Dear Client,

Thank you for purchasing our HTBC-IV Transformer Turns Ratio Tester. Please read the manual in detail prior to first use, which will help you use the equipment skillfully.

Our aim is to improve and perfect the company's products continually, so there may be slight differences between your purchase equipment and its instruction manual. You can find the changes in the appendix. Sorry for the inconvenience. If you have further questions, welcome to contact with our service department.

The input/output terminals and the test column may bring voltage, when you plug/draw the test wire or power outlet, they will cause electric spark. PLEASE CAUTION RISK OF ELECTRICAL SHOCK!

SERIOUS COMMITMENT

All products of our company carry one year limited warranty from the date of shipment. If any such product proves defective during this warranty period we will maintain it for free. Meanwhile we implement lifetime service. Except otherwise agreed by contract.

SAFETY REQUIREMENTS

Please read the following safety precautions carefully to avoid body injury and prevent the product or other relevant subassembly to damage. In order to avoid possible danger, this product can only be used within the prescribed scope.

Only qualified technician can carry out maintenance or repair work.

--To avoid fire and personal injury:

Use Proper Power Cord

Only use the power wire supplied by the product or meet the specification of this produce.

Connect and Disconnect Correctly

When the test wire is connected to the live terminal, please do not connect or disconnect the test wire.

Grounding

The product is grounded through the power wire; besides, the ground pole of the shell must be grounded. To prevent electric shock, the grounding conductor must be connected to the ground.

Make sure the product has been grounded correctly before

connecting with the input/output port.

Pay Attention to the Ratings of All Terminals

To prevent the fire hazard or electric shock, please be care of all ratings and labels/marks of this product. Before connecting, please read the instruction manual to acquire information about the ratings.

Do Not Operate without Covers

Do not operate this product when covers or panels removed.

Use Proper Fuse

Only use the fuse with type and rating specified for the product.

Avoid Touching Bare Circuit and Charged Metal

Do not touch the bare connection points and parts of energized equipment.

Do Not Operate with Suspicious Failures

If you encounter operating failure, do not continue. Please contact with our maintenance staff.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in Explosive Atmospheres.

Ensure Product Surfaces Clean and Dry.

—Security Terms

Warning: indicates that death or severe personal injury may result if proper precautions are not taken

Caution: indicates that property damage may result if proper precautions are not taken.

Contents

I. General

HTBC-IV Transformer Turns Ratio Tester is specially designed for three- phase transformer in power system, especially for transformer of type Z winding and other transformers whose zero-load current is relatively high.

The tester has wide testing range, fast testing speed, favorable repeatability, flexible data processing, convenient connection, complete protection, easy learning and convenient operation.

II. Safety Measures

2.1 User shall read this manual carefully before using the tester.

2.2 Operator shall have general knowledge about electrical equipments or instruments.

2.3 The tester is applicable to both indoor and outdoor purposes, but shall avoid exposure under rain, corrosive gases, dense dust, high temperature and direct sunshine, etc.

2.4 The tester shall avoid severe vibration.

2.5 Maintenance, repair and adjustment of the tester shall be carried out by special technician.

2.6 Yellow, green and red test clamps shall be connected to A, B and C of transformer respectively.

2.7 High and low voltage cables shall not be reversed.

2.8 During testing of monophase transformer, only yellow and green test clamps are used and idle ones shall be suspended.

2.9 During testing of transformer, power must not be added at the low-voltage terminal to test the voltage ratio of tester coil, so as to avoid causing any dangers.

2.10 Transformer shell and earthing terminals of the tester shall be earthed well. But the neutral point of three-phase transformer shall not be earthed. High-voltage terminal of monophase testing transformer shall not be earthed.

III. Performance Characteristics

3.1 Applicable to transformers connected in Z type.

3.2 Two output voltages are optional and applicable to transformer whose

zero-load current is relatively high.

3.3 Have wide testing range and the highest transformation ratio may reach 10000.

3.4 Automatically calculate tap position.

3.5 Fast speed, which is only 18 seconds for three-phase.

3.6 Favorable repeatability.

3.7 Automatically save 99 data at most.

3.8 Flexible data processing, including retrieval, print, transfer to U-disk, delete and upload to PC computer for testing.

3.9 Have transformer short-circuit protection and interturn short-circuit protection functions. In case of short circuit, relevant information will be displayed on the LCD screen in characters.

