatic in human body will enter IC through foot position. If one side of IC is grounding to form discharge path, discharge will be generated through grounding foot position. Couples of ampere of momentary current will be generated within hundreds of ns to destroy circuit in IC. Peak value of momentary current can be 1.33A within 2-10ns to tolerable HBM, 2KV of common components.

Mechanical discharge model MM is developed by Japanese in 1970s according to the most serious situation. Mechanical discharge model simulates equipment machinery to accumulate electrostatic. When the machinery touches IC, electrostatic will discharge to IC. MM and HBM share similar discharge behavior model. However when MM discharges, there's always contact between metal and metal. Therefore, speed of discharge is very fast and ampere of current is much higher than HBM. Couples of ampere of current generate within dozens of ns. As a result, mechanical discharge can destroy IC more seriously.

Due to impact of inductance effect, MM will affect products in form of positive and negative current wave when discharge. Hence there is more serious damage.

Note: Please refer to relative standard for details.

2.General safety information

This equipment should only be operated after carefully reading the user manual.

The earth connection of the ESD Simulator must be connected to a good earth. If trigger is pressed without connection to earth, electrical shock may occur!

Dangerous mains voltage or high voltages are present inside EDS 10IC.

Do not open any part of EDS 10IC as it contains no user replaceable parts. This does not apply to the cover used for replacement of RC module.

EDS 10IC should only be maintained by trained personnel.

People with heart pacemakers must not be in the vicinity of the system, when it is in operation.

Do not switch on or operate the EDS 10IC if an explosion hazard exists.

The system should be operated in dry room. If condensation is visible the unit should be dried before operating.

Never touch the equipment under test when EDS 10IC is operating.

If any part of the EDS 10IC is damaged or it is possible that damage has occurred, for example during transportation, do not switch on the unit.

This user manual is an integral part of the system. Suzhou 3ctest Electronic Co., ltd. and its sales partners refuse to accept any responsibility for consequential or direct damage to persons and/or goods due to none observation of instructions contained herein or due to incorrect use of the EDS 10IC.

2.1 Safety Standards

EDS 10IC fulfils the requirements of IEC 61010-1。

3.Operation function

3.1 Front panel

1	Indication light	**4**	HBM impulse output
2	Touch screen	**5**	MM impulse output
3	Function key		

1） Indication light

Indication light as below：

Power： Indication light of power Green

Line： DUT power input No

Pulse： Pulse Green

Error： Indication light of fault alarming Red

2） Touch screen

All functions and parameters are shown and parameters can be set directly on the screen.

3） Function key：

Start and stop function of pulse

4） HBM pulse output：

HBM pulse output port is connected to EUT.

5） Functional key：

MM pulse output port is connected to EUT.

3.2 Back panel

1	CDM control connection point	**5**	Power switch of equipment
2	CDM high voltage input connection point	**6**	LAN connection point
3	External trigger	**7**	Auxiliary communication connection point
4	Ground terminal	**8**	Remote control connector CN

1） CDM control connection point

Control signal connection point of CDM test counter or relay.

2）CDM high voltage input connection point

High voltage input connection point of CDM test counter and provides MAX 2000VDC voltage.

3）External trigger

Internal signal source can be triggered by external signal and releases load dump pulse. Internal 10K up to 5V, short connection to grounding COMS/TTL, falling edge in low electrical level is effective.

4）Ground terminal

To ensure the grounding connection of outer case of equipment during experiment.

5）Power switch

Power switch of equipment, auxiliary power input point, contains fuse 220V/ 110V/10A.

6）LAN connection point

Ethernet communication connection point and used for remote computer control.

7）Auxiliary communication connection point

To adjust power communication with outside.

8）Remote control connector CN

Peripheral control connection point is used for simulator to control auxiliary equipment.

