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UNI-T®



**UT206C**

**AC 钳形表说明书**

**AC Clamp Meter User Manual**

## 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，请您在使用之前仔细阅读说明书全文，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的保管，与仪器一同放置或者放在您随时可以查阅的地方，以便在将来的使用过程中进行查阅。

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## 目 录

一、概述	4
二、特点	4
三、附件	4
四、安全操作准则	5
五、电气符号	5
六、综合规范	6
七、外表结构	6
八、LCD显示器	7
九、量程选择旋钮及按键	8
十、测量操作说明	9
十一、技术指标	13
十二、保养和维修	16

### 一、概述

UT206C是迷你袖珍型数字万用钳形表，除了具有常规的万用表、钳形表功能以外，还能稳定测量叠加有载频、畸变信号的变频电压及频率、变频电流；（VFD）。交流电流测量范围可达1000A,且当电流幅值 $\geq 3A$ 时能精确测量电流频率。产品根据CAT II 600V/CAT III 300安全等级进行设计，并且取得相应的EC、cETLus认证。

### 二、特点

- 宽范围的电流测量档位，电流测量范围可达1000A；
- 内置VFD低通滤波电路，能准确测量叠加有载频、畸变信号的变频电压及频率、变频电流；
- 大电容测量，测量电容量程可达10mF；
- 全功能误测保护，最大可承受600V过电压冲击；并设置有过压、过流报警提示；
- 档位功能切换蜂鸣提示（蜂鸣一声提示切换成功，蜂鸣二声提示该档位上无复合功能切换）。

### 三、附件

打开包装箱取出仪表，请仔细检查下列附件是否缺少或损坏，如发现有任何缺少或损坏，请与供货商联系。

- |          |    |
|----------|----|
| 1. 使用说明书 | 1份 |
| 2. 表笔    | 1副 |
| 3. 电池    | 1对 |
| 4. 保修卡   | 1张 |

## 四、安全操作准则

### 1. 安规认证

- 1) CE、cETLus 认证标准: EN61010-2010, EN61010-2-032, EN61010-2-033;
- 2) 600V第二类测量标准 (CAT II), CAT II 600V;  
300V第三类测量标准 (CAT III), CAT III 300。
- 3) 污染等级2。
- 4) 双重绝缘的安全标准。

### 2. 安全说明及使用注意事项

#### ⚠ 警告

为了防止可能发生的触电、火灾或人身伤害, 请仔细阅读所有说明。

- 1) 后盖未盖紧前严禁使用, 否则有电击危险!
- 2) 使用前应检查表笔绝缘层是否完好、无破损及断线。
- 3) 液晶出现"▢"欠压符号时, 为确保测量精度, 请及时更换电池。
- 4) 功能量程开关应置于正确测量位置上。
- 5) 被测信号不允许超过规定的极限测量值, 以防电击和损坏仪表!
- 6) 严禁在功能测量时切换档位开关, 以免发生事故及损坏仪表!
- 7) 在完成了每次测量操作后, 应及时将表笔与被测电路断开; 在进行大电流的测量时, 操作人员应穿戴绝缘鞋、绝缘服及绝缘手套。
- 8) 被测电压高于直流60V或交流30Vrms的场合, 应小心谨慎, 防止触电!
- 9) 不要在高温、高湿环境中使用仪表, 更不能将仪表存储在潮湿环境中, 避免仪表受潮后影响性能、甚至损坏。
- 10) 请勿随意改变仪表内部接线, 以免损坏仪表和危及安全!
- 11) 维护保养请使用湿布或温和的清洁剂清洁仪表表面, 不要使用研磨剂或溶剂!

## 五、电气符号

	电池电量不足		高压警示
	接地		AC (交流) / DC (直流)
	警告提示		

## 六、综合规范

1. 输入端子和接地之间的最高电压: 详见技术指标中各输入端子保护电压说明。
2. 最大显示: 电压610V, 电流1030A, 电容10.30mF, 电阻1.030MΩ;
3. 其它:
  - 量程: 自动
  - 极性: 自动
  - 每秒更新3次; 过量程显示"OL"。
  - 显示屏: TN屏
  - 工作温度: 0°C~40°C (32°F~104°F)
  - 储存温度: -10°C~50°C (14°F~122°F)
  - 相对湿度: 0°C~30°C以下≤75%, 30°C~40°C≤50%
4. 工作海拔高度: 0~2000m
5. 机内电池: AAA 1.5V×2节
6. 电池电量不足: LCD显示"▢"符号
7. 外形尺寸: 约190mm×68mm×19.4mm
8. 重量: 130.5g
9. 电磁兼容性:
  - 在1V/m的射频场下: 总精度=指定精度+量程的5%, 当射频强度超过1V/m以上时, 测试数值仅供参考。

