TIANJIN GREWIN TECHNOLOGY CO.,LTD.

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PCLC-901D CABLE FAULT LOCATOR

*FAULT PRE-LOCATING DEVICE

V 5.0

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NOTICE

Thank you for choosing our devices.

Read the instruction carefully before using,specially pay attention to the security warning and tips.

Please don't maintain device by yourselves. Contact us if any breakdown or error.

CATALOG

1. GENERAL DESCRIPTION

1.1 GENERAL :

The PCLC-901D Power Cable Fault Pre-locator is an easy operation device used for distance locating . It's easy to operate,support both touch screen/button operation and with friendly interface.

PCLC-901D can be used alone under the low voltage impulse mode.

Under the mode of impulse current,PCLC-901D needs to work with HVSG-500GX high voltage generator items.Under the multiple impulse mode,PCLC-901D also need PCLC-900C coupler.After distance locating,user could use PCLD-901P items for fault pinpointing. And these products can be combined into a set of high performance and innovative cable fault testing system.

1.2 FUNCTION FEATHER:

- Multiple distance locating method:

-Low current impulse method: apply to the locating of the low resistance fault. Short circuit fault, open circuit fault. It also can be used in the measurement of the cable length, the intermediate joints, T joints, and cable termination joint. This method also can be used to correct the wave velocity.

-Impulse current method: apply to the high resistance fault, breakdown fault. Use the current coupler to gather signal from the earth wire

-Multiple impulse method: improvement of the SIM method

- 200MHz real-time sampling

-Advance tech.Upgrading for SIM method

-Max. 0.4m measurement resolution,PCLC-901D has small blind zone and is special for the short cable and nearly-terminal fault cable

- Touch screen and press key operation

-Touch operating screen with smart gesture operation

-Support cursor drag-drop function and double-click function,easy to locate

-Simple function menus with high performance.

- Big color LED screen, friendly interface

-Simple function menus with high performance

- 7" LED screen,160° viewing angle,bright with 750cd/m2 to view under sunshine

-PIP copy（pic. temporary storage). There'll be a main window and three temporary storage windows could check three waveform together.

- Waveform storage and PC communication

-Special software management for software upgrade, backup and restore in device.

-Waveform storage and communication with computer.

-Internal storage of waveform.

-Optional mini printer for waveform printing

-Support connection with PC or laptop

● Power management

-Back light weakens if no operation in 2 min and power off in 10 min. if no operation.

-Built-in Polymer Lithium-ion battery.

-Working time could reach 7 hours for each use.

1.3 SPECIFICATION:

Locating methods:	● Low voltage impulse method ● Impulse current method ● Multiple impulse method
Sampling frequency:	200MHz
Gain range:	0-70dB
Low voltage impulse voltage:	32V
Max.resolution:	0.4m
Locating range:	100km
Dead zone:	2m
Battery:	L-ion battery rechargeable batteries,7.4 V endurance time over 7 hours
Communication interface:	USB,bluetooth (optional)
Power supply:	Input AC220V,50Hz,current 1A,charge for 6 hours
Dim.:	274×218×81mm
Weight:	3.5kgs
Operating Temperature:	-10℃－40℃
Humidity:	5-90％RH
Elevation:	<4500m

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2.　PHYSICAL CHARACTERISTICS AND OPERATION

2.1　CONFIGURATION

Standard : main unit, low voltage impulse testing guideline, impulse testing connecting wire and filter,charger and so on.

2.2　MAIN UNIT PANEL

Fig.2.1 shows the operation interface
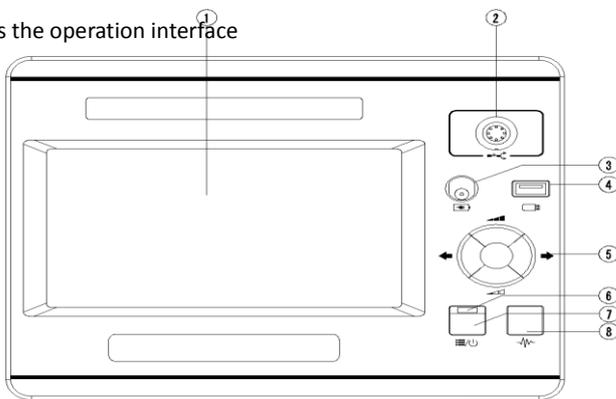
Fig.2.1 Operation interface

Details:

① LED screen : Display all the information. Will introduce in the following.

