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Special hints!!!

Because the machine adopts the mandatory 3C authentication standard is through the computer switch power, ac power input to the shell (ground) have anti-interference capacitance in the power cord, so the center of landlines must which connects (connect the earth), or from the instrument front-housing led a thread reliable grounding, otherwise, in direct contact with the hand when test pins, there may be slight leakage feeling, but not cause damage to personal safety.

preface

In order to better use of lithium battery, avoid lithium battery using on safety accidents and prolong the service life of lithium-ion batteries, so, li-ion battery protective plate became lithium battery application on key components, basically a finished product should contain a piece of lithium

battery at least li-ion battery protective plate, li-ion battery protective plate and shell core, lithium battery PACK (packing become PACK) constitute the necessary three elements, to a great extent, lithium battery using on whether safe and reliable, besides core quality outside, li-ion battery protective plate can effectively protect, became absolutely crucial factors.

But, li-ion battery protective plate effective detection is a long-standing problem, li-ion battery protective plate involves many parameters, and required accuracy is higher, but also because of li-ion battery protective plate protection generally has delay time, so, test protection board, measuring precision and test time into big contradiction, in order to obtain sufficient measurement precision, must be very long time measuring time, current tester for measuring four variables, incredibly need 10-20 seconds over time, this regarding the laboratory tests can accept, but for factory mass delivery terms, this kind of test speed almost is unacceptable, in order to solve this problem, I have carefully developed cixin li-ion battery protective plate tester, AD hoc several measurement model, according to different requirement, can with different test speed to get different test functions, rapid tests fastest need only 1 seconds (for delay times shorter protection board), in order to obtain precise measurement results, the tester can also set accurate testing volume mode, can be obtained with the fastest speed over time revised precise measurements, voltage measurement precision can reach 1mV, far higher than lithium battery protection IC voltage measuring accuracy and at the same time, the software program on the upgrade, added short-circuit protection time testing function, further satisfy the requirements of customers. This instrument connection protection board, then starts to automatic test, without buttons startup, reduce operation complexity, also raise operating speed.

Functions overview

This tester is the basic features include:

1, li-ion battery protective plate fast detection

1.1 protection board static power test

1.2 protection board impedance test

1.3 protection board of charging protection function testing

1.4 protection board of charging protection restore function testing

1.5 protection board after discharge protection function testing

1.6 protection board after discharge protection restore function testing

1.7 protection board over-current protection and current size test

1.8 battery internal identification resistance 1 (or thermistors) test

1.9 battery internal identification resistance 2 (or thermistors) test

1.10 to communication yards slice of battery can communicate yards test
(currently only for DS2502 compatible yards pieces)

1.11 short-circuit protection time testing

2, li-ion battery protective plate precise testing

With 1 shown quickly test project is consistent, but 1.3 ~ 1.60 can accurately test the voltage size, and can be tested after discharge protection of protection board from power consumption (Is).

3, li-ion battery protective plate protection delay time testing

In this function, can test the li-ion battery protective plate protection delay time.

3.1 charging protection delay time

3.2 after discharge delay protect time

3.3 over-current protection and delay time

4, read the code function (currently only for DS2502 compatible yards piece, applicable to all MOTO phone battery)

Choose this function, can read DS2502 compatible yards slice all internal data real-time observation, but any address data, and see the last of the CRC check data, by comparing the last two bytes of the CRC check data, can judge whether data transmission error.

Instrument appearance

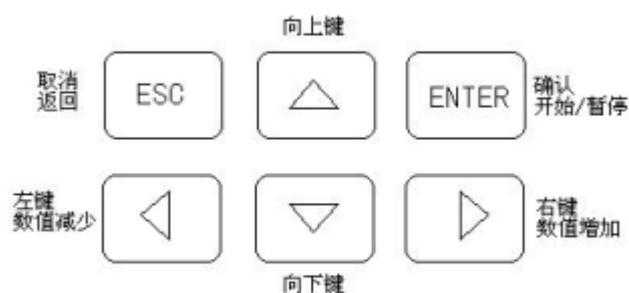
Instrument appearance the top is made up of three main parts, used to display operation and measurement information of LCD display, operating keyboard, and wiring hole, as shown in figure:



interface

The instrument is input interface is 6 light touch pad, respectively is upward, downward keys, click key (reduced), right click (increase), cancel button (return), confirm key (start/pause), the operation is very simple, each key-press of single function.