## 七. 外表结构(见图1)

- 1: 钳头开关
- 2: 复合选择SEL键
- 3: LCD显示屏
- 4: 测量负极(黑表笔)输入端口
- 5: 测量正极(红表笔)输入端口
- 6: 锁屏及背光按键开关
- 7: 功能选择开关
- 8: 电池盖螺丝
- 9: 电池盖

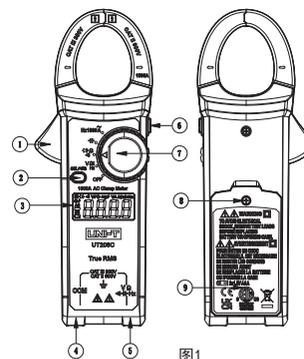


图1

## 八. LCD显示器(见图2)

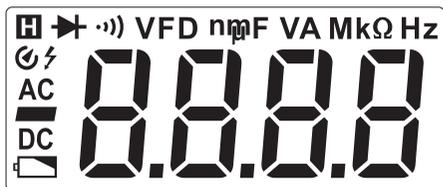


图2

符号	说明
	数据保持提示符
	自动关机开启提示符
	交直流电压高于30V警示符
AC	交流测量提示
	负号
DC	直流测量提示符
	电池电量不足提示符
	二极管测量提示符
	电路通断测量提示符
VFD	VFD功能档位测试提示符
µF mF	电容单位: 微法、毫法
V	电压单位: 伏
A	电流单位: 安培
Ω kΩ MΩ	电阻单位: 欧姆、千欧姆、兆欧姆
Hz kHz	频率单位: 赫兹、千赫兹

## 九. 功能选择旋钮及按键

功能位置	说明
V $\approx$ Hz	交流电压、直流电压、电压频率测量 (在该档位上, 可通过SEL键切换选择)
Ω	电路通断、电阻测量、二极管PN结电压测量 (在该档位上, 可通过SEL键切换选择)
	电容测量
Hz1000 $\tilde{\sim}$	交流电流测量、交流电流频率测量 (在该档位上, 可通过SEL键切换选择)
OFF	电源开关

### 按键:

\* SEL按键(仅适用于复合功能档位):

- (1) 在复合功能档位上, 短按该键并伴随一声蜂鸣, 即可切换到复合档位, 以此操作选择合适的功能档位进行测量。
- (2) 在交流电压、交流电流模式下, 长按SEL键, 显示屏显示"VFD"可进入低通滤波测量模式, 能稳定测量变频电压及频率、变频电流。

注: 在VFD模式下短按SEL键, 则进入VFD频率测试, 在此模式下短按该键即可循环切换VFD模式; 在VFD模式下, 再次长按SEL键即可退出VFD测量模式。

\* HOLD按键:

- (1) 短按HOLD键, LCD显示""提示符, 对应测试数值被锁定, 再点击一次, 锁定功能被解除;
- (2) 长按HOLD键, 则打开背光, 再次长按HOLD键, 则关闭背光

## 十、测量操作说明

在测量之前，请先注意检查内置AAA 1.5Vx2电池，若开机后仪表显示屏上出现“”欠压提示符号，则提示电池电量过低，请更换电池后再使用。还要注意测试表笔插口上的警示符号“

### 1. 交流电压测量

- 1) 将功能量程开关拨到交流电压档位上。
- 2) 将红表笔插入“ $\frac{V}{\Omega}$  Hz”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触所测电压的两端（并联到负载上）进行测量。
- 3) 仪表输入阻抗约为10M $\Omega$ 时，这种负载在高阻抗的电路中会引起测量上的误差。大部分情况下，如果电路阻抗在10k $\Omega$ 以下，误差可以忽略（0.1%或更低）。
- 4) 交流测量显示值为真有效值。

### 2. 直流电压测量

- 1) 在交流电压测试模式下，短按一次SEL键，则进入直流电压测试模式。
- 2) 将红表笔插入“ $\frac{V}{\Omega}$  Hz”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触到所测电压的两端（并联到负载上）进行测量。

#### 注意：

- 不要测量高于600V<sub>rms</sub> 的电压，测量更高的电压可能会有电击危险及损坏仪表！在测量高电压时，要特别注意安全，避免触电危险！
- 在使用前先测试已知电压，以确认产品功能是否完好，精度是否准确！

### 3. 交流电压频率测量

- 1) 在交流电压测试模式下，短按两次SEL键，则进入交流电压频率测试模式。
- 2) 将红表笔插入“ $\frac{V}{\Omega}$  Hz”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触到所测频率电路的两端（并联到负载上）进行测量。
- 3) 当电压输入幅值>3V时，100kHz以内的频率可精准测量，大于此频段的仅供参考。