② Signal port: connect with testing wire. Choose different wires under different testing mode.

③ Charging port:connect with wire for built-in battery

④ USB disk:save or import waveform

⑤ Multiple function button:total five functions,up,down,left,right and enter.Up and down button is used for gain adjustment,left and right button is used for cursor adjustment, and enter is used to switch the dotted cursor and soiled cursor

⑥ Power indicator light:it will light when power on

⑦ Power/Menu : Turn on or off the machine.When power on,it's menu button.Short press into the menu,press again to exit.

⑧ Test button:Press to test.

2.3　Menu introduction

This device adopts unique menu operation of the screen as fig.2.2
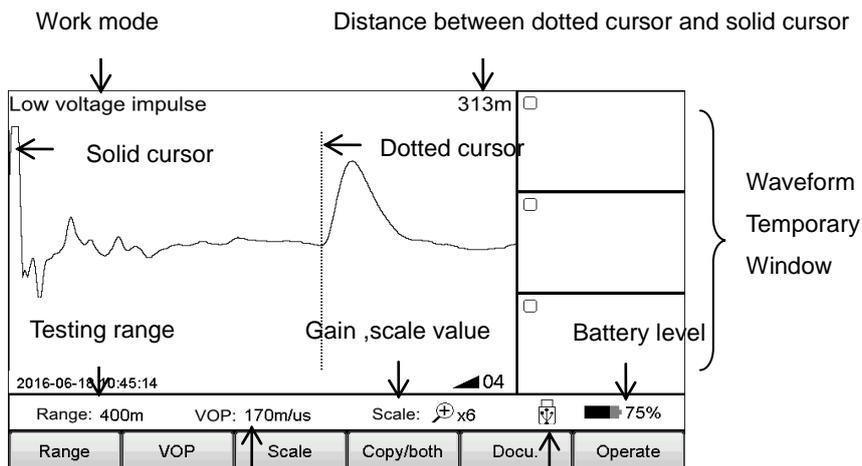
Waveform velocity value   USB indication

Fig.2.2 Working interface

Support both touch screen operation and Mechanical button. The operation is easy, flexible and direct.

Pop-up menu operation:

Main menu includes Range,VOP,Ratio,Scaling,Copy, Staff, Docu. And Operate.

Sub-menu will pop-up when press above button. After operation or click other position of the screen will exit sub-menu.

Press ☰/⏻ Power/Menu or Sub-menu will enter the menu mode,and now user could use the multiple function button to operate.

Press ☰/⏻ Power/Menu again to exit.

Below is the introduction of main-menu button and their sub-menu details:

*Operation example:

Main menu	Submenu
Range	200m、400m、800m、1.5km、3km、6km、12km、25km、50km、100km
VOP	XLPE cable,oil paper cable,plastic cable,VOP+,VOP-
Scale	Global,zoom in,zoom out
Copy	1/2/3 zone copy,1/2/3 zone compare
Staff	Scale switch,new staff,contact setting,fault setting,full length setting,contact delete
Docu.	Local storage,USB disk storage,main unit to USB,docu.recall
Operate	system setting,screen correct

Low voltage impulse   308m

2016-06-18 10:46:40   01

Range: 1.5km   VOP: 170m/us   Scale: ⊕x4   75%

| Range | VOP | Scale | Copy/both | Docu. | Operate |
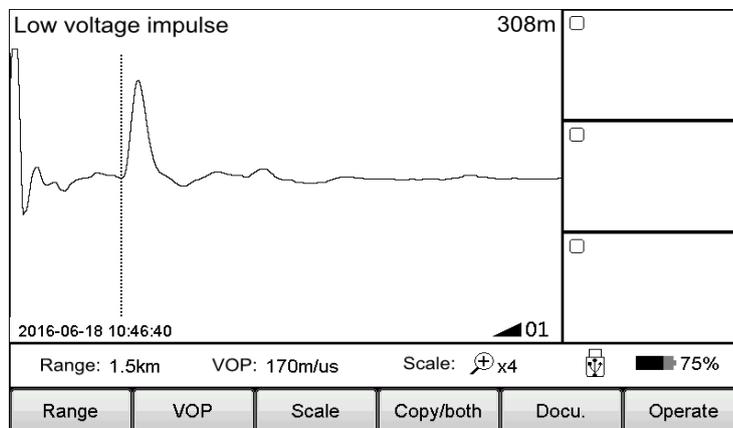
Observe the waveform,seems the fault point may located on the first half of the waveform,so the distance 1.5km range is too large and then adjust the distance to 400m.

