UNI-T 优利德



UT283A

使用手册
Operating Manual

单向电能质量分析仪
Single Phase Power Quality Analyzer

REV.3
DATE:2018-06-26
P/N110401105569X:

UNI-T®

UT283A
使用说明书

序　言

尊敬的用户：

您好！感谢您选购全新的优利德仪表，为了正确使用本仪表，请您在本仪表使用之前仔细阅读本说明书全文，特别有关“安全注意事项”的部分。如果您已经阅读完本说明书全文，建议您将此说明书进行妥善保管，以便在将来的使用过程中进行查阅。

有限担保和有限责任

优利德公司担保本产品自购买之日起一年内，在材料和工艺上均无任何缺陷。本担保不适用于保险丝，一次性电池，或由于意外、疏忽、误用、改装、污染及非正常操作或处理引起的损坏。经销商无权以优利德的名义给予其它任何担保。如在保修期内需要保修服务，请与您就近的优利德授权服务中心联系，获得产品退还授权信息；然后将产品寄至该服务中心，并附上产品问题描述。本项担保是您能获得的唯一补偿。除此以外，优利德不提供任何明示或隐含的担保，例如适用于某一特殊目的的隐含担保。同时，优利德不对基于任何原因或推测而导致的任何特殊、间接、附带或继起的损坏或损失负责。由于某些地区或国家不允许对默示担保及附带或继起的损坏加以限制，故上述的责任限制与规定或许对您不适用。

目　录

一、产品简介---------- 1
1.开箱验货清单----------1
2.使用前须知----------1
1)安全标准---------- 1
2)注意事项---------- 1
3)电流传感器通过BNC连接---------- 2
3.连接方法---------- 2
1)连接电压探头---------- 2
2)连接电流传感器---------- 2
3)连接电源适配器---------- 2
4)连接USB---------- 2
5)插入SD卡---------- 2
6)上电启动---------- 2
二、功能及操作说明---------- 3
1.总体介绍----------3
2.基本操作---------- 4
3.输入连接---------- 5
4.外观---------- 7
5.界面---------- 8
1)界面分区---------- 8
2)主菜单---------- 8
3)METER测量功能----------11
4)EVENT功能----------12
5)SCOPE页面功能----------16
6)TREND趋势图记录功能----------17
7)DMM多功能测量功能----------20
8)HARM谐波测量功能----------20
9)FLICK闪变----------22
10)FILE文件管理功能----------23
11)E-SETUP事件设置功能----------24
12)SYSTEM系统设置功能----------31
三、连接上位机----------38
四、维护和问题处理----------39
1.清洁本体----------39
2.存储UT283A----------39
3.清洁电流探头----------39
4.不能开机或自动关机----------39
5.屏幕黑屏----------39
6.不能读出或写入SD存储卡----------39
7.不能启动事件监测----------39
8.不能启动趋势记录----------39
9.事件数据丢失----------39
10.电压测量值不正确----------39
11.电流测量值不正确----------39
12.事件溢出----------39
五、技术规格---------- 40

一、产品简介

1.开箱验货清单

序号	配件名称	型号/规格	数量
1	本机	UT283A	1台
2	鳄鱼夹	UT-C04	1对
3	测试探头	UT-C08	1付
4	测试线	UT-L09	1付
5	电源适配器	E221142	1个
6	SD卡	CLASS 4	1张
7	电流传感器	1000A/100A/10A	1个
8	说明书		1本
9	软件光盘		1张

2.使用前须知

1)安全标准:为确保仪器安全使用，请遵循如下指南。

UT283A单相电能及功率质量分析仪符合:IEC/EN 61010-1:2010
额定电压等级为CAT Ⅲ 600V,CAT Ⅱ 1000V,污染等级2。

请按照用户手册的指定使用分析仪及其配件，否则分析仪及其附件所提供的保护可能受到破坏。

警告一词代表对使用者构成危险的情况或行为。

注意一词说明对分析仪可能造成损坏的状况和动作。

下列国际符号用于分析仪上和本手册中：

⧈	双重绝缘	⚠	警告提示
⏚	接地	⚠	高压危险
CE	符合欧洲共同体(European Union)标准		

2)注意事项

请勿在易燃易爆环境中使用，避免在多尘、日光直射、高辐射环境中使用。

非专业维护人员请勿打开后盖维修或更换元件、校准仪器时，应由专业人员实行或联系相关经销商或公司售后服务。

不要随意拆分或修改仪器，未经授权的修改可能造成仪器永久性破坏。

只能使用与分析仪一同提供或适用于分析仪的绝缘电流钳头、测试导线和适配器。

测试时请将手指握在电流钳头护指装置的后面。

使用前请检查分析仪、电流钳头，测试导线和附件是否有机体损坏的情况。如有损坏，应立即更换。查看是否有损坏或缺少塑胶件，特别注意连接器附近的绝缘层。

通过测量已知电压来验证分析仪的操作。

总是先连接电源适配器到交流电源插座,然后再将它连接至分析仪。

不要触摸高压:交流有效值(RMS)30V,交流峰值42V或直流60V。

接地输入端仅可作为分析仪接地之用，不可在该端施加任何电压。

不要施加超出测试仪额定标准的输入电压，施加的电压不可超过电压探头或电流钳表上标示的额定值。

仅使用正确的测量标准类别(CAT)的电压和电流额定探头、测试导线和适配器进行测量。不要超过产品探头，或配件的最低额定单个组件测量标准类别(CAT)。

3)电流传感器通过BNC连接。

因为BNC与USB接口和12V电源口为同一电位，所以，为保证测量的安全和准确，必须使用符合安规要求的电流互感器测量电流，切勿直接使用BNC端连接到被测电位上。

3.连接方法

1)连接电压探头

将电压探头插入电压测端口中。

并将测试线(黑)插入“COM”插孔中。

如果测试电压值请将测试线(红)插入“V”插孔中，如果使用多功能测量电阻、电容、二极管、导通等，请将测试线(红)插入对应标示的多功能插孔中。

注意，请不要将高压引入多功能插孔中，否则可能会造成仪器永久性损坏。

2)连接电流传感器

测试电流请将电流传感器的BNC连接头。(以下所指电流互感器、钳头都指该电流互感器)。

选择好电流传感器的电流档位(标配钳头为10A,100A,1000A 3档)。

并在系统页面设置好电流传感器对应量程，前缀为“D”代表标配的电流互感器。

注意标配电流互感器上有箭头的方向为电流的正向流动方向。

3)连接电源适配器

如果发现内部电池电量不足，请尽快连接好电源适配器。

4)连接USB

如果要连接上位机，请插入USB连接线。

5)插入SD卡

如果需记录事件或趋势数据，请关机状态下插入标配的SD卡，请不要在开机状态下插入或弹出SD卡，否则可能会造成数据丢失和SD卡永久性损坏。

6)上电启动

长按电源键开机，等待几分钟开机画面后，进入主菜单页面。请根据测量需要，选择相应的菜单并进入该页面测量功能。

按电源键关机，注意请不要再记录状态或写SD状态关机，否则可能会造成数据丢失和SD卡永久性损坏。

请在开机稳定10分钟后读取测试数据，否则可能导致测量数据不准确。

二、功能及操作说明

1.总体介绍

UT283A单相电能质量分析仪提供广泛且强大的测量、监视、记录功能来帮助用户检查供、输、配电系统的各个参数。包括电压电流的幅值、相位、谐波、事件等信息。广泛应用于变电站、工厂、医院、通信机房、节能监察等供电设备。UT283A可已使用类似示波器的功能，直观的显示电压、电流的波形。

UT283A测量功能详见下表：

名称	电压相关	电流相关	功率相关
有效值	●	●	
峰值	●	●	
直流分量	●	●	
交流分量	●	●	
有功功率			●
无功功率			●
视在功率			●
总功率因数			●
基波功率因数			●
正向电能			●
反向电能			●
感性电能			●
容性电能			●
峰值系数	●	●	
K系数		●	
总谐波畸变率	●	●	
谐波相对基波畸变率	●	●	
闪变	●		

UT283A趋势记录功能详见下表：

名称	表示符号
电压有效值	URMS
电流有效值	IRMS
频率	FREQ
有功功率	P
无功功率	Q
视在功率	S
基于基波的电压畸变率	UTHDR
基于基波的电流畸变率	ITHDR
功率因数	PF
短闪变	PST
电压峰值系数	UCF
电流峰值系数	ICF
直流电压	Udc
交流电压	Uac
直流电流	Idc
交流电流	Iac
K系数	KF

UT283A事件记录功能详见下表：

名称	表示符号
电压分次谐波超上限	UHARM
电流分次谐波超上限	IHARM
频率超上限	FREQ+
频率超下限	FREQ-
浪涌电流超上限	INRUSH
电压中断	INTRPT
电压骤升	SWELL
电压骤降	DIP
瞬变	TRANS

2.基本操作

简介

本章涉及仪器的一些常规操作方面的内容：

- 支架
- 仪器供电
- SD 存储卡

支架

分析器附有一个倾斜的仰角架，将分析仪放置在平整表面上时，分析仪的仰角架可方便您以一定角度观看屏幕。如图4-1 所示。如图所示为USB 接口连接器的位置。此接口可以使USB端口与PC建立数据连接。

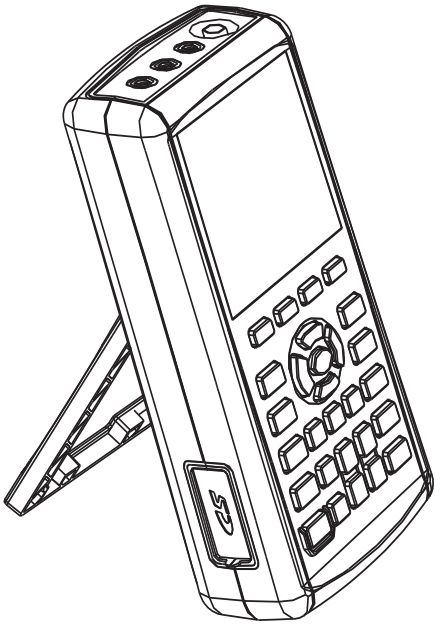


图4-1

分析仪供电

分析仪配备内置式锂离子电池供电，完全充满电之后，可向分析仪供电5个小时左右。当电池供电时，屏幕表头部位的电池状态符号指示电池的充电状况。电池本身显示为4段电量方格。当电量耗尽时，请使用电源适配器对电池进行充电。在分析仪关机状态下充电，充满电至少需要4小时。分析仪处于启动状态时，所需充电时间较长。充电器与分析仪长时间连接，如经过一个周末，也不会发生损坏。分析仪发货时，电池可能并未充电，因此建议使用前先给电池充电。

有关电池充电器/电源适配器的使用，请记住以下内容：

- 务必使用分析仪自带的电源适配器。
- 使用前请先检查电源适配器上标明的额定电压和频率，以及该数据是否符合当地线路电源的量程。
- 连接电源适配器至交流电源插座。
- 将电源适配器连接至分析仪底部侧面的电源适配器输入端口。
- 为了避免充电过程中电池过热，请不要超出规格中所规定的允许环境温度。
- 为了节省电池电量，如果自动背光亮度被使能，在一定时间内没有操作按键，分析仪显示屏会自动调暗，最后会关闭屏幕背光，此时HOLD按键灯闪烁表示节能中。当操作某个按键时，显示屏又将重启。

注意：为了防止电池的容量降低，每年至少将电池充电两次。

SD 存储卡

分析仪配备有可存储测量数据的SD存储卡。如果没有安装存储卡，不能进行事件记录和趋势记录。要插入或弹出存储卡，请向内按SD即可。

注意

为避免存储卡故障，请不要接触存储卡接头。

请不要在开机状态下，插入或弹出SD存储卡。

请使用本产品标配SD存储卡，否则可能存储失败。有问题请联系公司售后技术人员。

请不要频繁取出SD卡，因为SD卡是易损坏件。

初始设置：当您对分析仪恢复出厂默认值后进行首次充电，或者如果分析仪已经从所有电源断开，您需要对一些常规设定进行调整，使设置符合你所在地区的情况。

这关系到：语言，背光，额定频率，电压等级，日期和时间，电压电流变比和频率源。按步骤进行设置，请参阅相关章节。

3.输入连接

简介

本章解释了如何与被测配电系统连接及如何调整分析仪的设置。检查分析仪设置是否满足被测系统的特征及测试所用附件。这关系到：

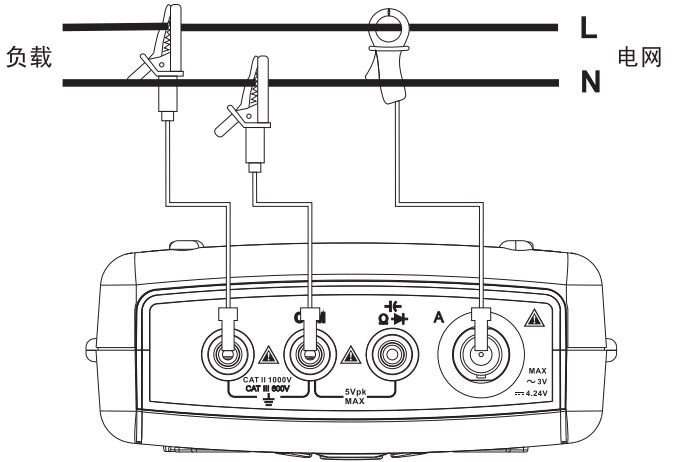
- 接线配置
- 额定频率
- 电压等级
- 用于电能质量监测和事件检测的极限值
- 电压测试导线和电流钳夹的性能

输入连接

分析仪具有1个BNC输入端口供连接电流钳头，及3个输入端口供连接电压及万用表测试输入。

注意：

务必使用分析仪自带的或者推荐使用的安全电流钳头，使用第三方电流钳可能引起电流幅值和相位不准确。这些钳头装备有一个塑料BNC连接器。为确保安全地进行测量，必须使用绝缘BNC连接器。如有可能，请在连接之前尽量断开电源系统。始终使用合适的个人防护设备，请勿单独工作并遵照第1章“安全须知”中所列警告信息操作。



电流接线：

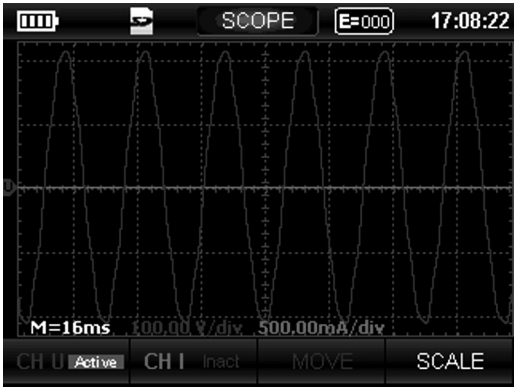
首先将电流钳夹放置在L或N其中一根线的导体上。钳头上标有箭头，用于指示正确的信号极性，箭头方向表示电流流过的方向。要确保电流钳头牢固并完全夹钳在导体四周。

电压连接：

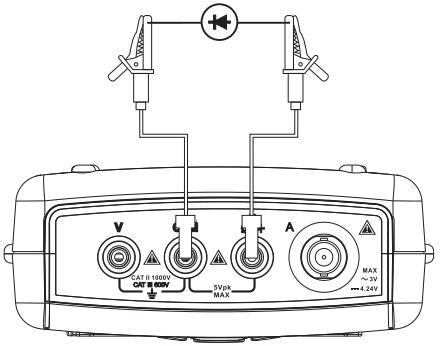
将电压线的红线和黑线对应接到L和N。要获得正确的测量结果，始终要正确连接地线输入端口，要复查连接是否正确。

在开始任何测量之前，先针对要测量的电力系统的线路电压、频率及接线配置来设置仪器。具体信息在相关设置章节中进行了说明。

示波器波形(Scope)显示可用于检查电压导线和电流钳头是否正确连接。如图显示电压电流波形表示接线正确。



多功能测量接线方式，电阻电容的二极管的方法都参见下图



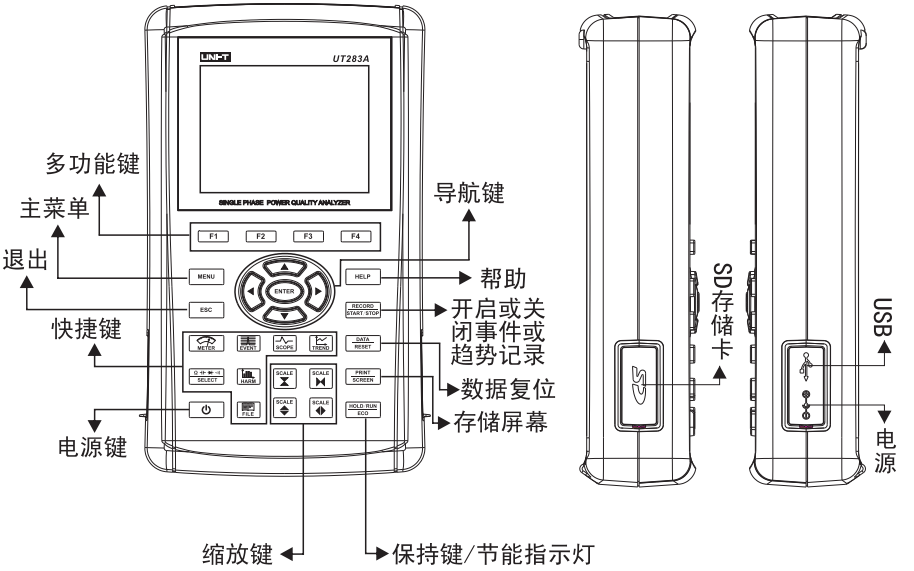
电压连接端L

电流传感器连接端

电压连接端N或多功能测量负极

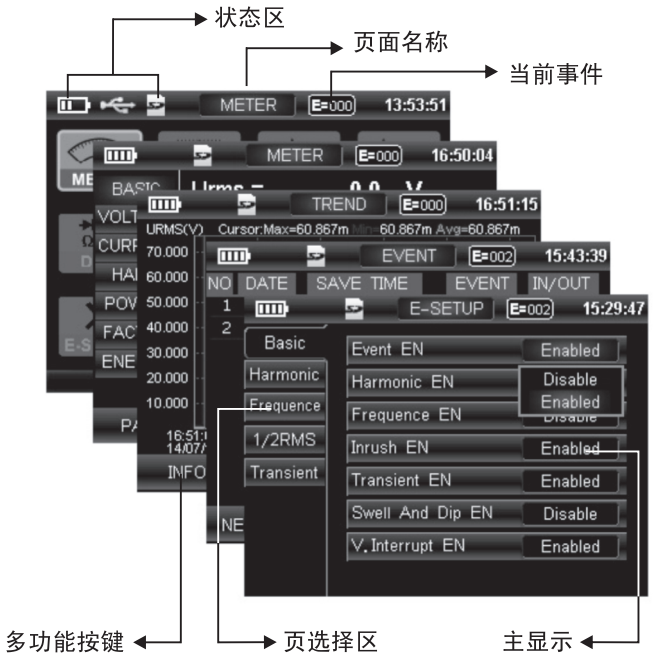
多功能测量正极

4.外观



5.界面

1)界面分区

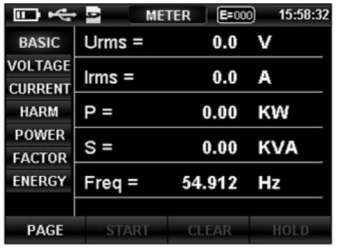


2)主菜单

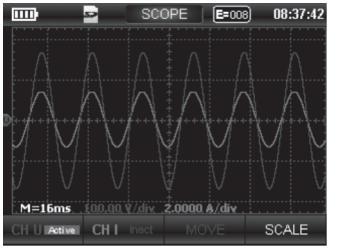
UT283A开机以一个主界菜单显示开机屏幕，主菜单页面显示各功能页面菜单选项，每个功能不同的屏幕类型以最有效的方式显示测量结果。各测量模式特有的详细信息分别在各相关章节中讲述。