4.Operation

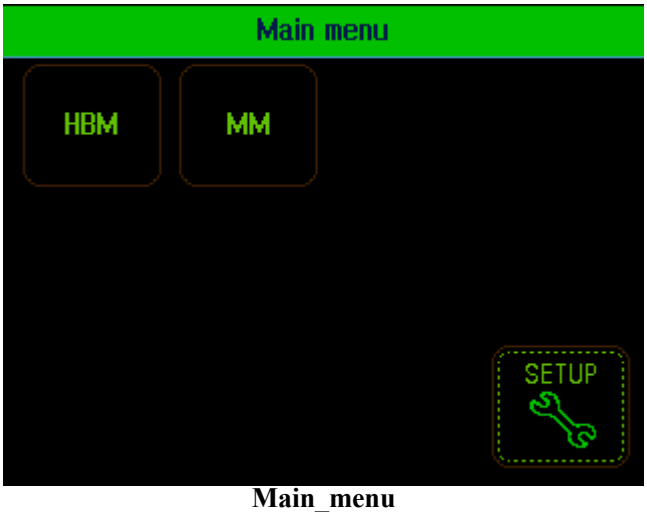
4.1 Menu instruction

EDS 10IC uses touch screen for control. Please choose HBM,MM mode to enter corresponding operation interface.

4.2 Menu structure

Menu of EDS 10IC test system is hierarchy dendritic structure.

4.3 Main menu



Main_menu

4.3.1 HBM Human body mode test

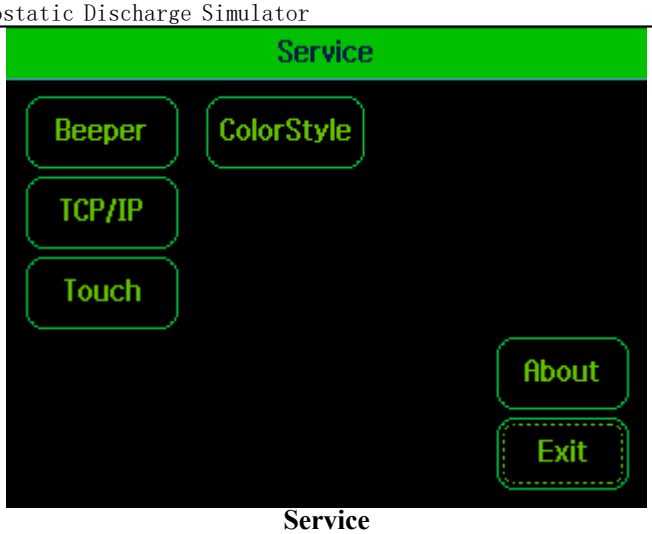
1) Press **HBM**, users can choose ESD test which conform to ANSI /ESD-STM5.1, JEDEC JESD22-A114, MIL-STD-883 and ANSI/JEDEC JS-001-2010. Capacitance of waveform main loop is 100pF，discharge resistance is 1500Ω.
2) Press **MM**， users can choose ESD test which conform to ANSI /ESD-STM5.2, JEDEC JESD22-A115. Capacitance of waveform main loop is 200pF， discharge resistance is 0Ω.

4.3.2 SETUP

1） Press **SETUP** , users enter service page of test system and can set auxiliary parameter of test system.

4.4 Service

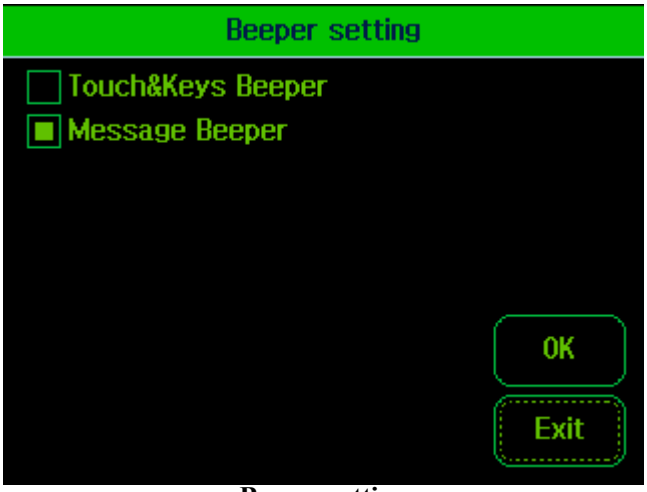
4.4.1 Press SETUP and enter auxiliary parameter setting：