As below:



This instrument operation interface using common multi-stage, scroll type menu interface, and support the function is much, simple operation.

The main menu is said above four main function, to press upward or downward key choose corresponding key functions and press the ok button to select, enter setup interface in operating interface, and by up and down

keys chosen corresponding adjustment item, press left (decrease) right (increase) choose numerical and press the ok button, can begin to test run.

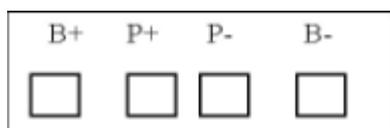
In any operation interface, press cancel button can exit the current operating, and returns on level menu, such as current in set condition and press the ok button will enable operation, such as in the running state and press the ok button can stop the current operating, again press ok button, can restart the current operation.

Wiring way

This instrument has nine terminals, including B + 1 in test single section protection board, connected to the protection board B + tests in two protection board, connection protection board of BM terminals, B + 2 only used for connecting double festival protection board B + end, B - and B - respectively with independent two wire connected to the battery protective plate B -, P - and P - use; Two lines are connected separately to protective plate P - end, as signal measured join channel, such measure, through 4 wire measurement, can eliminate the error of measurement caused wires, improve the testing precision.

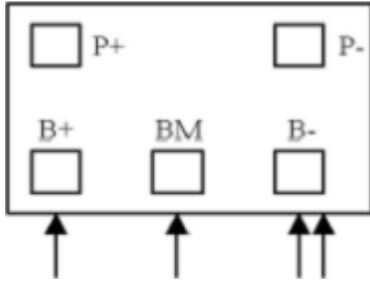
In addition, and R2 respectively as R1 battery internal ID resistance or fortoment terminals, if any, can use wires connected to its terminals, ID line is used to measure a few belts yards piece of battery, at present this function can be chosen.

Below is testing single section protection board connection diagram:



B + 1 P - P - B - B -

Test two protection board connection diagram:



B + 2 B + 1 B - B -

The ones pictured example, measuring single section protection board needs at least 5 root connections, measuring double festival protection do need at least six lines, including P - and B - respectively with two wire connection, so can obtain precise resistance measurements, if not required precise resistance measurement result, also can put P - and P - directly in parallel, B - and B - directly in parallel, then respectively connected to protect board, such except impedance test resistance may slants big outside, no other adverse effects.

Note: in any case, protection board B + end all need last touch, such ability get correct test results, such as using test fixture, B + the test pins must than the other end of the test pins short.

If need to separate test MOTOROLA mobile phone battery code piece, only need to connect to the terminals of the code slice ID end, another with a thread connection P - P - end can.

Boot up with shutdown

The apparatus adopts computer USES powerful ATX power, support software shutdown, not the power switch, in need of shutdown, can grow to press the ESC key for 3 seconds, instrument will automatically into shutdown state, swaying, weaving, and display the backlight closed company information, if needs to boot, press any key to all except the ESC outside can boot. In addition, in order to save power, in the instrument not operation or no testing state, after 30 minutes, the device also automatically goes to shutdown state, only minimal power consumption, like long not use, it needs a thorough without electricity, must be pulled out the power cord.

Main function selection menu

In the boot screen display, into the main function after the menu display interface, following figure display:

- 1, rapid test mode
- 2, accurate test mode
- 3, delay time test mode
- 4, read the code function

According to the fluctuation function keys can choose the current needed test function and press the ok button enters the selected function.

In rapid tester mode, must know protection board of the overcharge protection and put protection voltage parameters, set right after, protection board tester can be automatically start test to determine protection board whether meet the requirements and complete the rapid testing process only needs 1 ~ 2 seconds, (depending upon protection board delay).

In precise tests, need to set the protective plate delay time, in the setting of the delay time later, protection board tester will automatically accurate test protection board of the overcharge protection voltage and had put protection of voltage detail parameters, and to determine whether qualified.

In delay time testing project, set right protection board of the overcharge protection voltage and had put over current protection voltage and after test current and attach protection board began to automatic test protection board of delay time parameters.

Reading the code functions inside, can read the MOTOROLA mobile phone protection board piece of code data.