下图显示各菜单页面

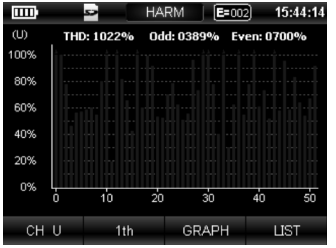

METER
E=000
15:58:32
BASIC
VOLTAGE
CURRENT
HARM
POWER
FACTOR
ENERGY
Urms = 0.0 V
Irms = 0.0 A
P = 0.00 KW
S = 0.00 KVA
Freq = 54.912 Hz
PAGE
START
CLEAR
HOLD


EVENT
E=004
17:14:14
NO DATE SAVE TIME EVENT IN/OUT
1 07/14 17:13:56.210 DIP IN
2 07/14 17:14:00.968 DIP OUT
3 07/14 17:14:01.512 DIP IN
4 07/14 17:14:01.522 DIP IN
Cursor=69.50 V
2014/07/14-17:14:01.412
M=0.5mS
92.87 V/div
NEWEST
WAVE_U
DETAIL
TRANS


SCOPE
E=008
08:37:42
M=16ms
100.00 V/div 2.0000 A/div
CH U
CH I
MOVE
SCALE

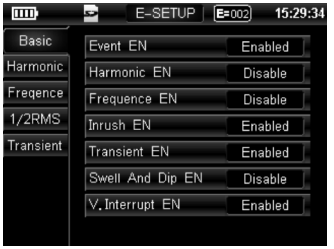

NOTBat
TREND
E=000
00:02:26
URMS(V) Cursor:Max=225.18 225.18 Avg=225.18
350.00
300.00
250.00
200.00
150.00
100.00
50.00
00:00:52 00:01:42 00:02:32 00:03:22 00:04:12 00:05:02
00/01/01 00/01/01
INFO
URMS
SCROLL
EXPLORE

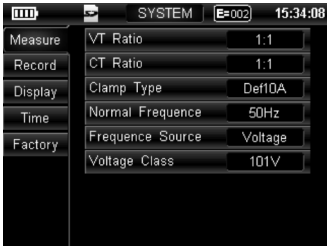

DMM
E=000
16:51:26
Ω
AUTO
OL MΩ
0 10M 20M 30M 40M 50M 60M
FUNC
AUTO
RANGE


HARM
E=002
15:44:14
(U)
THD: 1022% Odd: 0389% Even: 0700%
100%
80%
60%
40%
20%
0%
0 10 20 30 40 50
CH U
1th
GRAPH
LIST


FLICK
E=002
15:41:52
St: Max= 0.11 Min= 0.03
No. Time Pst Plt
1 2014/07/14 14:06:44 0.22 Invaild
2 2014/07/14 14:16:44 0.23 Invaild
3 2014/07/14 14:26:44 0.21 Invaild
4 2014/07/14 14:36:48 0.30 Invaild
5 2014/07/14 14:46:48 0.28 Invaild
6 2014/07/14 14:56:48 0.27 Invaild
7 2014/07/14 15:06:48 0.27 Invaild
8 2014/07/14 15:16:48 12.83 Invaild
9 2014/07/14 15:26:48 0.22 Invaild
UP
DOWN


FILE
E=002
15:42:02
0:/UT283
No. Name Size Date
1 EVENT <DIR> 2014/07/06 16:54:34
2 BMP <DIR> 2014/07/06 16:54:34
3 SETUP <DIR> 2014/07/06 16:54:34
4 TREND <DIR> 2014/07/06 16:54:34
Total: 4 files SD Used: 88MB Free:7370MB
LOAD
OPEN
DELETE
FORMAT


E-SETUP
E=002
15:29:34
Basic
Harmonic
Freqence
1/2RMS
Transient
Event EN Enabled
Harmonic EN Disable
Frequence EN Disable
Inrush EN Enabled
Transient EN Enabled
Swell And Dip EN Disable
V.Interrupt EN Enabled


SYSTEM
E=002
15:34:08
Measure
Record
Display
Time
Factory
VT Ratio 1:1
CT Ratio 1:1
Clamp Type Def10A
Normal Frequence 50Hz
Frequence Source Voltage
Voltage Class 101V

菜单页面操作

在主菜单页面上按 键移动黄色框选择菜单项，选中对应菜单项，按“ENTER”键进入功能页面。

快捷键功能，按 、 、 、 、 、 、 可进入对应的功能页面。

主菜单页面说明：



1、METER：测量页面。

主要测量：基本电压、电流、频率、功率、相关功率因素、总谐波畸变率，电压电流总谐波畸变率、电流KF系数、电能等。

2、EVENT:事件页面。

主要测量:骤升骤降、浪涌、频率事件、谐波事件、电压瞬变、中断等。

3、SCPOE:波形页面。

主要测量:电压、电流基本波形。

4、TREND:趋势图页面。

主要测量:电压、电流有效值趋势图,频率、功率、谐波趋势图等。

5、DMM:多功能页面。

主要测量：电阻、电容、二极管、通断。

6、HARM:谐波页面。

主要测量：电压、电流谐波及间谐波，功率谐波，电压、电流、功率相位等。

7、FLICK:闪变页面。

主要测量：电压短时闪变和长时闪变。

8、FILE:文件管理页面。

SD卡文件管理功能页面，SD卡中主要存放事件数据，趋势图数据，拷屏图片数据并且可以浏览相关数据及波形。

9、E-SETUP:事件设置页面。

事件设置管理页面，主要事件功能的使能与禁止，事件阈值设置。

10、SYSTEM:系统页面。

系统设置管理页面，主要有测量相关设置，钳头档位设置，频率、电压等级设置，趋势图记录相关设置，显示语言设置，时间设置，恢复出厂设置等。

3)METER:测量功能

测量(METER)显示一个包含重要数字测量电压/电流/频率/功率/功率因数/电量的屏幕。电能量是功率与时间的累积，要开启电能量测量后才开始测量。

测量页面

进入测量(METER)屏幕：

1、按“METER”快捷键直接进入METER功能页面，如图8-2。

2、主菜单页面选中“METER”菜单图标如图8-1,再按“ENTER”进入METER功能页面8-2。

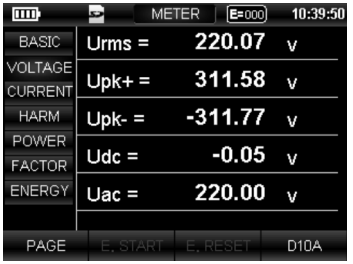


图8-1

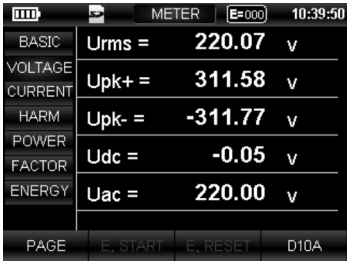


图8-2

METER页面功能：

1、BASIC:Urms电压有效值,Irms电流有效值,P有功功率,S视在功率，Freq频率。

2、VOLTAGE:Urms电压有效值，Upk+电压波峰值，Upk-电压波谷值，Udc直流电压分量，Uac交流电压分量。

3、CURRENT:Irms电流有效值,Ipk+电流波峰值,Ipk-电流波谷值,Iac交流电流分量,Idc直流电流分量(钳头要支持直流测量)。

4、HARM: UthdR总电压谐波畸变率,IthdR总电流谐波畸变率,UthdF基于基波总电压谐波畸变率,IthdF基于基波总电流谐波畸变率，KF电流K系数。

5、POWER：P有功功率，Q无功功率，S视在功率。

6、FACTOR：PF功率因数，DPF基波相功率因素，UCF电压峰值系数，ICF电压峰值系数，KF电流K系数。

7、ENERGY:WP+正向有功电量,WP-反向有功电量,WQLag正向无功电量，WQLead反向无功电量。

METER页面操作：

1、按“F1”或“▽”键依次查看下一个功能测量页面，按“△”依次查看上一个功能测量页面。

2、在ENERGY电能测量页面,按“F2”E.START键开始电量测量，此时按钮变成E.STOP，屏幕显示Energy is calculating正在计量电量，再次按“F2”E.STOP停止测量,及完成该时间段内电量的测量。再下次开始测量前按“F3”E.RESET键清除当前测量数据，否则测量数据有误。注意，电能量在掉电后会被清零。

3、电压变比、电流变比、钳头档位、电压等级、频率源都会影响到相关测量数据，请设置正确。

4、按“F4”键，快捷依次改变电流变比。

4)EVENT功能

电能质量发生了某种异常称事件。事件包括电流浪涌(Inrush Currents)、电压骤升与骤降(Swells& Dips)、瞬态、中断、谐波事件、频率事件等。

注意：

单次记录事件最大数为500次。

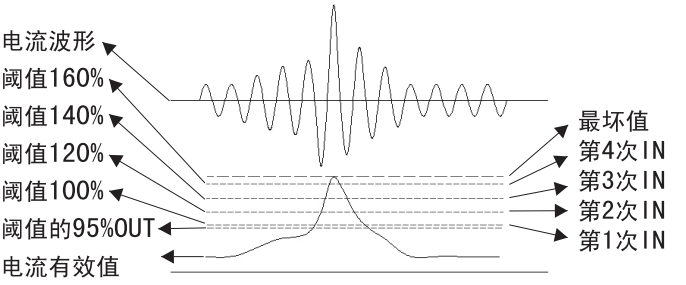
过度频繁的事件可能会导致捕捉丢失或内存溢出保护，而提前终止事件监测。

不允许瞬态过压长时间持续，否则可能造成分析仪系统故障。

a)浪涌电流

分析仪可以捕获浪涌电流(Inrush Currents)。浪涌电流是当线路上出现高负载或低阻抗负载时发生的冲击电流。一般来说,当负载达到正常工作条件时,电流经过一段时间就会稳定。例如感应电机的启动电流可高达正常工作电流的十倍。电流波形超出可调整极限值时，就发生浪涌事件。浪涌趋势图在屏幕的右侧逐步形成。触发前信息让您能够查看在发生浪涌之前所发生的波形信息情况。

分析仪当判断到1个周期的有效值超过预设值时就会发生1次Inrush In的事件，在这之后每超过设定阈值的递增20%，就会再次发生1次Inrush In的事件，当有效值低于事件设定阈值的95%就会发生一次1次Inrush Out事件，并记录最坏值。

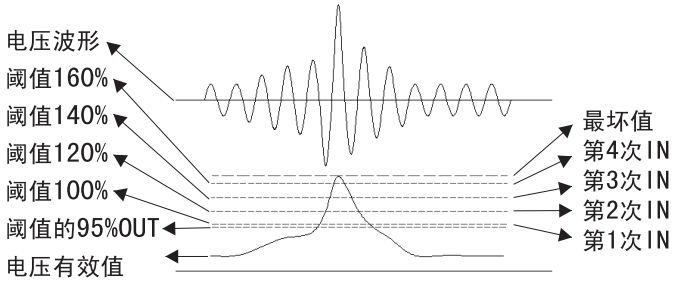


b)骤降与骤升(Dips & Swells)

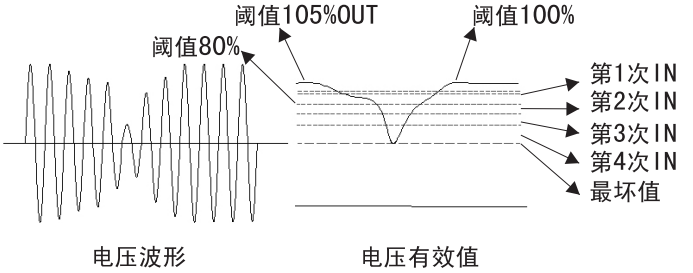
骤降、骤升。骤降(下降)和骤升是正常电压的快速变化。变化幅度可高达电压的10倍至100倍。依照EN61000-4-30所定义，其持续时间从1个周期至数秒种不等。分析仪让您能够选择标称或可调整的电压等级。

在骤降过程中电压下降，在骤升过程中电压上升。

分析仪当判断到1个周期的有效值超过预设值时就会发生1次Swe ll In的事件，在这之后每超过设定阈值的递增20%，就会再次发生1次Swe ll In的事件，当有效值低于事件设定阈值的95%就会发生1次Swe ll Out事件，并记录最坏值。

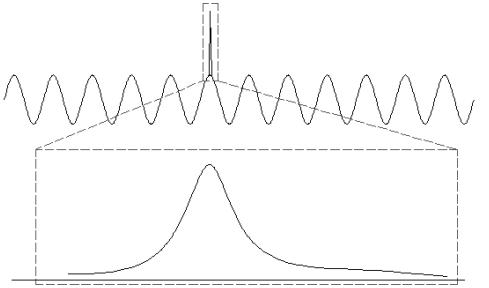


分析仪当判断到1个周期的有效值低预设值时就会发生1次Dip In的事件，在这之后每超过设定阈值的递减20%，就会再次发生1次Dip In的事件，当有效值高于事件设定阈值的105%就会发生1次Dip Out事件，并记录最坏值。



c)瞬态过压

在瞬态(Transients)模式中，分析仪使用其输入电路的特殊设置能够捕获振幅高达6000V的信号。瞬态是电压波形上的快速峰值信号。由于瞬态具有非常高的能量，可影响甚至损坏灵敏的电子设备。瞬态(Transients)屏幕看上去与示波器波形的相似，但它的垂直跨度被放大以便能够观察60Hz或50Hz正弦波上叠加的电压峰值信号。每当电压超过可调整极限值时，分析仪就会捕获一个波形。瞬态检测的采样速率是2MkS/s。注意，瞬态事件只有In事件，不会产生Out事件。



提示与技巧

配电系统中诸如瞬态之类的干扰可引起许多类型的设备故障。例如，计算机会重置；受到瞬态反复影响的设备最终可能会出现故障。由于该事件是间歇性发生的，因此有必要监控系统一段时间来查找瞬态事件。当电子设备的电源重复出现故障或者计算机自行重置时，则需要查看一下电压瞬态情况。

d)电压中断

当供电电压降低到设定额定电压中断电压以下，我们认为发生了电压中断。电压中断是一种短时间电压变动现象；造成电压中断的原因可能是系统故障、用电设备故障或控制失灵等。其计算原理与电压骤降相同。

e)频率事件

频率变化是由电站、电网投切和重负载投切引入的变化，其稳定性会对频率敏感的设备产生影响，如风机等。当频率低于或高于设定频率时我们认为产生了频率事件(上限Freq+In或下限Freq-In)。如果，再次超过设定频率限值的递增或递减1%,会再次发生频率事件，当频率回到限值以内(1%回差)会产生(上限Freq+Out或下限Freq-OUT)事件。

f)谐波事件

谐波是指在50~60Hz的电网正弦波电压上叠加一个基波频率整数倍的谐波电压分量。其产生多由电网接入了重型非线性负载引起。当电压或电流的某一次谐波超过设定的谐波含量时，就会发生1次UHARM或IHARM In的事件，在这之后每超过设定阈值的递增20%，就会再次发生1次UHARM或IHARM In的事件，当有效值低于事件设定阈值的95%就会发生1次UHARM或IHARM Out事件,并记录最坏值。

g)事件页面

进入事件(EVENT)屏幕：

1、按“EVENT”键快捷进入EVENT功能页面如图9-4。

2、在主菜单页面通过方向键选中“EVENT”菜单图标如图9-3,再次“ENTER”键进入EVENT功能页面如图9-4。



图9-3



图9-4

EVENT页面功能：

No.：一次事件记录中，事件发生序号，发生一个事件后会加1。

DATA：事件发生的日期，格式为月/日。

SAVE TIME：事件发生的时间，格式为时：分：秒.毫秒。

EVENT：事件类型，如DIP、SEWLL、INRUSH、TRANS、INTERRUPT、UHARM、IHARM、FREQ等。

IN/OUT：事件状态，发生或退出。

EVENT页面操作：

1、开始事件记录前必须先设置好相关事件阈值(详情事件设置管理页面),按“RECORD START/STOP”键开始事件记录。如下图中,当还没监测到事显发生时，显示区无内容，状态栏上出现一个红色“E”在闪动，表示当前正在事件监测。