Service

Beeper	Beeper setting	**TCP/IP**	Network setting
Touch	Touch screen brightness and touch point calibration	**Color Style**	Color style setting
About	Version information		

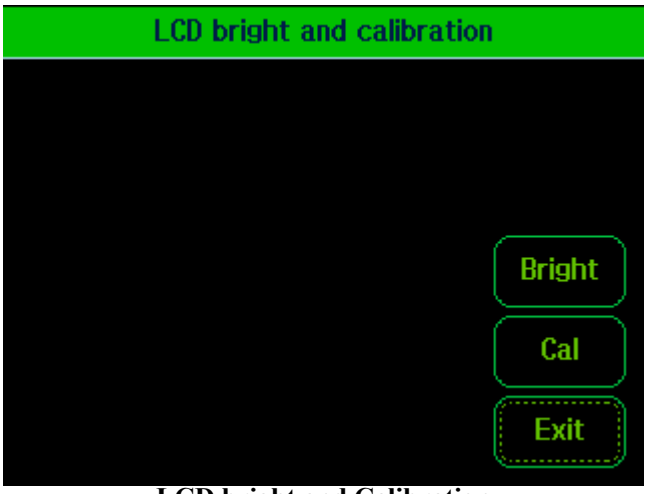
4.4.2 Choose Beep on the auxiliary parameter page to enter beeper setting:



Beeper setting

Touch & Beeper	Touch screen gives effect of beeper	**Message Beeper**	Message gives effect of beeper

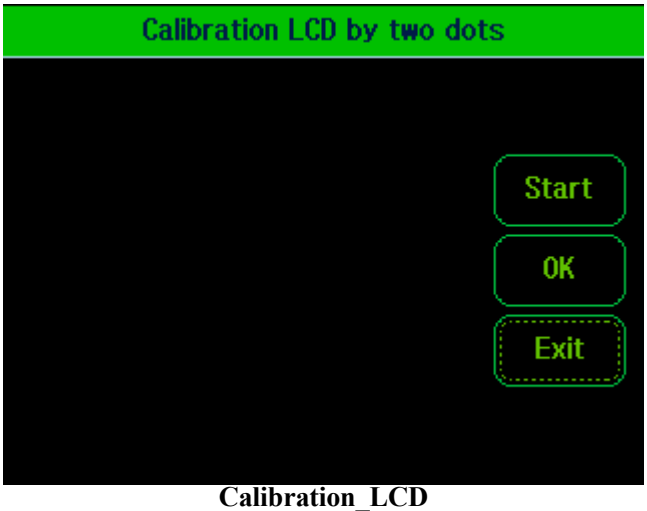
4.4.4 Choose Touch on auxiliary parameter page, users can set screen brightness and touch point calibration.



LCD bright and Calibration

Bright	User can set brightness of screen	**Cal**	User can calibrate touch screen with two-point calibration setting