Touch operation as below:

Click Range button displayed the optional range.Click 400m button, exit after chosen. Now the range change into 400m as in below fig.4.The device

auto test again after modify the range. The testing waveform as below Fig.2.4
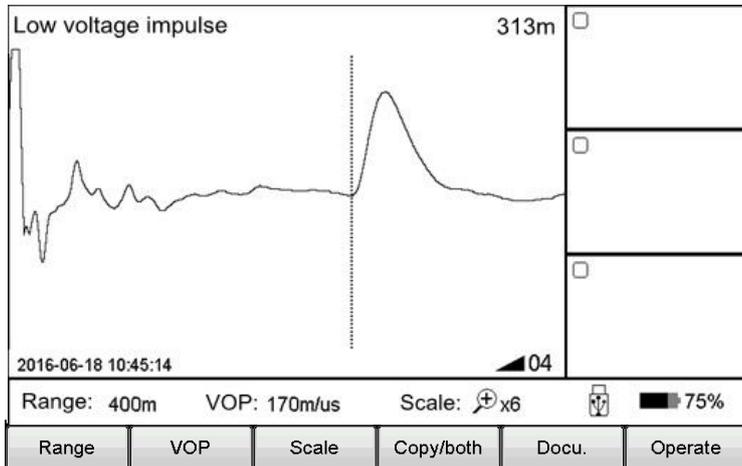
<div align="center">Fig.2.4 Working interface</div>

Mechanical button operation as below:

Click ☰/⏻ Power/Menu button to enter the Menu mode. Current menu will highlight in the main menu and automatically appear pop-up sub-menu. Use the multiple function button Left/Right button to choose main menu as Range ,and use the Up/Down button to choose the sub-menu as 400m. Press Enter button to change the range as 400m and automatically exit the sub-menu. Check the testing range, it's 400m so the modify is successful and will automatically exit the Menu mode. If no execution any sub-menu and click the ☰/⏻ Power/Menu button again, it will exit the Menu mode.

Summing up above points, menu operation steps are as below:

- choose the main menu, and press the corresponding sub-menu

- choose the sub-menu, and press the corresponding button

In the following,we will all use the way Menu — sub-menu to introduce the operation steps.（For example, Range — 200m）

2.4 Basic operation

2.4.1 Choose the testing range

Testing range is the device measuring distance.

For TDRL or ARM(multiple impulse method):

For the initial testing, the range should be hundreds meters longer than the cable complete length, for example,if the cable is 1400m, it's suggested to choose 3000m but no 1500m. If the suspect point is close, it is suggest to reduce the testing range.

For Impulse current mode:

When initial testing,the range should be triple of the cable length. For example, if the cable is 200m, it is suggested to choose 800m.If the suspect point is close, it is suggest to reduce the testing range.

For testing range chosen:

Choose Range menu to choose different range, total 10 levels from min. 200m to max. 100km,refer below Fig. 2.5

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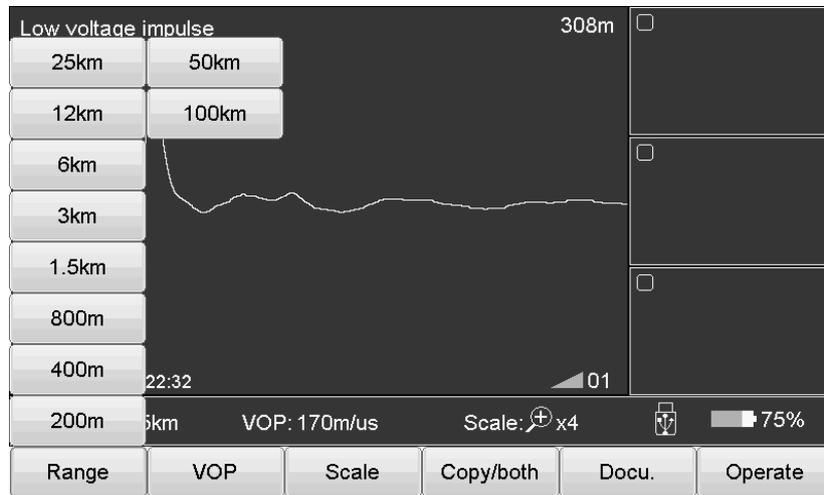
Fig.2.5 Range chosen interface

2.4.2 Adjust the waveform

Device adopts the traveling wave method to do fault locating.