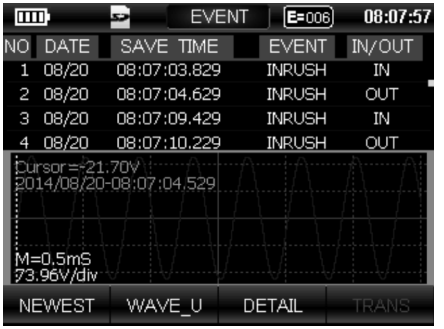
2、事件发生时，仪器会记录下事件相关数据。按“F1”NEWEST键光标自动选中最新事件序号。

3、按“F2”WAVE_U键依次轮询查看电压->电流事件波形。在波形窗口中Cursor表示当前光标位置电压或电流值，时间表示当前事件发生的时间，“M”时间轴间隔，“73.96/div”幅值增益间隔。

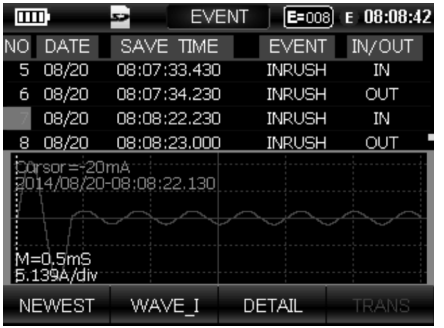
下图监测到事件发生，并记录相关数据：



下图查看电压波形数据：



下图查看电流波形数据：



4、按“F3”DETAIL键查看当前事件详细数据，打开EVENT DETAIL窗口。

Event Time:事件发生事件，格式为：年/月/日-时：分：秒：毫秒。

Event Type:事件类型,事件类型有:UHARM、IHARM、FREQ+、FREQ-、INRUSH、INTRPT、SWELL、DIP、TRANS。

Event IN/OUT:事件进入或退出。

Event Occur Level:当前光标位置幅值。

Worst Time:捕获最槽糕事件发生时间。

Worst Level:捕获最槽糕事件值。

Threshold:事件阈值。



图9-5

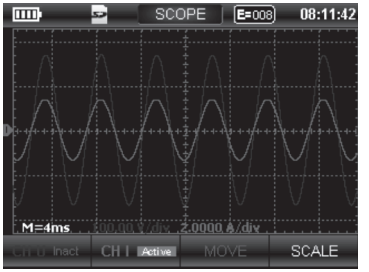
当事件类型为TRANS时，按“F4”TRANS键查看瞬变事件数据,再按“F4”BACK键返回EVENT主页面。如图



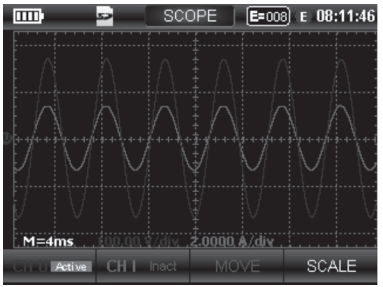
5)SCOPE页面功能

示波器页面操作

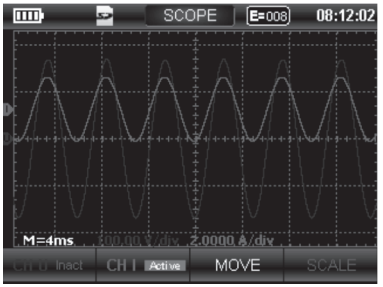
1、按“F1”CH U键显示与关闭电压通道显示，按“F2”CH I显示与关闭电流通道显示。CHU、CHI高亮表示显示打开，灰暗表示关闭。



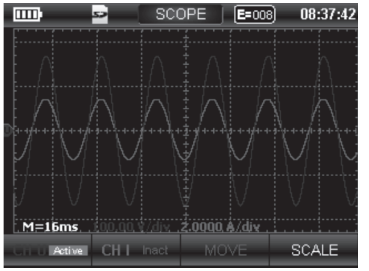
2、激活显示通道，在通道显示时即CHU、CHI显示高亮，如显示“Active”表示当前活动通道，另一个通道处于“Inact”状态，按处于Inact状态下通道对应的按键“F1”或“F2”切换激活通道。



3、按“F3”激活MOVE功能，按“ ”或“ ”键向上或向下移动当前活动通道的基线。



4、按“F4”激活SCALE功能，按“ ”或“ ”键缩小或放大当前活动通道时基，按“ ”或“ ”键缩小或放大当前活动通道幅度。



5. 按“ ”快捷键缩小当前活动通道幅度，按“ ”快捷键放大当前活动通道幅度，按“ ”快捷键缩小当前活动通道时基，按“ ”快捷键放大当前活动通道时基。

6)TREND趋势图记录功能

分析仪具有数据趋势图记录功能，包括URMS、IRMS、Frequence、P、Q、S、UTHDR(1~51次)、ITHDR(1~51次)、PF、PST、UCF、ICF、Udc、Uac、Idc、Iac、KF。

注意：趋势图数据记录需要SD支持，即只有插入SD并格式化后才能开启趋势图记录功能。系统设置页面Repeat Times设置值要大于0，开启趋势图数据才有效，否则是无法记录数据，详细参见相关系统设置。

页面操作

按“RECORD/START/STOP”键开始记录数据，如图9-1趋势图页面，会记录下URMS、IRMS、Frequence、P、Q、S、UTHDR、ITHDR、PF、PST、UCF、ICF、Udc、Uac、Idc、Iac、KF所以的数据，但当前查看数据只有一个。如果Record Enable Time没有被使能需要的“RECORD START/STOP”键来停止本次记录。如果Record Enable Time被使能，达到Record Enable Time预约时间后自动停止本次记录。

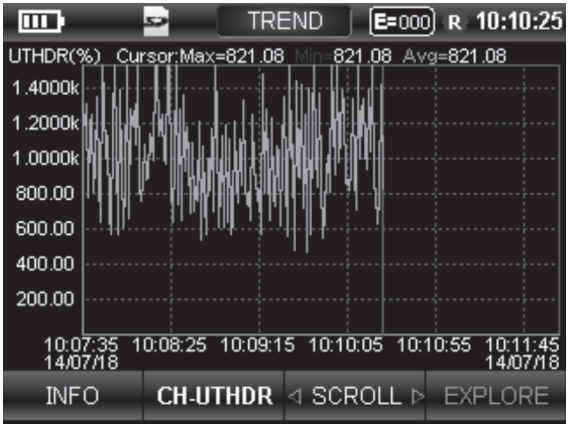


图9-1

按“F2”键数据转换功能，按钮会变成红色，按一次该键查看下一个数据趋势图，如图9-2。

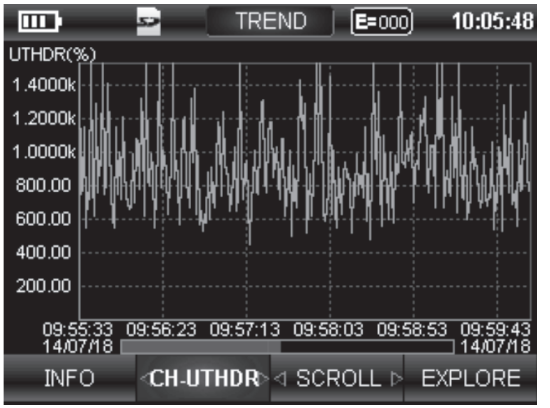
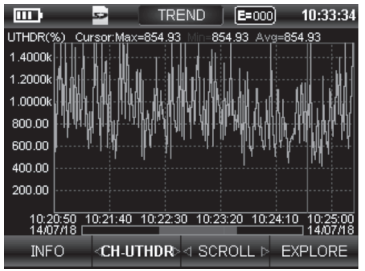


图9-2

当记录的数据超过1个屏幕数据时，在时间轴的下方会出现一个进度条表示当前数据量，进度条会数据量的增大而变小。在记录状态下进度条红线位置表示当前光标位置，停止记录后在浏览状态下，进度条红线位置表示一个相对位置，是相对于当前屏幕数据下光标的位置。如图9-3表示当前查看第二个屏幕数据时当前光标位置。



按“F3”键使能光标移动或数据翻屏功能，如图9-2“SCROLL”被选中高亮，当前状态下按“◁”或“▷”键向左或向右翻动一个屏幕的趋势图数据。

如图9-3“SCROLL”正常显示，当前状态下按“◁”或“▷”键向左或向右移动当前光标位置查看当前光标数据，当前光标数据在Cursor：Max、Min、Avg显示具体数值。

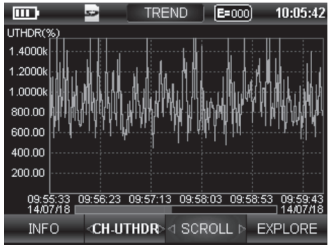


图9-2

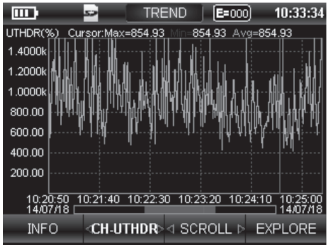


图9-3

按“F4”键全浏览当前趋势图数据Max、Min、Avg趋势图，只要记录数据长度超过两个屏幕长度才有作用，黄色表示最大值趋势图数据，蓝色表示最小值趋势图数据，绿色表示平均值趋势图数据如图9-3。



图9-3

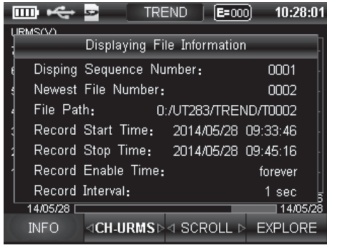


图9-4

按“F1” INFO键查看本次数据记录详细信息，在INFO弹出的对话框中包含如下内容，当前数据文件序号、最新文件序号、文件路径、记录开始时间、记录停止时间、记录使能时间、记录时间间隔，如图9-4。

注意：

如果当前记录没有停止，记录停止时间想显示--/--/-- --:--:--，只有停止记录才能查看记录停止时间。

当查看UTHDR、ITHDR谐波数据时，当前只能查看一个谐波阶次数据，如UTHDR5或ITHDR3表示当前数据是5次电压谐波或3次电流谐波数据。按“◁”或“▷”键查看上一次或下一次谐波阶次趋势图数据。

7)DMM多功能测量功能

DMM多功能功能具有电容、电阻、二极管，通断测量功能。

进入DMM万用表页面：

1、按“SELECT”键快捷进入DMM多功能页面，如图12-1。

2、在主菜单通过方向键中选中“DMM”菜单图标如图12-2，按“ENTER”键进入DMM万用表功能页面，如图12-1。



图12-1



图12-2

DMM万用表页面操作：

1、按“SELECT”或“F1”FUNC键转换测量功能，电阻->电容->二极管->通断。

2、在电阻或电容功能页面下，按“F3”AUTO键选择自动量程。

3、在电阻或电容功能页面下，按“F4”RANGE键切换量程。

8)HARM谐波测量功能

谐波可测量和记录最多51次电压、电流及功率谐波和间谐波。对相关数据，如直流分量、总谐波失真(THD)及K系数都作了测量。谐波是电压、电流或功率正弦波的周期性失真。波形可被视作具有不同频率和振幅的各种正弦波的组合。也对这些成分分别对全信号所起的作用进行了测量。读数可以表示为基波的百分比，或谐波含量的有效值(RMS)。结果值可以在柱状图、列表值或趋势图显示中查看。谐波经常由非线性负载，如计算机的开关电源、电视机和调速电机的驱动装置引起。谐波可导致变压器、导体和电机过热。建议使用100A档电流量程测量谐波。

进入HARM谐波功能页面

1、按“HARM”键快捷进入HARM谐波功能页面，如图13-1。

2、在主菜单通过方向键中选中“HARM”菜单图标,如图13-2，再按“ENTER”键进入HARM谐波功能页面，如图13-1。

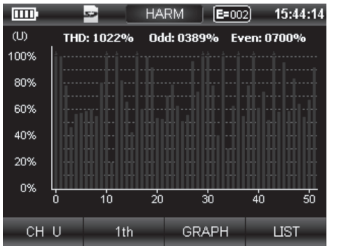


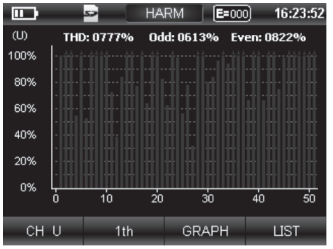
图13-1



图13-2

谐波页面有两种显示方式：柱状图和列表值显示。

1、柱状图:以柱状图形式直观显示各谐波分量相对基波分量含量百分比。无失真的信号应显示第一次谐波(基波)在100%。如图



纵坐标表示百分比值0%~100%，横坐标表示谐波阶次0~51。

THD:总谐波畸变率。Odd:奇次谐波畸变率。Even:偶次谐波畸变率。

2、清单值：以各谐波分量的有效值显示，同时显示谐波分量频率、相位及含量百分比。如图



Orders:谐波阶次。

Freq:谐波频率。

Level:谐波幅值。

HRU:谐波相对基波百分比含量，功率谐波时HRU无效。

Phase:谐波相位。

注意：

电压相位是相对基波的相位偏移，电流相位是相对本次电压谐波相位偏移。

3、当没有输入测量信号时，电压、电流柱状图出现不确定的数据，清单页面下电压谐波含量(HRU)、电压相位(Phase)及电流谐波含量出现不确定数据，是正常的，当有测量信号输入后，才显示被测信号稳定数据。如图13-3

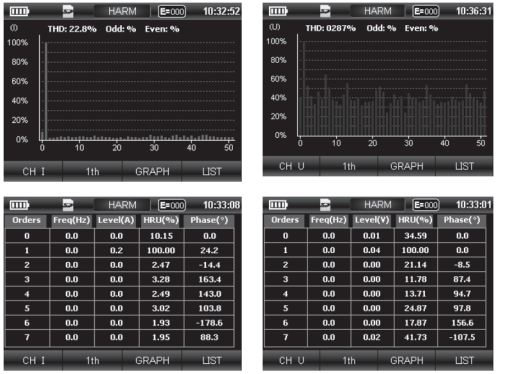


图13-3

谐波功能页面操作：

1、按“F1”键切换查看电压、电流、功率谐波测量值。

2、按“F2”键切换查看谐波与间谐波测量值。电压、电流间谐波没有相位，功率间谐波只有频率值。

3、按“F3”GRAPH切换到柱状图模式页面。

4、按“F4”LIST切换到列表值模式页面。

5、在LIST清单值模式页面时，一屏幕只显示8次谐波数据。按方向键“⊛”键向下翻页或按“⊛”向上翻页查看更多谐波数据。

9)FLICK闪变

UT283A具有闪变(Flicker)测量功能。它将由于电源电压变化而导致电灯亮度的波动用量化表示。测量所用的运算法则符合EN61000-4-15标准，并且以肉眼/大脑感官系统的知觉模型为基础。

UT283A将电压变化的持续时间和幅度转换成受此变化引起如一只60W灯泡闪变而造成的“不舒服系数”。测量是在由120V/60Hz或230V/50Hz供电的灯泡上进行优化。

闪变的特征包括：瞬时闪变Pinst，短期严重性Pst(在10分钟时间内测得)及长期严重性Plt(在2个小时时间内测得)。

进入闪变(Flick)测量页面

1、在主菜单通过方向键中选中“FLICK”菜单图标如图14-1,再按“ENTER”键进入闪变(Flick)测量功能页面如图14-2。注:如当前页面不是主菜单页面，依次按“ESC”键直至返回到主菜单页面，或按“MENU”键直接返回主菜单页面。



图14-1

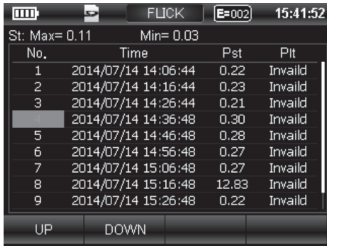


图14-2

闪变(Flicker)测量页面功能

1、No.:测量闪变次数序号。

2、Time:闪变发生时间。

3、Pst:短时闪变值(10分钟测量值)。

4、Plt:长时闪变值(2个小时测量值)。

5、Max:瞬态ST最大值

6、Min:瞬态ST最小值

闪变(Flick)测量页面操作

1、按“F1”P.UP键向上移动光标，按“F2”P.DOWN 键向下移动光标。

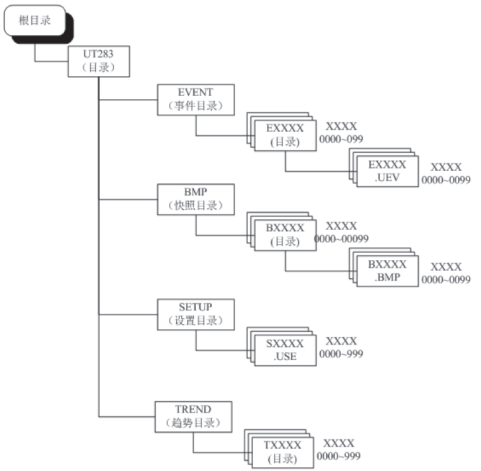
2、按方向键“⊛”向上移动光标，按“⊛”向下移动光标。

注意：

闪变需在一个稳定的状态下测量，开始测量30分钟内测量的数据可能不准确，闪变过程中电压发生中断的也会造成数据不准确，请注意避免以上情况。

10)FILE文件管理功能

UT283A具备SD卡扩展功能，FILE文件管理即是对记录在SD卡上的历史文件进行管理，包括SD记录事件数据，趋势图数据及拷屏图片数据。最大支持8G容量SD卡，在使用SD做数据记录前，请先对SD卡进行格式化，否则无法正常使用。请使用标配的的SD卡，否则可能由SD卡不兼容，引起SD卡记录故障。文件目录结构如图