4.4.4 Choose Cal ， user can calibrate touch screen with two-point calibration setting.



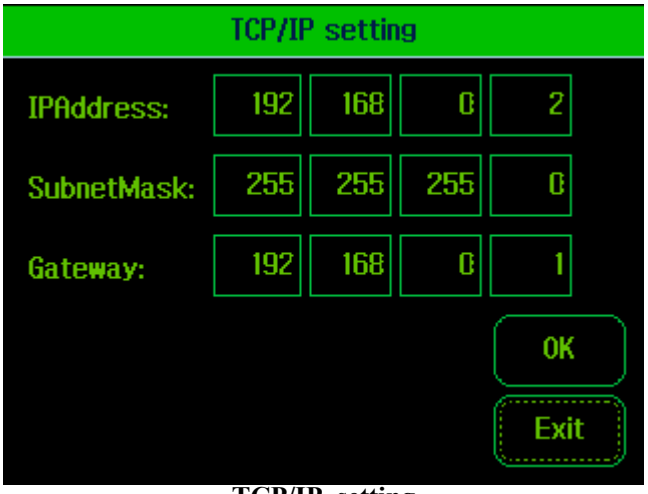
Calibration_LCD

1）Click **Start**， a small circle will appear on the upper left part of screen.

2）Click circle, another small circle will appear on the lower right part. When clicking calibration point, sharp tool shall not be used to prevent from damaging touch screen.

3） Click circle and operation interface will appear，choose **OK** to finish calibration.

4.2.5 Choose TCP/IP on auxiliary parameter page, users can set IP parameter.



TCP/IP_setting

Address	IP Address	**Subnet Mask**	Subnet mask
Gateway	Default gateway		

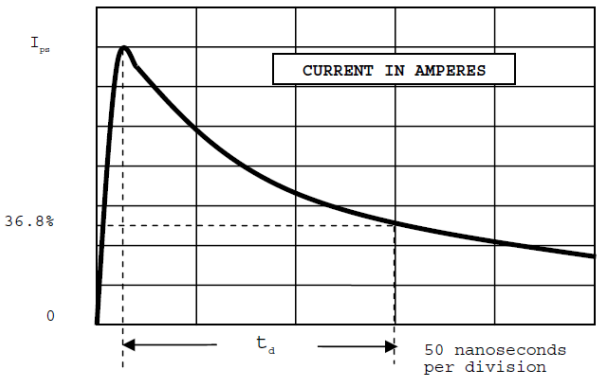
4.2.5 Choose About on auxiliary parameter page, users can search for hardware and software, Internet version, equipment No.

5. Technical parameter

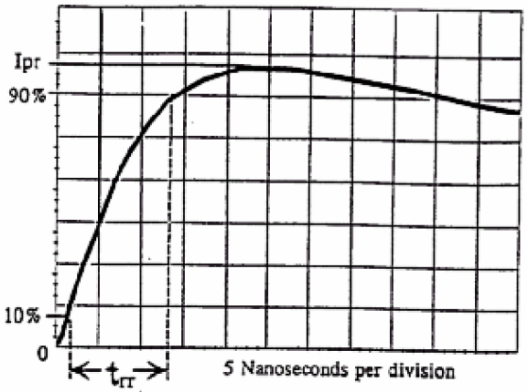
5.1 General parameter

General parameter	
Screen	5.7 inch TFT touch screen
Current range	110V/220V，±10%，50/60Hz
Protection fuse	6A
Max power	100W
External triggered input	BNC,5V TTL, node is normally open and triggered when closed
Working condition indication	Front panel LED indication、LCD displaying
Size of machine cabinet	450 x 190 x 320mm(L*H*W)
Weight	10Kg
Temperature	15–35℃
Humidity	45%–75%
Air pressure	86kPa–106kPa

