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UT283A

Operating Manual

Single Phase Power Quality Analyzer



Model UT283A
OPERATING MANUAL

UT283A OPERATING MANUAL

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I. PRODUCT INTRODUCTION

1. Unpacking and accessory list

No.	Name of accessory	Model/specifications	Number
1	The analyzer	UT283A	1 set
2	Alligator clip	UT-C04	1 pair
3	Test probe	UT-C08	1 pair
4	Test lead	UT-L09	1 pair
5	Power adaptor	E221142	1 piece
6	SD card	CLASS 4	1 piece
7	Current clamp	1000A/100A/10A	1 piece
8	Instructions		1 piece
9	Software CD		1 piece

2. Instructions before use

1) Safety standards

To ensure the safe use of the analyzer, please follow the following guidelines.

UT283A single phase power quality analyzer complies with: IEC/EN 61010-1: 2010 nominal voltage class, CAT III 600V, CATII 1000V; Pollution Degree 2.

Please use the analyzer and its accessories in accordance with the User Manual, otherwise the protection provided by the analyzer and its accessories may be damaged.

Warning indicates conditions and actions that pose hazard(s) to the user.

Caution denotes conditions and actions that may damage the analyzer.

The following international symbols are used on the analyzer and in this Manual:

	Double insulation		Warning & caution safety label
	Earthing		Danger: high voltage
	Comply with EC standard		

2) Caution

Do not use the analyzer in inflammable and explosive environment and avoid exposure to dust, direct sunlight and high radiation.

Non-professional personnel are prohibited to open the back cover and if maintenance, component replacement or calibration is required, please contact qualified personnel or relevant dealer or after-sales service of our Company.

Do not dismantle or modify the analyzer and any unauthorized modification may result in permanent damage to the analyzer.

Use only insulated current clamp, test lead and adaptor supplied with or applicable to the analyzer.

When testing, please keep fingers behind the finger protection device of the current clamp.

Please inspect whether there is mechanical damage on the analyzer, current clamp, test lead and accessories before use. If any, please replace it immediately. Check whether plastic parts are damaged or missing and pay special attention to the insulating layer surrounding the connectors.

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The operation of the analyzer is verified by measuring a known voltage.

Always connect the power adaptor to an AC power socket and then connect it to the analyzer.

Do not touch the high voltage: root mean square value of AC is 30V, maximum value of AC is 42V or that of DC is 60V.

Grounding terminal shall only be used for the grounding purpose of the analyzer and any voltage shall not be applied on the terminal. Do not apply any voltage over nominal input voltage of the analyzer and the applied voltage shall not exceed the rated values marked on the voltage probe or the clamp ammeter.

Use only the voltage and current rated probes, test leads and adaptor with correct measurement category. Do not exceed the lowest rated measurement category of the analyzer, probe or individual component of accessories.

3) Connect current clamp through BNC.

Because BNC has the same potential as USB port and 12V power port, current clamp which complies with safety rating shall be used to measure the current to ensure the safety and accuracy, do not directly connect BNC port to the potential to measure.

3. Connection method

1) Connecting voltage probe

As shown in the figure below, plug the voltage probe into the voltage measurement port.

Plug test lead (black) into “COM” jack.

If the voltage value is to be measured, please plug test lead (red) into “V” jack, and if resistance, capacitance, diodes and continuity, etc. are to be measured, please plug test lead (red) into the corresponding versatile jack.

Note: Do not apply high voltage into the versatile jack, otherwise permanent damage may be caused to the analyzer.

2) Connecting current clamp

Please connect current clamp to BNC port to measure the current. (All current transformer and clamp below refers to current clamp). Select proper current range of current clamp (3 ranges 10A, 100A, 1000A for standard current clamp).

The corresponding measuring range is set at SYSTEM page for current clamp, the prefix “D” represents standard current clamp.

Note: The arrow on standard current clamp points to the direction of a positive current.

3) Connecting the power adaptor

If the built-in battery is low in energy, please connect the power adaptor as soon as possible.

4) Connecting USB

If upper computer is to be connected, please plug in USB cable.

5) Inserting SD card

If event or trend data are to be recorded, please insert SD card when the device is turned off, do not plug or remove SD card when the device is turned on, otherwise, it may result in data loss and permanent damage to SD card. Figure

6) Switching on the analyzer

Long press the power button to start up the analyzer, wait for a few minutes until startup picture appears and then the device displays main menu page. Please select proper menu according to the measurement needs and enter the measurement function of the interface.

Long press the power button to shut down the analyzer, do not shut down the analyzer during recording or when SD card is being written, otherwise, data loss and permanent damage to SD card may be resulted.

Please read the measured values after the analyzer is stable for 10 minutes, otherwise, the measured values may be inaccurate.

II .Function and operating instructions

1. Overview

UT283A single phase power quality analyzer offers a wide range of powerful measurement, monitoring, recording functions to help users to inspect various parameters of power supply, transmission and distribution system, including the amplitude of voltage and current, phase, harmonic, event and other information. It is widely used in transformer substations, factories, hospitals, communication rooms, energy monitor and other power equipment.

UT283A has a function similar to oscilloscope and can intuitively display the waveform of voltage and current.

Measurement functions of UT283A are shown in the table below:

Name	Voltage related	Current related	Power related
RMS	●	●	
Peak value	●	●	
DC component	●	●	
AC component	●	●	
Active power			●
Reactive power			●
Apparent power			●
Overall power factor			●
Fundamental power factor			●
Positive power			●
Reverse power			●
Inductive power			●
Capacitive power			●
Crest factor	●	●	
K factor		●	
Total harmonic distortion	●	●	
Distortion rate of harmonic to fundamental wave	●	●	
Flick	●		

Trend recording functions of UT283A are shown in the table below:

Name	Symbol
Voltage RMS	URMS
Current RMS	IRMS
Frequency	FREQ
Active power	P
Reactive power	Q
Apparent power	S
Voltage distortion rate based on fundamental wave	UTHDR
Current distortion rate based on fundamental wave	ITHDR
Power factor	PF
Short flick	PST
Voltage crest factor	UCF
Current crest factor	ICF
DC voltage	Udc
AC voltage	Uac
DC current	Idc
AC current	Iac
K factor	KF

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Event recording functions of UT283A are shown in the table below:

Name	Symbol
Voltage sub-harmonic over the upper limit	UHARM
Current sub-harmonic over the upper limit	IHARM
Frequency over the upper limit	FREQ+
Frequency below the lower limit	FREQ-
Inrush current over the upper limit	INRUSH
Voltage interruption	INTRPT
Voltage swell	SWELL
Voltage dip	DIP
Transient	TRANS

2. Basic operations

Introduction

Some basic operations of the analyzer are described in this chapter:

- Mount
- The power supply of the analyzer
- SD memory card

Kickstand

The analyzer is equipped with kickstand which will help you to view the screen at an angle when the analyzer is placed on a flat surface. The position of USB port connector is shown in Figure 4-1. This interface may be used to establish data connection between USB port and PC.

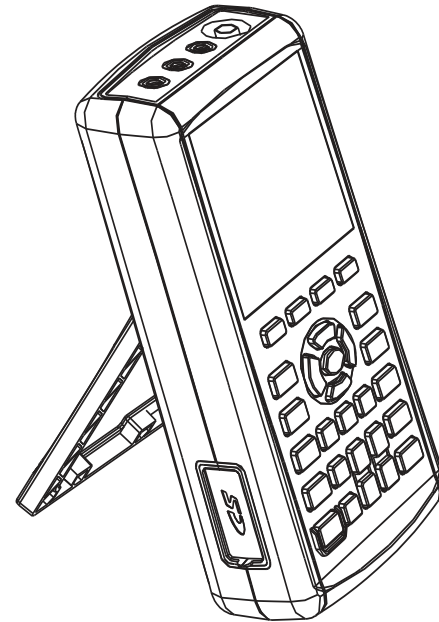


Figure 4-1

The power supply of the analyzer

The analyzer is equipped with a built-in lithium-ion battery, which can provide 5 hours of use when fully charged. When the analyzer is powered by the battery, the battery icon at the top of the screen informs you about the condition of the battery. The battery symbol has 4 bars. When the battery is low in energy, please charge it with the power adaptor. It takes at least 4 hours to fully charge the battery if the analyzer is shut down, otherwise it will take more than 4 hours. If the power adaptor connects to the analyzer for a long time, for example, a weekend, will not impair the battery. At delivery, the battery may not be charged, so please charge it before use.

To use of the battery charger/ power adaptor, please remember the following:

- Always use the power adaptor supplied with the analyzer.
- Please check the rated voltage and frequency marked on the power adaptor and whether these numbers are consistent with the local power supply before use.
- Plug the power adaptor into an AC socket.
- Plug the power adaptor into the input jack at the bottom of the analyzer.
- To avoid overheating of the battery during charging, do not charge the battery at the environment temperature exceeding the specified temperature in specifications.
- To save electricity of the battery, if automatic backlight brightness is enabled and no button is pressed within a certain time, the screen will automatically dim and eventually turn off the screen backlight, at this moment, HOLD button light flashes, suggesting energy conservation. When a button is pressed, the screen is lit again.

Note: To prevent the capacity of the battery from decreasing, the battery shall be charged at least twice a year.

SD memory card

The analyzer is equipped with an SD memory card to store measurement data. If an SD memory card is not inserted, events and trends cannot be recorded. To insert or remove an SD memory card, please press down the SD memory card.

Notes:

To avoid memory card failure, do not touch the contact of memory card. Do not plug or remove an SD memory card when the device is turned on. Please use standard SD memory card supplied with the analyzer, otherwise it may fail to store data. Please contact after-sales technical staff of the Company for troubleshooting.

Do not remove an SD memory card frequently because it is easy to be damaged.

Initial Setup: When you first charge the analyzer after restore to its factory default, or if the analyzer has been disconnected from all power sources, some general settings shall be adjusted to meet the local conditions.

These settings include: language, backlight, rated frequency, voltage class, date and time, voltage to current ratio and frequency source. Please refer to the relevant chapter for instructions.

3. Connecting input

Brief introduction

In this chapter, we will explain how to connect to the power distribution systems to be measured and how to adjust the settings of the analyzer. Check whether the settings of the analyzer are suitable for the characteristics of the measured system and test accessories.

These include:

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Wiring configuration

- Rated frequency
- Voltage class
- Limit value used for power quality monitoring and event detection
- Performance of voltage test leads and current clamp

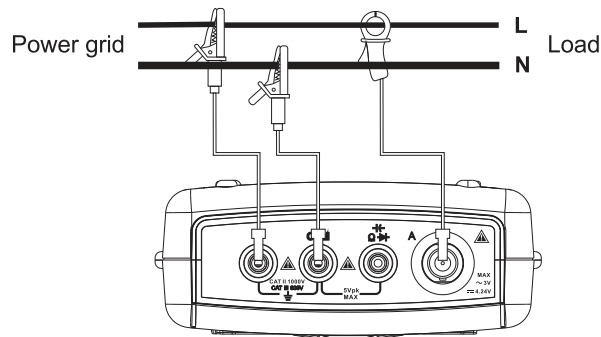
Connecting input

The analyzer is equipped with a BNC input port for connecting current clamp and 3 input ports for connecting voltage and multimeter to measure inputs.

Notes: Always use safe current clamp supplied with the analyzer or recommended in the Manual, using a current clamp supplied by a third party may result in inaccurate current reading and phase.

These clamps are equipped with a plastic BNC connector. To ensure safety, an insulated BNC connector must be used.

Please disconnect the power system before connection as far as possible. Always use proper personal protective equipment, do not work alone and comply with the safety standards described in Chapter 1 “Instructions before use”.