每种存储文件最大序号有一定的限制，事件最大序号最多9999，BMP图片最大序号最多9999，设置文件最大序号999，趋势文件最大序号999，如果超过以上数将可能引起系统鼓掌，请尽快格式化.
另外，随之SD卡已使用空间增加，SD卡的存储速度慢，请注意定期清理SD卡。

进入FILE文件管理页面

1、按“FILE”键快捷进入FILE文件管理功能页面如图15-1。
2、在主菜单通过方向键中选中“FILE”菜单图标如图15-2，再按“ENTER”键进入FILE文件管理功能页面如图15-1。



图15-1



图15-2

FILE文件管理页面功能

进入FILE文件管理页面有四个文件夹EVENT、BMP、SETUP、TREND。
1、EVENT:存放事件相关数据。
2、BMP:存放屏幕拷贝图片数据。
3、SETUP:存放相关设置数据，保存的数据有，记录：Data Interval、Repeat Times; Enable Time, 显示：Language、Backlight Off、Backlight，测量：VT RATIO、CT RATIO、Clamp Type、Voltage class、Normal Frequence、Energy EN、Frequence Source及所有事件设置相关的数据。

4、TREND：存放趋势图相关数据。

Size表示文件大小，如果是文件夹，则显示<DIR>。Data当前文件夹或文件创建日期时间。Total:当前浏览页面总文件数量，SD Used:SD已用容量，Free:SD卡剩余可用容量。SD总大小是Used SD已用容量和Free可用容量总和。

FILE文件管理页面操作

在该页面下,F1~F4按键对应按钮为高亮时表示按键有响应功能。

1、按“F4”FORMAT键格式化SD,对SD格式化后所有记录数据被删除，并重新创建EVENT、BMP、TREND四个空文件夹。
2、按方向键“▲”或“▼”键移动光标选择要操作或查看的文件或文件夹。
3、按“F2”OPEN键或“ENTER”键打开当前光标位置文件夹或文件。
4、按“F3”DELETE键删除当前光标位置文件。
5、打开文件夹或文件时,按“ESC”键依次返回上一层页面。
6、当打开浏览事件数据或趋势图数据时，相关操作请参阅事件页面及趋势图页面相关操作与说明。
7、打开事件、趋势数据其操作与事件功能页面和趋势记录功能页面基本相同。按ESC键可返回文件浏览状态。
8、当打开SETUP目录时，如果目录下有文件，文件只能被加载并改变E-SETUP相关内容设置。

注意：

请不要在该页面下开启记录功能，不要在该页面下弹出SD卡，否是可能会造成SD损坏及文件丢失。如果SD卡存储数据过多容易造成读写速度变慢，请及时清理。

11)E-SETUP事件设置功能

E-SETUP事件设置页面是所有事件相关设置页面，如事件记录使能，事件阈值等。事件的发生受制于相关阈值，所以在开始事件记录前请先设置相关事件阈值，否则记录发生的事件不正确。

进入E-SETUP事件设置页面

在主菜单通过方向键中选中“E-SETUP”菜单图标如图16-1，再按“ENTER”进入SETUP事件设置功能页面如图16-2。



图16-1

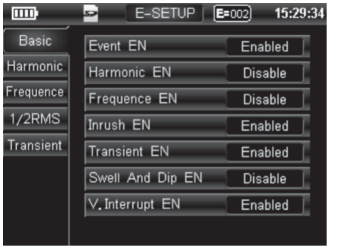


图16-2

注意：

在该页面下无法开启记录功能，如果仪器正在记录数据，该页面只能浏览相关设置，无法进行任何更改设置。

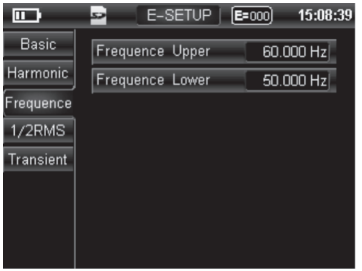
E-SETUP事件设置页面功能

1、Base:事件记录使能选项，包括一个全局使能和各事件独立使能选项。开始事件记录前需先打开全局使能和相关事件使能。
如图16-2

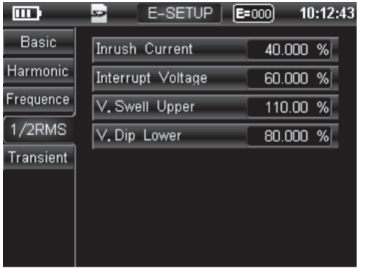
2、Harmonic：谐波事件相关阈值设置项。如图



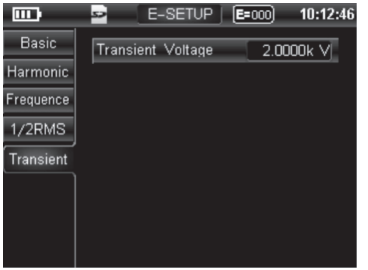
3、Frequenc：频率事件相关阈值设置项。如图



4、1/2RMS:浪涌、中断、骤升及骤降事件相关阈值设置项。如图



5、Transient：瞬变事件阈值设置项。如图



E-SETUP事件设置页面操作

E-SETUP页面有两级菜单选项，左边栏为主菜单，右边栏为项目设置子菜单，红色选中框表示当前被选中菜单项。

1、当选择框在主菜单上活动时，按“⊙”“⊙”键移动选择不同菜单项，按“⊙”或“ENTER”键进入当前选中菜单的子菜单项。当前选中框在主菜单上活动，如图16-3。

2、当选择框在子菜单上活动时，按“▲”“▼”键移动选择不同设置项，按“◀”或“ESC”键返回对应的主菜单。当前选中框在主菜单上活动，如图16-4。

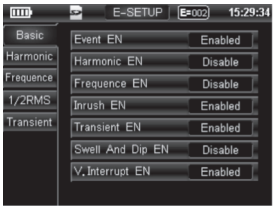


图16-3

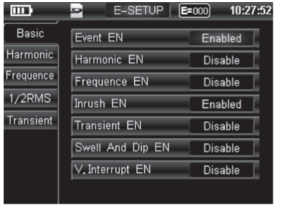
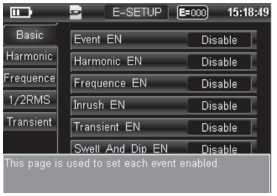
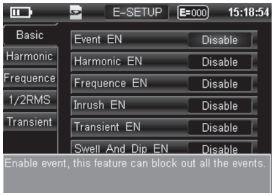
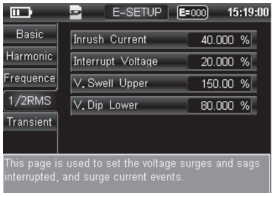


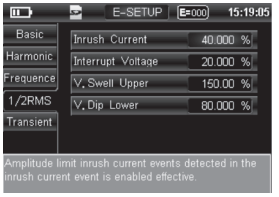
图16-4

HELP功能：在该页面下，按“HELP”键屏幕下方会弹出或隐藏简要帮助菜单，提示当前光标所在设置项的功能。如图









3、Basic菜单设置:

Basic菜单下是事件的使能选项：

1) Event EN:全局使能,只有全局事件被使能后,事件使能后才会被记录。
2) Harmonic EN:谐波事件使能选项。
3) Frequence EN:频率事件使能选项。
4) Inrush EN:电流浪涌使能选项。
5) Transient EN:电压瞬变使能选项。
6) Swell And Dip EN:电压骤升骤降使能选项。
7) V.Interrupt EN:电压中断使能选项。

操作：如图16-4，按“▲”或“▼”键选择要记录的事件，在当前选中使能，按“ENTER”键弹出下拉选项框，如图16-5，按“▲”或“▼”选择“Enable”使能或不使能“Disable”，按“ENTER”键确认生效并退出编辑状态，按“ESC”键直接退出编辑状态，使能选择不会被改变。

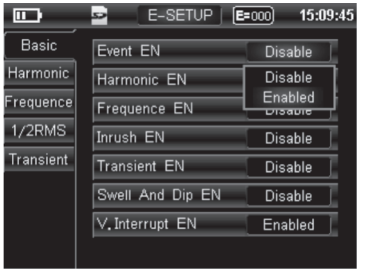


图16-5

4、Harmonic：菜单设置

Harmonic菜单是谐波事件阈值设置，如图16-6，包含两个阈值设置，Order谐波阶次，Harm.Upper谐波含量上限值。即当该次谐波含量超过Harm.Upper值时发生事件，并在事件功能目录记录下该事件的相关数据。

Order设置：如图16-6，按“▲”“▼”键选中Order项，按“ENTER”键进入编辑状态，如图16-7，按“▲”“▼”键编辑设置谐波事件的谐波阶次，编辑完成，按“ENTER”键确认保存并退出编辑状态，按“ESC”键直接退出编辑状态不保存编辑状态。



图16-6

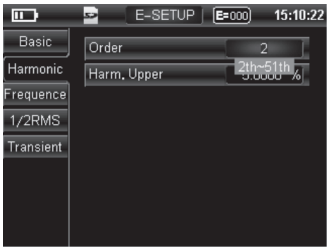


图16-7

Harm.Upper设置：

按“▲”或“▼”选中Harm.Upper项，按“ENTER”键进入编辑状态，如图16-8，光标闪烁位置为编辑位，按“▲”键增加当前数值，按“下”键减小当前数值。按“◀”或“▶”键向左或向右移动光标编辑位。当光标在小数点位置时，按“▲”键小数点右移一位即数值增加10倍，按“▼”键小数点左移一位即数值减缩小10倍。当进入编辑状态时，在当前编辑项目下弹出提示阈值设置范围，设置超过这个范围时被设置值无效。

Order阶次范围：2~51。

Harm.Upper范围：0%~100%。相对于基波的含量百分比。

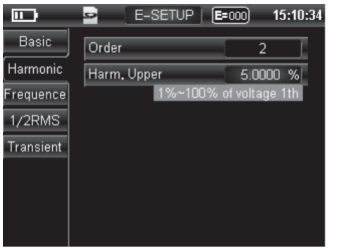


图16-8

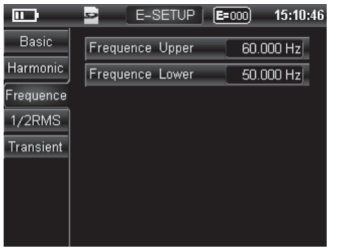


图16-9

1、Frequence菜单设置

Frequence菜单是频率事件下限阈值(Frequence Lower)和上限阈值(Frequence Upper)设置，如图16-9当检测到输入频率低于下限值或超过上限值时发生频率事件。

Frequence Upper(Lower)设置：

如图16-9，按“▶”或“ENTER”键进入菜单设置项如图16-10，按“▲”或“▼”选中 Frequence Upper 或 Frequence Lower。选中编辑的项，按“ENTER”进入编辑状态，如图16-20。光标闪烁位置为编辑位，按“▲”键增加当前数值，按“下”键减小当前数值。按“◀”或“▶”键向左或向右移动光标编辑位。当光标在小数点位置时，按“▲”键小数点右移一位即数值增加10倍，按“▼”

键小数点左移一位即数值减缩小10倍。当进入编辑状态时，在当前编辑项目下弹出提示阈值设置范围，设置超过这个范围时被设置值无效。



图16-10



图16-20

6、1/2RMS菜单设置

1/2RMS是当前系统设定频率(参见系统设置Measure->Normal Frequence)半周期信号事件阈值。如图16-20

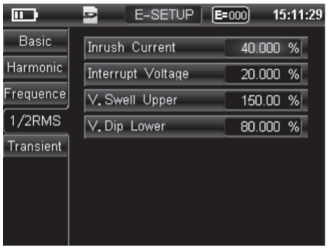


图16-20

Inrush Current:

电流浪涌阈值，基于当前电流量程(参见系统Measure->Clamp Type)百分比设定。当电流浪涌超过设定值时发生事件，并在事件功能目录记录下该事件的相关数据。

设定操作参见

如下图1，按“ENTER”键进入编辑状态，如下图2，光标闪烁位置为编辑位,按“▲”键增加当前数值，按“下”键减小当前数值。按“◀”或“▶”键向左或向右移动光标编辑位。当光标在小数点位置时，按“▲”键小数点右移一位即数值增加10倍，按“▼”键小数点左移一位即数值减缩小10倍。当进入编辑状态时，在当前编辑项目下弹出提示阈值设置范围，设置超过这个范围时被设置值无效。

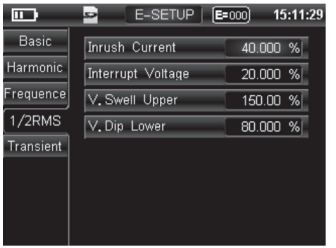


图1

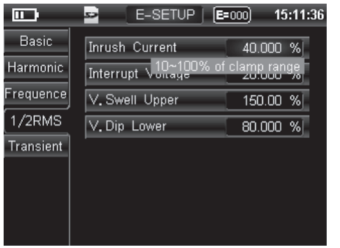


图2

Interrupt Voltage:

电压中断阈值设置，基于当前电压量程等级(参见系统Measure->Voltage Class)百分比设定。当电压下降超过设定值时发生事件，并在事件功能目录记录下该事件的相关数据。

设定操作

如下图1，按“ENTER”键进入编辑状态，如下图2，光标闪烁位置为编辑位，按“▲”键增加当前数值，按“下”键减小当前数值。按“◀”或“▶”键向左或向右移动光标编辑位。当光标在小数点位置时，按“▲”键小数点右移一位即数值增加10倍，按“▼”键小数点左移一位即数值减缩小10倍。当进入编辑状态时，在当前编辑项目下弹出提示阈值设置范围，设置超过这个范围时被设置值无效。

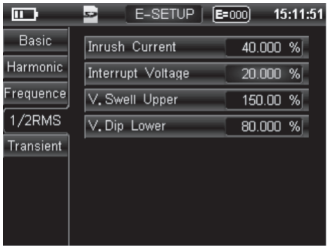


图1

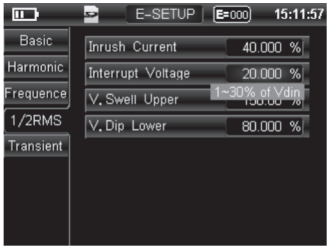


图2

V.Swell Upper:

电压骤升上限阈值，基于当前电压量程等级(参见系统Measure->Voltage Class)百分比设定。当电压下降超过设定值时发生事件，并在事件功能目录记录下该事件的相关数据。

设定操作

如下图1，按“ENTER”键进入编辑状态，如下图2，光标闪烁位置为编辑位，按“▲”键增加当前数值，按“下”键减小当前数值。按“◀”或“▶”键向左或向右移动光标编辑位。当光标在小数点位置时，按“▲”键小数点右移一位即数值增加10倍，按“▼”键小数点左移一位即数值减缩小10倍。当进入编辑状态时，在当前编辑项目下弹出提示阈值设置范围，设置超过这个范围时被设置值无效。

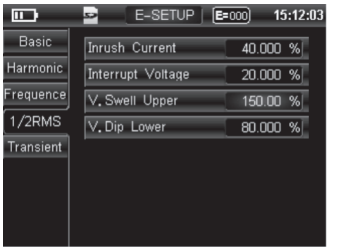


图1

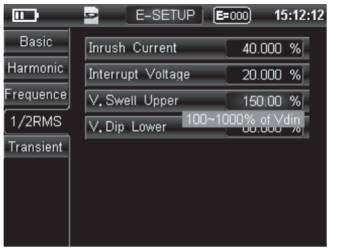


图2

V.Dip Lower:

电压骤降下限阈值，基于当前电压量程等级(参见系统Measure->Voltage Class)百分比设定。当电压下降超过设定值时发生事件，并在事件功能目录记录下该事件的相关数据。

设定操作

如下图1，按“ENTER”键进入编辑状态，如下图2，光标闪烁位置为编辑位，按“▲”键增加当前数值，按“下”键减小当前数值。按“◀”或“▶”键向左或向右移动光标编辑位。当光标在小数点位置

时，按“▲”键小数点右移一位即数值增加10倍，按“▼”键小数点左移一位即数值减缩小10倍。当进入编辑状态时，在当前编辑项目下弹出提示阈值设置范围，设置超过这个范围时被设置值无效。

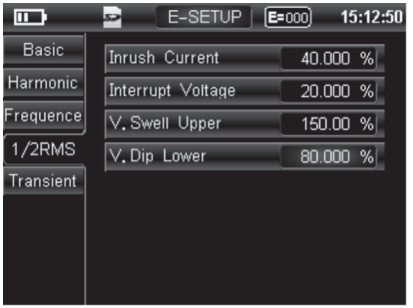


图1

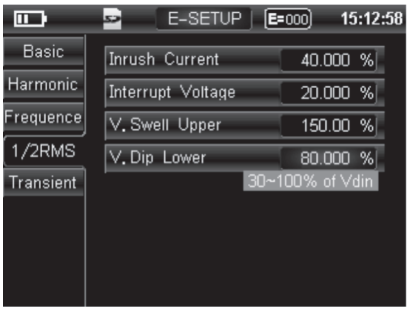


图2

1、Transient菜单设置

Transient Voltage:电压瞬变阈值，如图16-21，当电压瞬变超过设定值时发生事件，并在事件功能目录记录下该事件的相关数据。

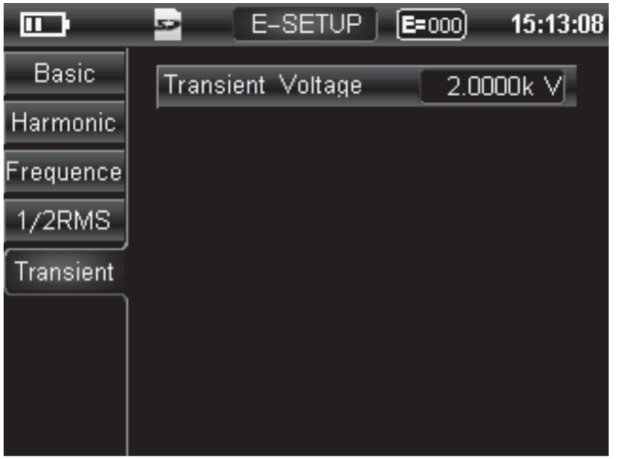


图16-21

设定操作

如下图1，按“ENTER”键进入编辑状态，如下图2，光标闪烁位置为编辑位,按“▲”键增加当前数值，按“下”键减小当前数值。按“◀”或“▶”键向左或向右移动光标编辑位。当光标在小数点位置时，按“▲”键小数点右移一位即数值增加10倍，按“▲”键小