3.10 The upper computer could control the whole testing process, save data .

3.11 Struction manual is attached to the tester, providing convenience for users.

3.12 The tester is small and is a little bigger than a piece of A4 paper.

3.13 The tester is light and its weight is only 6.9kg.

IV. Technical Indexes

4.1 Transformation ratio testing range: 0.8～10000

4.2 Group testing range: 1～12

4.3 Ransformation ratio testing accuracy: Class 0.2 (180V: 0.8～1000)

Class 0.5 (180V: 1000～10000)

Class 0.2 (10V: 0.8～200)

4.4 Transformation ratio resolution: 0.0001

4.5 Power input: 220V±10%, 50Hz ±1Hz

4.6 Service temperature: -20℃~40℃

4.7 Relative humidity: ≤85%, no condensation

4.8 Overall size of host machine: 325mm×278mm×188mm

4.9 Weight of host machine: 6.9kg

V. System Description

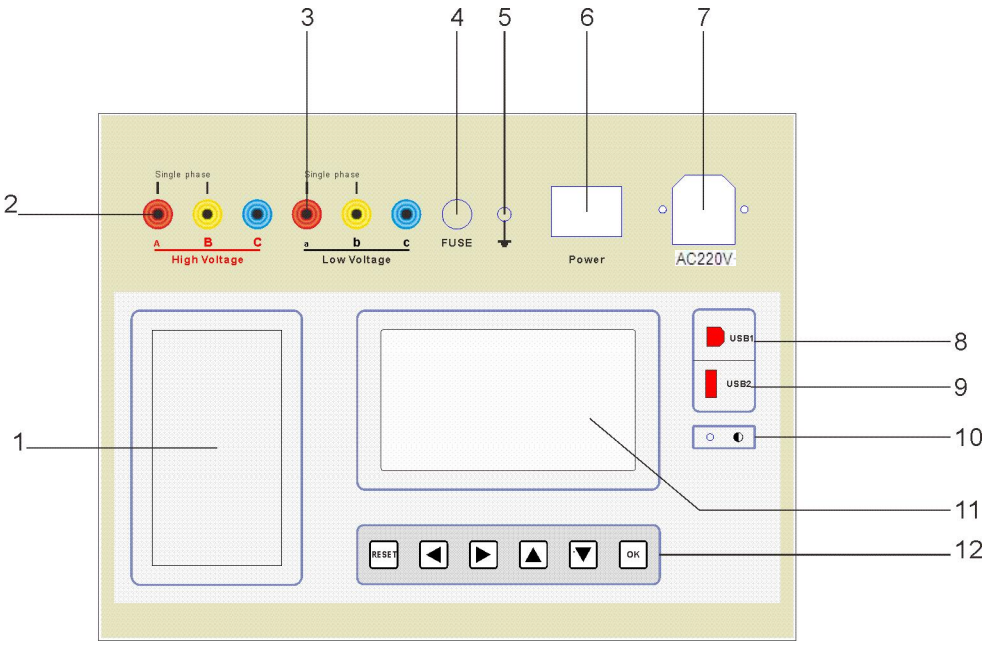

Figure of Tester Panel see figure 1in next page

Figure 1

5.1 Printer: print test result.

5.2 High-voltage terminal: connect to the high-voltage terminal of transformer through 3-core cable with red jacket

5.3 Low-voltage terminal: connect to the low-voltage side of transformer through 3- core cable with black jacket

5.4Testing fuse, 1A.

5.5 Protective earthing rod.

5.6 Power switch

5.7 Power socket: connected to power supply of 220V and 50Hz, with 2A fuse.

5.8 USB interface.

5.9 USB disk interface.

5.10 Contrast: regulate the contrast of character displayed.

5.11 Reen: 240×128 LCD screen with LCD backlight, displaying menu and test result.

5.12Keyboard.

VI. Operation Method

6.1 Wiring to connect test clamps correctly according to the type of transformer to be tested.

Single-phase transformer		Three-phase transformer
Instrument	transformer	Instrument transformer
A----------A		A----------A
B----------X		B----------B
C----------not connect		C----------C
a----------a		a----------a
b----------x		b----------b
c----------not connect		c----------c

6.2 Parameter setting

Turn on the power switch after wires are connected. For master menu

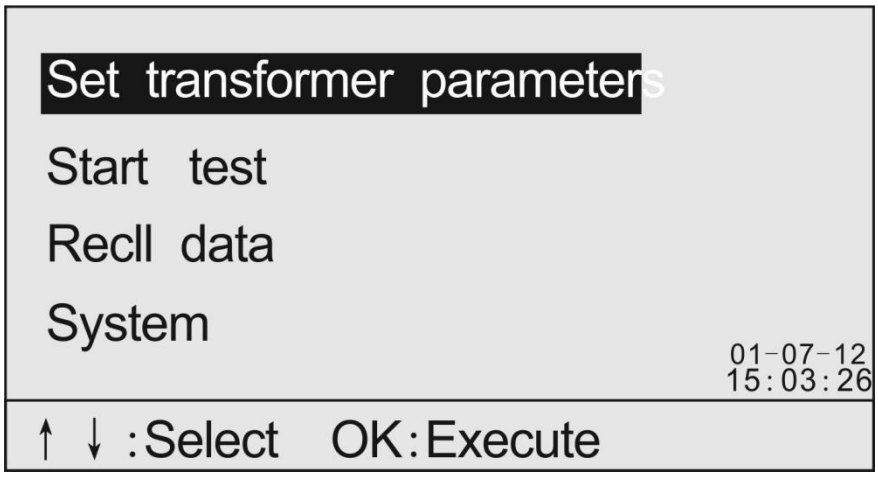

Figure 2

6.2.1 Key operation

Note: One keystroke includes pressing a key and releasing it. "↑" and "↓": Select function menu or data to be modified.