5.2 Waveform parameter



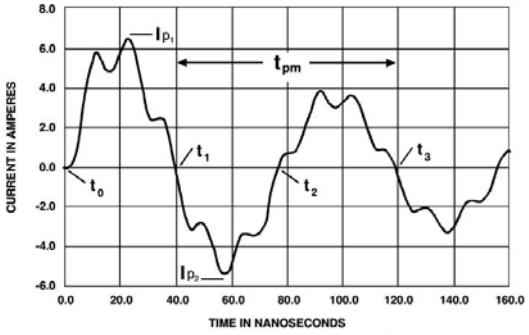
HBM short circuit current wave

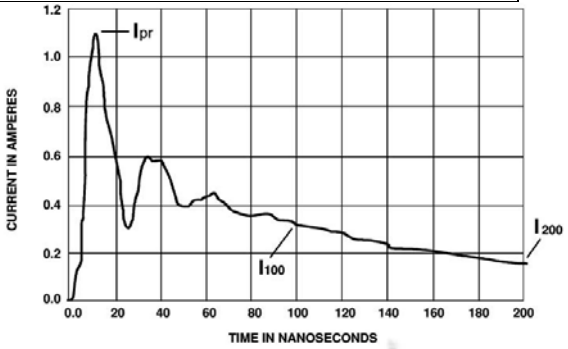


HBM 500 Ohm resistance current wave

HBM	
Compliance standard	ANSI/ESD STM5.1,JESD22-A114, MIL-STD-883,ANSI/JEDEC JS-001-2010
RC parameter	100pF/1500Ω
Pulse amplitude	5-8000V 5%±5V， 1V step
Pulse polarity	Positive, negative, alternative
No. of pulse	1 - 999
Trigger method	Auto, manual, external trigger
Short circuit current parameter	
Peak current Ips	0.17A±10% @250V

	0.33A±10% @500V 0.67A±10% @1000V 1.33A±10% @2000V 2.67A±10% @4000V 5.33A±10% @8000V
Pulse rise time	2-10 ns
Pulse duration	150 ns ± 20 ns
Ring amplitude	<15% peak current
HBM 500 Ohm resistance current parameter	
Peak current Ipr	375-550mA @1000V 1.5-2.2A @4000V
Ipr / Ips	≥ 63%
Rise time	5-25ns





MM machinery mode	
Compliance standard	ANSI/ESD STM5.2,JESD22-A115
RC parameter	200pF/0Ω
Pulse amplitude	5-1000V 5%±5V， 1V step
Pulse polarity	Positive, negative, alternative.
No. of pulse	1 – 999
Trigger method	Auto, manual, external trigger
Short circuit current parameter	
Peak current Ip1	0.44A±20% @25V 0.88A±20% @50V 1.75A±10% @100V 3.5A±10% @200V 7.0A±10% @400V
Period tpm	66 -90 ns
Ip2 / Ip1	67%-90%
MM 500 Ohm resistance current parameter	
Peak current Ipr	0.85-1.2A @400V
I100	0.23-0.40
I200/I100	30-55%

6. Delivery part

6.1 Basic equipment

- EDS 10IC EDS simulator
- Test line
- Three core power line
- Inspection report
- Warranty
- Instruction manual

6.2 Accessory and optional part

6.2.1 Accessory

- IC test bench
- Protection fuse
- Please refer to actual packing list for specific accessory and specification

7. HBM、MM electrostatic test

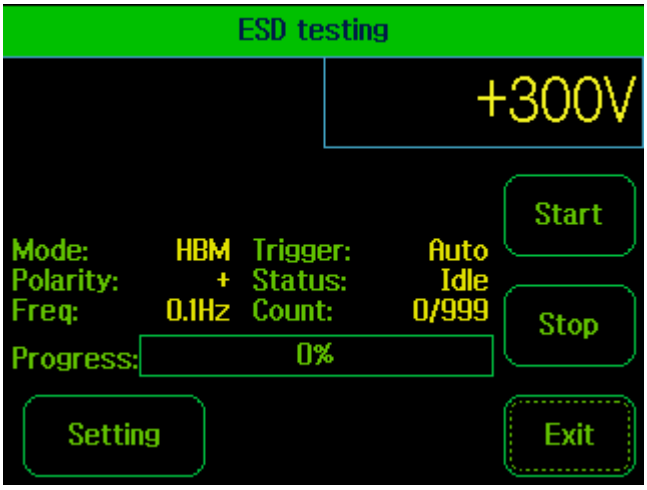
Electrostatic test module HBM and MM satisfy ANSI/ESD STM5.1, JESD22-A114,MIL-STD-883, ANSI/JEDEC JS-001-2010,ANSI/ESD STM5.2,JESD22-A115.