### 4. 电路通断测量

- 1) 功能量程开关拨到通断测量档位上，显示屏上显示“”字符。

- 2) 将红表笔插入“ $\frac{V}{\Omega}$  Hz”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触所测电路两端（并联到负载上）进行测量。

### 5. 电阻阻值测量

- 1) 将功能量程开关拨到通断测量档位上，短按一下SEL键切换到电阻测量模式；
- 2) 将红表笔插入“ $\frac{V}{\Omega}$  Hz”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触所测电阻的两端（并联到负载上）进行测量。

#### 注意：

### 6. 二极管测量

- 1) 功能量程开关拨到通断测量档位上，短按两下SEL键，功能档位切换到二极管测量档位上，显示屏上显示字符。
- 2) 将红表笔插入“ $\frac{V}{\Omega}$  Hz”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触所测二极管的两端（并联到负载上）进行测量。
- 3) 如果被测二极管开路或极性反接时，将会显示“0L”。对硅PN结而言，一般约为500~800mV确认为正常值。

#### 注意：

- 如果被测电阻开路或阻值超过仪表最大量程时，显示器将显示“0L”。
- 当测量在线电阻时，测量前必须先将被测电路内所有电源关断，并将所有电容器上的残余电荷放尽，才能保证测量准确。
- 如果表笔短路时的电阻值不小于0.5 $\Omega$ 时，应检查表笔是否有松脱现象或其它原因。
- 电路通断测量如果被测两端之间电阻约大于50 $\Omega$ ，默认为电路开路，蜂鸣器无声；被测两端之间电阻约小于30 $\Omega$ ，认为电路良好导通，蜂鸣器连续声响。
- 当测量在线二极管时，在测量前务必先将被测电路内所有电源断开，并将所有电容器放尽残余电荷。
- 二极管测试电压范围约为3.0V
- 不要输入高于直流60V或交流30V以上的电压，否则可能会引发安全事故！

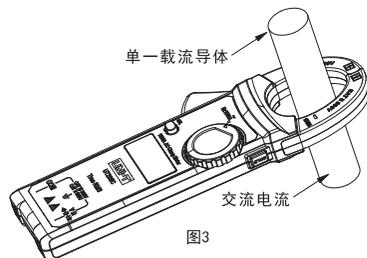
## 6. 电容测量

- 1) 将功能量程开关拨到电容测量档位上。
- 2) 将红表笔插入" $\frac{V}{\Omega}$  Hz"插孔，黑表笔插入"COM"插孔，并将两只表笔笔尖分别接触所测电容的两端（并联到负载上）进行测量。

### ⚠ 注意:

- 如果被测电容短路或容值超过仪表的最大量程，显示器将显示"OL"。
- 对于大容量电容的测量，会需要等待数秒的测量时间，均属正常。
- 测试前必须将电容全部放尽残余电荷后再进行测量，对带有高压的电容尤为重要，避免损坏仪表和伤害人身安全。

## 7. 交流电流测量(见图3)



- 1) 将功能量程开关拨到电流测量档位A 上；
- 2) 将钳头夹在待测线路的主回路线缆上；

### ⚠ 注意:

- 在仪表钳头夹在线路主回路上时，应先将回路中的电源断开。
- 在高电压的测试环境中进行测量作业时，请穿戴绝缘服、绝缘鞋、绝缘手套等劳保用品，避免发生事故。

## 8. 频率测量

- 1) 在交流电流测量档位上，短按一次SEL键，即可进入交流电流频率测量档位进行电流频率测量。
- 2) 当电压输入幅值 $>3A$ 时，45~400Hz以内的频率可精准测量，大于此频段的测试数值不保证测量精度。

## 9.VFD测量

- 1) 在交流电压/交流电流测量模式下，长按SEL进入"VFD"测量模式；
- 2) 在交流电压VFD测量模式下，短按SEL键，则切换到交流电压VFD频率测试；
- 3) 在交流电压VFD频率测试模式下短按SEL键则切换到VFD电压测量模式，以此循环切换（交流电流无VFD频率测量功能）……
- 4) 长按则退出VFD测试模式（注意：仅在交流电压/交流电流测量模式下才能进入VFD测量模式）