"←" and "→": Select data bit during data modification. "←": Retest after data are displayed in a test.

"→": Exit a menu during menu operation.

"OK": Execute the function selected or accept data. "Reset": Set the tester to its initial state.

Meanwhile, press "↑" or "↓" to reverse the display form of the selected menu (displayed in white characters on black background) and then press "OK" key to

execute relevant function.

6.2.2 Transformer Parameter Yy0, 10kV（1±2×2. 5%）/0. 4kV

Connection method：Yy

Rated voltage ratio： k=10kV／0. 4kv=25 Tap number ： 5

Regulation ratio：2. 5%

Tap position 1： 10kV×1. 05／0. 4kV=26. 25 Tap position 2 ： 25. 625

Tap position 3： 25

Tap position 4： 24. 375

Tap position 5： 23. 75

6.2.3 Parameter setting Master menu,

Press "↑" or "↓" to reverse display of "Set transformer parameters" menu, Press "OK" to enter set transformer parameters menu. see Figure 3

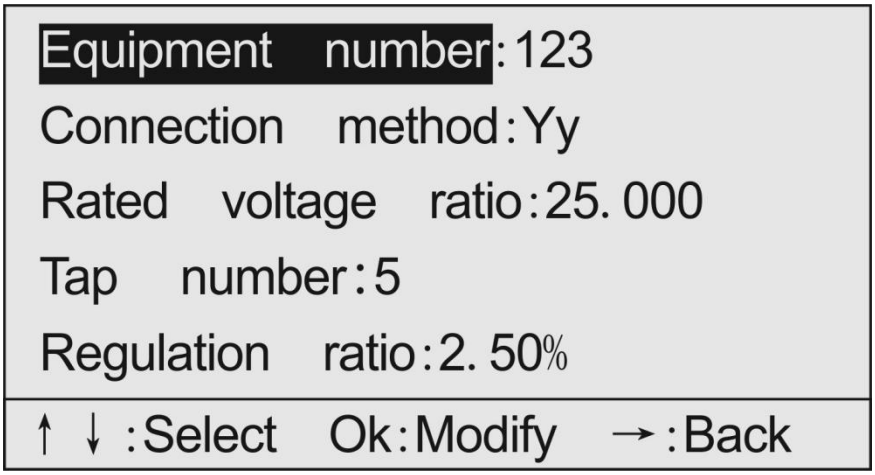

Figure 3

Press "↑" or "↓" to reverse display of "Equipment Number", Press "OK" to reverse display of bit 1, see Figure 4,

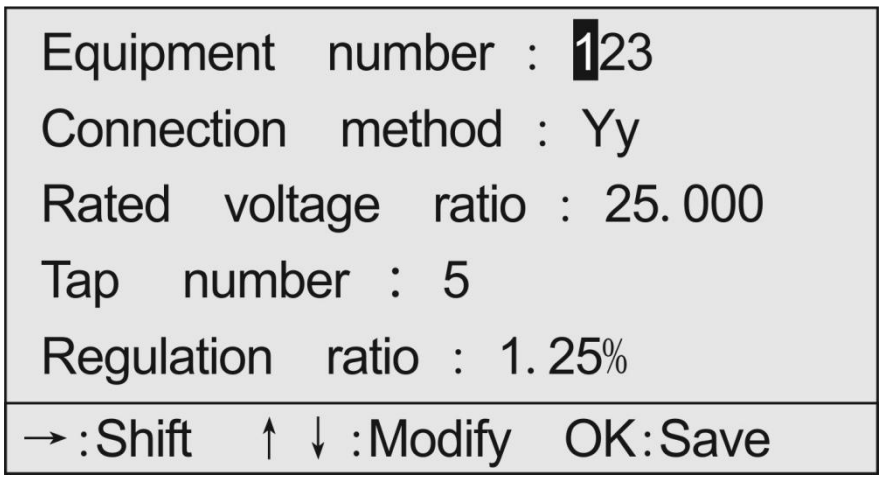

Figure 4

Press "↑" or "↓" to modify,

Press "OK" to reverse display of bit 2, Press "↑" or "↓" to modify,

Press "OK" to reverse display of bit 3, Press "↑" or "↓" to modify,

Press "OK" to reverse display of "Equipment number".

6.2.4 Setting of wiring method

Press "↑" or "↓" to reverse display of "Connection method" menu,

Press "OK" to reserve display of "Yy",

Press "↑" or "↓" to modify the Connection method,

Press "OK" to reverse display of “Connection method”.

6.2.5 Other parameters are similar to those specified above.

After all parameters are set, press " →" to back to the master menu.

6.3 Measurement

Master menu,

Press "↑" or "↓" to select "Start test", Press "Ok" to enter the function.

For the display, see Figure 5.