7.1 EDS simulator

EDS 10IC can simulate and generate current waveform that conform to corresponding standard.

7.2 Operation

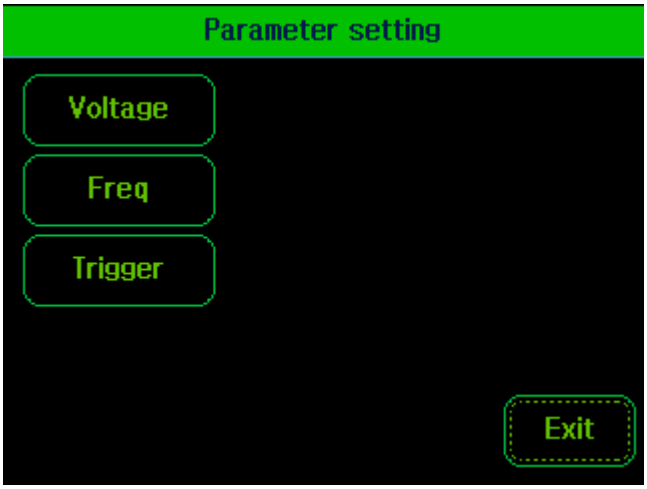
8.2.1 Choose HBM or MM on test system home page to enter test home page



ESD Testing Main

Mode	Electrostatic mode	**Trigger**	Trigger mode
Polarity	Polarity	**Status**	Status of test
Freq	Freq of test	**Count**	Test count under way/Total test count
Progress	Progress of test	**Start**	Test start
Setting	Parameter setting	**Stop**	Test stop
Exit			

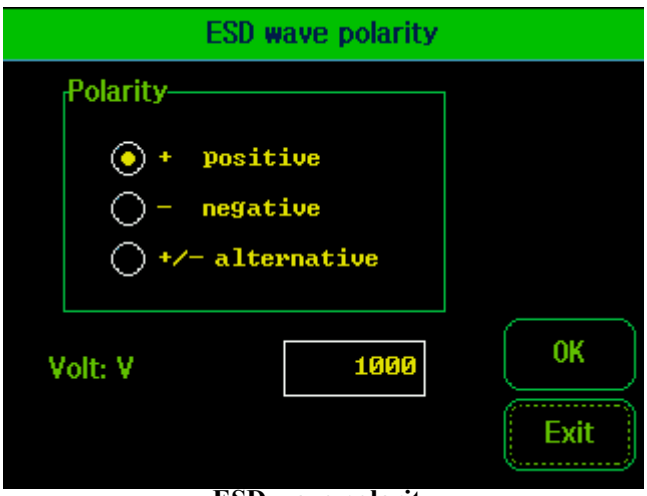
8.2.2 Choose Setting on ESD test home page to enter electrostatic parameter setting



Parameter_Setting_Main

Voltage	Electrostatic voltage setting	**Freq**	Test freq setting
Trigger	Trigger mode setting	**Exit**	