## 10.其它功能：

- 开机全显2秒后，进入正常测量状态（电流档可能约7秒），如仪表内部EEPROM出错，会显示"ErrE"，重新开机即正常。
- 在测量过程中，约15分钟内均无拨动功能量程开关及按下按键时，仪表进入"自动关机"状态以节省电能；
- 在睡眠状态下需要重新开机；
- 如需取消自动关机功能，在开机的同时按住SEL键，即可取消自动关机功能，LCD显示屏上的字符" $\text{⏻}$ "消失并伴随1长声蜂鸣，表示取消自动关机功能完成；重新开机即可恢复Auto-off自动关机功能。
- 在测量过程蜂鸣提示/警示音：
  - a、当输入电压 $\geq 600V$ （交流/直流）时，蜂鸣器持续蜂鸣，警示量程处于极限；
  - b、当交流电流 $\geq 1000A$ 时，蜂鸣器会持续蜂鸣，警示量程处于极限。
- 低电压检测：当电池电压约低于2.5V时，显示屏显示欠压符号" $\text{⏻}$ "，请及时更换电池，当低于约2.4V时，显示屏显示"LBT"字符，产品自动关机。

## 十一、技术指标

- 准确度：±(a%读数+b字数), 保证期为1年
- 环境温度：23°C±5°C (73.4°F±9°F) 相对湿度：≤75%

### △ 注意：

- \* 准确度温度条件18°C至28°C，环境温度波动范围稳定在±1°C内。当温度<18°C或>28°C时，附加温度系数误差0.1 × (指定准确度)/°C

### 1. 直流电压测量

量程	分辨力	准确度
6.000V	0.001V	±(1.0%+2)
60.00V	0.01V	
600.0V	0.1V	

- \* 输入阻抗：输入阻抗均约10MΩ。
- \* 准确度保证范围：1~100%量程，短路允许有<5个字的底数。
- \* 最大输入电压：±600V，≥600V有报警声。输入>610V LCD显示“0L”。

### 2. 交流电压测量

量程	分辨力	准确度
6.000V	0.001V	±(1.2%+5)
60.00V	0.01V	
600.0V	0.1V	
VFD:600.0V	0.1V	±(8%)频响40~400Hz

- \* 输入阻抗：输入阻抗约10MΩ。
- \* 显示真有效值；
- \* 频率响应：45~400Hz；
- \* 准确度保证范围：1~100%量程，短路允许有<5个字的底数。
- \* 非正弦波形：波峰因素1.0~2.0 准确度须增加3.0%  
波峰因素2.0~2.5 准确度须增加5.0%  
波峰因素2.5~3.0 准确度须增加7.0%
- \* 最大输入电压：600Vrms，≥600V有报警声，输入>610V LCD显示“0L”。

## 3. 电阻测量

量程	分辨力	准确度
600.0Ω	0.1Ω	±(1.0%+5)
6.000kΩ	0.001kΩ	±(1.0%+2)
60.00kΩ	0.01kΩ	
600.0kΩ	0.1kΩ	
1.000MΩ	0.001MΩ	

- \* 过载保护：600V-PTC
- \* 量程：被测值=测量显示值-表笔短路值
- \* 开路电压约：1V(测试电流约0.1mA)

## 4. 电路通断、二极管测量

量程	分辨力	备注
· )	0.1Ω	电路断开电阻值设定为：约>50Ω，蜂鸣器不发声； 电路良好导通阻值设定为：约≤30Ω，蜂鸣器连续发声。
▶	0.001V	开路电压约：3.0V(测试电流约1.2mA) 硅PN结正常电压值约为0.5~0.8V。

- \* 过载保护：600V-PTC

## 5. 电容测量

量程	分辨力	准确度
6.000μF	0.001μF	±(2%+5)
60.00μF	0.01μF	±(5%+5)
600.0μF	0.1μF	
6.00mF	0.01mF	±10%
10.00mF	0.01mF	±10%

- \* 过载保护：600V-PTC

## 6. 频率测量

### 1) 交流电压频率

量程	分辨率	准确度
10Hz~100KHz	0.01Hz~0.1KHz	±(0.1%+3)

- \* 过载保护：600V-PTC；
- \* 当 $10V_{rms} >$ 输入电压幅值 $>5V_{rms}$ 时，可测量频段 $\leq 50Hz$ ；
- \* 当输入电压幅值 $>10V_{rms}$ （VFD模式下要求输入电压幅值 $>50V$ ），可测量频段 $\geq 50Hz$ ；
- \* 当频段 $>100kHz$ 时，测试数值仅供参考。

### 2) 交流电流频率

量程	分辨率	准确度
45Hz~400Hz	0.01Hz~0.1Hz	±(0.1%+3)

- \* 当输入电流幅值 $>3A$ 时，可满足全频段电流频率测量；
- \* 当频段 $>400Hz$ 时，测试数值仅供参考

## 7. 交流电流测量

量程	分辨率	准确度
60.00A	0.01A	±(2.0%+10)
600.0A	0.1A	±(2.0%+5)
1000A	1A	±(2.0%+5)