Through VOP menu to set and adjust wave velocity. Refer Fig.2.6.

Steps:

Chick the VOP menu and choose different waveform velocity or directly to adjust the velocity to a suitable value.

● Cross linked(XLPE): Cross linked polyethylene cable,170m/us

● Oil paper: Impregnated paper insulated cable,160m/us

● Plastic: Plastic cable,201m/us

● Robber: Robber cable,220m/us

Use the VOP + & VOP - button to adjust the velocity. Under this interface,if click VOP + or VOP - button,the sub-menu can't automatically disappear. Click VOP button or other screen position, the sub-menu will automatically disappear.
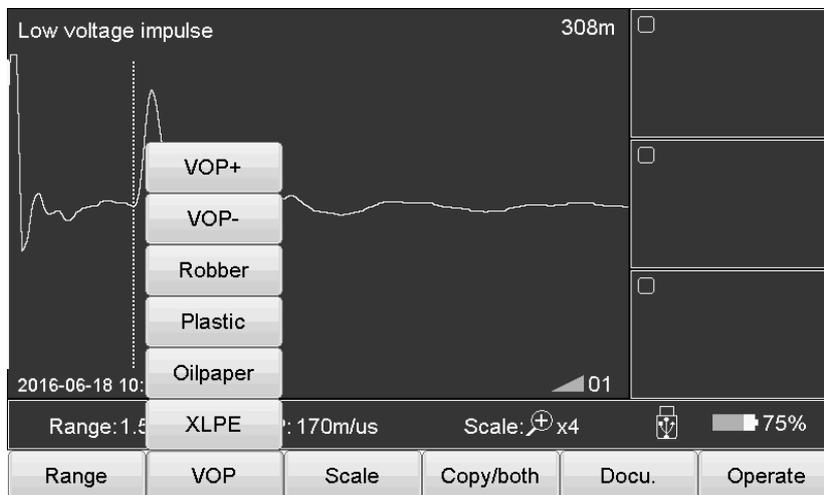
Fig.2.6 Waveform velocity adjustment

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2.4.3 Scale operation

If need to check the waveform velocity details, and analysis the waveform, we could choose the scale operation to scale and check the details.

Chose the main menu Scale and to zoom in/out as shown in Fig.2.7
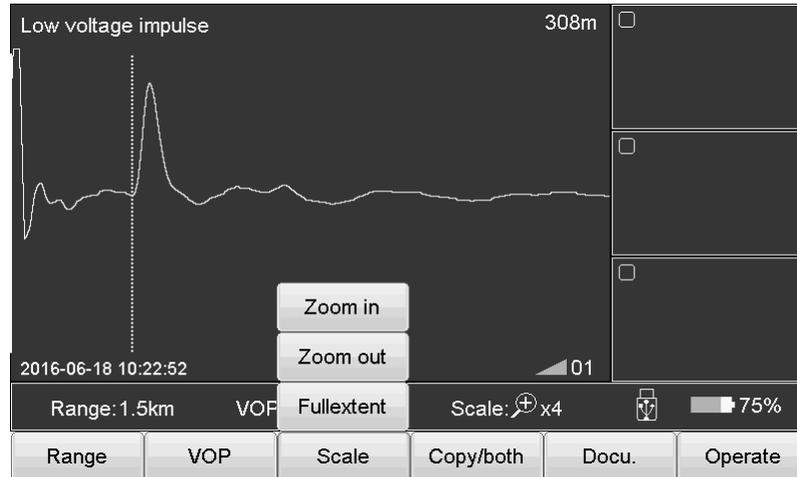
Fig.2.7 Scale operation

Steps:

Choose Scale menu,then choose Full extent, Zoom in or Zoom out

Full extent   restore the complete waveform

Zoom out   zoom out and display part of the waveform centered on dotted cursor. Move the dotted cursor to left/right and it will automatically page turning when reach the border.