8.2.3 Choose Voltage on electrostatic test parameter setting page and set test voltage and polarity.

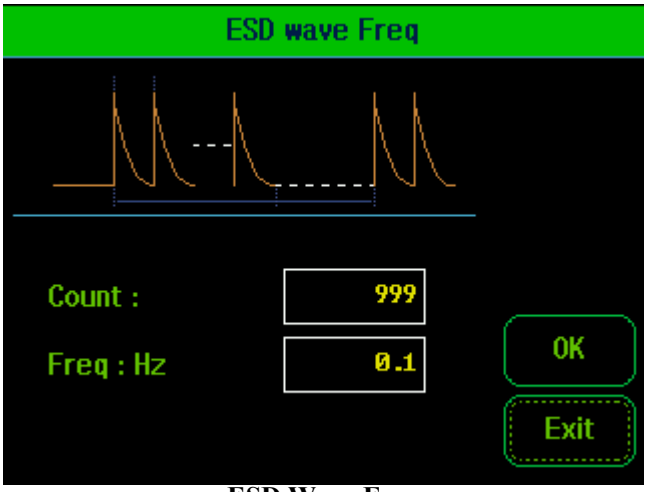


ESD wave polarity

HBM voltage range is 5~8000V，MM voltage range is 5V~1000V；Polarity includes positive, negative, alternative.

positive		**negative**	
alternative		**OK**	
Exit			

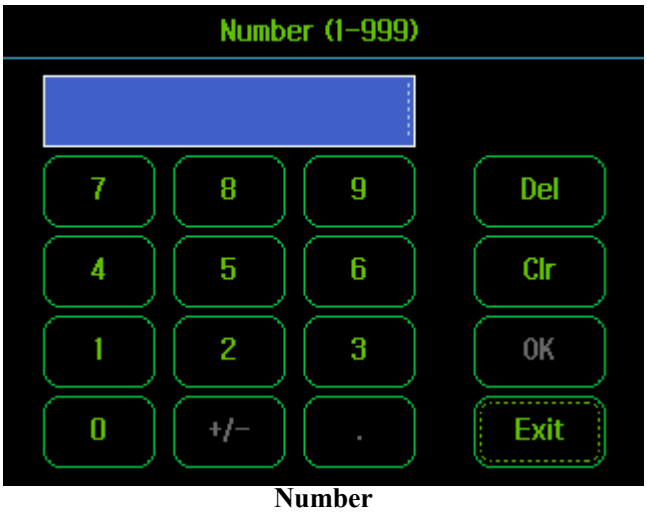
8.2.4 Choose Freq on electrostatic frequency setting page and set frequency and No. of test.



ESD Wave Freq

Number	No. of test	**Freq：Hz**	Freq setting
OK	Parameter confirmation	**Exit**	Exit

8.2.5 Choose Number on ESD Wave Freq setting page and enter number setting page：

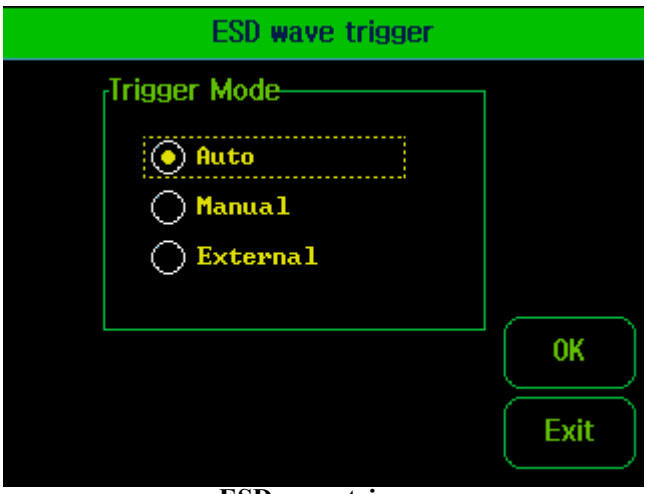


Number

8.2.6 Choose Freq on ESD Wave Freq setting page and enter frequency setting page:

Freq range is 0.1~5Hz.