- \* 频率响应：45~400Hz（电流幅值 $>3A$ ）
- \* 显示：真有效值。
- \* 准确度保证范围：1~100%量程。

## 十二、保养和维修

### ⚠ 警告：

在打开仪表后盖之前，应确定电源已关闭，表笔已离开输入端口和被测电路。

### 1. 一般的保养和维修

- \* 维护保养请使用湿布和温和的清洁剂清洁仪表外壳。不要使用研磨剂或溶剂。
- \* 如发现仪表有任何异常，应立即停止使用并送维修。
- \* 在有需要对仪表进行校验或维修时，请由有资格的专业维修人员或指定的维修部门维修。

### 2. 更换电池（见图4）

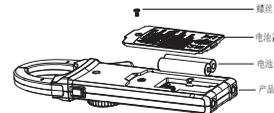


图4

- 1) 当LCD显示“”欠压提示符时，应当立即更换内置电池，否则会影响测量精度。
- 2) 把电源开关置于“OFF”位置，并从输入插孔中移走表笔。
- 3) 电池更换：用螺丝刀拧下电池盖固定的一颗螺丝（顶部），卸下电池盖，即可更换电池；注意装入新电池时特别要看清正、负极性。

**⚠ 警告：**请勿混用新旧电池，请勿混用碱性，碳性，充电电池。

- \* 电池规格：AAA 1.5Vx2节

#### 2) 更换表笔：

表笔绝缘损坏，请及时更换

### ⚠ 警告：

用于电源测量的表笔应当满足EN61010-2-032，EN61010-2-033  
CAT III 300V CAT II 600V。

## 优利德®

### 优利德科技(中国)股份有限公司

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## **Preface**

Thank you for purchasing a brand-new Uni-Trend instrument, in order to use this instrument correctly, please read the full text of this manual carefully before use, especially the "Safety Information" section.

If you have read the full text of this manual, it is recommended that you keep it in a safe place, preferably with the instrument or in a place where you can access it at any time, so that you can refer to it in future use.

## **Limited warranties and liability**

The Company warrants that this product will be free from any defects in materials and workmanship for a period of one year from the date of purchase. This warranty does not apply to damage caused by accident, negligence, misuse, modification, contamination and abnormal operation or handling. The Distributor is not entitled to any other warranties in the name of the Company. If warranty service is required during the warranty period, please contact the nearest authorized service center to obtain the product return authorization information, and then send the product to the service center with a description of the product problem.

This guarantee is your sole remedy. Otherwise, the Company disclaims all warranties, express or implied, such as those applicable to a particular purpose. The Company shall not be liable for any special, indirect, incidental or consequential damages or losses arising from any cause or presumption, and the above limitations and provisions of liability may not apply to you because some states or countries do not allow limitations on implied warranties and incidental or consequential damages.

## Contents

1、 Overview-----	20
2、 Accessories-----	20
3、 Safety Information-----	21
4、 Electrical Symbols-----	22
5、 General Specifications-----	22
6、 External Structure-----	23
7、 LCD Display-----	24
8、 Rotary Switch and Buttons-----	25
9、 Operating Instructions-----	26
10、 Technical Specifications-----	31
11、 Maintenance and Repair-----	34

## 1. Overview

UT206C is a mini pocket-sized digital clamp meter. In addition to the functions of conventional multimeter and clamp meter, it can also reliably measure voltage and frequency of signals superimposed with power frequency and distorted signals, as well as variable frequency current (VFD). The AC current measurement range can reach up to 1000A, and it can accurately measure current frequency when the current amplitude is  $\geq 3A$ . The product is designed according to CAT II 600V/ CAT III 300 safety standards and has obtained the corresponding CE and cETLus certifications.

## Features

- Wide range of current measurement settings, with a current measurement range of up to 1000A.
- Built-in VFD low-pass filter circuit, capable of accurately measuring variable frequency voltage and current with superimposed carrier and distorted signals.
- Large capacitance measurement, capable of measuring capacitance up to 10mF.
- Full-feature false detection protection, capable of withstanding up to 600V overvoltage surges; designed with overvoltage and overcurrent alarms.
- Audible beep indicates function switch (one beep for successful switch, two beeps for no composite function available).

## 2. Accessories

Open the package and take out the Meter. Please carefully check whether any of the following accessories are missing or damaged. If you find anything missing or damaged, please contact the supplier.