数点左移一位即数值减缩小10倍。当进入编辑状态时，在当前编辑项目下弹出提示阈值设置范围，设置超过这个范围时被设置值无效。

设定操作

如下图1，按“ENTER”键进入编辑状态，如下图2，光标闪烁位置为编辑位,按“△”键增加当前数值，按“下”键减小当前数值。按“◁”或“▷”键向左或向右移动光标编辑位。当光标在小数点位置时，按“△”键小数点右移一位即数值增加10倍，按“▽”键小数点左移一位即数值减缩小10倍。当进入编辑状态时，在当前编辑项目下弹出提示阈值设置范围，设置超过这个范围时被设置值无效。



图1

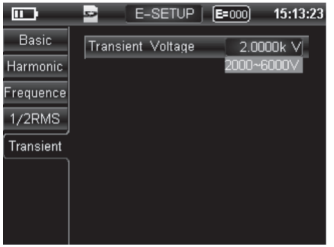


图2

12)SYSTEM系统设置功能

SYSTEM系统菜单主要系统相关参数设置包含了Measure、Record、Display、Time、Factory参数。SYSTEM系统菜单主页面如图17-1，进入SYSTEM系统菜单主页面，如图17-1，按“ENTER”键，进入该页面如图17-2。



图17-1

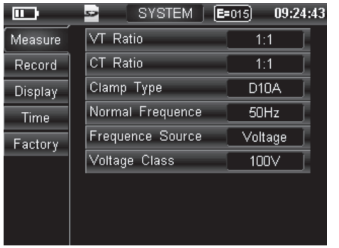


图17-2

SYSTEM系统菜单功能

1、Measure：测量参数设置，VT Raio、CT Ratio、Clamp Type、Normal Frequence、Frequence Source、Voltage Class。

2、Record：趋势图数据相关参数设置， Data Interval，Repeat Times、Enable Time。

3、Display：系统显示相关参数设置，Language、Backlight、Backlight Off。

4、Time：系统时间参数设置。

5、Factory：系统权限设置。

SYSTEM系统菜单操作

1、Measure菜单设置

VT Ratio:一次回路和二次回路电压比，显示测量电压值与变比成正比，当变比为1:1是显示值即是测量的真实值，否则显示值=测量值*变比。电压变比范围有：VARIABLE自定义变比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。

操作设定

如图17-2，按“ENTER”键弹出下拉选择菜单，如图17-3，按“▲”或“▼”键选择要设定的变比值，按“ENTER”键确认选中变比值，按“ESC”放弃选择并退出下拉菜单。

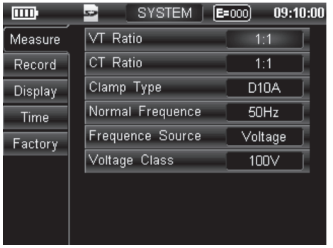


图17-2

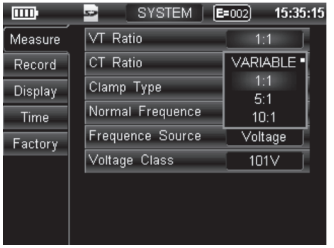


图17-3

当选择变比为自定义VARIABLE是，进入自定义编辑状态，如图17-4，按“▲”或“▼”键调整数值，按“▶”键编辑位向右移，按“◀”键编辑位向左移。当编辑位在小数点位置时，按“▲”键小数点右移，按“▼”键时小数点左移一位。完成编辑后，按“ENTER”键确认保存设定变比值，按“ESC”键放弃编辑并退出。

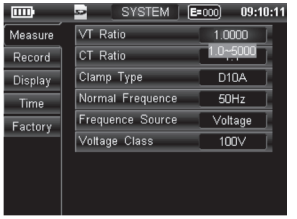


图17-4

CT Ratio:

一次回路和二次回路电流比，显示测量电流值与变比成正比，当变比为1:1是显示值即是测量的真实值，否则显示值=测量值*变比。电流变比范围有：VARIABLE自定义变比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。

操作设定：

如图17-5，按“ENTER”键弹出下拉选择菜单，如图17-6，按“▲”或“▼”键选择要设定的变比值，按“ENTER”键确认选中变比值，按“ESC”放弃选择并退出下拉菜单。

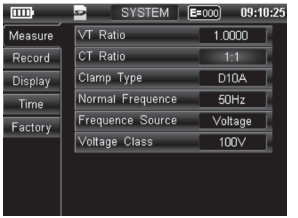


图17-5

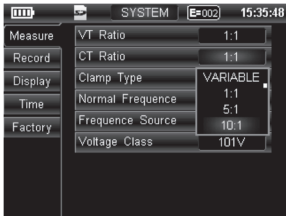


图17-6

当选择变比为自定义VARIABLE是，进入自定义编辑状态，如图17-7，按“▲”或“▼”键调整数值，按“▶”键编辑位向右移，按“◀”键编辑位向左移。当编辑位在小数点位置时，按“▲”键小数点右移，按“▼”键时小数点左移一位。完成编辑后，按“ENTER”键确认保存设定变比值，按“ESC”键放弃编辑并退出。

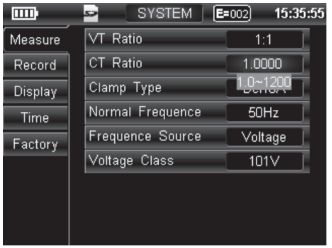


图17-7

Clamp Type:

电流互感器接口配置，电流互感器接口可配置范围有:D1000A、D100A、D10A、1mV/1A、10mV/1A、100mV/1A、1mV/3A、5A50mV，其中“D”为出厂标配互感器对应电流量程。

操作设置

如图17-8，按“ENTER”键弹出下拉选择菜单，如图17-9，按“▲”或“▼”键选择要设定的变比值，按“ENTER”键确认选中变比值，按“ESC”放弃选择并退出下拉菜单

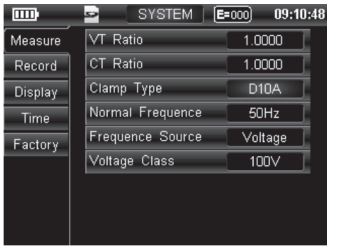


图17-8

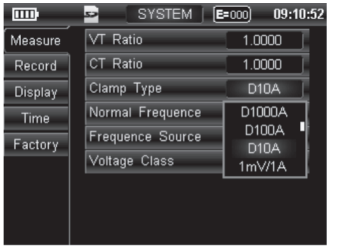


图17-9

Normal Frequence:

当前被测电网的工作频率设置，可设置范围有:50Hz、60Hz。

操作设置

如图17-20，按“ENTER”键弹出下拉选择菜单，如图17-21，按“▲”或“▼”键选择要设定的变比值，按“ENTER”键确认选中变比值，按“ESC”放弃选择并退出下拉菜单。

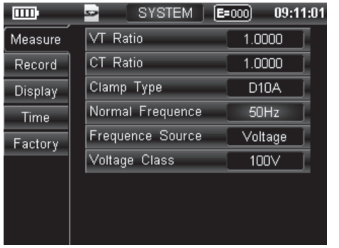


图17-20

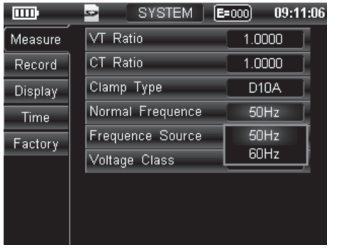


图17-21

Frequence Source:
频率、有效值、谐波相关测量功能的参考源，可设置参考源有：Voltage、Current。

操作设置
如图17-22，按“ENTER”键弹出下拉选择菜单，如图17-23，按“▲”或“▼”键选择要设定的频率源，按“ENTER”键确认选中变比值，按“ESC”放弃选择并退出下拉菜单。

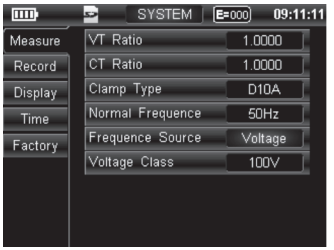


图17-22

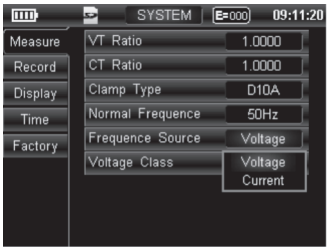


图17-23

Voltage Class:
被测电网的电压等级，可设置电压等级有：57.7V、100V、101V、110V、120V、127V、200V、202V、208V、220V、230V、240V、277V、347V、380V、400V、415V、480V、600V、1000V。

操作设置
如图17-24，按“ENTER”键弹出下拉选择菜单，如图17-25，按“▲”或“▼”键选择要设定的变比值，按“ENTER”键确认选中变比值，按“ESC”放弃选择并退出下拉菜单。

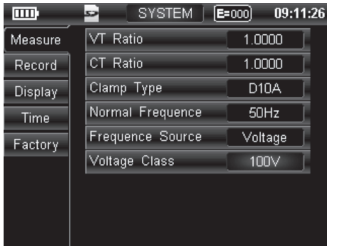


图17-24

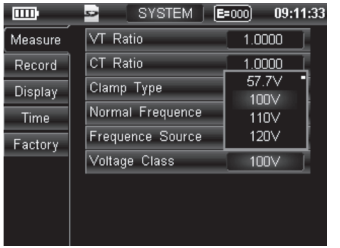


图17-25

2、Record 菜单设置
Data Interval：每个数据记录的时间间隔，可设置时间间隔有：1、2、4、8、15、30、60sec，2、4、6、12、24、48、60min，2 hour。

操作设置
如图17-26，按“ENTER”键弹出下拉选择菜单，如图17-27，按“▲”或“▼”键选择要设定的变比值，按“ENTER”键确认选中变比值，按“ESC”放弃选择并退出下拉菜单。

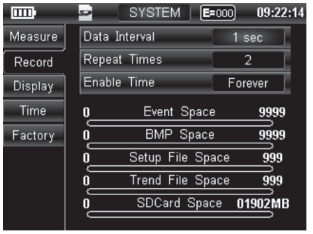


图17-26

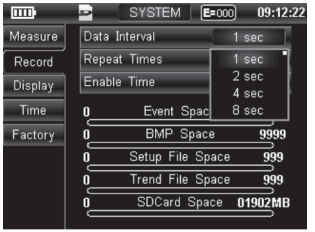


图17-27

Repeat Times:

重复记录次数，记录时间是被使能才有效。重复记录次数范围:0~9。

当Repeat Times的值为0时，开启数据记录功能，趋势图不会记录数据，只有事件在记录数据。

操作设置

如图17-28，按“ENTER”键进入编辑状态，如图17-29，按“▲”或“▼”键加大或减小数值，按“ENTER”键确认选中变比值，按“ESC”放弃选择并退出编辑状态。

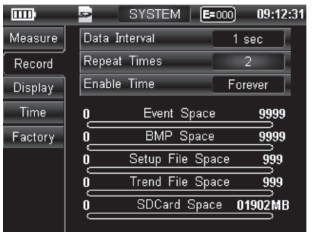


图17-28

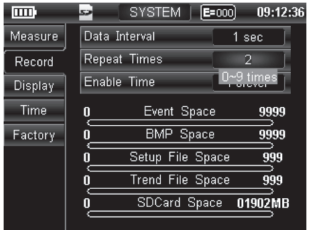


图17-29

Enable Time:

数据记录预约时间，即开始数据记录到时间自动停止数据记录，如再没有达到预约时间可按“START/STOP”键停止记录。可预约时间范围有：Forever手动停止，2、4、6、12、24、48、60min，2 、5、10、24 hour，2、4、8、16、30、60 days。

操作设置

如图17-30，按“ENTER”键弹出下拉选择菜单，如图17-31，按“▲”或“▼”键选择要设定的变比值，按“ENTER”键确认选中变比值，按“ESC”放弃选择并退出下拉菜单。

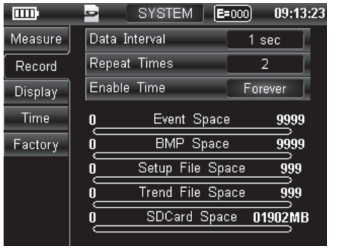


图17-30



图17-31

相关文件容量指示条，文件结构参见FILE章节文件目录结构。

Event Space:事件容量

BMP Space:快照容量

Setup File Space:设置文件容量

Trend File Space:趋势图容量

SDCard Space:SD卡容量

3、Display菜单设置

Language:系统语言，可设置两种语言中文(Chinese)和英文(English)。

操作设置

如图17-32，按“ENTER”键弹出下拉选择菜单，如图17-33，按“▲”或“▼”键选择要设定的语言，按“ENTER”键确认选中语言，按“ESC”放弃选择并退出下拉菜单。



图17-32



图17-33

Backlight:

屏幕背光亮度，可调节范围：25%、50%、75%、100%。

操作设置

如图17-34，按“ENTER”键弹出下拉选择菜单，如图17-35，按“▲”或“▼”键选择要设定的背光亮度等级，按“ENTER”键确认选中背光亮度等级，按“ESC”放弃选择并退出下拉菜单。



图17-34

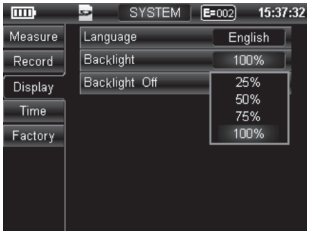


图17-35

Backlight Off:

屏幕背光自动关闭使能选项，Disable、Enable。屏幕背光自动关闭被使能后，在无任何按键被按下后大约5分钟，屏幕背光会自动关闭，已达到省电效果。

操作设置

如图17-36，按“ENTER”键弹出下拉选择菜单，如图17-37，按“▲”或“▼”键选择要设定的使能或禁止，按“ENTER”键确认选中设置，按“ESC”放弃选择并退出下拉菜单。



图17-36

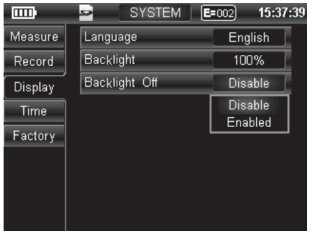


图17-37

Time菜单设置

Time菜单设置系统时间和日期。

操作设置

如图17-38，按“◀”或“▶”或“▲”或“▼”键选中要设置的项目，按“ENTER”键进入编辑状态如图17-39，按“▲”或“▼”键调整数值，按“ENTER”键确认保存设置并退出编辑，按“ESC”键放弃设置并退出编辑。如上述操作依次调整设置时间和日期。设置完成后将光标选中“Setup New Time”按钮如图17-40，按“ENTER”键确认修改设置的时间和日期。



图17-38

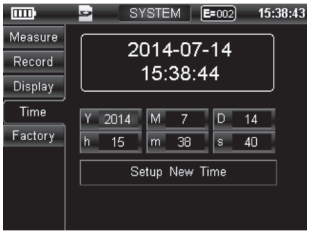


图17-39



图17-40

4、Factory菜单设置

Factory菜单是系统高级设置菜单，包含获取系统权限(厂家权限)。

恢复出厂化设置

如图17-42，按 “ENTER”键，在弹出对话框中选择“yes”确认恢复出厂化。

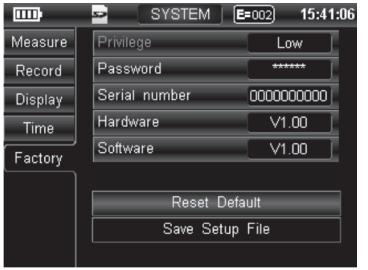


图17-42

保存设置文件

用于保存当前用户设置的参数状态，包含测量相关设置，事件相关设置，记录相关设置包括：

记录：Data Interval、Repeat Times、 Enable Time。

显示：Language、Backlight Off、Backlight

测量：VT RATIO、CT RATIO、Clamp Type、Voltage class、Normal Frequence、Energy EN 、Frequence Source及所有事件相关及相关设置参数，如事件使能参数，事件阈值参数等。