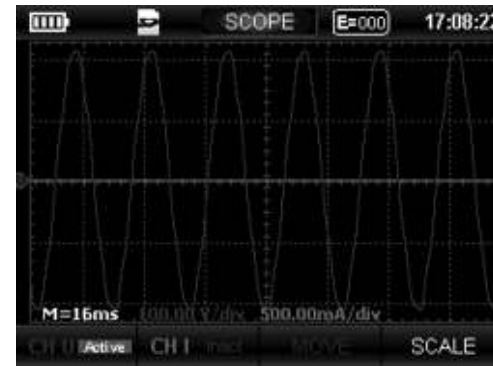


Connecting current: Put the current clamp on the conductor of either L line or N line. The arrow marked on the clamp is used to indicate the correct signal polarity and points to the direction of the current. Make sure that the current clamp jaw firmly and fully clamps around the conductor.

Connecting voltage: Connect the red and black voltage leads to the corresponding L line and N line. To obtain the accurate measurement results, always properly connect the correct input port of ground wire and review whether the connection is correct.

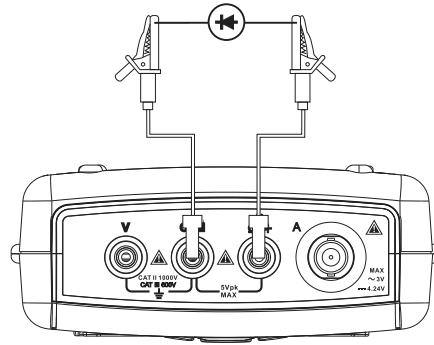
Please set the parameters of the analyzer aiming at the voltage, frequency and wiring configuration of the power system to be measured before any measurement.

Oscilloscope waveform (Scope) display may be used to check whether the connection of voltage lead and current clamp is correct. The voltage and current waveforms shown in the figure represent the correct connection.

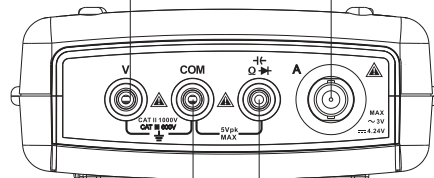


Please refer to the figure below for connection method of Multimeter Measurement, resistance, capacitance and diode.

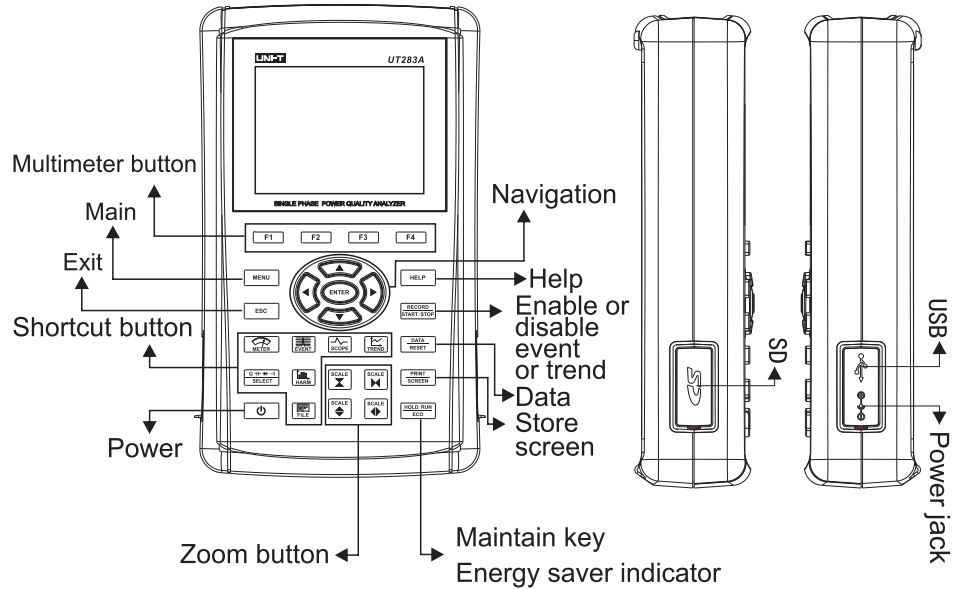
4. Appearance



voltage port L Current clamp



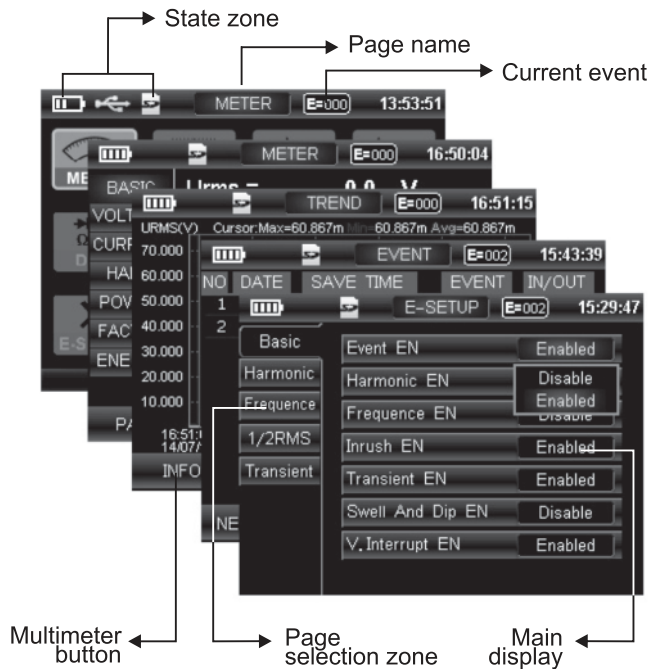
Voltage port N or port Port for the positive



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5. Interface

1) Interface partitions

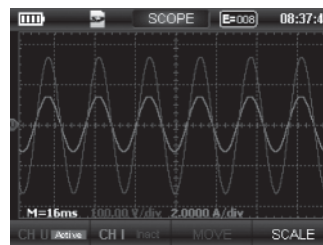


2) Main menu

When UT283A is started up, its main menu is displayed as the startup picture, the main menu page display various function page menu options, and different type of screens of functions display the measurement results in the most effective way. Please see the relevant chapter for details specific to each measurement method.



Various menu pages are shown in the figures below



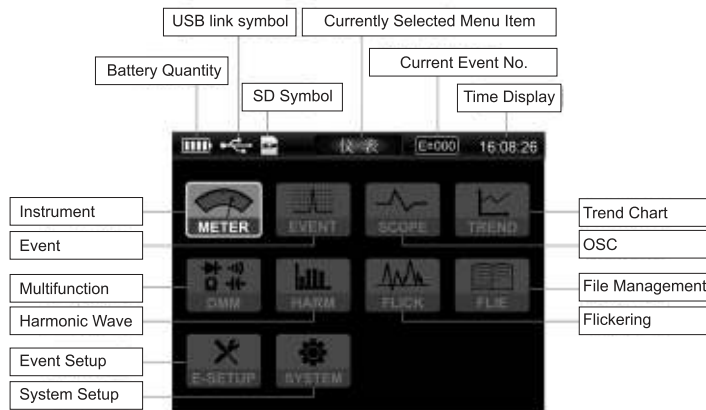
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Operation under Menu Page

Press button at the main menu to move the yellow box to select the proper menu option and press “ENTER” button to enter the function page.

Shortcut button function, enter the proper function page by pressing , , , , , , , respectively.

Description of the main menu page



1. METER: Measurement page.

Main measures: Basic voltage, current, frequency, power, correlated power factor, total harmonic distortion rate, total distortion rate of voltage and current harmonic, current KF factor, electric energy, etc.

2. EVENT: Event page.

Main measures: Swells and dips, inrushes, frequency events, harmonic events, voltage transients, interruptions, etc.

3. SCPOE: Waveform page.

Main measures: Basic waveform of voltage and current.

4. TREND: Trend file page

Main measures: trend file of voltage and current RMS, trend file of frequency, power, harmonics, etc.

5. DMM: Multimeter Page.

Main measures: Resistance, capacitance, diodes, continuity.

6. HARM: Harmonic page.

Main measures: Voltage, current harmonics and inter-harmonics, power harmonic, voltage, current, power phase, etc.

7. FLICK: Flick page.

Main measures: Short and long voltage flick.

8. FILE: File management page.

SD memory card file management function page, SD memory card is mainly used to store event data, trend file data, copy picture data from the screen and browse relevant data and waveforms.

9. E-SETUP: Event Setup Page.

Event Setup Management Page is used to enable and disable main event functions and set event thresholds.

10. SYSTEM: System Page.

System Setup Management Page, mainly including measurement related settings, clamp range setting, class setting of frequency and voltage, trend file record related setting, display language setting, time setting, restore factory setting.

3) METER: Measurement function

Measurement function (METER) displays a series of important readings, including voltage, current, frequency, power, power factor, electric energy. Electric energy is the accumulation of power and time and can be measured after the electric energy function is started.

Measurement page

Enter measurement (METER) screen:

1. Press “METER” shortcut button to directly enter METER function page, as shown in Figure 8-2.
2. Select “METER” menu icon as shown in Figure 8-1 from the main menu page and press “ENTER” enter Meter function page 8-2.



Figure 8-1



Figure 8-2

Functions under METER Page:

1. BASIC: Urms, voltage RMS; Irms, current RMS; P, active power; S, apparent power; Freq, frequency.
2. VOLTAGE: Urms, voltage RMS; Upk+, voltage peak value; Upk-, voltage trough value; Udc, DC voltage component; Uac, AC voltage component.
3. CURRENT: Irms, current RMS; Ipk+, current peak value; Ipk-, current trough value; Iac, AC current component; Idc, DC current component (The clamp should be suitable for DC measurement).
4. HARM: UthdR, total harmonic distortion rate of voltage; IthdR, total harmonic distortion rate of current, UthdF, total distortion rate of voltage based on fundamental wave; IthdF, total distortion rate of current based on fundamental wave; KF, current K factor.
5. POWER: P, active power; Q, reactive power; S, apparent power.
6. FACTOR: PF, power factor; DPF, fundamental phase power factor; UCF, voltage crest factor; ICF, current crest factor; KF, current K factor.
7. ENERGY: WP+, positive active power; WP-, negative active power; WQLag, positive reactive power; WQLead, negative reactive power.

Operations under METER Page:

1. Press “F1” or “” button to view the next function measurement page in turn, and press “” to view the last function measurement page in turn.
2. From ENERGY electric energy measurement page, press “F2” E. START button to measure electric energy, and then the button

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becomes E. STOP, the screen displays “Energy is calculating”, press “F2” E.STOP again to stop the measurement, and the energy measurement in the time frame is over. Please press “F3” E. RESET button to clear the current measurement data before the next measurement, otherwise the measurement data is inaccurate. Note that the measured energy values will be cleared after disconnection.

3. Please correctly set voltage ratio, current ratio, clamp range, voltage class, frequency source because all these will affect the relevant measurement data.
4. Press “F4” button to quickly change the current ratio at a time.

4) EVENT functions

Abnormalities of power quality are known as events. Events include inrush currents, swells and dips, transients, interruptions, harmonics events and frequency events, etc.