Fast measurement model

In choosing fast measurement function, enter relevant Settings interface:

1. 保护板: 3.6V-整合	9. 过流保护: 1.00-7.00A
2. 过充电压: 4.500V	10. 电阻R1: 0.1-0.3K Ω
3. 过敏电压: 2.020V	11. 电阻R2: 0.5-1.5K Ω
4. 测试内容: 1111111000	12. 码片型号: Read
5. 过充范围: ----	13. 保存设置: 保存
6. 过放范围: ----	
7. 内阻范围: B-164m Ω	
8. 自耗电: 0.3-100UA	

In the static parameters Settings interface, there were 24 optional:

1, protection board type selection, optional projects are:

A) 3.6 V ordinary protection board, 3.6 V integrated protection board.

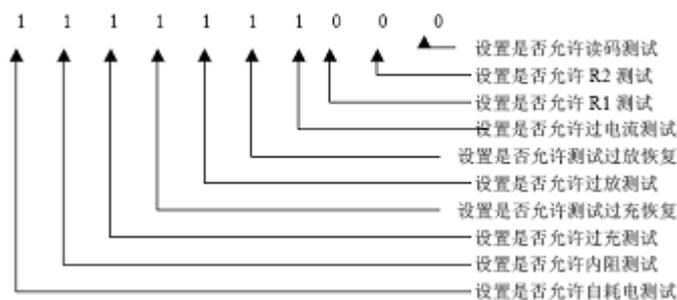
B) 7.2 V - 1 test double festival protection board, synchronization tests two batteries units, fast.

C) 7.2 V - 2 test double festival protection board, independent testing two batteries unit and its precision is higher.

2, and the overcharge protection, pre-settings voltage of the overcharge protection board test voltage

3, setting had put protection voltage, pre-set protection board had put the test voltage

4, set the project, according to need testing ENTER into set interface definition, each number shown below:



The above project, press the button around adjusted items, key change Settings, 1 - allows, 0 - closed

Above the default state. As a parameter is 0, then said in test procedures will skip the project, do not do the test.

5, overcharge range setting (in rapid tests to null)

6, had put range setting (in rapid tests to null)

7, impedance range setting (predefined impedance range)

8, since the power-hungry range setting (predefined impedance range)

9, over-current protection (predefined over-current upper)

10 and the scope of resistance R1 predefined resistance R1 choice (upper)

11, resistance R2 range choices (predefined resistance R2 upper)

12, choose communications code piece type, can choose corresponding various yards slice models.

13, when choosing to "save", every times after adjusting the numerical will be saved in internal memory, equipment, power lost after missing, when choosing for "non-preservation", after setting parameters were not saved, only the boot time effectively, shut down after set data will be lost when set to "reset", exit setup menu, will revert to the factory Settings.

When all of the above parameters Settings after, press ok button and the machine will start automatically, if the connection on protection board, start by a fixed flow testing chosen project, assuming all projects allow test, the test procedure is as follows:

1, test battery protective plate from power flow, such as not connected protection board (or protection board from power consumption is too low) is always wait until protection board is connected, and test to date, such as the power consumption current requirements, then the power-hungry into next measurement.

2, test resistance, and determine whether meet set range.

3, test of charging protection, protection board plus than setting of charging

pressure high voltage, determine whether closed charging.

4, tested charging protection recovery, give protection board plus more than charging protection electric low voltage, determine whether recovery through.

5, tested discharge protection, protection board plus more than discharge protection low voltages, determine whether closed discharging.

6, tested discharge protection recovery, give protection board plus more than discharge protection high voltage, determine whether recovery through.

7, test over-current protection function, give protection board plus increased gradually increasing test current, determine whether power protection, and record before the maximum current protection, and judge whether meet the requirements set range.

8, measurement of recognition, and determine whether resistance 1 set range requirements. Meet

9 recognition, measurement, and determine whether resistance 2 meet set range requirements. 10, test communications code plate and determine whether accord with setting model.

In the above test process, when any of the above a functional test instrument error, and keep, and instruct response function alarm, stop the follow-up testing error. When all of the projects test results normal, instrument will shortness of two sound, screaming display all the testing results, and instructions tested successfully.

Instructions:

1, in a testing project failed or error, no longer for the next step after testing work unless again connection protection board to start a new test.