1. User manual ----- 1 pc
2. Test leads ----- 1 pair
3. Batteries ----- 1 pair
4. Warranty card ----- 1 pc

### 3. Safety Information

#### 1. Safety Certification

- 1) CE, cETLus certification standards: EN61010-2010, EN61010-2-032, EN61010-2-033.
- 2) 600V Measurement Category II (CAT II), CAT II 600V; 300V Measurement Category III (CAT III), CAT III 300.
- 3) Pollution Degree 2
- 4) Safety standard: Double Insulated

#### 2. Safety Instructions and Usage Precautions

##### WARNING

To prevent possible electric shock, fire, or personal injury, please read all instructions carefully.

- 1) Do not operate the meter unless the back cover is securely closed, otherwise there is a risk of electric shock!
- 2) Before use, the insulation of the test leads should be checked to ensure it is intact, with no damage or broken wires.
- 3) When the LCD displays the low voltage symbol "", to ensure measurement accuracy, please replace the batteries promptly.
- 4) The rotary switch should be set to the correct measurement position.
- 5) The measured signal must not exceed the specified limit values to prevent electric shock and damage to the Meter!
- 6) It is strictly forbidden to switch the rotary switch during functional measurements to prevent accidents and damage to the Meter!
- 7) After completing each measurement operation, the test leads should be promptly disconnected from the circuit being tested; when measuring high currents, operators should wear insulating shoes, insulating clothing, and insulating gloves.
- 8) When the measured voltage exceeds DC 60V or AC 30Vrms, exercise caution to prevent electric shock!
- 9) Do not use the Meter in high-temperature or high-humidity environments, and never store the Meter in a damp environment to avoid performance issues or even damage caused by moisture.
- 10) Do not change the internal wiring of the Meter to avoid damaging the Meter and endangering safety!
- 11) For maintenance, please clean the Meter surface with a damp cloth or mild detergent. Do not use abrasives or solvents!

### 4. Electrical Symbols

	Low battery		High voltage warning
	Grounding		AC (Alternating Current) / DC (Direct Current)
	Warning		

### 5. General Specifications

1. The maximum voltage between the input terminals and ground: See the specifications for the protection voltage of each input terminal.
2. Maximum display: Voltage 610 V, Current 1030 A, Capacitance 10.30 mF, Resistance 1.030 MΩ.
3. Others:
  - Range: Auto
  - Polarity: Auto
  - Updates 3 times per second; displays "OL" when over range.
  - Display: TN screen
  - Operating temperature: 0°C ~ 40°C (32°F ~ 104°F)
  - Storage temperature: -10°C ~ 50°C (14°F ~ 122°F)
  - Relative humidity: ≤75% below 30°C, ≤50% at 30°C ~ 40°C
4. Operating altitude: 0~2000m
5. Battery in the Meter: AAA 1.5V × 2
6. Low battery: LCD displays "" symbol
7. Dimensions: approximately 190 mm × 68 mm × 19.4 mm
8. Weight: 130.5 g
9. Electromagnetic Compatibility:
  - In a 1V/m RF field: Total accuracy = specified accuracy + 5% of range.
  - When the RF intensity exceeds 1V/m, the test values are for reference only.

### 6. External Structure (Figure 1)

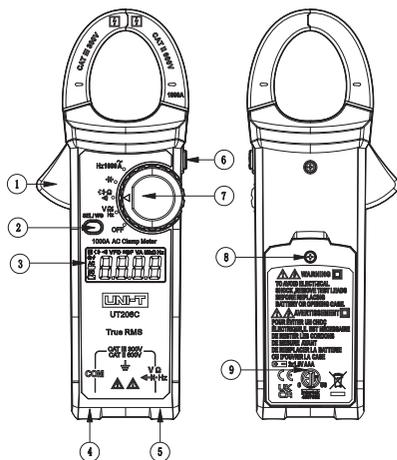


Figure 1

1. Trigger
2. Composite select SEL button
3. LCD display
4. Negative (black test lead) measurement input port
5. Positive (red test lead) measurement input port
6. Lock screen and backlight button switch
7. Function select switch
8. Battery cover screw
9. Battery cover

### 7. LCD Display (Figure 2)

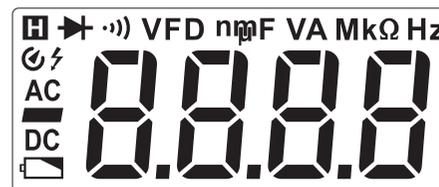


Figure 2

Symbol	Description
H	Data hold
G	Auto-off function enabled
⚡	AC or DC voltage exceeds 30V
AC	AC measurement
—	Negative sign
DC	DC measurement
⎓	Low battery
▶	Diode measurement
∩)	Continuity measurement
VFD	VFD function position test
μF mF	Capacitance units: microfarads, millifarads
V	Voltage unit: Volt
A	Current unit: Ampere
Ω kΩ MΩ	Resistance units: ohms, kilo-ohms, mega-ohms
Hz kHz	Frequency units: hertz, kilohertz