Notes:

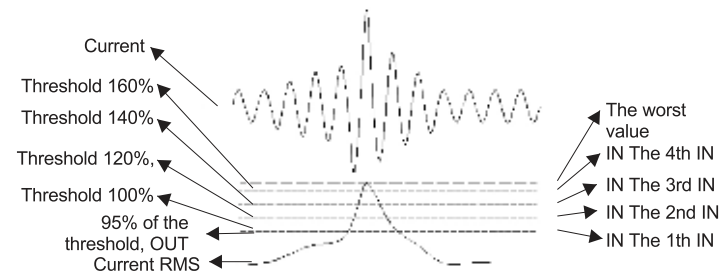
The maximum number of event recording at a time is 500. Excessively frequent events may cause data loss or memory overflow protection and early termination of event monitoring. Prohibit transient overvoltage lasting for a long time, or it may cause system failure of the analyzer.

a) Inrush Currents

The analyzer can capture inrush currents. Inrush current refers to surge currents which occurs when there are high loads or low impedance

loads in the circuit. Generally, when the load reaches the normal operating conditions, the current will be stable in a period of time. For example, the starting current of induction motor can be up to ten times of the normal operating current. When the current waveform goes beyond the adjustable limits, an inrush current occurs. Trend file of inrush current gradually forms on the right side of the screen. Information before triggering allows you to view information about the waveform before the inrush current occurs.

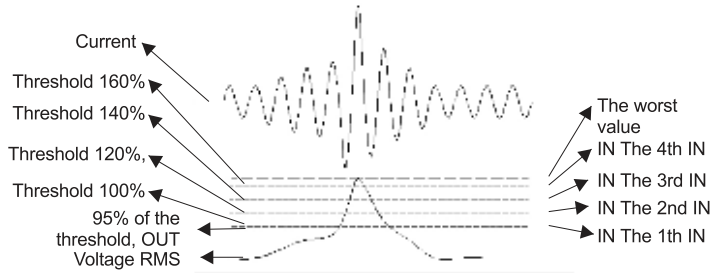
The analyzer produces an Inrush In event whenever it measures the RMS exceed the preset value during a cycle, and then produces another Inrush In event whenever the RMS exceed the preset threshold incremented by 20%, the analyzer produces an Inrush Out event whenever the RMS is lower than 95% of the preset threshold, and records the worst value.



b) Dips and swells

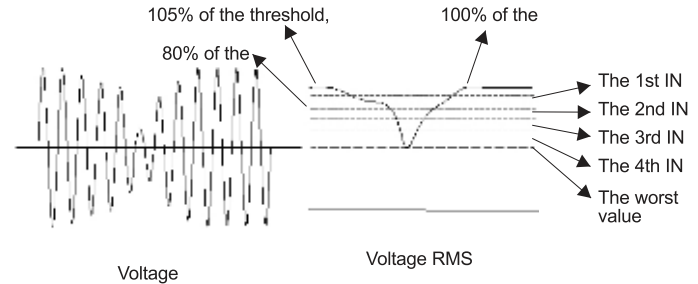
Dips and swells. Dips (dip) and swells refer to the rapid change of the normal voltage. The amplitude may be up to 10 to 100 times of the voltage. As defined by EN61000-4-30, its duration ranges from 1 cycle to a few minutes. The analyzer allows you to select nominal or adjustable voltage classes. The voltage decreases during dips and increases during swells.

The analyzer produces a Swell In event whenever it measures the RMS exceed the preset value during a cycle, and then produces another Swell In event whenever the RMS exceed the preset threshold incremented by 20%, the analyzer produces an Swell Out event whenever the RMS is lower than 95% of the preset threshold, and records the worst value.



The analyzer produces a Dip In event whenever it measures the RMS exceed the preset value during a cycle, and then produces another Dip In event whenever the RMS exceed the preset threshold

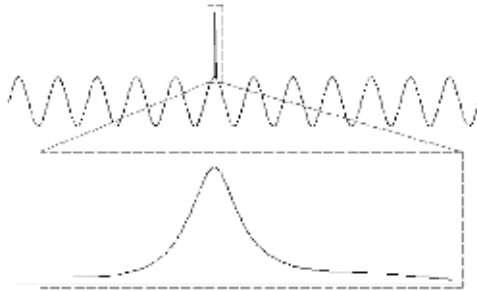
decremented by 20%, the analyzer produces an Dip Out event whenever the RMS is higher than 105% of the preset threshold, and records the worst value.



c) Transient overvoltage

In transient mode, the analyzer can capture the signal with the amplitude up to 6 000V by using its special device of input circuit. Transients refer to the rapid peak signal at the voltage waveform. Due to their very high energy, transients may affect or even damage sensitive electronic equipment. Transients screen looks like oscilloscope waveform; however, you can view voltage peak signal overlaid on 60 or 50 Hz sine wave if its vertical span is enlarged. Whenever the voltage exceeds the adjustable limits, the analyzer will capture a waveform. The sample rate of transient measurement is 2M kS/s. Note: transient event only produces In event rather than Out event.

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Tips and tricks

Disturbances in distribution system such as transients may cause many types of equipment failure. For example, the computer will reset; the equipment which is affected by repeated transients may eventually break down. Because the event is intermittent, it is necessary to monitor the system for a period of time to capture a transient event. When the power supply of electronic equipment fails to work repeatedly or the computer reset itself, you need to check voltage transients.

d) Voltage interruption

When service voltage drops below the voltage which is set to interrupt nominal voltage, we think voltage interruption occurs. Voltage interruption is a phenomenon of short voltage fluctuation; voltage interruption may result from system failures, electrical equipment failures and control failures, etc. Its calculation principle is same as voltage dips.

e) Frequency events

Frequency changes result from changes in the switching and introduction of power station, power grid and heavy load, and its stability may affect the devices sensitive to frequency, such as fans, etc. when the frequency is lower or higher than the set frequency, we think that frequency event occurs (the upper limit Freq+ Out or the lower limit Freq- OUT). If the frequency is higher or lower than the set upper or lower limit incremented or decremented by 1% again, another frequency event occurs, and when the frequency returns to within the limits (1% of return difference), the upper limit Freq+ Out or the lower limit Freq- event occurs.

f) Harmonic event

Harmonic refers to a harmonic voltage component with a frequency which is integer multiples of the fundamental frequency overlaid on 50-60 Hz sine wave voltage. It results from a heavy non-linear load be introducing to the power grid. When a voltage or current harmonic exceeds the set harmonic content, a UHARM or IHARM In event occurs, and then another UHARM or IHARM In occurs whenever it exceeds the set threshold incremented by 20%, a UHARM or IHARM Out event occurs when the RMS is lower than 95% of the set threshold, and the analyzer records the worst value.

g) Event page

Enter EVENT screen:

1. Press "EVENT" button directly enter EVENT function page shown in Figure 9-4

2. Select “EVENT” icon shown in Figure 9-3 via arrow buttons from the main menu and then press “ENTER” button to enter EVENT function page shown in Figure 9-4.



Figure 9-3



Figure 9-4

Functions under EVENT Page:

No.: The number of an event at event recording and 1 will be added to the number after an event occurs.

DATA: The date when the event occurred and its format is month/day.

SAVE TIME: The time when the event occurred and its format is minute: seconds: milliseconds.

EVENT: Event type, such as DIP, SEWLL, INRUSH, TRANS, INTERRUPT, UHARM, IHARM, FREO, etc.

IN/OUT: The status of the event, in or out.

Operations under EVENT Page:

1. Before the event recording, the relevant event threshold should be set (please see Event Setup Management Page for details) and press “RECORD START/STOP” button to start event recording. As shown in the

figure below, when no event has been monitored, the screen display no content, a red “E” flashing in status bar indicates that the analyzer is currently monitoring the event.



2. When an event occurs, the analyzer will record the event-related data. Press “F1”NEWEST button and then the cursor will automatically check the number of the latest event.
3. Press “F2”WAVE_U button to view voltage and current event waveforms in turn. The cursor in waveform window indicates the voltage or current value at the cursor position, TIME represents the time when the current event occurs, “M” represents the time interval and “73.96/div” represents the interval of amplitude gain.

As shown in the figure below, an event is monitored and event-related data is recorded.

NO	DATE	SAVE TIME	EVENT	IN/OUT
1	08/20	08:07:33.629	INRUSH	IN
2	08/20	08:07:34.629	INRUSH	OUT
3	08/20	08:07:39.429	INRUSH	IN
4	08/20	08:07:39.229	INRUSH	OUT
5	08/20	08:07:33.430	INRUSH	IN
6	08/20	08:07:34.230	INRUSH	OUT

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Voltage waveform related data is shown in the figure below:



Current waveform related data is shown in the figure below:



4. Press “F3”DETAIL button to view the detail data of the current event and open EVENT DETAIL window.

Event Time: The time when the event occurred and its format is year/month / day – hours: minutes: seconds: milliseconds.

Event Type: Event type, including UHARM, IHARM, FREQ+, FREQ-, INRUSH, INTRPT, SWELL, DIP, TRANS.

Event IN/OUT: Event enters in or exits.

Event Occur Level: The amplitude at the current cursor position.

Worst Time: The time when the worst event is captured.

Worst Level: The worst event is captured.

Threshold: The event threshold.



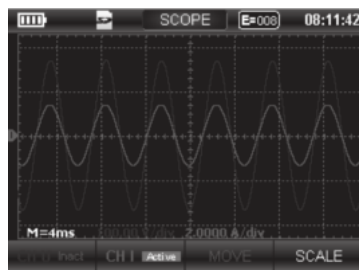
When the event type is TRANS, press “F4”TRANS button to view the transient event related data, and then press “F4”TRANS button to return to EVENT Main Page.



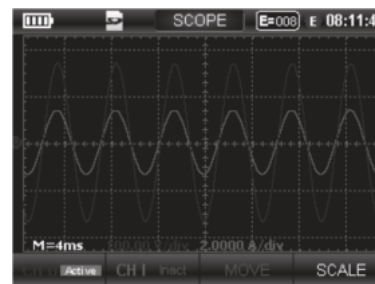
5) Functions under SCOPE Page

Operations under Oscilloscope Page

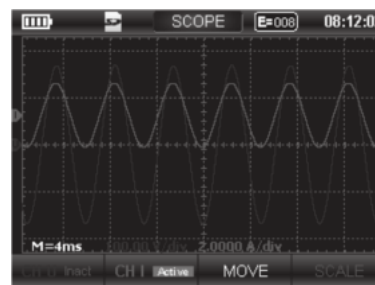
1. Press “F1”CH U button to open and close voltage channel display, press “F2”CH I button to open and close current channel display. The highlighted CHU or CHI means that the display is opened and the grey CHU or CHI means the display is closed.



2. Activate the displayed channel, CHU or CHI is highlighted when the channel is displayed, if “Active” is displayed, the channel currently is active and another channel is in the “inact” state, press “F1” or “F2” corresponding to the channel in the “inact” state to switch the active channel.

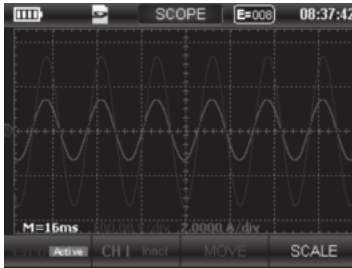


3. Press “F3” to activate MOVE function, press “▲” or “▼” button to move up or down the baseline of the current active channel.



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4. Press “F4” to activate SCALE function, press “◀” or “▶” button to zoom out or zoom in the time base of the current active channel, and press “▲” or “▼” button to zoom out or zoom in the amplitude of the current active channel.



5. Press “” shortcut button to zoom out the amplitude of the current active channel, press “” shortcut button to zoom in the amplitude of the current active channel, press “” shortcut button to zoom out the time base of the current active channel and press “” shortcut button to zoom in the time base of the current active channel.

6) TREND Trend file Recording functions

The analyzer is equipped with data trend file recording function, including URMS, IRMS, Frequency, P, Q, S, UTHDR (1~51 times), ITHDR (1~51 times), PF, PST, UCF, ICF, Udc, Uac, Idc, Iac, KF.