Zoom in   zoom in and display part of the waveform centered on dotted cursor. Move the dotted cursor to left/right and it will automatically page turning when reach the border.

2.4.4 Copy/both operation

If need to compare the waveform, it is suggested to use the the Copy/both button.The device could temporarily storage 3 waveform and display the waveform in the Copy Window. Refer Fig. 2.8

*ICM (impulse current mode) doesn't have this function

Sub-menu introduction:

zone 1 copy:Temporary storage the waveform in window 1 on the right.Other copy   buttons are similar function.

zone 1 Both:Display the waveform of window 1 into the main window.Other both buttons are similar function.
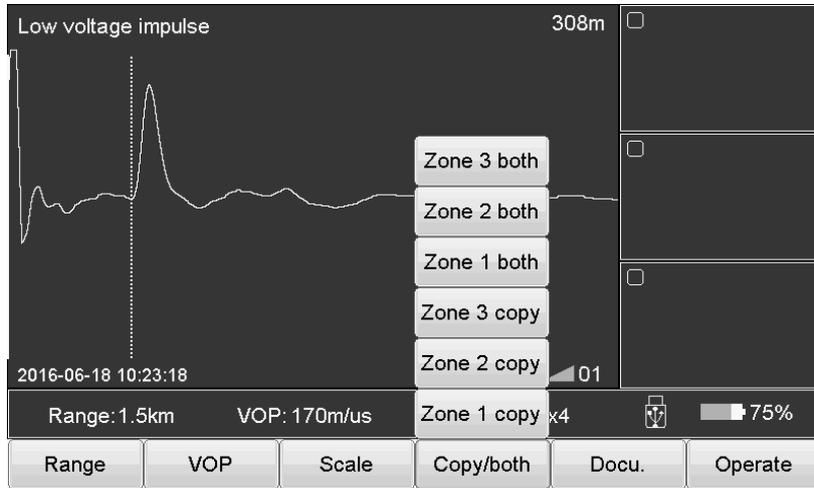
Fig.2.8 Copy/ both button introduction

Touch operation:

Through slide special shapes in the screen,device will distinguish different functions.The shapes of waveform copy and waveform both function are below shapes in the pic.

Zone 1 copy : Sliding from main window to the Zone 1.

Zone 1 both : Sliding from Zone 1 to the main window.

Other operations are same.Sliding again to exit the compare..

Double click the Copy windows to compare the waveform or exit the comparing.
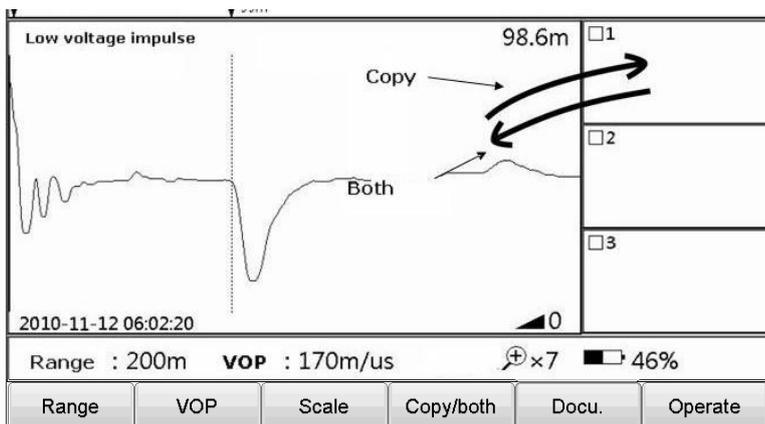
Fig.2.9 Copy/ both touch operation

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2.4.5 Docu. Operation

Different methods will be for waveform management.