## 8. Rotary Switch and Buttons

Position	Description
$V \approx \text{Hz}$	AC voltage, DC voltage, voltage frequency measurement (in this position, you can switch selections using the SEL button)
$\rightarrow \Omega \rightarrow$	Circuit continuity, resistance measurement, diode PN junction voltage measurement (in this position, you can switch selections using the SEL button)
$\leftarrow C \rightarrow$	Capacitance measurement
$\text{Hz} 1000 \tilde{A}$	AC current measurement, AC current frequency measurement (in this position, you can switch selection using the SEL button)
OFF	Power off

### Buttons:

#### \* SEL Button (Only applicable to composite-function position):

- (1) In the composite-function position, a short press of this button accompanied by a beep will switch to the composite position. Use this operation to select the appropriate function position for measurement.
- (2) In AC voltage and AC current modes, press and hold the SEL key; the display will show "VFD," allowing entry into the low-pass filter measurement mode, which can stably measure variable frequency voltage and frequency, as well as variable frequency current (Note: In VFD mode, briefly pressing the SEL key will enter VFD frequency testing, and in this mode, briefly pressing the key will cycle through the VFD modes); in VFD mode, pressing and holding the SEL key again will exit the VFD measurement mode.

### HOLD button:

- (1) Short press the HOLD button briefly, and the LCD will display a "  " symbol, indicating that the corresponding test value is locked. Press it again to deactivate the lock function.
- (2) Long press the HOLD key to turn on the backlight, and long press the HOLD key again to turn off the backlight.

## 9. Operating Instructions

Before measuring, please check the built-in AAA 1.5V x 2 batteries. If the Meter display shows the low voltage symbol "  " when powered on, it indicates that the battery is low and needs to be replaced before use. Also, pay attention to the warning symbol "  " on the test lead jack. This warns you to make sure that the voltage or current being tested does not exceed the Meter's maximum measurement value to ensure safe measurement !

### 1. AC Voltage Measurement

- (1) Turn the rotary switch to the AC voltage position.
- (2) Insert the red test lead into the "  $\rightarrow \Omega \rightarrow$  " terminal, the black test lead into the "COM" terminal, and place the tips of the two test leads on both ends of the voltage to be measured (connected in parallel to the load) for measurement.
- (3) When the Meter's input impedance is about 10 M $\Omega$ , this kind of load can cause measurement errors in high-impedance circuits. In most cases, if the circuit impedance is below 10 k $\Omega$ , the error can be neglected (0.1% or less).
- (4) The displayed AC measurement value is the True RMS value.

### 2. DC Voltage Measurement

- (1) In AC voltage test mode, short press the SEL button once to enter DC voltage test mode.
- (2) Insert the red test lead into the "  $\rightarrow \tilde{V} \rightarrow$  " terminal, the black test lead into the "COM" terminal, and touch the tips of the two test leads to the two ends of the voltage being measured (connected in parallel with the load) for measurement.

### WARNING:

- Do not measure voltages higher than 600Vrms. Measuring higher voltages may pose a risk of electric shock and damage the Meter!

- When measuring high voltage, pay special attention to safety and avoid the risk of electric shock!
- Test with a known voltage before use to ensure that the product is functioning properly and the accuracy is correct !

### 3. AC Voltage Frequency Measurement

- (1) In AC voltage test mode, short press the SEL button twice to enter the AC voltage frequency test mode.
- (2) Insert the red test lead into the " $\frac{V\Omega}{-)-+Hz}$ " terminal, the black test lead into the "COM" terminal, and then touch the tips of the two test leads to both ends of the frequency circuit to be measured (in parallel with the load) for measurement.
- (3) When the voltage input amplitude is greater than 3V, frequencies within 100kHz can be measured accurately, while those above this range are for reference only.

### 4. Continuity Measurement (·))

- (1) Turn the rotary switch to the continuity measurement position, and the display will show the symbol "·))".
- (2) Insert the red test lead into the " $\frac{V\Omega}{-)-+Hz}$ " terminal, the black test lead into the "COM" terminal, and then place the tips of the two test leads on both ends of the circuit to be measured (connected in parallel to the load) for measurement.

### 5. Resistance Measurement

- (1) Turn the rotary switch to the continuity measurement position, then short press the SEL button to switch to resistance measurement mode.
- (2) Insert the red test lead into the " $\frac{V\Omega}{-)-+Hz}$ " terminal, the black test lead into the "COM" terminal, and place the tips of the two test leads on both ends of the resistor being measured (connected in parallel to the load) for measurement.