Notes: SD memory card is required for data trend file recording and Trend file Recording function can be opened only after an SD memory card is plugged and formatted. The data of trend file is valid after Repeat

Times is set to greater than 0 from System Setup Page, otherwise data cannot be recorded, and please see the relevant system settings form details.

Operations under the Page

Press “RECORD/START/STOP” button to start recording data, and as shown in Figure 9-1 trend file page, all data on URMS, IRMS, Frequency, P, Q, S, UTHDR, ITHDR, PF, PST, UCF, ICF, Udc, Uac, Idc, Iac, KF will be recorded, but only one set of data is displayed. If Record Enable Time is not enabled, please press “” button to stop recording. If Record Enable Time is enabled, the analyzer will automatically stop recording after the appointment time of Record Enable Time is over.



Figure 9-1

Press “F2” button to activate data conversion function, the button will turn red, press the button to view the next data trend file, the trend file of different data can be viewed in turn only after the recording is stopped, as shown in Figure 9-2.

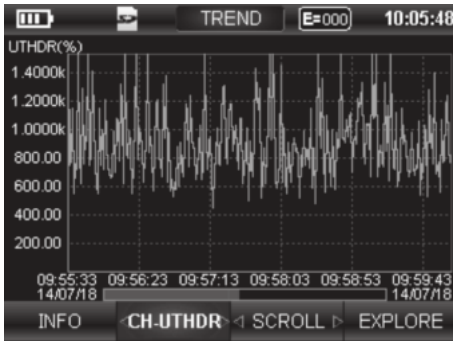


Figure 9-2.

When the recorded data is too much to be displayed on the screen, a progress bar will appear below the timeline to indicate the current amount of data and it will zoom out along with the increase of the amount of data. In the recording state, the position of the red line in the progress bar represents the current cursor position; however, in the viewing state after the recording is stopped, the position of the red line in the progress bar represents the cursor position relative to the current data on the screen. The current cursor position when the second screen of data is viewed is shown in Fig 9-3.

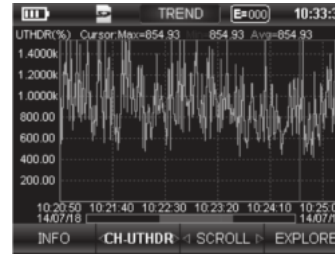


Fig 9-3

Press “F3” button to activate Cursor Move or Screen Roll function, “SCROLL” is checked and highlighted as shown in Fig 9-2 and press “←” or “→” button in the current state to roll a screen of data of trend file towards the left or right.

As shown in Figure 9-3, “SCROLL” is displayed normally, press “←” or “→” button in the current state to move the current cursor position towards the left or right to view the current cursor data, the current cursor data at Cursor position such as Max, Min, Avg represent the specific values.

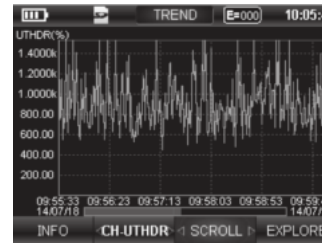


Figure 9-2

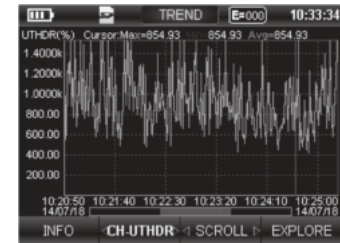


Figure 9-3

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Press “F4” button to view the full trend file of the current data such as Max, Min, Avg as long as the record length of the data is longer than the double length of the screen, the yellow chart represents the trend file of the maximum values, the blue chart represents the trend file of the minimum values and the green chart represents the trend file of the average values, as shown in Figure 9-3.



Figure 9-3

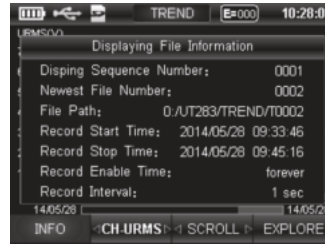


Figure 9-4

Press “F1” INFO button to view the details of this data record, the following contents is included in the dialog box popped by INFO: the number of the current data file, the number of the latest file, file path, the start time of recording, the stop time of recording, the enabling time of recording, the interval of recording, as shown in Figure 9-4

Note: If the current recording is not stopped, the stop time of recording is displayed as --/-- --:--:--; the stop time of recording may be viewed only after the recording is stopped.

When UTHDR, ITHDR harmonic data is viewed, only a harmonic order of data can be viewed, for example, UTHDR 5 or ITHDR 3 indicates that the current data is five or three orders of harmonic.

Press “←” or “→” button to view the trend file data of the last or next harmonic order.

7) DMM Multimeter Measurement functions

DMM Multimeter Measurement functions include capacitance, resistance, diodes and continuity measurement functions.

Enter DMM Multimeter Page:

1. Press “SELECT” button to directly enter DMM Multimeter Page, as shown in Fig 12-1.
2. Check “DMM” menu icon as shown in Figure 12-2 through arrow buttons from the main menu, press “ENTER” button to enter DMM Multimeter Page, as shown in Figure 12-1.



Figure 12-1



Figure 12-2

Operations under DMM Multimeter Page:

1. Press “” or “F1”FUNC button to switch measurement functions, resistance -> capacitance -> diodes-> continuity.
2. Press “F3”AUTO button to select auto measuring range under Resistance or Capacitance Function Page.
3. Press “F4”RANGE button to switch measuring range under Resistance or Capacitance Function Page.

8) HARM Harmonic Measurement function

This function can be used to measure and record the voltage, current, power harmonics and inter-harmonics up to 51 times. It can also be used to measure the relevant data, such as the DC component, the total harmonic distortion (THD) and K factor. Harmonics refer to the periodic distortion of the sine waves of the voltage, current or power. A waveform can be considered as a combination of various sine waves with different frequencies and amplitudes. The effect of these component to the full signal is also measured respectively. The readings may be represented as a percentage of fundamental waves or RMS of harmonic content. The results can be viewed in the form of histogram, table or trend file. Harmonics mainly result from non-linear loads, such as switching power supply of computer, the actuating devices of TV and adjustable-speed motor. Harmonics may result in the overheating of transformers, conductors and motor. 100A current range of measuring range is recommended to measure harmonics.

Enter HARM Harmonics Function Page

1. Press “HARM” button to directly enter HARM Harmonics Function Page, as shown in Figure 13-1.
2. Check “HARM” menu icon as shown in Figure 13-2 through arrow buttons from the main menu, press “ENTER” button to enter HARM Harmonics Function Page, as shown in Figure 13-1.

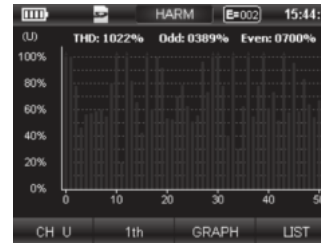


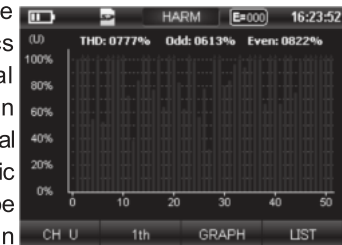
Figure 13-1



Figure 13-2

Harmonics Page can be displayed in two forms, a histogram and list.

1. Histogram: The percentage composition of each harmonics component to the fundamental component is visually display in the form of histogram. For the signal without distortion, the first harmonic (fundamental harmonic) should be displayed at 100%, as shown in the figure below.



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The ordinate represents a percentage of 0% to 100%, the abscissa represents the harmonic order of 0 to 51.

THD: Total harmonic distortion. Odd: Odd harmonic distortion. Even: Even harmonic distortion.

2. List: Display RMS, the frequency, phase and content of each harmonic component, as shown in the figure below.

Orders	Freq(Hz)	Level(V)	HRU(%)	Phase(°)
0	0.0	-0.07	0.0	0.0
1	0.0	0.00	100.00	0.0
2	0.0	0.00	86.69	33.2
3	0.0	0.00	125.93	-178.0
4	0.0	0.00	82.00	-69.4
5	0.0	0.00	79.93	-42.5
6	0.0	0.00	98.07	149.5
7	0.0	0.00	88.99	-72.3

Orders: Harmonic orders.

Freq: Harmonic frequency.

Level: Harmonic level.

HRU: harmonic content relative to fundamental wave. HRU is invalid for the harmonics of power.

Phase: Harmonics phase.

Note: The voltage phase is the phase shift relative to the fundamental wave, the current phase is the phase shift relative to this voltage harmonic.

3. When no measured signal is input, uncertain data is displayed in the histogram of voltage and current, and it is normal that uncertain data on voltage harmonic content (HRU), voltage phase (Phase) and current harmonic content are shown under List Page, and when measured signal is input, the stable data of the measured signal is displayed, as shown in Figure 13-3.

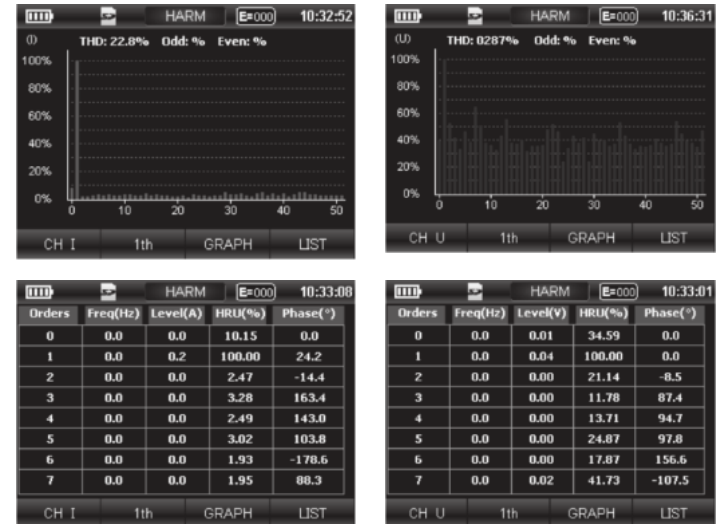




Figure 13-3

Operations under Harmonics Function Page:

1. Press “F1” button to switch and view the measured value of the voltage, current and power harmonics.
2. Press “F2” button to switch and view the measured value of the harmonics and inter-harmonics. The voltage and current inter-harmonics have no phase and power inter-harmonics only have frequency value.
3. Press “F3” GRAPH to switch to Histogram Mode Page.
4. Press “F4” LIST to switch to List Mode Page.
5. Only 8 orders of harmonic data are shown in the screen in List Mode Page. Press arrow button “” to roll down or “” to roll up the page to view more harmonics data.

9) FLICK

UT283A is equipped with flick measurement function. The flick is the quantization of the fluctuation in the brightness of the lamp caused by the fluctuation in the supply voltage. The algorithm used for the measurement complies with EN61000-4-15 standards and is based on the perceptual model of eye/brain sensory system. The duration and amplitude of voltage fluctuation is converted by UT293A into a “discomfort factor” caused by such fluctuation feel like the discomfort caused by the flick of a 60W lamp. The measurement is optimized with a lamp supplied by 120 V / 60 Hz or 230 V / 50 Hz power.

Flick is divided into instantaneous flick Pinst, short time ponderance Plt (measured within 10 minutes) and long time ponderance Plt (measured within 2 hours).

Enter Flick Measurement Page

1. Check “FLICK” menu icon through arrow buttons from the main menu as shown in Figure 14-1, press “ENTER” button to enter Flick Measurement Page as shown in Figure 14-2. Note: If the current page is not the main menu page, please press “ESC” button to return to the main menu page in turn, or press “MENU” button to directly return to the main menu page.