如图17-43，按“ENTER”键，在弹出对话框中选择“yes”确认保存设置文件。

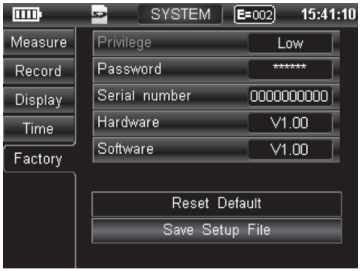


图17-43

三、连接上位机

UT283A可以通过USB连接线连接到个人电脑，并通过上位机软件读取当前测量数据，或设置参数。也可以通过SD卡将历史事件和趋势数据拷贝到电脑中，浏览历史数据。

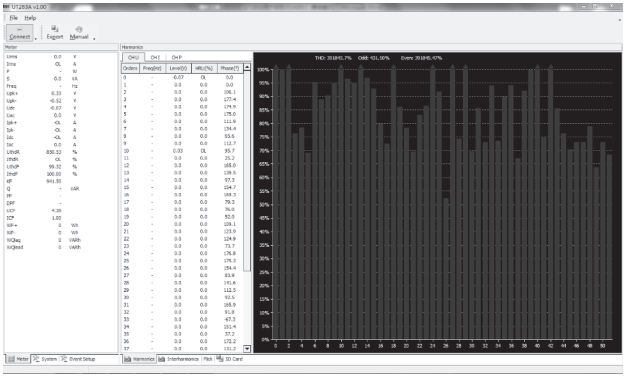
步骤

1、首次使用需安装好附带光盘的UT283A软件，这需要数分钟时间，请耐心等待。请使用安装版Windows系统，否则可能因为系统文件丢失，而无法连接仪器。

2、将USB线一端插入以前USB连接口，另一端连接上电脑。这时将在仪器上看到USB连接符。



3、请在上位机上点击CONNECT按钮，即可通信。



4、具体操作参考上位机使用帮助。

5、退出时拔出USB连接线即可。

6、为了安全起见，上位机不要直接接入电网系统中，建议使用非充电状态下的笔记本电脑进行实时测量。

四、维护和问题处理

1.清洁本体

清洁UT283A用湿布和温和的清洁剂。不要使用研磨剂， 溶剂或醇。这些可能会损坏UT283A的丝印。

2.存储UT283A

当存储UT283A，非专业人士请不要取出电池组。然而，为避免该电池容量逐渐降低，保持电池的最佳状态，每一次电池充电周期（一个月）。

3.清洁电流探头

定期擦拭外壳用湿布和清洁剂。不要使用研磨剂，溶剂或醇。
打开钳口和磁极片，用稍微浸油的布擦拭，以避免生锈或腐蚀，影响钳头磁场封闭。

4.不能开机或自动关机

可能是由电量不足引起，请插入电源适配充电15分钟以上，再长按电源键开机。

5.屏幕黑屏

请从新设置屏幕背光亮度。
可能由于节能保护状态，请按任意按键唤醒屏幕背光

6.不能读出或写入SD存储卡

可能是由SD读写错误引起，请在重新在电脑和本机上格式化SD卡后，再进行SD卡相关的操作。

7.不能启动事件监测

请检查SD卡是否插入。
请检查相关事件设置是否被使能。
请回到主菜单页面。

8.不能启动趋势记录

请检查SD卡是否插入。
请检查趋势记录次数要大于0。
请回到主菜单页面。

9.事件数据丢失

请保持电池电量足够，否则可能因突然断电而丢失数据。
每次事件数据必须正常按STOP键，才能保存到SD卡中，否则，当前事件只是存储在RAM中，掉电就会丢失。

10.电压测量值不正确

请检查电压变比设置是否正确。

11.电流测量值不正确

请检查电流变比设置和电流钳头设置是否正确。

12.事件溢出

如系统报告事件溢出，说明可能有很多事件在短时间内频繁发生，此时，请检查事件设置是否正确，或通过设置分类检查产生事件的原因。

五、技术规格

安全规格

型号	UT283A(单相电能质量分析仪)		
介绍	单相手持式电能质量分析仪		
安规	国际指标	电压测量端:CAT III 600V或CAT II 1000V	
		IEC/EN 61010-1-1:2010, Pollution degree 2	
	国内指标	GB 4793.1-2007	
电磁兼容	国际标准	IEC/EN 61326-1:2013	
	国内标准	GB/T 18268.1-2010	
		静电放电抗扰度	GB/T 17626.2-2006 8kv
		射频电磁场辐射抗扰度	GB/T 17626.3-2006 m/10v
		电快速瞬变脉冲群抗扰度	GB/T 17626.4-2008 2kv
		浪涌(冲击)抗扰度	GB/T 17626.5-2008 3级

输入特性

基频测量范围		40 and 70 Hz.
电压输入	电压通道数	1 CH (AC or DC coupled)
	标称电压(Udin)	57.7V to 1000 V
	电压精度	±(0.5%) Udin
	真有效值	√
	输入电压	<1000 V AC, <1000V DC
	输入阻抗	2 MΩ
	最大输入带宽	1MHz
	瞬变测量电压	2~6 kV (Transient mode only)
	电压变比	1~5000
电流输入	电流通道数	1CH (AC or DC coupled)
	电流传感器	1000A(标配)
	电流量程精度	±(0.5%f.s)@>(10%~100%)
	电流通道最大输入电压	AC 3V DC 4.24V
	电流变比	1~1200
注:Udin为标准输入电压		
⚠ 当仪表检测电压>1100V,电压过载会显“0L”作为危险电压警告。		

采样系统

采样解析度	16Bit for PQA,10Bit for Transient
基本采样率	100kHz
瞬变采样率	2M SPS

电压/电流/频率/功率/电能

可测量项目		V,A,HZ,Power,Energy
电压测量范围		10.00V to 1000.0 V(AC/DC) Udin=57.7V~1000V(可选档)
电压测量准确度	RMS	<± 0.5% (依照IEC 61000-4-30 S Class，GB/T 19862—2005，DL/T 1028-2006)
	RMS1/2	±1%(依照IEC 61000-4-30 S Class，GB/T 19862—2005，DL/T 1028-2006)
电流测量范围		10 A /100A/1000 A (标配电流互感器)
电流测量准确度	RMS	±0.5%f.s@>10%~100%(依照IEC 61000-4-30 S Class，GB/T 19862—2005，DL/T 1028-2006)
	RMS1/2	±1%f.s@>10%~100%(依照IEC 61000-4-30 S Class，GB/T 19862—2005，DL/T 1028-2006)
频率测量范围		40.00 Hz to 70.00Hz
频率测量准确度		40 to 70 Hz时± 50mHz
有功功率		±1%S @ f.s=1000A or 100A; ±2%S @ f.s=10A (nominal load conditions)
无功功率		同有功功率
视在功率		同有功功率
功率因数		± 0.02 @ nominal load conditions
基波功率因素		大于0.25时 <± 0.04
峰值系数		1.0 to 10.0 ±(5% + 1 count)
电能准确度		±1.5 %
注1：以上电流测量精度为标配传感器状态下测试. 注2：Udin为额定电网电压，Inom为常规输入电流。		

谐波（依照IEC 61000-4-7,GB/T 14549.7-1993）

谐波次数	DC..51th step1
间谐波次数	1.5,2.5,3.5,..50.5th step1
电压谐波、间谐波幅值准确度	Um ≥1% Unom: <±5% Um
	Um <% Unom: <±0.05% Unom
电流谐波、间谐波幅值准确度	<±5% Im (Im ≥3% Inom,@f.s=1000A or 100A)
	<±0.15% Inom (Im <3%Inom,@f.s=1000A or 100A)
	<±5% Im (Im ≥10% Inom,@f.s=10A)
	<±0.5% Inom (Im <10% Inom,@f.s=10A)
功率谐波测量准确度	由谐波电压谐波电流的幅值、相位误差累加计算而得
电压谐波相位	小于11次时<±1°,大于11次时<±5°%,
电流谐波相位	小于11次时<±3°%，大于11次时<±5°%（@Im≥10%Inom, @f.s=1000Aor 100A)≤5° %(@Im≥10%Inom,@f.s=10A)
K系数	±10 %
注：Unom基波电压, Um为谐波电压, Inom为基波电流, Im为谐波电流，	

趋势记录

方式	Automatically records min, max and average values over time for readings being displayed.(自动记录显示值)
采样	10/12 cycle values(采样半周波波值)
记录时间	defined by memery size of sdcard (由SDCARD决定)
间隔时间	1s to 2hr, user selectable (default 1s) 10 minutes when using Monitor mode
存储空间	Data is stored on Micor SDcard (8GB max)
事件方式	Tabulated in event list, including 50/60** waveform cycles and 1/2 cycle rms Voltage and Amps trend

暂升和暂降

半周电压准确度(交流+直流)	Vnom ±1% din (依照IEC 61000-4-30 S Class)
捕捉分辨率	1/2 Cycle

浪涌电流

半周电流准确度(交流+直流)	Inom ±1% (依照IEC 61000-4-30 S Class)
捕捉分辨率	1/2 Cycle

瞬变

瞬变范围	±(2000~6000) Vpk
准确度	±5.0% rdg. ±5.0%f.s. (依照IEC 61000-4-30 S Class)
瞬变采样率	2MHz
测量带宽	1MHz

闪变

闪变范围	0.1~10按照对数将P.U.进行1024分割
准确度	〈5.0% rdg. (IEC61000-4-15 Ed1，GB 12326-2008)

万用表

电阻	测量范围	600.0Ω to 6.000 MΩ, 60.00 MΩ
	600Ω	±(1.2%+2)
	6KΩ/60KΩ/600KΩ	±(1.0%+3)
	6MΩ	±(1.2%+5)
	60MΩ	±(2%+5)
	最大测量电流	0.5 mA
	最大开环电压	< 4V
二极管	准确度	硅PN结正向约0.5V~0.8V
	最大测量电流	0.5 mA
	最大开环电压	< 4V
导通测量	蜂鸣器指示	< 30 Ω (± 5 Ω)
	最大测量电流	0.5 mA
	检测时间	> 1 ms
电容	测量范围	60.00 nF to 600.0 μF±(4 % +20 counts)
	最大测量电流	0.5 mA

本说明书内容如有变更，恕不另行通知！

优利德®

优利德科技(中国)股份有限公司

地址:中国广东省东莞松山湖高新技术产业
开发区工业北一路6号

电话:(86-769)8572 3888

邮编: 523 808

http://www.uni-trend.com.cn

UNI-T®

Model UT283A
OPERATING MANUAL

UT283A OPERATING MANUAL

TABLE OF CONTENTS

Ⅰ Product introduction----------47
1. Unpacking and accessory list----------47
2. Instructions before use----------47
1) Safety standards---------- 47
2) Caution----------47
3) Current clamp connected via BNC----------48
3. Connection method---------- 48
1) Connecting voltage probe---------- 48
2) Connecting current clamp----------48
3) Connecting the power adapter----------48
4) Connecting USB----------48
5) Inserting SD card----------48
6) Switching on and startup----------48
Ⅱ Functional and operating instructions---------- 49
1. Overview----------49
2. Basic operations---------- 50
3. Connecting input---------- 51
4. Appearance---------- 53
5. Interface---------- 54
1) Interface partition---------- 54
2) Main menu---------- 54
3) METER measurement function---------- 57
4) EVENT function---------- 58
5) Functions under SCOPE Page---------- 63
6) TREND trend file record function---------- 64
7) DMM versatile measurement function---------- 66
8) HARM harmonics measurement function---------- 67
9) Flick---------- 69
10) FILE management function---------- 70
11) E-SETUP event setup function---------- 72
12) SYSTEM setup function---------- 79
Ⅲ. Connecting upper computer---------- 87
Ⅳ. Maintenance and troubleshooting---------- 88
1. Cleaning the UT283A---------- 88
2. Storing the UT283A---------- 88
3. Cleaning the current probe---------- 88
4. The UT283A does not start up or automatically powers off------88
5. The screen remains black---------- 88
6. SD memory card cannot be read or written---------- 88
7. Event monitor does not start up---------- 88
8. Trend record does not start up----------88
9. Event data losses---------- 88
10. Measured value of the voltage is incorrect----------88
11. Measured value of the current is incorrect----------88
12. Events overflow----------89
Ⅴ. Specifications----------89

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
CE	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.

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

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.

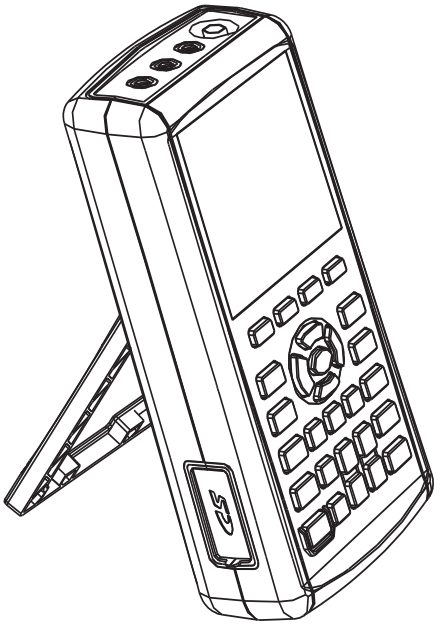


Figure 4-1

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:

Wiring configuration

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

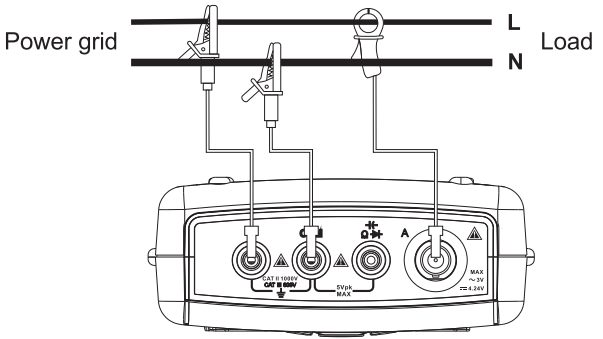
Connecting input

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”.

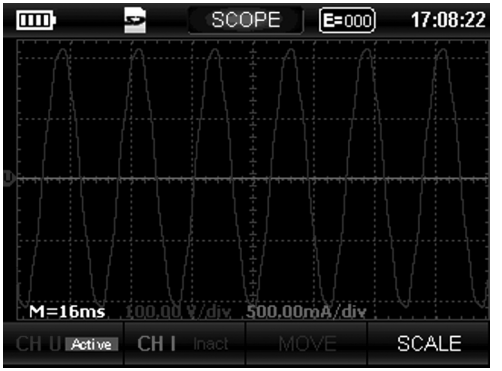


Connecting current: Put the current clamp on the conductor of either L line or N line. The arrow marked on the clamp is used to indicate the correct signal polarity and points to the direction of the current. Make sure that the current clamp jaw firmly and fully clamps around the conductor.

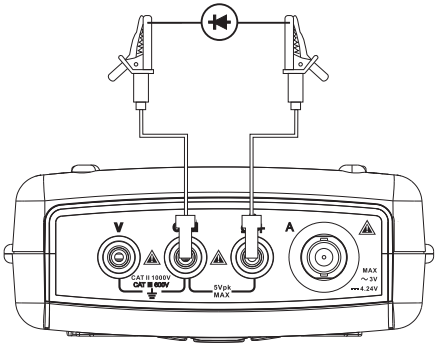
Connecting voltage: Connect the red and black voltage leads to the corresponding L line and N line. To obtain the accurate measurement results, always properly connect the correct input port of ground wire and review whether the connection is correct.

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.

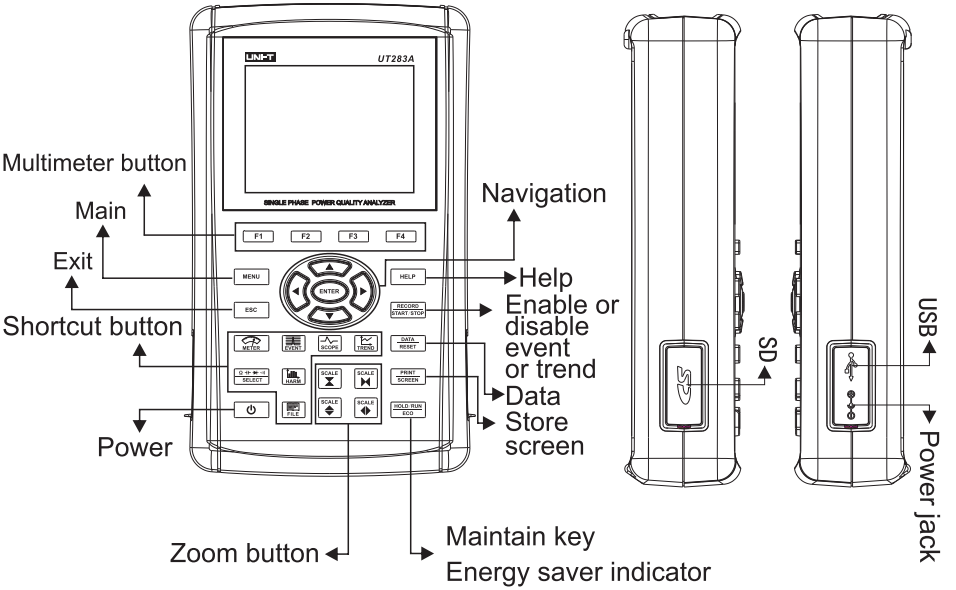
Oscilloscope waveform (Scope) display may be used to check whether the connection of voltage lead and current clamp is correct. The voltage and current waveforms shown in the figure represent the correct connection.