Choose the Docu. ,the operation as below Fig.2.10
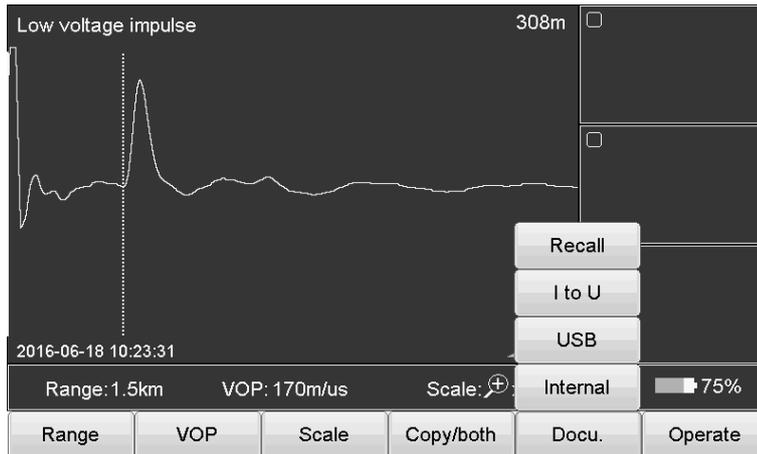
Button introduction as below:

Internal : Storage the wave in the device. The stored file name is default as 'working mode English abbreviation & wave storage date.All are xxx.wav file

Low voltage impulse mode: TDR

Impulse current mode: ICM

Multiple impulse mode: ARM

USB : save the data into the USB disk.

I to U: insert the USB disk into the USB port. Click this button to export data to USB

Recall: Open the waveform file stored in the device. Click this button to appear the file windows as below Fig. 2.11
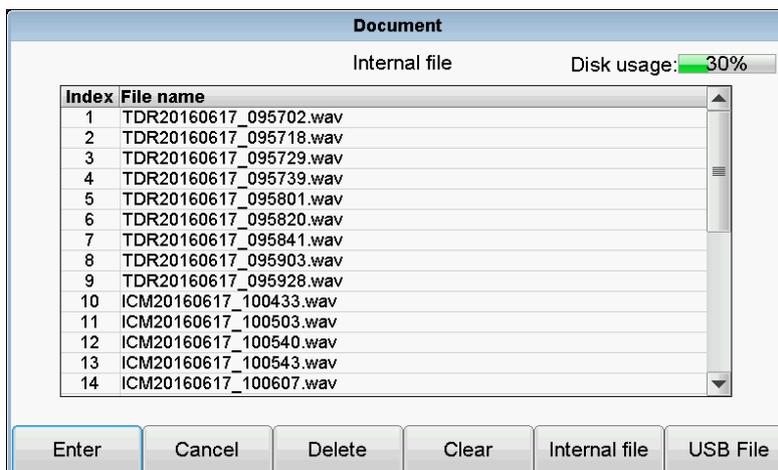
Fig.2.11 Recall waveform file

Button introduction as below:

Enter : highlight the chosen waveform and the waveform will display in he main windows

Cancel : cancel operation or exit from this file window

Delete : delete the chosen file and press ↓↑ to choose file. After click it, the prompt information will appear.

Clear : clean the waveform file in the device(can't be restored)

Internal file: choose the files stored in the device

USB file: Chose the files stored in the USB disk, valid when insert the USB disk

USB usage: indicates the files storage in the device. If reach 100%, new waveform can't be logged. Delete old waveform before store new waveform.

2.4.6 Parameter setting

Operate below steps:

Operate — System setting, pope window appears as below Fig.2.12

It's for impulse current delay setting, multiple impulse delay and date setting.
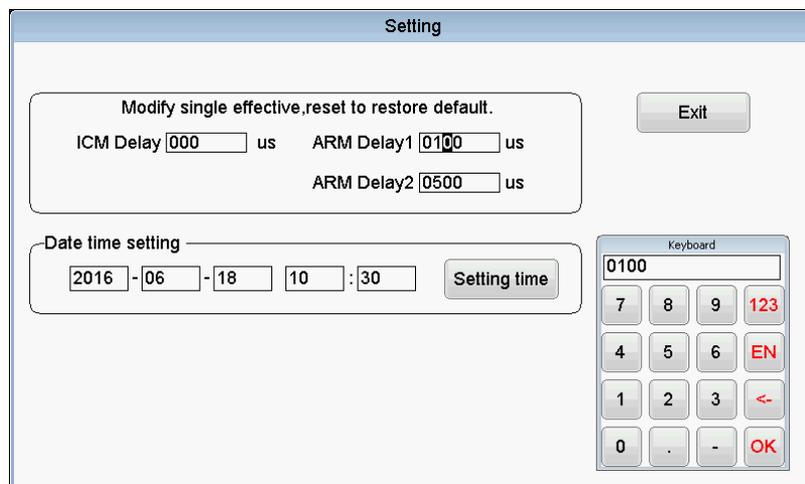
Fig.2.12 System setting windows introduction

Steps as below:

● Click the parameters need to modify

● Use the number keyboard to modify the parameter value

● Click the OK to confirm the modify

2.4.7 Delay adjustment

When use the impulse current mode and the multiple impulse mode to test, it is needed to adjust the delay. Details refer following captor.