Figure 14-1




Figure 14-2

Functions under Flick Measurement Page

1. No.: The number of the measured flick.
2. Time: The time when the flick occurs.
3. Pst: Short time flick value (measured within 10 minutes).
4. Plt: Long time flick value (measured within 2 hours).
5. Max: Maximum instantaneous ST
6. Min: Minimum instantaneous ST

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Operations under Flick Measurement Page

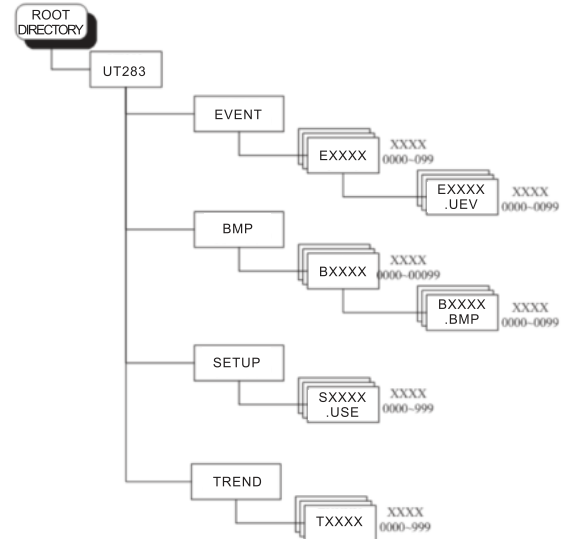
1. Press “F1”P.UP button to move up the cursor, press “F2”P.DOWN button to move down the cursor.
2. Press arrow button “

Notes: The flick should be measured in a stable state, so the values measured within the first 30 minutes may be inaccurate and voltage interruption occurred during measurement may result in inaccurate data, please pay attention to avoid the above situations.

10) FILE Management functions

EU283A is equipped with SD card expansion function, File Management functions refer to the management of historical files recorded on the SD card, including event data, trend file data recorded by SD card and the copied picture data. It supports up to 8G SD card, and please format the SD card before recording, otherwise, it cannot be normally used. Please use the standard SD card, or it may not be compatible with the analyzer, resulting in a SD card recording failure.

The directory structure of files is shown in the figure below.



There are some limits for the maximum number of each store file, the maximum number of event is 9999, that of BNP picture is 9999, that of setup file is 999, that of trend file is 999, if the maximum number is exceeded, system failure will occur, please format as soon as possible.

In addition, with the increase of the used space of SD card, its storage speed will slow down, please regularly clean up the memory of SD card.

Enter FILE Management Page

1. Press “FILE” button to directly enter File Management Page as shown in Figure 15-1.
2. Check “FILE” menu icon through arrow buttons from the main menu as shown in Figure 15-2, and then press “ENTER” button to enter File Management Page as shown in Figure 15-1.



Figure 15-1



Figure 15-2

Functions under File Management Page

Enter FILE Management Page, and there are four folders, EVENT, BMP, SETUP and TREND.

1. EVENT: Used to store event related data.
2. BMP: Used to store pictures copied from the screen.
3. SETUP: Used to store the relevant setting data, the stored data include: record: Data Interval, Repeat Times; Enable Time; display: Language, Backlight Off, Backlight; measurement: VT_RATIO, CT_RATIO, Clamp Type, Voltage class, Normal Frequency, Energy EN, Frequency Source and all data related to event settings.

4. TREND: Used to store trend file related data. Size represents the file size, if it is a folder. <DIR> will be displayed. Date represents the date when the current folder or file is created. Total represents the total number of files on the current page. SD Used refers to the used capacity of the SD card. Free refers to the remaining available capacity of the SD card. The total size of the SD card is the sum of Used SD and Free.

Operations under File Management Page

Under this page, the highlighted buttons corresponding to F1~F4 mean that the button has responded.

1. Press “F4”FORMAT button to format SD card, all recorded data will be deleted after formatting and four empty folders, EVENT, BMP, SETUP and TREND will be recreated.
2. Press arrow buttons “” or “” to move the cursor and select the file or folder to be operated or viewed.
3. Press “F2”OPEN or “ENTER” button to open the file and folder at the current cursor position.
4. Press “F3”DELETE to delete the file at the current cursor position.
5. Press “ESC” button to return to the previous page in turn when the folder or file is opened.
6. Please see the relevant operations and description on Event Page and Trend file Page for detail operations while opening and viewing event data or trend file data.
7. The operations for opening and browsing event and trend file data are basically same as that of Event Function Page and Trend

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Recording Page. Press ESC button to return to File Browsing Page.

8. While opening SETUP directory, if there are files in the directory, the files can only be loaded and E-SETUP related content settings are changed.

Notes:

Do not enable recording function under this page, do not remove SD card under this page, otherwise these may impair SD card or result in file loss. Too much data may decrease the read-write speed of SD card and should be properly removed.

11) E-SETUP Event Setup functions

E-SETUP Event Setup Page is the setup page of all events, such as event record enabling, event threshold, etc. The occurrence of events is enslaved to the relevant thresholds, so please preset the relevant thresholds before event recording is enable, otherwise the recorded event may be inaccurate.

Enter E-SETUP Event Setup Page

Check “E-SETUP” menu icon through arrow buttons from the main menu as shown in Figure 16-1 and then press “ENTER” enter SETUP Event Setup Page as shown in Figure 16-2.



Figure 16-1



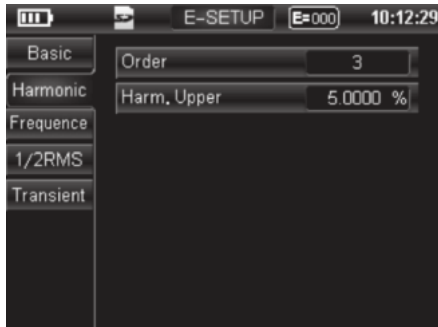
Figure 16-2

Notes:

Recording function cannot be enabled under this page, if the analyzer is recording data, the relevant setting can only be browsed and any settings can be changed under this page.

Functions under E-SETUP Event Setup Page

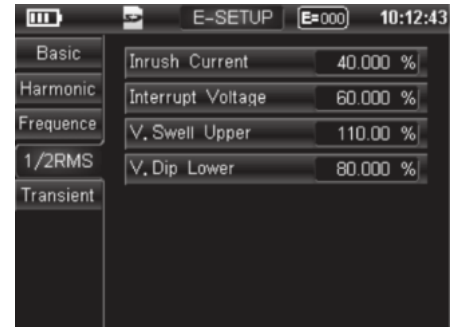
1. Base: Event Record Enabling options include a global enabling option and an individual enabling option for each event. Before recording, it is necessary to open the global enabling option and the individual enabling option for the relevant event as shown in Figure 16-2.
2. Harmonic: Harmonic event-related threshold setup option is shown in the figure below.



3. Frequency: Frequency event-related threshold setup option is shown in the figure below.



4. 1/2RMS: Inrush, interruption, swells and dips event-related threshold setup option is shown in the figure below.



5. Transient: Transient event-related threshold setup option is shown in the figure below.



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Operations under E-SETUP Event Setup Page

There are two levels of menu options under E-SETUP Page, the left column is the main menu and the right column is the submenu of event setup, and the red check box represents the currently checked menu option.

1. When the check box moves on the main menu, press “” or “” button to check different menu option and press “” or “ENTER” button to enter the submenu option of the currently checked menu. The current check box moves on the main menu as shown in Figure 16-3.
2. When the check box is moving on the submenu, press “” or “” button to check different setup option and press “” or “ESC” button to return to the corresponding main menu. The current check box moves on the main menu as shown in Figure 16-4.

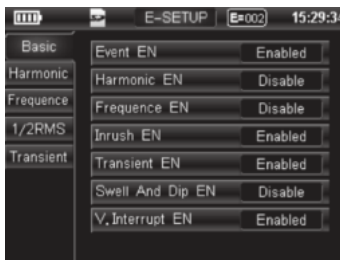
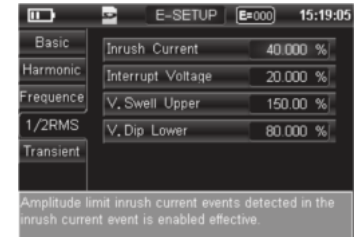
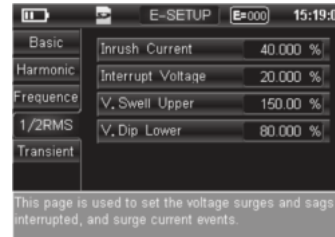
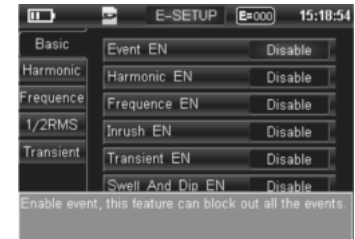
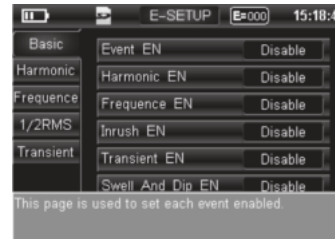


Figure 16-3



Figure 16-4

HELP function: Under this page, press “HELP” button and then a brief help menu will be popped up or hidden at the bottom of the screen, suggesting the functions of setup option at the cursor position, as shown in the figure below.



3. Basic menu setup:

Event enabling options under Basic menu:

- 1) Event EN: The global enabling option, event can be enabled and recorded only after the global event is enable.
- 2) Harmonic EN: Harmonic event enabling option.

- 3) Frequency EN: Frequency event enabling option.
- 4) Inrush EN: Inrush event enabling option.
- 5) Transient EN: Transient event enabling option.
- 6) Swell And Dip EN: Swells and dips event enabling option.
- 7) V.Interrupt EN: Voltage interruption enabling option.

Operations: As shown in Figure 16-4, press “” or “” button to check the event to be recorded, and press “ENTER” button to pop up drop-down option box under the current checked enabling option as shown in Figure 16-5, press “” or “” button to select “Enable” or “Disable”, press “ENTER” button to confirm and then exit Edit mode, or press “ESC” button to directly exit Edit mode, and then the enabling option will not be changed.



Figure 16-5

4. Harmonic: Menu setup

Harmonic menu is used to set the thresholds of harmonic events as shown in Figure 16-6, and include two threshold setup options, Order (harmonic order) and Harm.Upper (the upper limit of harmonic content). When the harmonic content is higher than the Harm.Upper value, an event occurs and the event-related data is recorded in the event function directory.

Order setup: As shown in Figure 16-7, press “” or “” button to check Order option, press “ENTER” button to enter Edit mode; as shown in Figure 16-7, press “” or “” button to edit and set the harmonic order of the harmonic event, and then press “ENTER” button to confirm and exit Edit mode or press “ESC” button to directly exit Edit mode without saving the Edit mode.

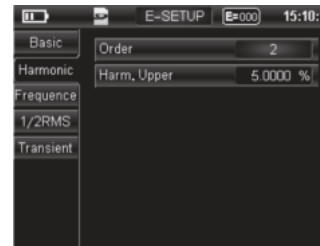


Figure 16-6

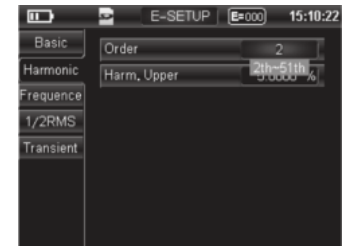


Figure 16-7

Harm.Upper setup:

Press “” or “” button to check Harm.Upper option, press “ENTER” button to enter Edit mode, as shown in Figure 16-8, the

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blinking cursor position is the edit position, press “” button to decrease the current value. Check Harm.Upper and press “” or “” button to move left or right the cursor edit position.

When the cursor is at the decimal point position, press “” button to shift the decimal point left a bit (the value increases by a scale), press “” to shift the decimal point right a bit (the value decreases by a scale). When in the edit state, threshold setup range appears in the current edit page and a setting beyond this range is invalid.