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

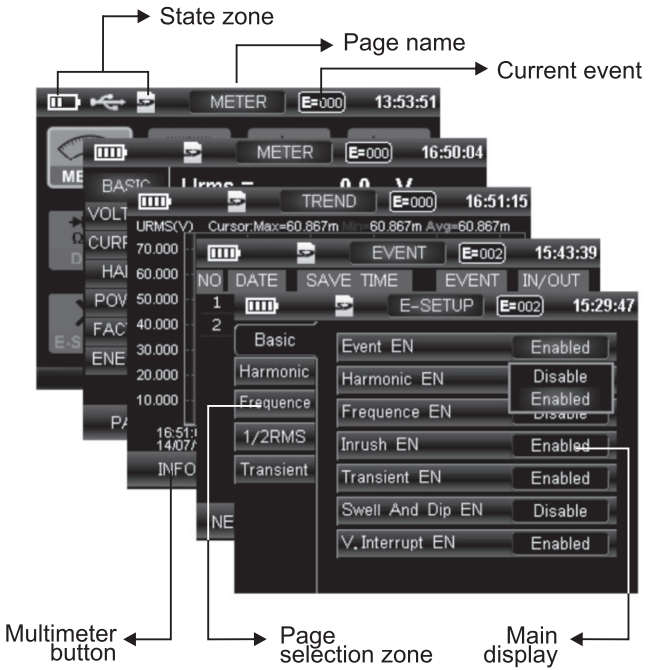


4. Appearance



5. Interface

1) Interface partitions

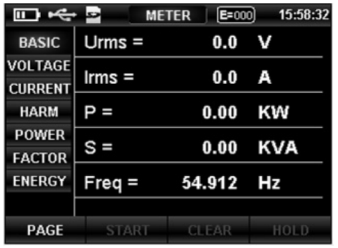


2) Main menu

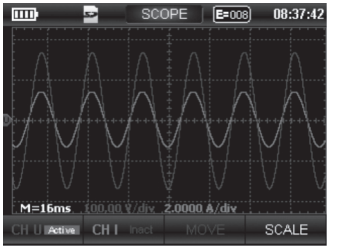
When UT283A is started up, its main menu is displayed as the startup picture, the main menu page display various function page menu options, and different type of screens of functions display the measurement results in the most effective way. Please see the relevant chapter for details specific to each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



Various menu pages are shown in the figures below

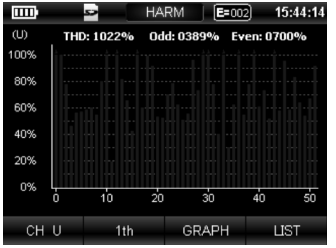






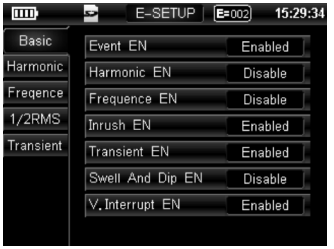


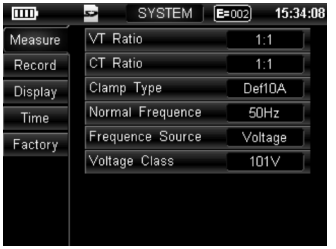










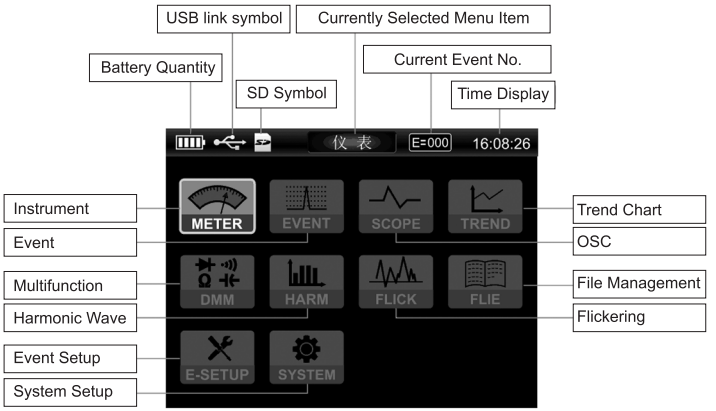


Operation under Menu Page

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.

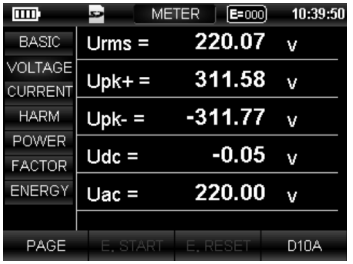


Figure 8-1

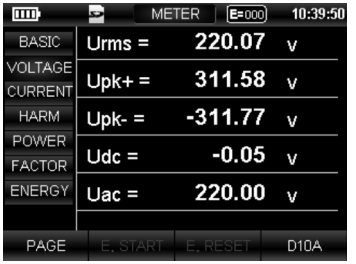


Figure 8-2

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

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.

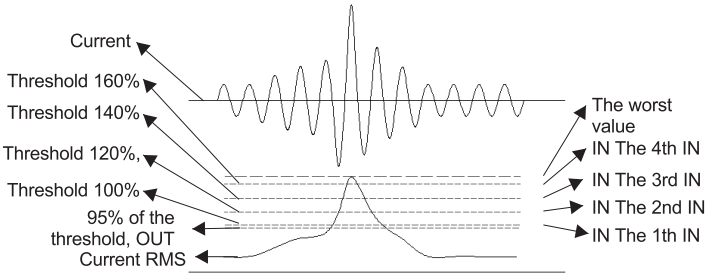
Excessively frequent events may cause data loss or memory overflow protection and early termination of event monitoring.

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.

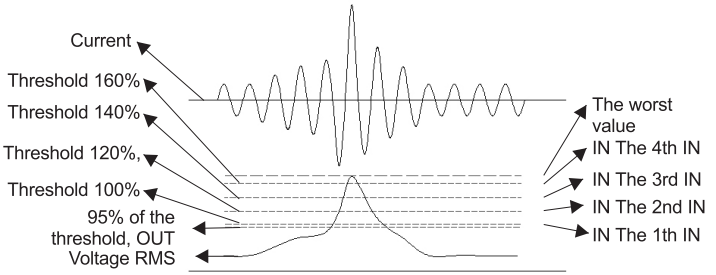
The analyzer produces an Inrush In event whenever it measures the RMS exceed the preset value during a cycle, and then produces another Inrush In event whenever the RMS exceed the preset threshold incremented by 20%, the analyzer produces an Inrush Out event whenever the RMS is lower than 95% of the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



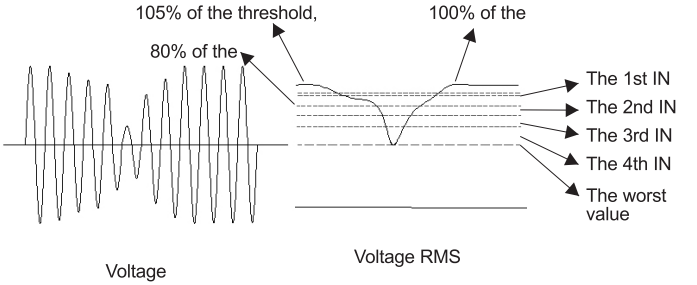
b) Dips and swells

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.

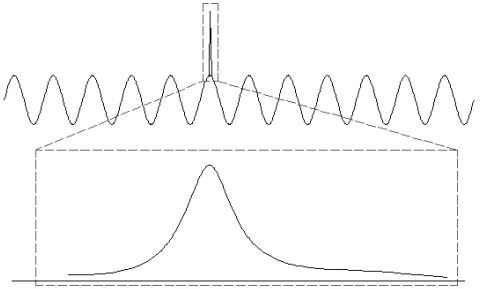


The analyzer produces a Dip In event whenever it measures the RMS exceed the preset value during a cycle, and then produces another Dip In event whenever the RMS exceed the preset threshold decremented by 20%, the analyzer produces an Dip Out event whenever the RMS is higher than 105% of the preset threshold, 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.



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.

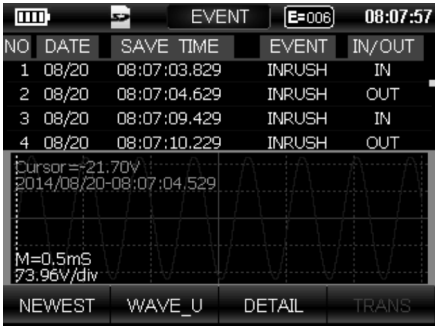


2. When an event occurs, the analyzer will record the event-related data. Press “F1”NEWEST button and then the cursor will automatically check the number of the latest event.
3. Press “F2”WAVE_U button to view voltage and current event waveforms in turn. The cursor in waveform window indicates the voltage 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.

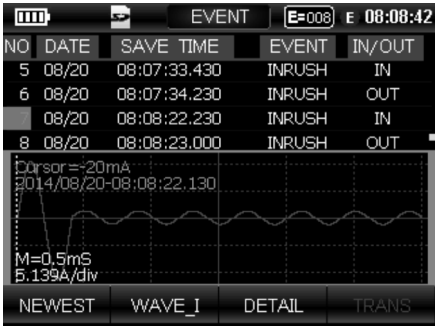
As shown in the figure below, an event is monitored and event-related data is recorded.



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.





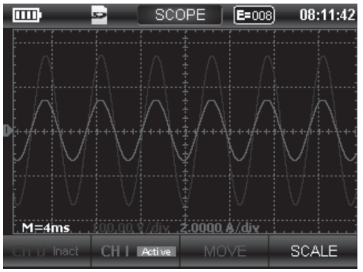
When the event type is TRANS, press “F4”TRANS button to view the transient event related data, and then press “F4”TRANS button to return to EVENT Main Page.



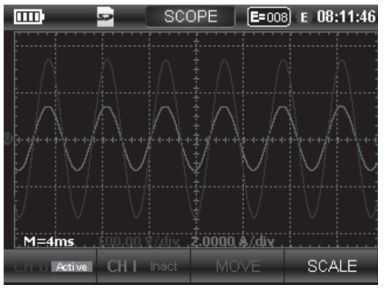
5) Functions under SCOPE Page

Operations under Oscilloscope Page

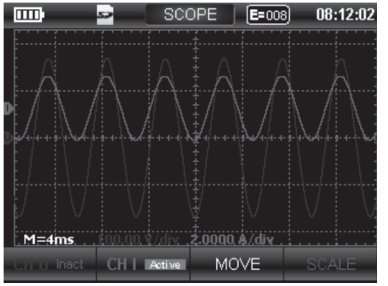
1. Press “F1”CH U button to open and close voltage channel display, press “F2”CH I button to open and close current channel display. The highlighted CHU or CHI means that the display is opened and the grey CHU or CHI means the display is closed.



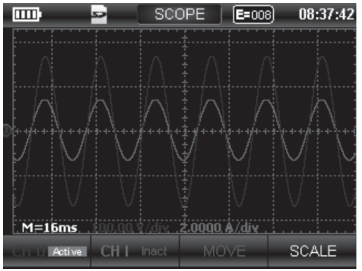
2. Activate the displayed channel, CHU or CHI is highlighted when the channel is displayed, if “Active” is displayed, the channel currently is active and another channel is in the “inact” state, press “F1” or “F2” corresponding to the channel in the “inact” state to switch the active channel.



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



4. Press “F4” to activate SCALE function, press “ ◀ ” or “ ▶ ” button to zoom out or zoon 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 “SCALE ⧗” shortcut button to zoom out the amplitude of the current active channel, press “SCALE ⧫” shortcut button to zoom in the amplitude of the current active channel, press “SCALE ◆”shortcut button to zoom out the time base of the current active channel and press “ SCALE ⋈ ”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 “RECORD START/STOP” 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.

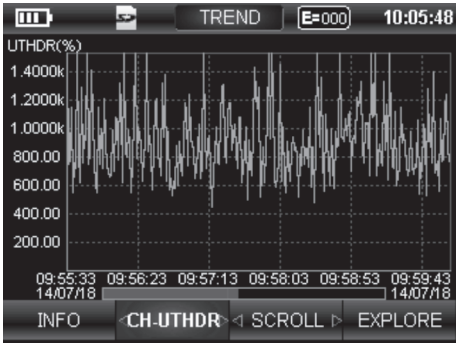


Figure 9-2.

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.

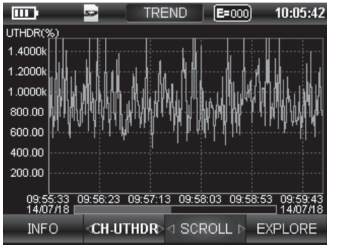


Figure 9−2



Figure 9−3

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

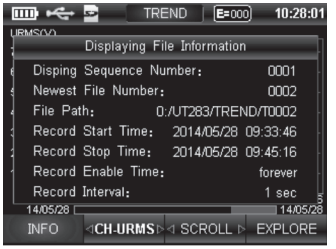


Figure 9-4

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 Multimether 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 "SELECT" 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 theses 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.

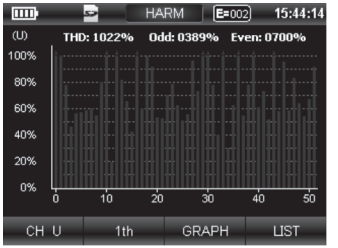


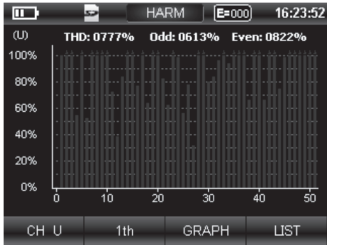
Figure 13-1



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.



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: 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.

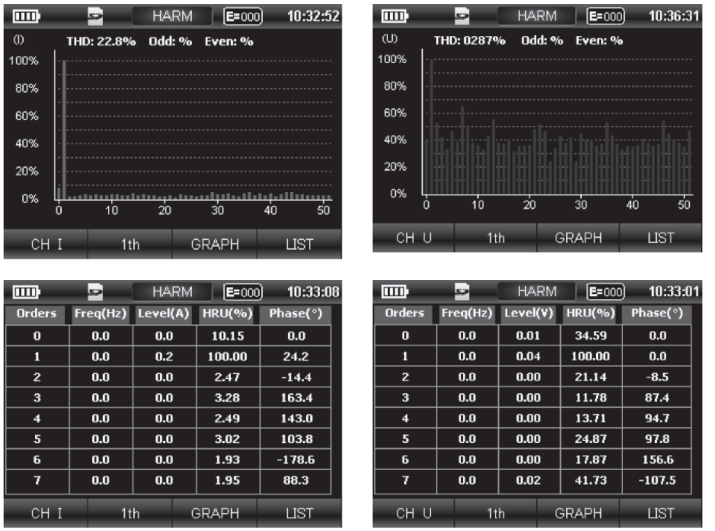


Figure 13-3

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

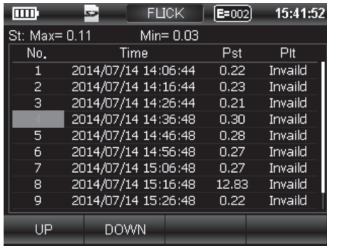


Figure 14-2

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

Operations under Flick Measurement Page

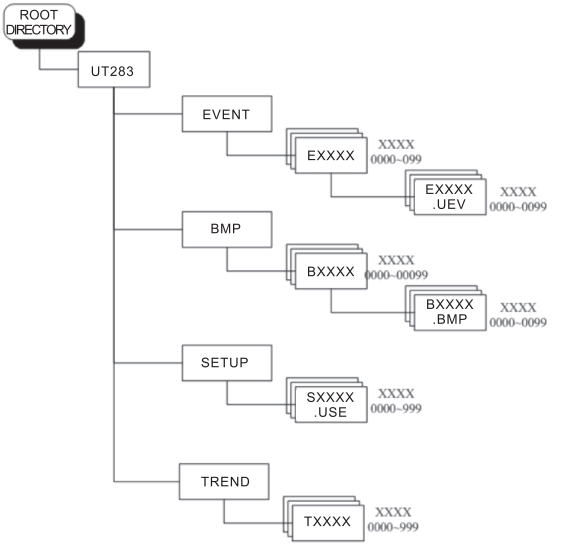
1. Press “F1”P.UP button to move up the cursor, press “F2”P.DOWN button to move down the cursor.
2. Press arrow button “ ▲ ” to move up the cursor, press “ ▼ ” to move down the cursor.

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 cared 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 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.

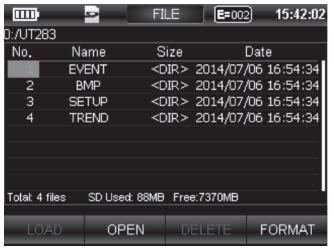


Figure 15-1



Figure 15-2

Functions under File Management Page

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

1. EVETN: 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. Data 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 pervious 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

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

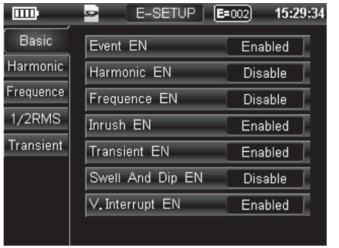


Figure 16-2

Notes:

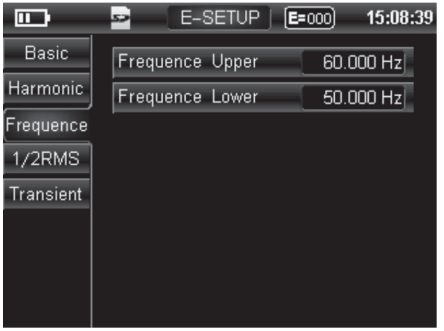
Recording function cannot be enabled under this page, if the analyzer is recording data, the relevant setting can only be browsed and any settings can be changed under this page.

Functions under E-SETUP Event Setup Page

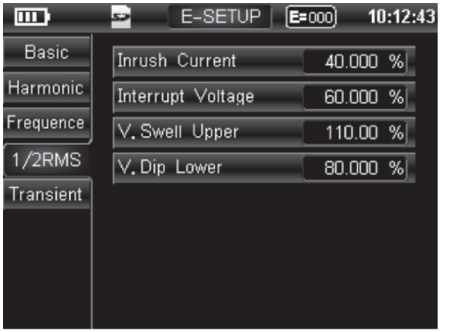
1. Base: Event Record Enabling options include a global enabling option and an individual enabling option for each event. Before recording, it is necessary to open the global enabling option and the individual enabling option for the relevant event as shown in Figure 16-2.
2. Harmonic: Harmonic event-related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



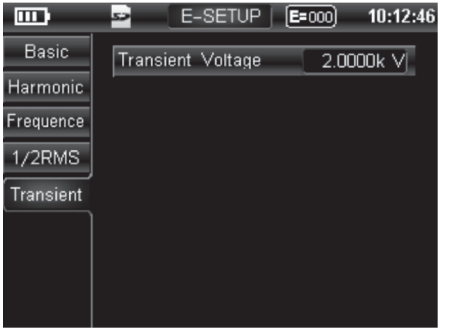
3. Frequency: Frequency event-related threshold setup option is shown in the figure below.