2.4.8 Exit testing

When use the impulse current mode and the multiple impulse mode to test, press 〜�〜 Test button to enter the triggering condition. Press this button again to exit.

2.4.9 Waveform movement

Move the cursor to the left end of the waveform, then continue to move to the left, the waveform will move to right for half screen. Similar as in the right operation.

2.4.10 Cursor movement

Under the normal mode, move the cursor position through ⑤Multiple function button.

Left and right button is used for cursor movement.

Long time press to move fastly, short time press to pinpointing.

2.4.11 Cursor movement operation (touch operation)

Use the stylus to press the cursor, drag the cursor to suitable position. Or double click the target position by stylus, the dotted cursor will move this position.

Or use touch screen to roughly position. And then pinpointing by the multiple button.

2.4.12 Data setting

Date is the retrieval tag of stored waveform, so it's important to make sure the device time is correct. If there's error,it's needed to set again. Steps as below:

Choose Operate — System setting to set the data in the pop-up window. Refer Fig.2.12

2.4.13 fault distinguish and work mode selection.

Before distance locating, we should first judge the cable fault to choose the suitable detecting method, steps as below:

Use tramegger to measure the insulation resistance of each phase -earth and phase-phase of cable terminal. If the tested result is 0, to use the multimeter to test resistance again. If the tested result is very high, reach normal insulation level, check whether cable is break by method: short circuit three phase and short circuit to the earth in one end of cable, then test in another end of cable to distinguish whether it's break.

Fault tyoe and the distinguish method as below

No	Cable Fault	Representation	Testing method
1	Low resistance /short circuit fault	Tramegger value ： 0 Multimeter value：＜ 200Ω	Low Voltage Impulse
2	Break fault	Conductor disconnection	Low Voltage Impulse
3	High resistance fault	Tramegger ： 0 Or: Tramegger ： 0 Multimeter：≥200Ω	Impulse current
4	Flashover fault	Tramegger: insulation normal Withstand voltage test:no	

Adopt different testing methods, different testing connection lines are needed.

The work mode of generator also need to adjust, our HVSG-500GX device could recognize different signal sources and automatically adjust the working mode.

During different working mode, the operation menu has different function, in the following chapters, we'll give a detailed introduction.

2.4.14 Touch screen calibration

During the usage,if find touch position is not accuracy, it is needed to do screen calibration. Click Operate — screen correction ,refer below Fig.2.13

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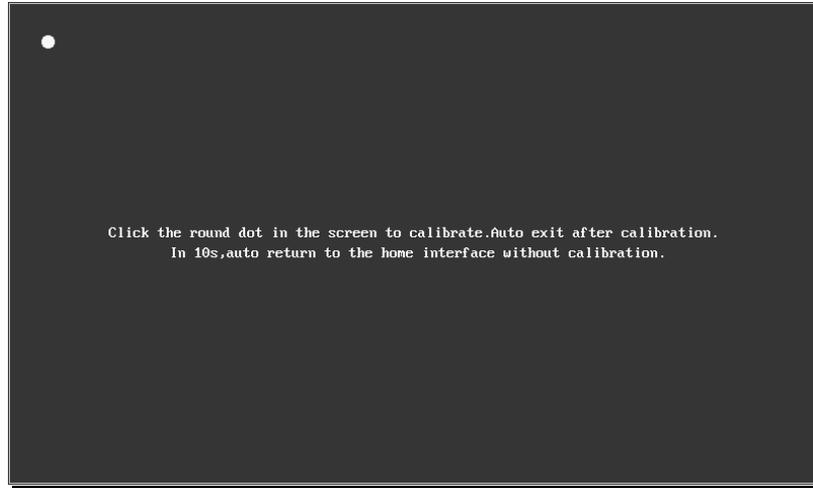
Fig.2.13 Screen correction