The range of Order: 2-51.

The range of Harm.Upper: 0%~100%, percentage composition relative to fundamental wave.

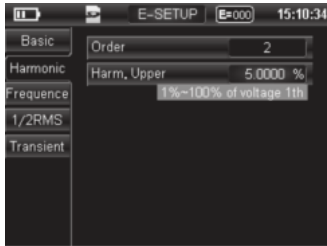


Figure 16-8



Figure 16-9

5. Frequency menu setup

Frequency menu is used to set the lower threshold (Frequency Lower) and the upper threshold (Frequency Upper) of frequency event as shown in Figure 16-9, and when the measured frequency

is lower than the lower threshold or higher than the upper threshold, a frequency event occurs.

Frequency Upper (Lower) setup: As shown in Figure 16-9, press “” or “ENTER” button to enter menu setup option and press “” or “” to check Frequency Upper or Frequency Lower as shown in Fig 16-10. Check the option to be edited, press “ENTER” to enter the edit mode, as shown in Fig 16-20. The blinking cursor position is the edit position, press “” or “” button to increase or decrease the current value. Press “” or “” button to move left or right the cursor edit position. When the cursor is at the decimal point position, press “” button to shift the decimal point left a bit (the value increases by a scale), press “” to shift the decimal point right a bit (the value decreases by a scale). When in the edit state, threshold setup range appears in the current edit page and a setting beyond this range is invalid.



Figure 16-10

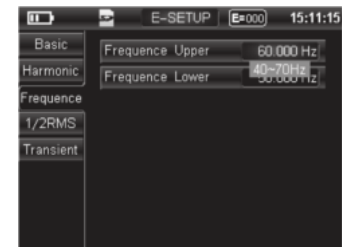


Figure 16-20

6. 1/2RMS menu setup

1/2RMB is the half-cycle signal event threshold of the current system setup frequency (see System Setup Measure->Normal Frequency), as shown in Figure 16-20.

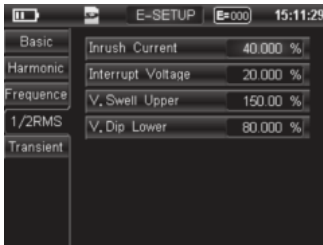


Figure 16-20

Inrush Current: Inrush current threshold, set based on the current percentage of current measuring range (see System Measure -> Clamp Type). When inrush current goes beyond the preset value, an event occurs and the event-related data is recorded in the event function directory.

Operations for setup

As shown in Figure 1 below, press “ENTER” button to enter edit mode, the blinking cursor position is the edit position as shown in Fig 2 below, press “▲” or “▼” button to increase or decrease the current value. Press “◀” or “▶” button to move left or right the cursor edit position. When the cursor is at the decimal point position, press “▲” button to shift the decimal point left a bit (the value increases by a scale) , press “▼” to shift the decimal point right a bit (the value decreases by a scale). When in the edit state, threshold setup range appears in the current edit page and a setting beyond this range is invalid.

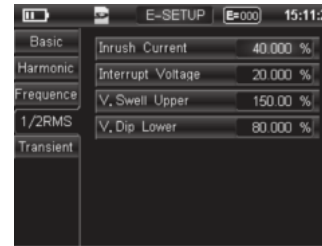


Figure 1

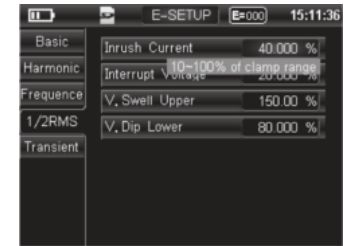


Figure 21

Interrupt Voltage: Voltage interruption threshold setup, set based on the current percentage of voltage class (see System Measure -> Voltage Class). When voltage reduction goes beyond the preset value, an event occurs and the event-related data is recorded in the event function directory.

Operations for setup: As shown in Figure 1 below, press “ENTER” button to enter edit mode, the blinking cursor position is the edit position as shown in Figure 2 below, press “▲” or “▼” button to increase or decrease the current value. Press “◀” or “▶” button to move left or right the cursor edit position. When the cursor is at the decimal point position, press “▲” button to shift the decimal point left a bit (the value increases by a scale) , press “▼” to shift the decimal point right a bit (the value decreases by a scale). When in the edit state, threshold setup range appears in the current edit page and a setting beyond this range is invalid.

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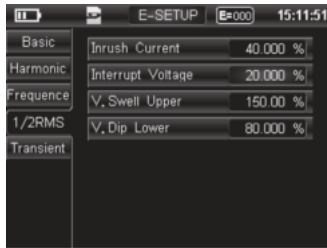


Figure 1

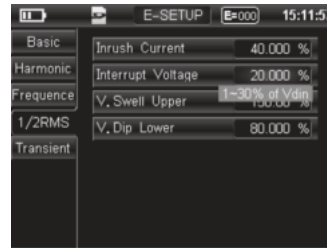


Figure 2

V.Swell Upper: The upper threshold of voltage swells, set based on the current percentage of voltage class (see System Measure-> Voltage Class). When voltage reduction goes beyond the preset value, an event occurs and the event-related data is recorded in the event function directory.

Operations for setup: As shown in Figure 1 below, press “ENTER” button to enter edit mode, the blinking cursor position is the edit position as shown in Figure 2 below, press “▲” or “▼” button to increase or decrease the current value. Press “◀” or “▶” button to move left or right the cursor edit position. When the cursor is at the decimal point position, press “▲” button to shift the decimal point left a bit (the value increases by a scale), press “▼” to shift the decimal point right a bit (the value decreases by a scale). When in the edit state, threshold setup range appears in the current edit page and a setting beyond this range is invalid.

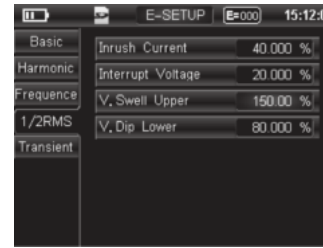


Figure 1

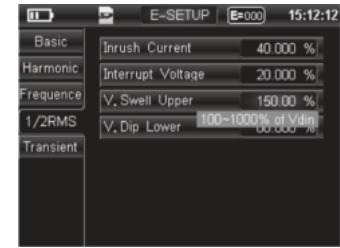


Figure 2

V.Dip Lower: The lower threshold of voltage dips, set based on the current percentage of voltage class (see System Measure-> Voltage Class). When voltage reduction goes beyond the preset value, an event occurs and the event-related data is recorded in the event function directory.

Operations for setup

As shown in Figure 1 below, press “ENTER” button to enter edit mode, the blinking cursor position is the edit position as shown in Figure 2 below, press “▲” or “▼” button to increase or decrease the current value. Press “◀” or “▶” button to move left or right the cursor edit position. When the cursor is at the decimal point position, press “▲” button to shift the decimal point left a bit (the value increases by a scale), press “▼” to shift the decimal point right a bit (the value decreases by a scale). When in the edit state, threshold setup range appears in the current edit page and a setting beyond this range is invalid.

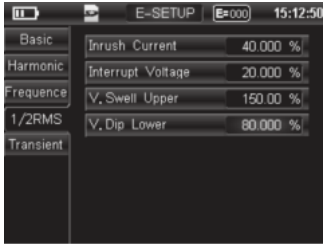


Figure 1

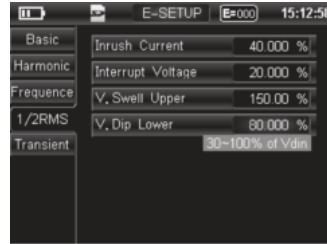


Figure 2

6. Transient menu setup

Transient Voltage: Voltage transient threshold, as shown in Figure 16-21. When voltage transient goes beyond the preset value, an event occurs and the event-related data is recorded in the event function directory.



Figure 16-21

Operations for setup

As shown in Figure 1 below, press “ENTER” button to enter edit mode, the blinking cursor position is the edit position as shown in Figure 2 below, press “▲” or “▼” button to increase or decrease the current value. Press “◀” or “▶” button to move left or right the cursor edit position. When the cursor is at the decimal point position, press “▲” button to shift the decimal point left a bit (the value increases by a scale), press “▼” to shift the decimal point right a bit (the value decreases by a scale). When in the edit state, threshold setup range appears in the current edit page and a setting beyond this range is invalid.

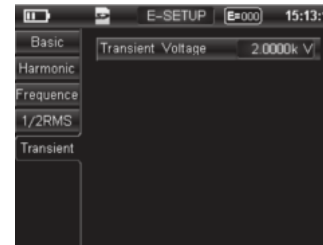


Figure 1



Figure 2

12) System Setup functions

The main system related parameters set in System Menu include Measure, Record, Display, Time, Factory. The main page of System Menu is shown in Figure 17-1, enter the main page of System Menu as shown in Figure 17-1 and press “ENTER” button to enter the page as shown in Figure 17-2.

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Figure17-1

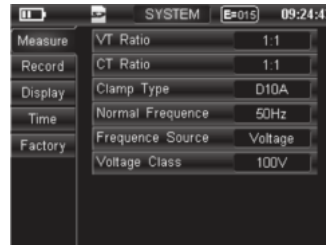


Figure17-2

Functions under System Menu

1. Measure: Measurement parameter setup, VT Ratio, CT Ratio, Clamp Type, Normal Frequency, Frequency Source, Voltage Class.
2. Record: Trend file-related parameter setup, Data Interval, Repeat Times, Enable Time.
3. Display: System display-related parameter setup, Language, Backlight, Backlight Off.
4. Time: System time-related parameter setup.
5. Factory: System permissions setup.

1. Measure Menu setup

VT Ratio: The voltage ratio of primary circuit to secondary circuit, showing the measured voltage value is in direct proportion to variable ratio, when variable ratio is 1:1, the reading is the true value, otherwise, the reading = the measured value * variable ratio. The range of variable ratio: VARIABLE custom variable ratio 0~5000, 1:1, 5:1, 10:1, 20:1, 50:1, 60:1, 100:1, 120:1, 200:1, 500:1, 600:1, 1000:1, 1200:1, 2000:1, 5000:1.

Operations for setup

As shown in Figure 17-2, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-3, press “” or “” button to select variable ratio to be set, press “ENTER” button to confirm the selected variable ratio, or press “ESC” button to give up and exit drop-down menu.

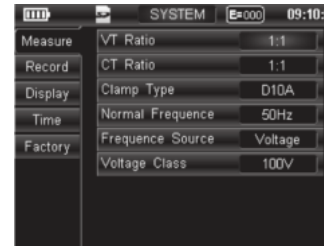


Figure 17-2

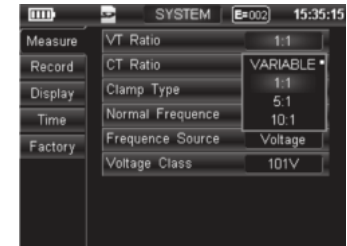


Figure 17-3

Select “yes” for “Is Custom VARIABLE selected for variable ratio” to enter Custom Edit mode, as shown in Figure 17-4, press “” or “” button to adjust the value, press “” button to make the edit position move right, and press “” button to make it move left. When the edit position is at the decimal point position, press “” button to shift the decimal point right, press “” to shift the decimal point left. When the edit is completed, press “ENTER” button to confirm and store the set variable ratio or press “ESC” button to give up and exit edit.