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.



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.

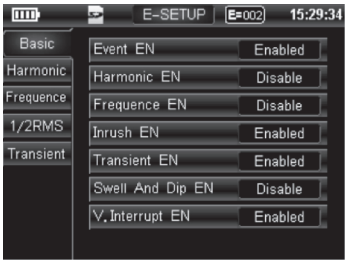


Figure 16-3

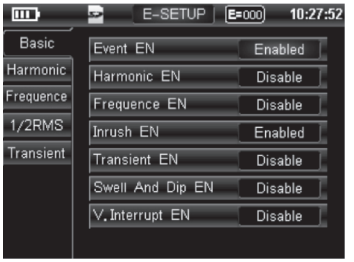
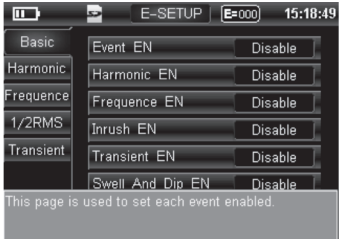
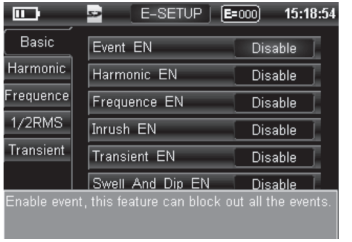
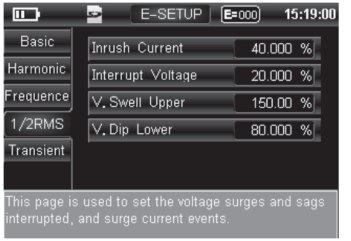


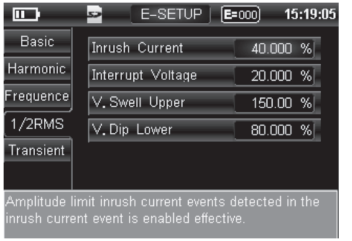
Figure 16-4

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.

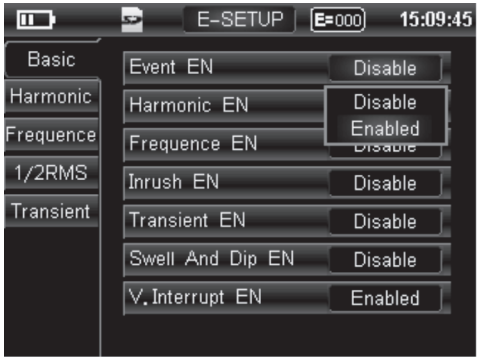


Figure 16-5

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

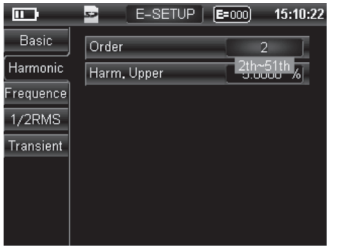


Figure 16-7

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

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

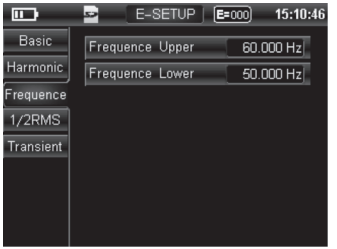


Figure 16-9

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.

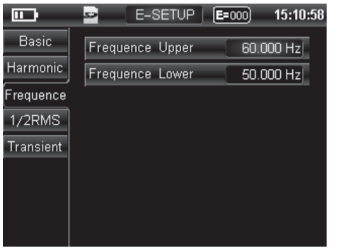


Figure 16-10

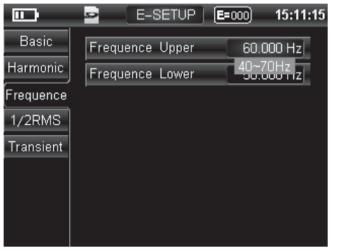


Figure 16-20

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.

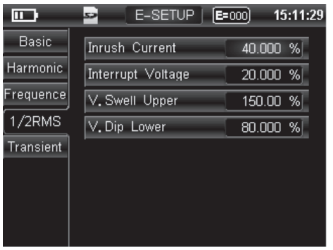


Figure 16-20

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.

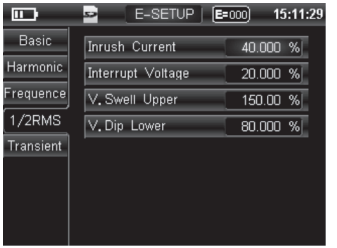


Figure 1

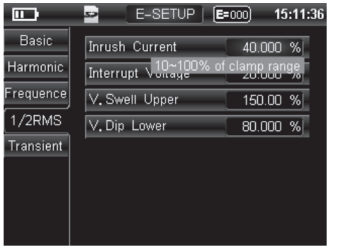


Figure 21

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.

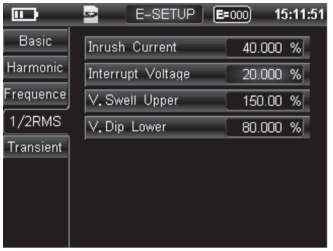


Figure 1

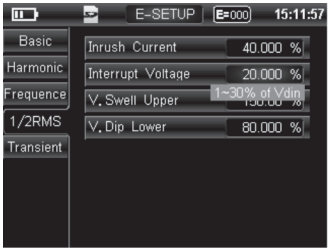


Figure 2

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.

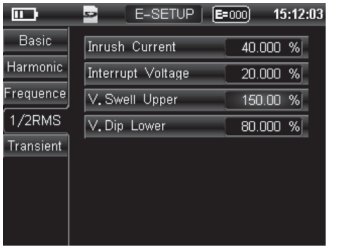


Figure 1

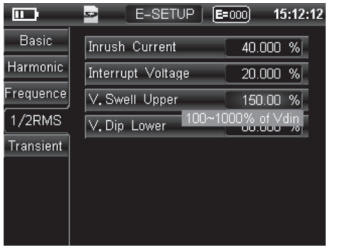


Figure 2

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.

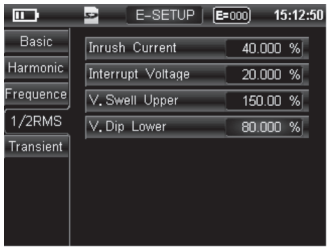


Figure 1

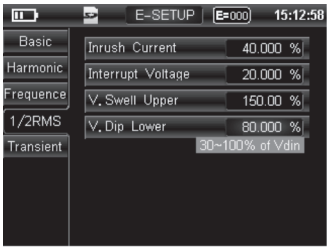


Figure 2

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.

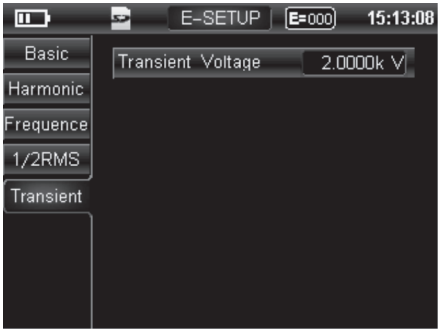


Figure 16-21

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.

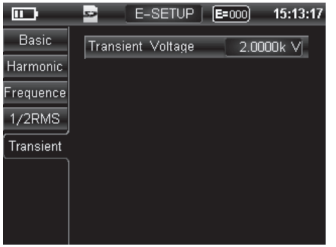


Figure 1

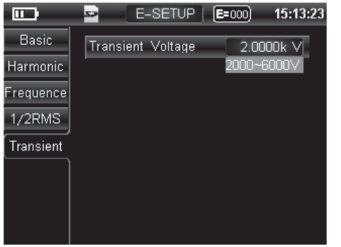


Figure 2

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.



Figure17-1

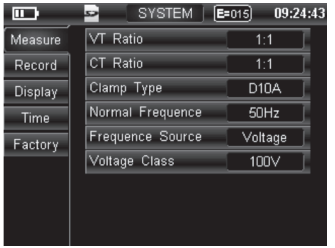


Figure17-2

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.

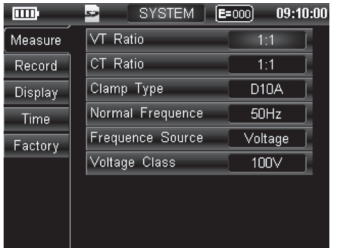


Figure 17-2

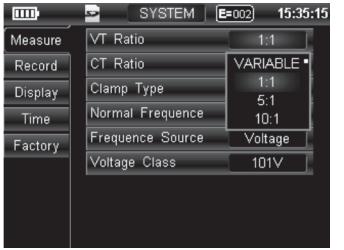


Figure 17-3

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 “▶” 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.

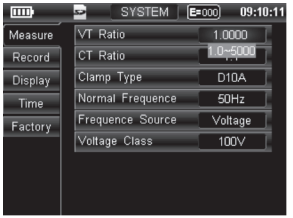


Figure 17-4

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.

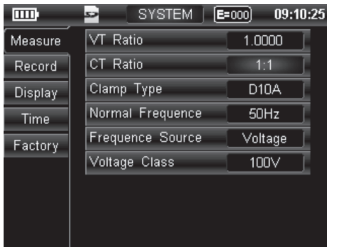


Figure 17-5

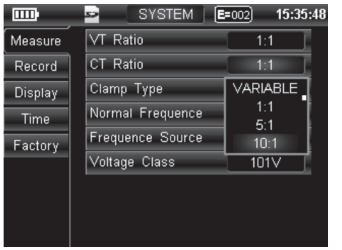


Figure 17-6

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 “▶” 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.

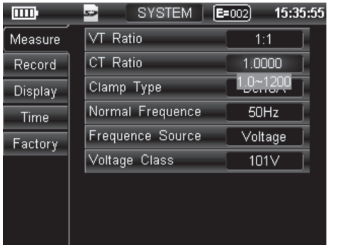


Figure 17-7

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.

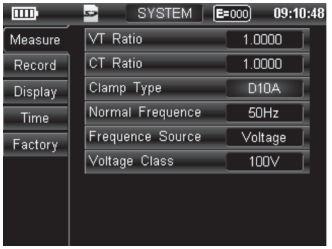


Figure 17-8

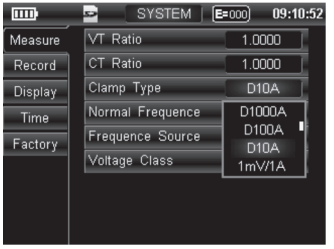


Figure 17-9

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.

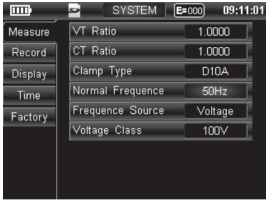


Figure 17-20

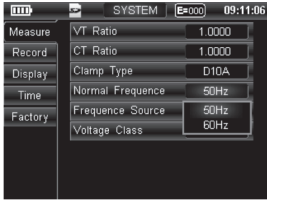


Figure 17-21

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.

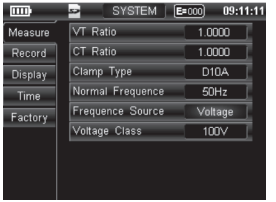


Figure 17-22

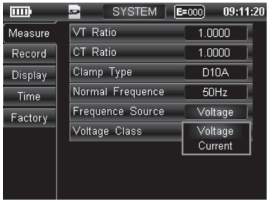


Figure 17-23

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.

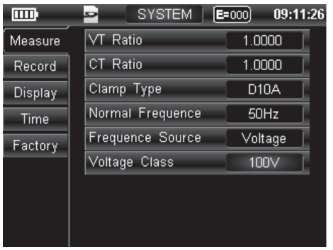


Figure 17-24

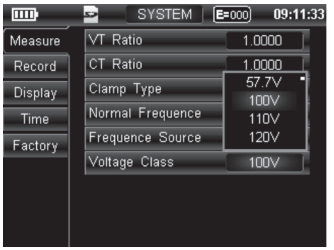


Figure 17-25

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

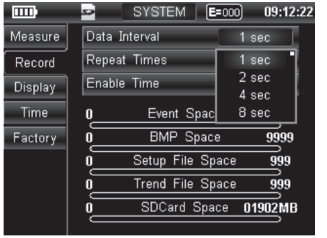


Figure 17-27

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.

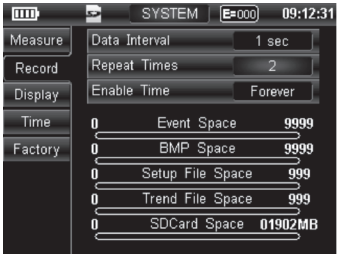


Figure 17-28

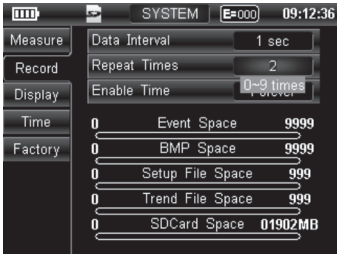


Figure 17-29

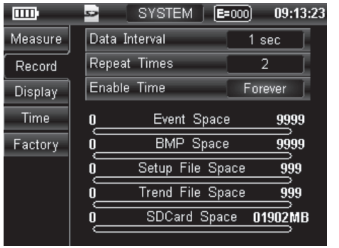


Figure 17-30



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 snapshoot

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.

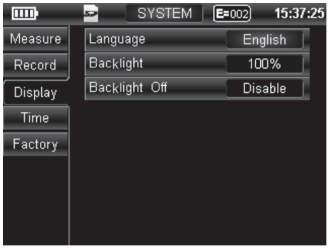


Figure 17-32



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

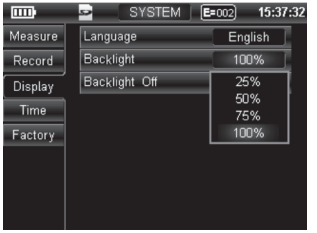


Figure 17-35

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

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.

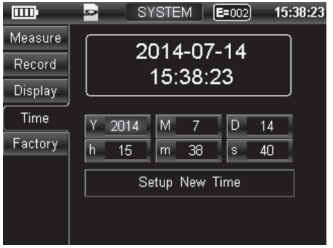


Figure 17-38



Figure 17-39

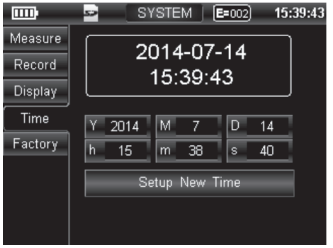


Figure 17-40

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.

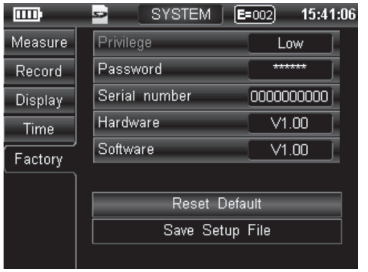


Figure 17-42

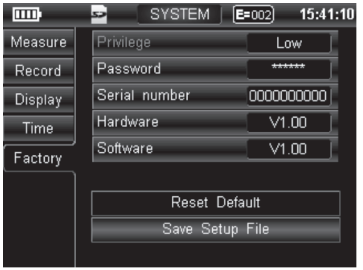
Save Setup File

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.

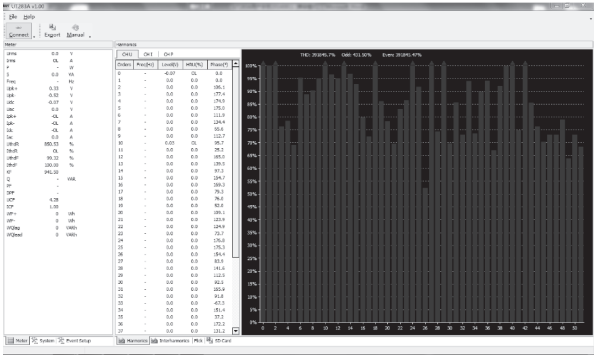
Steps:

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.



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

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
		±(0.5%) Udin
	True RMS	x
	Input voltage	<1000 V AC, <1000V DC
	Input impedance	2 MΩ
	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)
		±(0.5%f.s)@>(10%~100%)
	Max. Input voltage	AC 3V DC 4.24V
	Ratio	1~1200
4Note: Udin 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) Udin=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: Udin is the nominal voltage of the grid, Inom is the normal input current.		

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	Um ⩾1% Unom: <±5% Um
	Um < 1% Unom: <±0.05% Unom
Accuracy of the amplitude of current harmonics or inter-harmonics	<±5% Im (Im ⩾3% Inom,@f.s=1000A or 100A)
	<±0.15% Inom (Im < 3%Inom, @f.s=1000A or 100A)
Accuracy of power harmonics readings	<±5% Im (Im ⩾10% Inom,@f.s=10A)
	<±0.5% Inom (Im < 10% Inom, @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	<±3° when less than 11 times, <±5°% when more than 11 times (@Im≥10%Inom, @f.s=1000Aor 100A)≤5°%(@Im≥10%Inom,@f.s=10A)
K-factor	± 10 %
Note: Unom is fundamental voltage, Um is harmonics voltage, Inom is fundamental current, and Im 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)	Vnom± 1%din (according to IEC 61000-4-30 S Class)
Capture resolution	½ Cycle

Inrush Current

Accuracy of half cycle current (AC+DC)	Inom± 1% (according to IEC 61000-4-30 S Class)
Capture resolution	½ Cycle

Transients

Transients Range	± (2000~6000) Vpk
Accuracy	± 5.0% rdg.±5.0%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）

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

The operating instruction is subject to change without any further notice.

UT283A OPERATING MANUAL

UNI-T®
UNI-TREND TECHNOLOGY（CHINA）CO., LTD.
No6, Gong Ye Bei 1st Road,
Songshan Lake National High-Tech Industrial
Development Zone, Dongguan City,
Guangdong Province, China
Tel: (86-769) 8572 3888
http://www.uni-trend.com