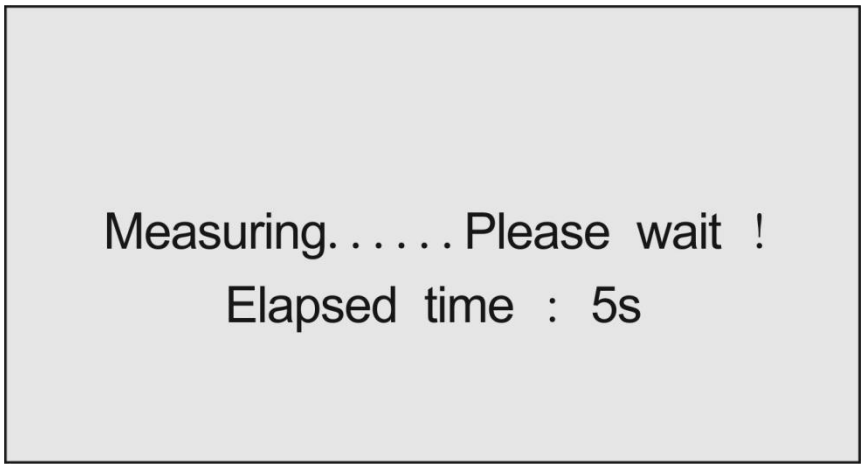

Figure 5

After measurement, measurement result of voltage ratio is displayed on the LCD screen, see Figure 6.

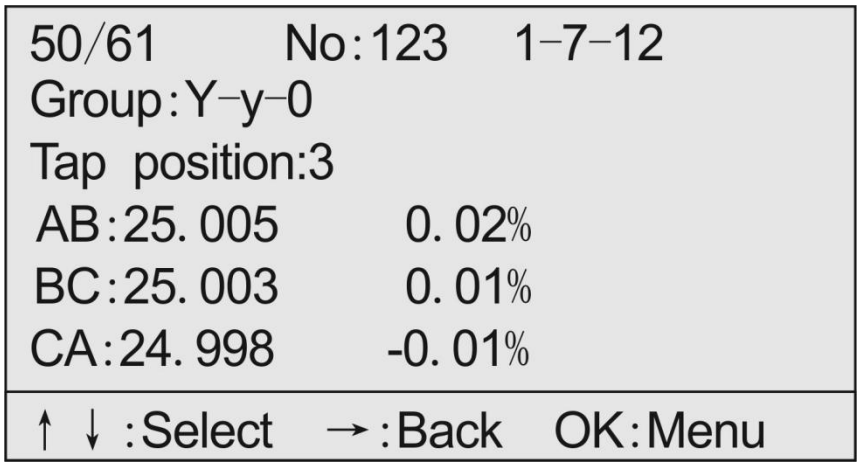

Figure 6

If monophase transformer is tested, the last two lines will not be displayed.

User could call history data by press "↑" or "↓". The first data will be displayed again after the last one is displayed.

Press "←" to retest.

Press "→" to back to the master menu.

Press "OK" to display submenu, see Figure 7.

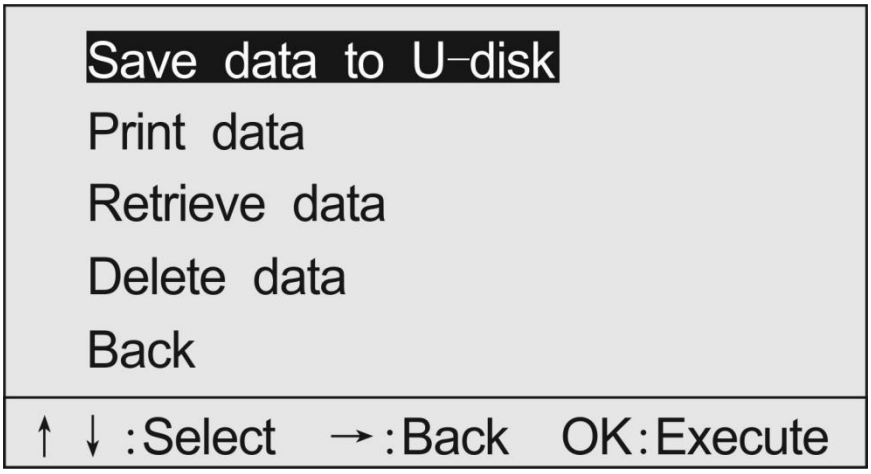

Figure 7

Operation of submenu is same as those specified above. Submenus are displayed below.

Note: U-disk shall be inserted before saving data to the U-disk and U-disk must not be withdrawn before data transmission is finished and the indicator lamp doesn't flash any more.