8.2.7 Choose Trigger on electrostatic test parameter page and enter trigger mode setting page:

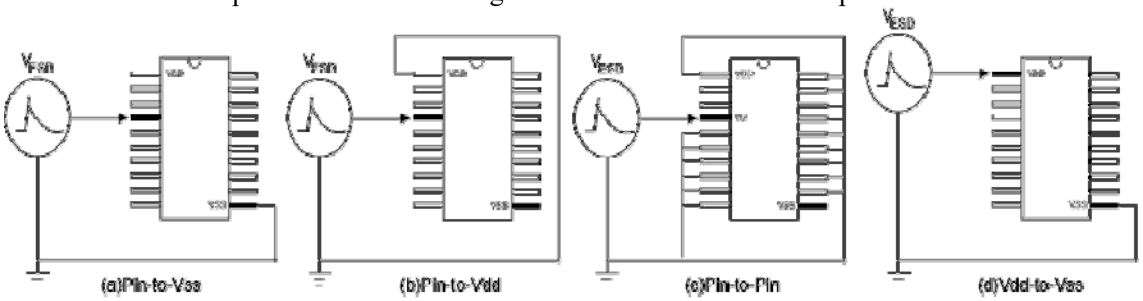


ESD wave trigger

Auto		**Manual**	
External			

7.3 Test method of chip base pin

Put EUT on the test panel and test according to below test method of base pin.



8. Alarming information

When there is problem with circuit or users establish protection, corresponding error indication will appear on the page.

Below information will also appear on the alarming page:

Warning
Device temperature too high
Input power too low
CPU temperature unsuitable.
Hardware has been damaged
HP charge protected.
Equipment need to be maintained

9. Other items

9.1 Manufacture

Suzhou 3ctest Electronic Co., Ltd. is located in the National development zone——Suzhou High-tech district, a technology-intensive enterprise combining scientific research, design, manufacture, sales and service as one. The company is divided into electromagnetic compatibility (EMC) test equipment, High voltage shock (HIGH VOLTAGE) test and laboratory system integration of the three major business subjects. At present, we have R&D center in Nanjing, committed to the depth of EMC technology research and practical application of technology development, with offices in Beijing, Shenzhen, Chengdu. Taiwan office has EMC instruments experience laboratory, the headquarter in Suzhou has 600 m^2 compatibility EMC lab. We actively provide customers with professional and meticulous service, and strive to build first-class products, creating world brand. Today's 3ctest, in the industry has developed into domestic largest scale and strong influence of professional manufacturer.

Suzhou 3ctest, with "good faith", "innovation", "win-win" for the purpose of the company, to promote and applications as own duty, as "3ctest" flagship brand for the company, actively explores the domestic and foreign markets, extensively with colleges and universities, the national research institutions, measurement test department and the international company to take all-round cooperation. At the same time, in recent years, the company also actively participates in the activities about formulating and implementing of national standards and industry standards. We will continue to improve product technology content, pay attention to and study the international advanced measurement testing technology development and change, contribute a meager strength to "China Creation".

The company is an enterprise through the GB/T 19001-2016 / ISO9001:2015 quality system certification, this ensures 3ctest products with high quality in each link of the production process about scientific research, production, inspection, testing, debugging and so on. Currently the products are widely used in electric power system, household electrical appliances, automatic control, instruments and meters, consumer electronics, automotive electronics, communications, security monitoring, LED lighting, medical equipment, new energy industry, avionics and military departments, and other enterprises, EMC testing certification bodies. Products are not only widely used for mainland enterprises, joint ventures, wholly owned enterprises and certification examination organization, but also exported to Hong Kong and Taiwan and Southeast Asia.

Suzhou 3ctest has always been to high-tech products as actively grasp of the future market competition, from product use to test, countermeasure and solution, we will, as always, actively

cooperate with the customer needs, effectively assist vendors through product certification (CE UL CCC) and reliability requirements of its own products, we sincerely look forward to cooperating with you.

9.2 Address

Suzhou 3ctest Electronic Co.,Ltd

Tel: +86-512-68413700/68413800/68413900 Service line: 4006-0512-77

Fax: +86-512-68079795

Address: No.99 Emeishan Rd, SND, Suzhou, Jiangsu, 215153, China

E-mail：info@3ctest.cn

Website: www.3ctest.cn