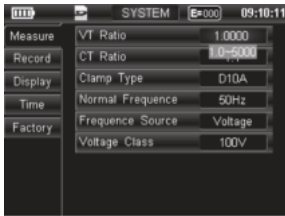


Figure 17-4

CT Ratio: The current ratio of primary circuit to secondary circuit, showing the measured current value is in direct proportion to variable ratio, when variable ratio is 1:1, the reading is the true value, otherwise, the reading = the measured current * variable ratio. The range of variable ratio: VARIABLE custom variable ratio 1~1200, 1:1, 5:1, 10:1, 20:1, 50:1, 60:1, 100:1, 120:1, 200:1, 500:1, 600:1, 1000:1, 1200:1.

Operations for setup

As shown in Figure 17-5, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-5, press “▲” or “▼” button to select variable ratio to be set, press “ENTER” button to confirm the selected variable ratio, or press “ESC” button to give up and exit drop-down menu.

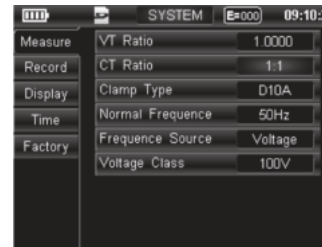


Figure 17-5

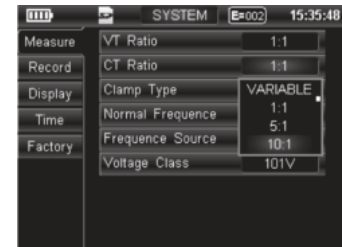


Figure 17-6

Select “yes” for “Is Custom VARIABLE selected for variable ratio” to enter Custom Edit mode, as shown in Figure 17-7, press “▲” or “▼” button to adjust the value, press “←” button to make the edit position move right, and press “→” button to make it move left. When the edit position is at the decimal point position, press “▲” button to shift the decimal point right, press “▼” to shift the decimal point left a bit. When the edit is completed, press “ENTER” button to confirm and store the set variable ratio or press “ESC” button to give up and exit edit.

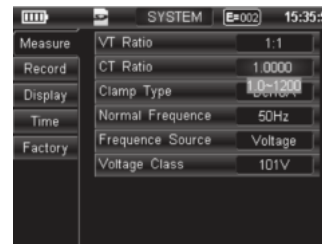


Figure 17-7

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Clamp type: The interface configuration of current transformer, including: D1000A, D100A, D10A, 1mv/1A, 10vm/1A, 100vm/1A, 1mv/3A, 5A50mV, among which “D” is the corresponding current range of the factory standard transformer.

Operations for setup

As shown in Figure 17-8, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-9, press “” or “” button to select variable ratio to be set, press “ENTER” button to confirm the selected variable ratio, or press “ESC” button to give up and exit drop-down menu.

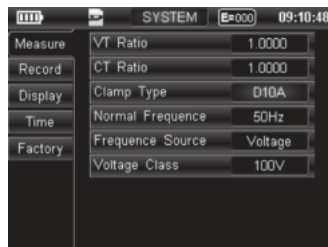


Figure 17-8

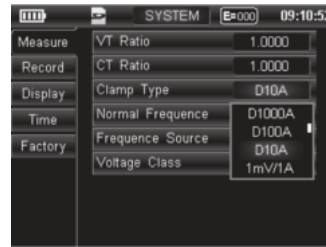


Figure 17-9

Normal Frequency: Used to set the operating frequency of the current measured grid, setup range includes: 50Hz, 60Hz.

Operations for setup

As shown in Figure 17-20, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-21, press “” or “” button to select variable ratio to be set, press “ENTER” button to confirm the selected variable ratio, or press “ESC” button to give up and exit drop-down menu.

to confirm the selected variable ratio, or press “ESC” button to give up and exit drop-down menu.

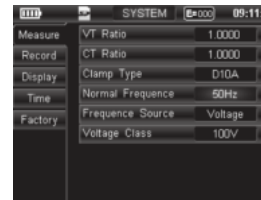


Figure 17-20

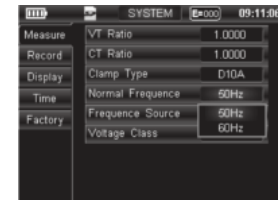


Figure 17-21

Frequency Source: The reference sources of frequency, RMS, harmonics related measurement functions, the reference source to be set include: voltage, current.

Operations for setup

As shown in Figure 17-22, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-23, press “” or “” button to select variable ratio to be set, press “ENTER” button to confirm the selected variable ratio, or press “ESC” button to give up and exit drop-down menu.

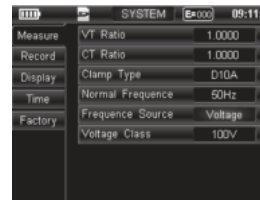


Figure 17-22

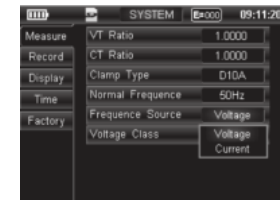


Figure 17-23

Voltage Class: The voltage class of the measured grid, the voltage class to be set include: 57.7V, 100V, 101V, 110V, 120V, 127V, 200V, 202V, 208V, 220V, 230V, 240V, 277V, 347V, 380V, 400V, 415V, 480V, 600V, 1000V.

Operations for setup

As shown in Figure 17-24, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-25, press “▲” or “▼” button to select variable ratio to be set, press “ENTER” button to confirm the selected variable ratio, or press “ESC” button to give up and exit drop-down menu.

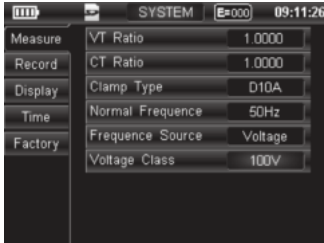


Figure 17-24

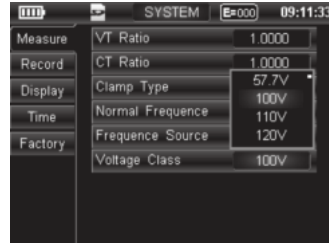


Figure 17-25

2. Record Menu setup

Data Interval:

The data interval between data records, the data interval to be set include: 1, 2, 4, 8, 15, 30, 60sec, 2, 4, 6, 12, 24, 48, 60min and 2 hours.

Operations for setup

As shown in Figure 17-26, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-27, press “▲” or “▼” button to select variable ratio to be set, press “ENTER” button to confirm the selected variable ratio, or press “ESC” button to give up and exit drop-down menu.



Figure 17-26



Figure 17-27

Repeat Times:

The times of repeat records, effective only after recording time is enabled. The range of repeat times is from 0 to 9. When the value of Repeat Times is 0, Data Recording function is enabled, the data is recorded by Event Recording function rather than Trend file function.

Operations for setup

As shown in Figure 17-28, press “ENTER” button to enter the edit mode, and as shown in Figure 17-29, press “▲” or “▼” button to increase or decrease the variable ratio, press “ENTER” button to confirm the selected variable ratio, or press “ESC” button to give up and exit the edit mode.

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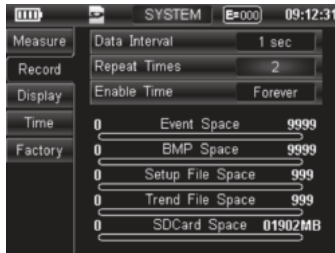


Figure 17-28



Figure 17-29



Figure 17-30



Figure 17-31

Enable Time:

The appointment time of data recording, that is, the time from starting data recording to stopping data recording, press “START/STOP” button to stop data recording if the appointment time is not over. The appointment times include: Forever manually stop, 2, 4, 6, 12, 24, 48, 60min; 2 , 5, 10, 24 hour; 2, 4, 8, 16, 30, 60 days.

Operations for setup

As shown in Figure 17-30, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-31, press “▲” or “▼” button to select variable ratio to be set, press “ENTER” button to confirm the selected variable ratio, or press “ESC” button to give up and exit drop-down menu.

Please see the file directory structure of FILE chapter for description of relevant document’s space.

Event Space: The space of event

BMP Space: The space of snapshot

Setup File Space: The space of setup file

Trend File Space: The space of trend file

SDCard Space: The space of SD card

3. Display Menu setup

Language: System language, two languages (Chinese and English) can be set.

Operations for setup

As shown in Figure 17-32, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-33, press “▲” or “▼” button to select language to be set, press “ENTER” button to confirm the selected language, or press “ESC” button to give up and exit drop-down menu.

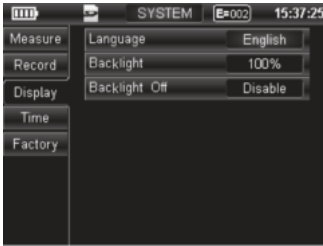


Figure 17-32



Figure 17-33

Backlight:

The brightness of backlight, adjustable range: 25%, 50%, 75%, 100%.

Operations for setup

As shown in Figure 17-34, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-35, press “▲” or “▼” button to select brightness class to be set, press “ENTER” button to confirm the selected brightness, or press “ESC” button to give up and exit drop-down menu.

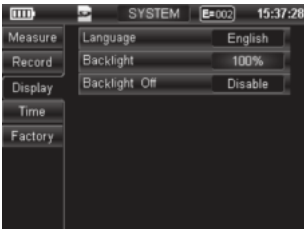


Figure 17-34

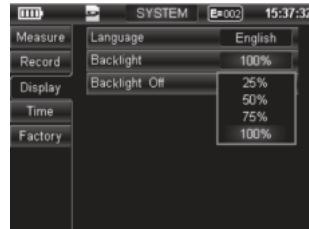


Figure 17-35

Backlight Off:

The option of backlight auto off, Disable, Enable. After backlight auto off is enabled, the backlight will automatically turn off within 5 minutes after no button is pressed to reach the purpose of power saving.

Operations for setup

As shown in Figure 17-36, press “ENTER” button to pop up drop-down selection menu, and as shown in Figure 17-37, press “▲” or “▼” button to select “enabled” or “disable”, press “ENTER” button to confirm the selected setting, or press “ESC” button to give up and exit drop-down menu.



Figure 17-36

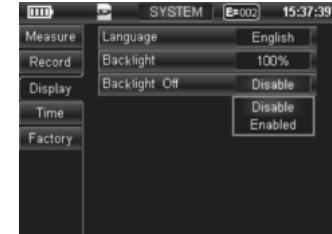


Figure 17-37

Time Menu setup

Time Menu is used to set system time and date.

Operations for setup

As shown in Figure 17-38, press “◀”、“▶”、“▲”、or “▼” to select the option to be set, press “ENTER” button to enter the

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edit mode, and as shown in Figure 17-39, press “▲” or “▼” button to adjust the value, press “ENTER” button to confirm the selected setting, or press “ESC” button to give up and exit the edit mode. Adjust and set time and date according to the above instructions. After setup, check “Setup New Time” button with the cursor as shown in Figure 17-40, press “ENTER” button to confirm the set time and date.

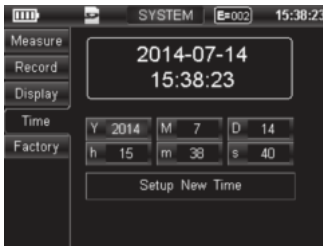


Figure 17-38



Figure 17-39



Figure 17-40

4. Factory Menu setup

Factory Menu is the advanced system setup menu

Restore factory settings

As shown in Figure 17-42, press “ENTER” button, and check “Yes” in the popped dialog box to confirm and restore factory setting.

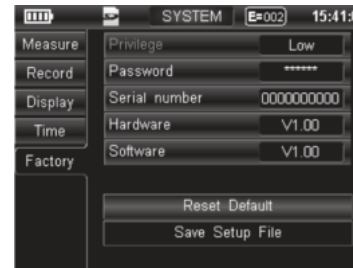


Figure 17-42

Save Setup File

5. Used to save the parameters set by the current user, including measurement related settings, event-related settings and recording

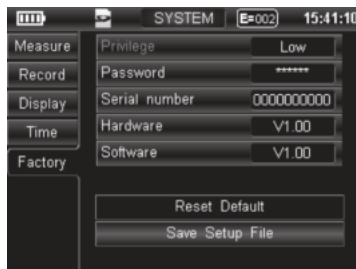
related settings:

Recording: Data Interval, Repeat Times, Enable Time.