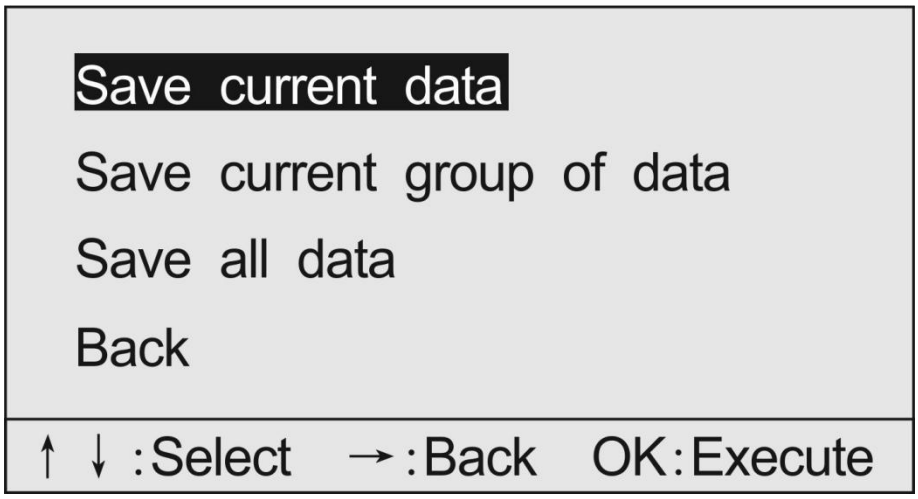

Figure 8

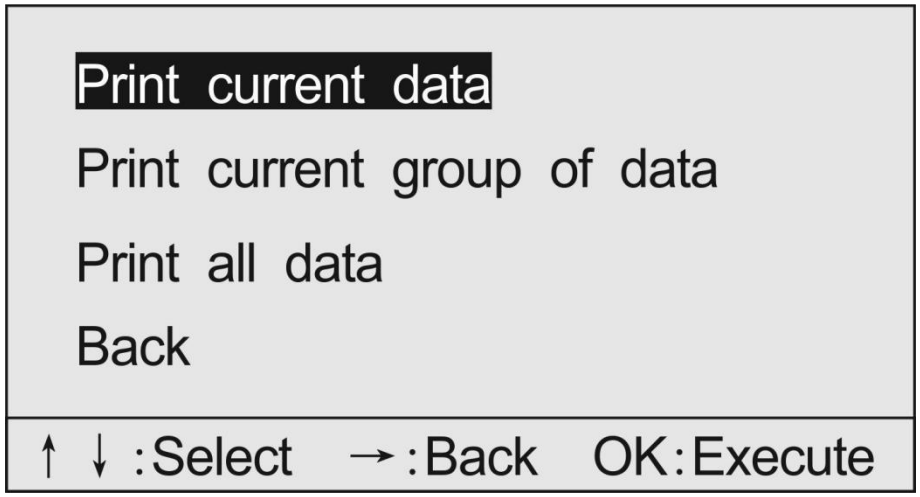

Figure 9

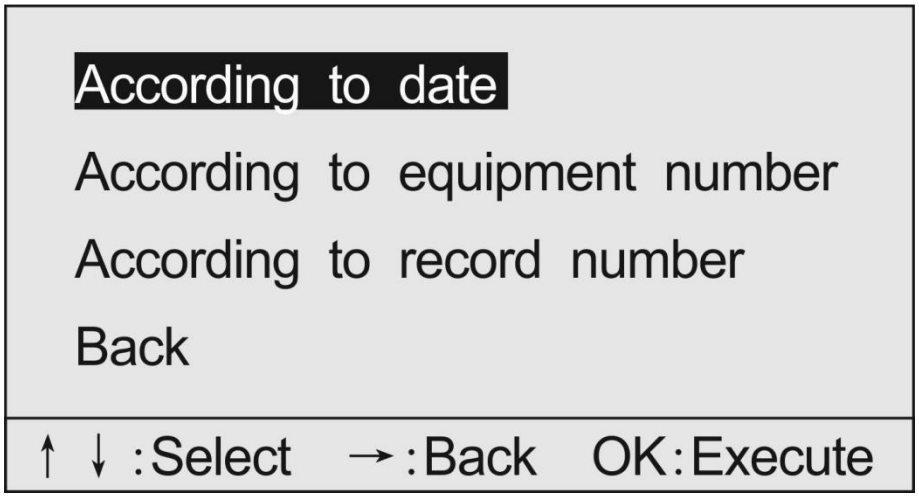

Figure 10

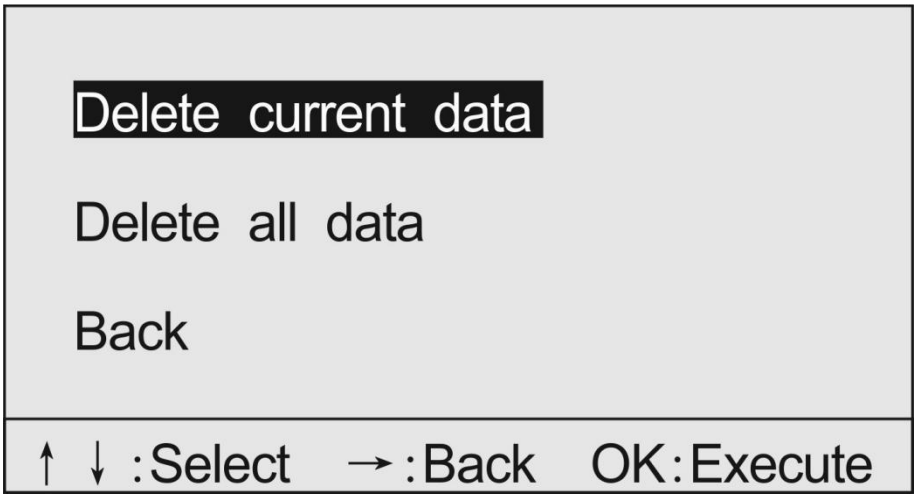

Figure 11

6.4Recall history data

In the master menu, press "↑" or "↓" to select "History", press "Ok" to display history data. See Figures 6 to 11.

6.5 Setting of system functions

In the master menu, press "↑" or "↓" to select "System", press "OK" to display Figure 12