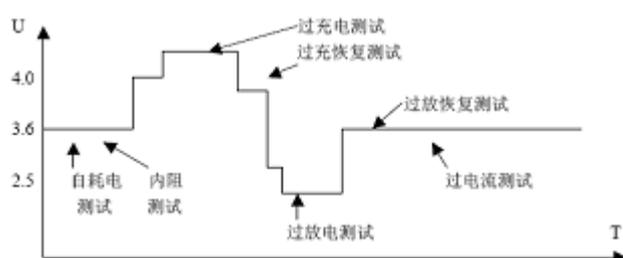
2 if the test protection board is double festival protection board, so will the overcharge for two batteries and put alone testing, in instructions above,

can see, overcharge test, overcharge recovery, had put test, had put recovery will be tested two times.

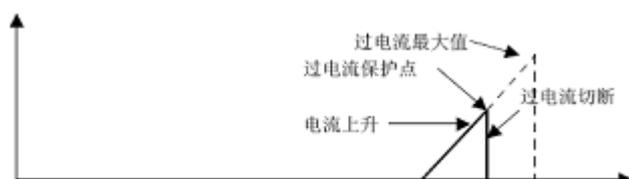
3, during a test is completed, redirecting a protection board can begin a new test process.

4, overcharge recovery and had put recovery is not must test items, for the product design limitations, possibly to some models protection IC, may appear can't test overcharge recovery projects, cancel the project test can.

Pictured is add in protection board B +, B - the voltage between test waveforms:



Below for current test current waveform:



1, if chose read code test, common yards slice corresponding phone models list:

A) x2935 often used in MOTOROLA phone models V998, V8088, 328,366, CD928 C300, T191, T189,, L2000, V2088

B) x2936 often used in MOTOROLA phone models V60, V66, V300, V303, V500, V600 with integrated E360, T720, and new type A760, A768, A860, E680 E398, V80, V3, I90,

C) x2937 often used for MOTOROLA phone models, CDMA V680, V730, V688, V2680, C510

D) other type number slice corresponding to some early type, now already discontinued, if cannot determine yards slice model, can be arbitrarily choose a code slice model tests, such as not through is a change of models, such as above all can't test through, can consider to use for reading code test and specific methods are connected test code piece, the choice advocate function menu for the first 12 function, DS2502. Read to test data, this data code piece automatically deposited in internal memory, the test model test in code item inside ", and then select "for this new number slice to test.

Accurate testing function model

In the main function menu item 2, is accurate measurement of the function. In selecting the test function after entering parameter Settings menu, shown below:

1. 保护板: 3.6V-普通
2. 过充延时: 100mS
3. 过放延时: 50mS
4. 测试内容: 1111111000
5. 过充范围: 4.150-4.400V
6. 过放范围: 2.200-2.800V
7. 内阻范围: 10-100m Ω
8. 自耗电: 1.0-100UA

9. 过流保护: 1.00-7.00A
10. 电阻R1: 5.0-50.0K Ω
11. 电阻R2: 5.0-50.0K Ω
12. 码片型号: Read
13. 保存设置: 保存

1, with accurate test pattern inside, according to set the delay time, apparatus, instruments automatic selection of appropriate test speed, rises or falls output voltage, judge whether protection board, and make record

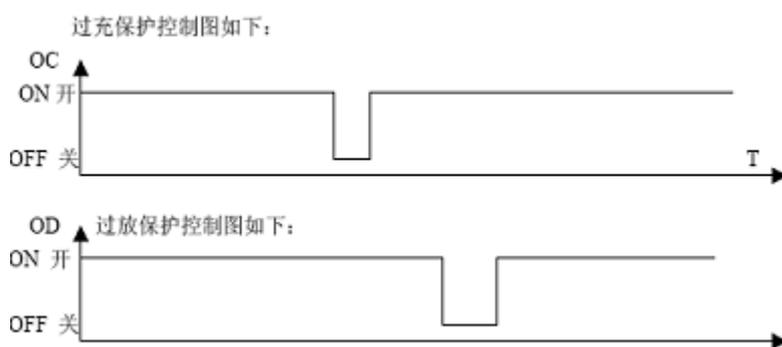
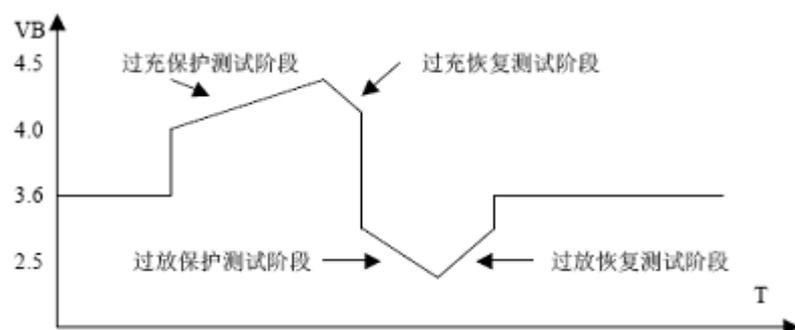
protection movement when the voltage protection movement, and delay time parameter amended.