Display: Language, Backlight Off, Backlight

Measurement: VT RATIO, CT RATIO, Clamp Type, Voltage class, Normal Frequency, Energy EN, Frequency Source and all event related and setup related parameters, such as event enabling parameters, event threshold parameters, etc.

As shown in Figure 17-43, press “ENTER” button, check “yes” in the popped dialog box to confirm and save setup file.



III Connecting upper computer

UT283A can connect to personal computer with USB cable and read the currently measured data through the upper computer or set parameters. It can also copy historical events and trend files to the computer with SD card to browsing historical data.

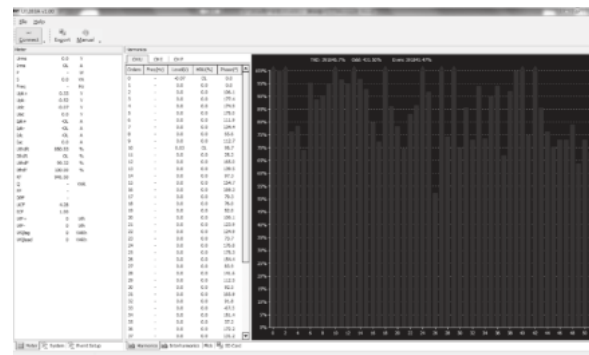
Steps:

1. UT283A software should be installed by the supplied CD at the first use, the installation needs a few minutes and please be patient. Please use the setup version of Windows system, otherwise file loss may occur and the analyzer cannot be connected due to the system.

2. Please plug one end of USB cable into the USB port and connect the other end to the computer. And then the connection symbol appears in the screen of the analyzer.



3. Please CONNECT button on the screen of the upper computer to communicate.



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4. Please see Help of the upper computer for detail instructions.
5. Please remove USB cable to exit.
6. For safety, do not connect the upper computer to the grid system directly, it is recommend that real-time measurements is performed with a notebook computer under non-charging state.

IV. Maintenance and troubleshooting

1. Cleaning the UT283A
Clean the UT283A with a damp cloth and a mild detergent. Do not use abrasives, solvents or alcohol. These may damage the text on the UT283A.
2. Storing the UT283A
When storing the UT283A, the battery pack should not be removed by non-professionals. However, to prevent the batteries from gradually discharging and keep them in optimal condition, charge the batteries periodically (once per month).
3. Cleaning the current probe
Open the jaws and wipe the magnetic pole pieces with a lightly oiled cloth to avoid the form of rust or corrosion, which will affect the closure of the magnetic field of the clamp.
4. The UT283A does not start up or automatically powers off
The batteries may be dead. Please connect the power adaptor without turning it on. After about 15 minutes, keep pressing the power button again.
5. The screen remains black
Please reset the brightness of backlight.
The analyzer may be in energy saving and protection state, please press any button to awake the backlight.
6. SD card cannot be read or written
These may be caused by read or write error of SD card, please perform SD card-related operations after SD card is reformatted on the computer or the analyzer.
7. Event monitor does not start up
Please check whether SD card is inserted.
Please check whether the relevant event setup functions are enabled.
Please return to the main menu page.
8. Trend record does not start up
Please check whether SD card is inserted.
Please check whether the number of trend record is greater than 0.
Please return to the main menu page.
9. Event data losses
Please ensure that the battery has enough power, or data loss may be caused by a sudden power failure.
Whenever you want to store event data in SD card, you should press STOP button, otherwise, the current event data will be saved in RAM and will loss when power failure.
10. Measured value of the voltage is incorrect
Please check whether variable ratio of the voltage is properly set.
11. Measured value of the current is incorrect

Please check whether variable ratio of the current and the parameters of current clamp are properly set.

12. Events overflow

If the system reports events overflow, many events may frequently occur in a short time, at this time, please check whether event setup is correct or find out the causes by setting inspection by category.


V. Specifications

Safety characteristics

Model #	UT283A (Single Phase Power Quality Analyzer)		
Description	Handheld Single Phase Power Quality Analyzer		
Safety Rating	International standards	Measuring terminal of the voltage: CAT III 600V or CAT II 1000V	
		IEC/EN 61010-1-1:2010 ,Pollution degree 2	
	Domestic standards	GB 4793.1-2007	
Electro magnetic compatibility	International standards	IEC/EN 61326-1:2013	
	Domestic standards	GB/T 18268.1-2010	
		Electrostatic discharge immunity test	GB/T 17626.2-2006 8kv
		Radiated, radio-frequency, electromagnetic field immunity test	GB/T 17626.3-2006 m/10v
		Electrical fast transient /burst immunity test	GB/T 17626.4-2008 2kv
Surge immunity test	GB/T 17626.5-2008 Class 3		

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Input characteristics

Specifications are valid		0 and 70 Hz.
Voltage input	Number of inputs	1 CH (AC or DC coupled)
	Nominal voltage range	57.7V to 1000 V
		$\pm(0.5\%) U_{din}$
	True RMS	x
	Input voltage	<1000 V AC, <1000V DC
	Input impedance	2 M Ω
	Input bandwidth	1MHz
	Max. peak measurement voltage	2~6 kV (Transient mode only)
Ratio	1~5000	
Current input	Number of inputs	1CH (AC or DC coupled)
	Clamp current sensor	1000A (standard)
		$\pm(0.5\%f.s)@>(10\%\sim 100\%)$
	Max. Input voltage	AC 3V DC 4.24V
Ratio	1~1200	
4Note: U_{din} is the standard input voltage		
 When the detection voltage of the instrument is larger than 1100V, voltage is overload, and “OL” is displayed and adopted as the hazardous voltage warning.		

Sampling system

Resolution of sampling	16Bit for PQA,10Bit for Transient
Basic sampling frequency	100kHz
Transient sampling frequency	2M SPS

Volts / Amps / Hertz/Power/energy

Readings	V,A,HZ,Power,Energy	
Voltage ranges	10.00V to 1000.0 V(AC/DC) U _{din} =57.7V~1000V (optional range)	
Voltage accuracy	RMS	<±(0.5%)(according to IEC 61000-4-30 S Class, GB/T 198—2005, DL/T 1028-2006)
	RMS1/2	±(1%)(according to IEC 61000-4-30 S Class, GB/T 19862—2005, DL/T 1028-2006)
Current ranges	10 A /100A/1000 A(AC) (standard current transformer)	
Current accuracy (accuracy excluding clamp accuracy)	RMS	±(0.5%f.s)@>(10%~100%)(according to IEC 61000-4-30 S Class, GB/T 19862—2005, DL/T 1028-2006)
	RMS1/2	±(1%f.s)@>(10%~100%)(according to IEC 61000-4-30 S Class, GB/T 19862—2005, DL/T 1028-2006)
Range of frequency measurement	40.00 Hz to 70.00Hz	
Accuracy of frequency readings	±(50mHz), when 40 to 70 Hz	
Active power	±1%S @ f.s=1000A or 100A, ±25%S @ f.s=10A (nominal load conditions)	
Reactive power	Same as active power	
Apparent power	Same as active power	
Power factor	± 0.02 @ nominal load conditions	
Fundamental power factor	<± 0.04, when > 0.25	
Crest factor	1.0 to 10.0 ±(5%+1 count)	
Accuracy of power energy	± 1.5%	

Note 1: The above accuracy of current measurement is tested with standard sensor. Note 2: U_{din} is the nominal voltage of the grid, I_{nom} is the normal input current.

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Harmonics (according to IEC 61000-4-7, GB/T 14549.7-1993)

Number of harmonics	DC..51th step1
Number Inter harmonics	1.5,2.5,3.5,..50.5th step1
Accuracy of the amplitude of voltage harmonics or inter-harmonics	$U_m \geq 1\%$ U_{nom} : $<\pm 5\%$ U_m
	$U_m < 1\%$ U_{nom} : $<\pm 0.05\%$ U_{nom}
Accuracy of the amplitude of current harmonics or inter-harmonics	$<\pm 5\%$ I_m ($I_m \geq 3\%$ I_{nom} ,@f.s=1000A or 100A)
	$<\pm 0.15\%$ I_{nom} ($I_m < 3\%$ I_{nom} , @f.s=1000A or 100A)
Accuracy of power harmonics readings	$<\pm 5\%$ I_m ($I_m \geq 10\%$ I_{nom} ,@f.s=10A)
	$<\pm 0.5\%$ I_{nom} ($I_m < 10\%$ I_{nom} , @f.s=10A)
Harmonics phase of the voltage	The sum of the amplitudes of voltage and current harmonics and phase errors
Harmonics phase of the current	$<\pm 3^\circ$ when less than 11 times, $<\pm 5^\circ$ when more than 11 times (@ $I_m \geq 10\%$ I_{nom} , @f.s=1000A or 100A) $\leq 5^\circ$ (@ $I_m \geq 10\%$ I_{nom} ,@f.s=10A)
K-factor	$\pm 10\%$
Note: U_{nom} is fundamental voltage, U_m is harmonics voltage, I_{nom} is fundamental current, and I_m is harmonics current.	

Trend recording

Method	Automatically records min, max and average values over time for readings being displayed. (Automatically record readings)
Sampling	10/12 cycle values (sampling half cycle values)
Recording time	defined by memory size of sdcard (depend on SD card)
Averaging time	1s to 2hr, user selectable (default 1s) 10 minutes when using Monitor mode
Memory	Data is stored on Micor SDcard (8GB max)
Events	Tabulated in event list, including 50/60** waveform cycles and 1/2 cycle rms Voltage and Amps trend

Sags & Swells

Accuracy of half cycle voltage(AC+DC)	$V_{nom} \pm 1\% \text{din}$ (according to IEC 61000-4-30 S Class)
Capture resolution	$\frac{1}{2}$ Cycle

Inrush Current

Accuracy of half cycle current (AC+DC)	$I_{nom} \pm 1\%$ (according to IEC 61000-4-30 S Class)
Capture resolution	$\frac{1}{2}$ Cycle

Transients

Transients Range	$\pm (2000\sim 6000) \text{Vpk}$
Accuracy	$\pm 5.0\% \text{rdg.} \pm 5.0\% \text{f.s.}$ (according to IEC 61000-4-30 S Class)
Transients Sampling frequency	2MHz
Measurement bandwidth	1MHz

Flick

Flick Range	0.1 ~ 10, P.U. is divided by 1024 logarithmically
Measurement accuracy	<5.0% rdg. (IEC61000-4-15 Ed1, GB 12326-2008)

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Multimeter

resistance	Measurement range	600.0Ω to 6.000 MΩ, 60.00 MΩ
	600Ω	±(1.2%+2)
	6KΩ	±(1.0%+3)
	60KΩ	
	600KΩ	
	6MΩ	±(1.2%+5)
	60MΩ	±(2%+5)
	maximum measurement current	0.5 mA
	Measurement voltage at open circuit	< 4V
diodes	Accuracy	Positive voltage of silicon PN junction, about 0.5V~0.8V
	Maximum measurement current	0.5 mA
	Measurement voltage at open circuit	< 4V
Continuity measurement	Beeper indicator	< 30 Ω (± 5 Ω)
	Maximum measurement current	0.5 mA
	Measurement time	> 1 ms
capacitance	Measurement range	60.00 nF to 600.0 μF±(4 % +20 counts)
	Maximum measurement current	0.5 mA