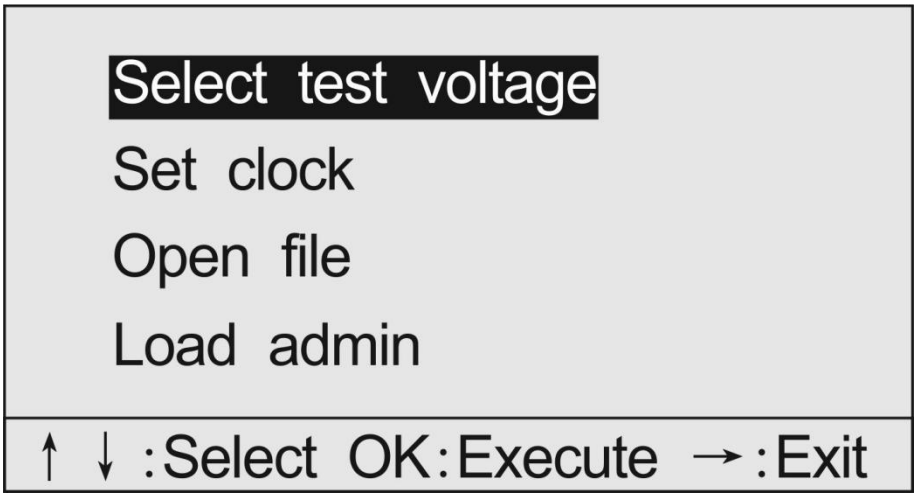

Figure 12

In "System" menu, press "↑" or "↓" to select "Select testing voltage", press "OK" to display Figure 13.

In Figure 13, select testing voltage, 180V voltage will be put out when high voltage is selected and 10V voltage will be put out when low voltage is selected.

In "System" menu, press "↑" or "↓" to select "Set Clock", press "OK" to display Figure 14.