2, the overcharge protection voltage measurement range: 4.150 ~ 4.500 V

3, had put protection voltage measurement range: 2.800 ~ 2.000 V

Note: because involves trying to use delay time correct the last voltage result factor, above the measurement results correctly with the degree of charging and discharging delay time delay of setting accurate ignition or not is closely linked, so, do not know at this protection board the delay time information, please advance measure protection board the delay time parameters, see behind the delay time test mode.

In setting good parameter later, according to confirm button to begin testing, test showed that interface and rapid tests, as in test process, protection board B + and B - the voltage waveform shown below:

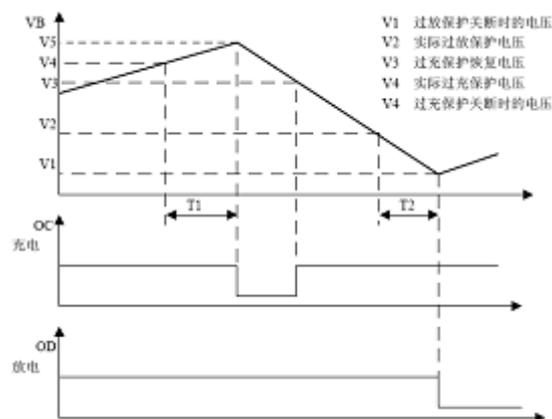


The overall test time and set delay time closely related, if the protection board delay time is short, the entire measuring time also shorter, if delay time longer, then the whole measuring time also is long. For example, in a

overcharge delay 10mS protection board only, the whole measuring time does not exceed 2 seconds, but for a overcharge delay to 1 second protection board, the whole measuring time May 15 ~ 20 seconds, so as to obtain precise voltage values, so, this kind of precise testing comparative takes time, if not must obtain the accurate numerical, recommends the rapid test protection board function the bad. If you don't know protection board the delay time, please enter the third test protection board delay time, after testing data by automatic into precise testing the delay time setting position, or will delay time project Settings for 0, actually show to "automatic", instrument will first automatic test delay time and then automatically accurately test.

Delay time test mode

Li-ion battery protective plate to prevent voltage rush interference, causing protection circuit misoperation, usually in charge, if the battery voltage exceed the overcharge protection voltage after, not immediately shut off the charging MOSFET, but continues to judge a period of time, at that time, if the voltage has been more than the overcharge protection voltage, so, controlled charging mosfets will shut off, so, this time length is called the overcharge protection delay time, in the same way, lithium overdischarge protection also should have corresponding delay protect time, as below:



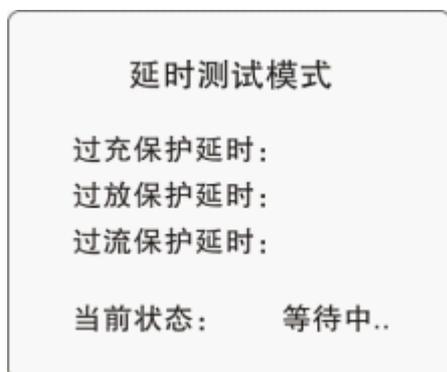
Figure, T1 namely protect delay time for filling, T2 outfit to discharge protection delay time

Choosing to delay test mode, then enter delay test set interface shown below:



According to the above Settings, instrument will adopt 435 V above voltage test overcharge delay time, use 2.3 V under voltage tested put protection delay time, using 7A current test over-current delay time.

Set up after, choosing the ok button, and then enter into testing interface, connection protection board, can automatically test out protection board delay time, as below:



1, general according to the default Settings for normal protective plate can test, if not expedient delay time tested a delay time, appear error display and alarm, can consider to corresponding charging pressure setting raise, or put voltage withdraws, or current current adjustable high, then to test, attention, overcharge delay the longest test time can reach 5 seconds, must the patience to wait for more than 5 seconds.

2 in delay time test model test data obtained will be entering accurate test the delay time setting project, can no longer set delay time, you can directly

begin accurate testing.