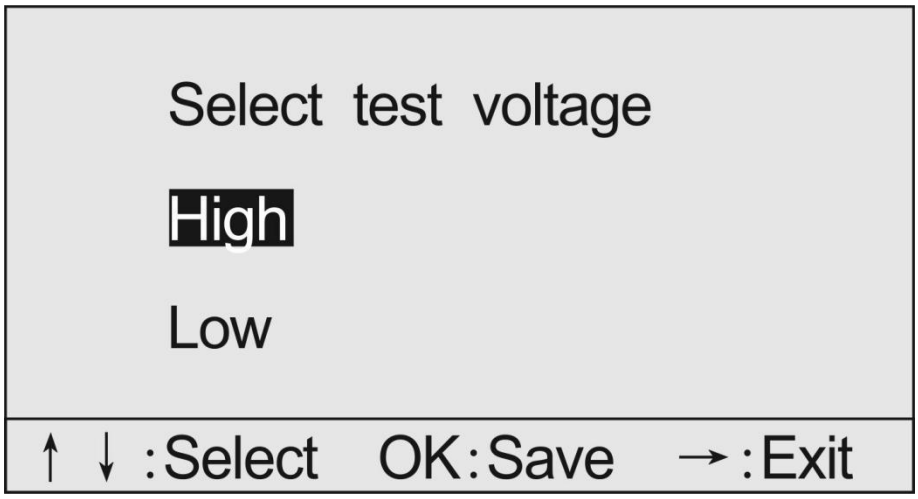

Figure 13

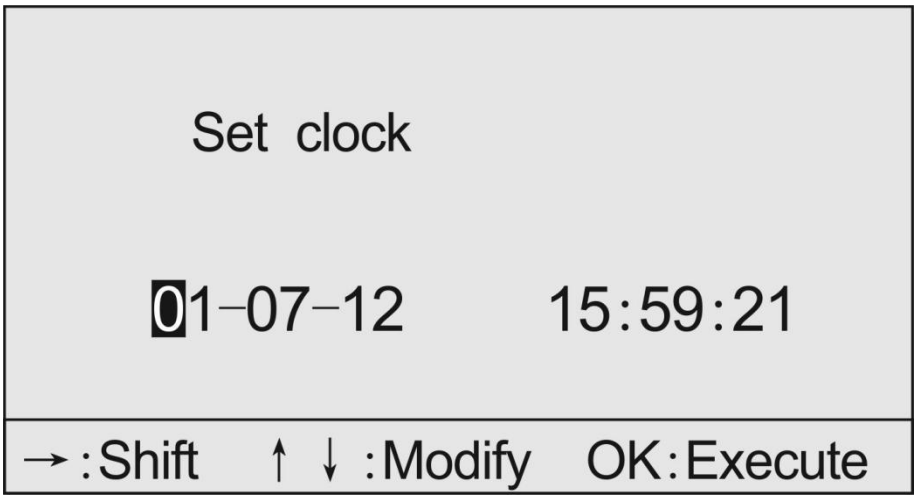

Figure 14

In Figure 14, set the clock by using the same method as setting the transformation ratio.

In "System" menu, press "↑" or "↓" to select "Open File", press "OK" to display Figure 15.

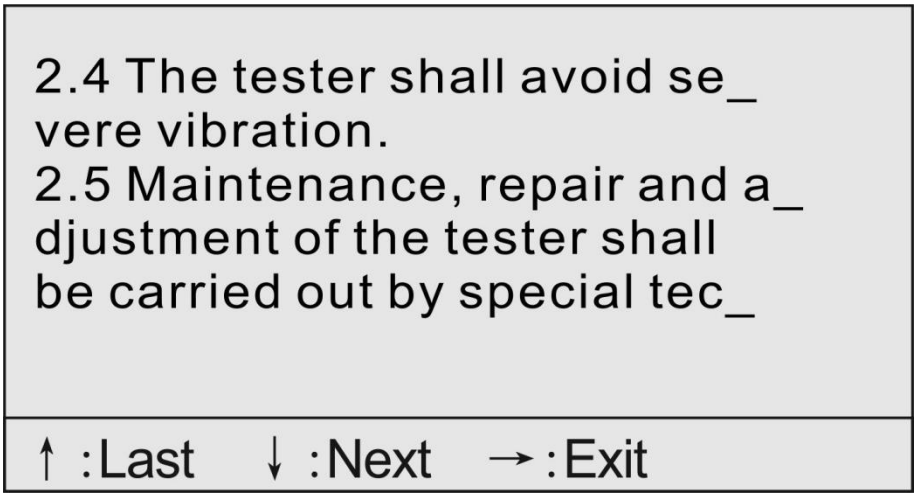

Figure 15

In Figure 15, display instruction manual. Press "↑" or "↓" to turn one page once and "←" to turn 5 pages once.

In "System" menu, press "↑" or "↓" to select "Load Admin", press "OK" to display Figure 16.

Method for loading admin: create or open Admin.TXT on a PC computer, put in a name and press enter to save it. Insert U-disk to the U-disk interface of the tester, and then press "OK" key. When data is printed, the tester is admin.

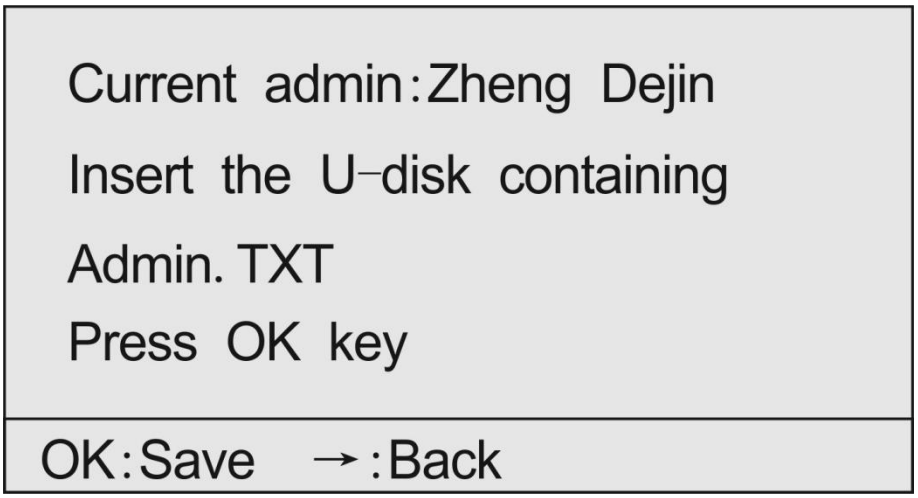

Figure 16

6.6 Online communication

6.6.1 Install control program of upper computer.

(1) Run Transformer Ratio Meter 5. 3\CP210x_VCP_Win2K_XP_S2K3\CP210x_ VCP_ Win_ XP_S2K3_Vista _7. exe

(2) Run Transformer Ratio Meter 5. 3 \dotnetfx \dotnetfx. exe

(3) Run Transformer Ratio Meter 5. 3 \Setup. exe

6.6.2 After USB wire is connected, turn on the power, don't carry out any operation on the tester and keep it under its initial state.

For windows xp, click

My computer\Properties\Hardware\Device Manager

If see Silicon Labs CP210x USB to UART Bridge in figure 17, USB drive is good

6.6.3Close other programe, Run Transformer Ratio Meter 5. 3 , and the

upper computer will automatically read the set parameters of the tester. After they are successfully connected, the tester will be set to its initial state again.

Thereafter, the tester could be controlled completely by the upper computer to set parameters, test and upload data. After each successful setting and measurement, the display on LCD screen will be updated.

Data file is . txt file.

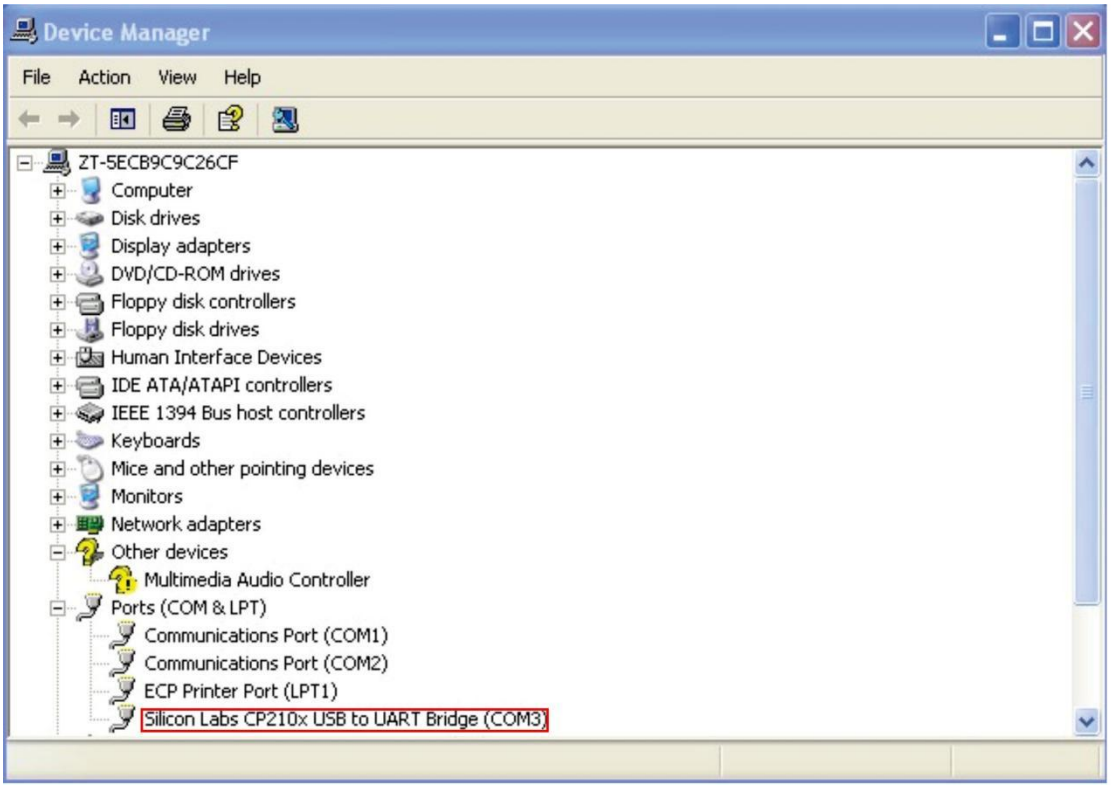

Figure 17

6.6.4If user wants to change from keyboard control into online control, please press the Reset key. Vice versa.

VII. Attentions

7.1 For transformer with 19-step load tap switch, steps 9, 10 and 11 are tapped to the same value. The tester shall put in 17 for tap type. At this time, after step 12 is tapped, the tap position displayed on the tester is 2 smaller than the actual position. For transformer whose tap switch is equipped at the low voltage side, displayed tap position and actual tap position are reversed.

7.2 When error information is displayed, the power shall be turned off before clearing the error.

7.3 Wires shall be connected well. The tester shall be earthed well!

7.4 When the tester is in service, if the display on LCD screen is unreadable and there is no response after pressing "↑" and "↓", or the measured value is far different from the actual value, please press the Reset key or turn off the power, and then repeat your operation.

7.5 If there is no character displayed on the screen or the color of character is very light, please turn the luminance potentiometer to an appropriate position. Luminance potentiometer is a multiturn potentiometer with 10 turns!

7.6 Working place of the tester shall be far from strong electric field, strong magnetic field and high-frequency equipment. The smaller disturbance of electric power supply is, the better it will be, and electric power supply should use illuminating line. If distance of electric power supply is still relatively intense, AC clean power supply may be used to provide power supply to the tester, as long as the capacity of AC clean power supply is greater than 200VA.

7.7 The tester shall be stored at a dry place with favorable ventilation. If it is stored for a long period or in a damp environment, the warm up time shall be prolonged to remove moisture before use.