3, once the test had current delay time, then the delay time will participate in the over-current protection and current measuring and calculation, make test out the over-current protection and current value more precise.

4, delay time measurement range and accuracy:

The overcharge protection delay time: 0 ~ 5000mS had put protection delay time: 0 ~ 1000mS over-current protection and delay time: 0 ~ 100mS + 1mS

1mS + + 1mS

(note 1mS = 0.001 seconds)

Read DS2502 compatible yards slice material

The instrument can complete DS2502 compatible endemic read piece inside all data code of function, can be very useful for analysis, and to make a judgement internal data comparison.

The battery code slice recognition terminals connection tester ID end, will battery cathode connection tester P - terminals, choose this function, and press the "ENTER" button can start reading code test, the test results are shown below:

DS2502 ROM CODE CRC * by FC 82 500001EFC7C9 89 Press DOWN to continue.

Pictured below, read the code success, display information shown below:

Code slice function code is: 89

Code slice sequence number is: 500001EFC7C9 (here Numbers are in hexadecimal representation)

Code slice data CRC check data: 82

If press "DOWN" button can continue to read other data, read behind data display format shown below:

00:00 00 01 98 5E 14 06:14 01 F4 3C 57 0E 0 c: 00 00 00 32 00 12:00 19
00 00 00 00 00

The first column of figures, such as 00:06:0 c: 12: refers to the bank began a the address of data, behind follows is data from the data, start address 00 5E01 9,800 00 1414 followed by F4 etc, such as the need to continue to see the follow-up data, only need to press "DOWN" can scroll DOWN, press "UP" ok UP content.

Note that if you flip to the last page, and the back of two data display, seperately chip internally generated CRC check data and calculated CRC checking instrument through data, usually, the two data must be the same, if not the same, the data that the read might be wrong.

If need be retested, only need to click again "ENTER" can again a test.

Calibration model

As time or changes of temperature, the instrument measuring precision may change, can be in not under the condition of opening the cabinet, by operating a keyboard and display interface to the measuring accuracy of this equipment calibration. In this mode, can to voltage measurement, impedance measurement, charging and discharging current and over-current protection current measurements made from the shell calibration and store the data.

In restarting, fast by pressing the "right" will enter a password interface, calibration will be prompted for input calibration password, so, can prevent irrelevant personnel incorrect operation to hidden trouble.

Specific calibration operation mode another refer to the calibration of manual "instructions, or by supplier or agent offer after-sale service support.

Instrument characteristic indicators

Instrument applicable environment:

1:0 ~ 40, temperature °C

2, the use of height: elevation used in 2Km

3, relative humidity: 40 ~ 80% humidity

Measuring scope:

1) the overcharge protection voltage measurement range: 4.150 ~ 4.500 V + 1mV

2) overcharge protection resuming voltage measurement range: 4.200 ~ 3.800 V + 1mV

3) had put protection voltage measurement range: 3.200 ~ 2.000 V + 1mV

4) had put protection resuming voltage measurement range: 2.500 ~ 3.500 V + 1mV

5) over current measurement range: 0 ~ 10.00 A + 0.1 A

6) static current measurement range: 0.0 ~ 100.0 uA + 0.1 uA

7) impedance measurement range: 0 ~ 200 m Ω + 1-m Ω

8) to identify resistance measurement range: 0.1 ~ 999.9 K Ω + 0.1 K Ω

9) overcharge protection delay time: 0 ~ 5000mS + 1mS

10) had put protection delay time: : 0 ~ 1000mS + 1mS

11) over-current protection and delay time: 0 ~ 100mS + 1mS

Test speed:

1, rapid tests: 1 second fastest (only for the overcharge protection delay for 10mS single section protection board)

2, precision testing: fastest 1.7 seconds (only for the overcharge protection delay for 10mS single section protection board)

Note: test time tested protection board depends entirely upon the delay parameter, if the delay time is short, the test time needed for are short,

conversely, testing time is longer.

Supply voltage: 220V + 10% 50Hz

Power consumption: the average 20W instant maximum 150W acuities

Instrument weight: 4.0 Kg

Instrument size: L (300mm) x W (300mm) x H (100mm) packing size: L (360mm) x W (360mm) x H (160mm) 4.4 Kg weight: packing

Based on "excelsior, the pursuit of excellence" enterprise purposes, the company will continue to upgrade the hardware or software tester, if have caused because function upgrade operational and manual equipment not consistent place, we cannot one notice.