#### WARNING:

### 6. Diode Measurement

- (1) Set the rotary switch to the continuity measurement position, short press the SEL button twice, the function mode will switch to the diode measurement mode, and the symbol will appear on the display.
- (2) Insert the red test lead into the " $\frac{V\Omega}{-)-+Hz}$ " terminal, the black test lead into the "COM" terminal, and touch the tips of the two test leads to the two ends of the diode being tested (connected in parallel with the load) for measurement.

- (3) If the tested diode is open or connected with reverse polarity, 'OL' will be displayed. For a silicon PN junction, a typical normal value is generally around 500–800 mV.

#### WARNING:

- If the resistor being measured is open or its resistance exceeds the Meter's maximum range, the display will show 'OL'.
- When measuring in-circuit resistance, all power sources in the circuit to be measured must be turned off before measurement, and any residual charge on all capacitors must be discharged to ensure accurate measurement.
- If the resistance value of the shorted test leads is not less than 0.5Ω, check whether the test lead is loose or if there is any other cause.
- Circuit continuity measurement: If the resistance between the two test points is greater than about 50Ω, it is considered an open circuit, and the buzzer will be silent; if the resistance between the two test points is less than about 30Ω, the circuit is considered to be conducting well, and the buzzer will sound continuously.
- When measuring an in-circuit diode, be sure to disconnect all power supplies in the circuit to be tested and discharge all capacitors before measurement.
- The test voltage range of the diode is approximately 3.0V.
- Do not input a voltage higher than DC 60V or AC 30V, otherwise it may cause a safety accident!

### 7. Capacitance Measurement

- (1) Turn the rotary switch to the capacitance measurement position.
- (2) Insert the red test lead into the " $\frac{V\Omega}{-)-+Hz}$ " terminal, the black test lead into the "COM" terminal, and place the tips of both probes on the two ends of the capacitor to be measured (connected in parallel with the load) for measurement.

#### WARNING:

- If the capacitor being tested is short-circuited or its capacitance exceeds the maximum range of the Meter, the display will show "OL".
- For measuring high-capacitance capacitors, it is normal to wait several seconds for the measurement.
- Before testing, all residual charges in the capacitor must be fully discharged before measurement. This is especially important for capacitors with high voltage to prevent damage to the Meter and ensure personal safety.

### 7. AC Current Measurement (Figure 3)

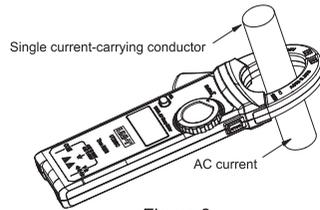


Figure 3

- (1) Turn the rotary switch to the current measurement position (A).
- (2) Clamp the Meter jaws onto the main line cable of the circuit to be measured.

#### **⚠ WARNING:**

- When clamping the Meter jaws onto the main circuit of the wiring, the power in the circuit should be turned off first.
- When performing measurements in a high-voltage testing environment, please wear protective equipment such as insulating clothing, insulating shoes, and insulating gloves to prevent accidents.

### 8. Frequency Measurement

- (1) In the AC current measurement position, short press the SEL button once to enter the AC current frequency measurement mode for measuring the current frequency.
- (2) When the input voltage amplitude is greater than 3A, frequencies within 45–400Hz can be measured accurately. Measurement accuracy is not guaranteed for values outside this frequency range.

### 9. VFD Measurement

- (1) In AC voltage/AC current measurement mode, long press SEL to enter the 'VFD' measurement mode.
- (2) In AC voltage/AC current VFD measurement mode, short press the SEL key to switch to AC voltage VFD frequency testing.

- (3) In the AC voltage VFD frequency test mode, pressing the SEL button briefly will switch to the VFD voltage measurement mode, and pressing it again will cycle back (For AC current, there is no VFD frequency measurement function).
- (4) Long press to exit VFD test mode (Note: VFD measurement mode can only be entered in AC voltage/AC current measurement mode).

### 10. Other Functions

- The Meter displays all segments for 2 seconds after powering on, then enters normal measurement mode (it may take about 7 seconds for current position). If there is an error in the internal EEPROM of the Meter, it will show 'ErrE'. Restarting the Meter will restore normal operation.
- During the measurement process, if the rotary switch is not operated for about 15 minutes, the Meter will enter the 'auto-off' state to save power.
- When in sleep mode, a restart is needed.
- To disable the auto-off function, long press the SEL button while turning on the Meter. This will cancel the auto-off function, indicated by the disappearance of the '⏻' symbol on the LCD screen along with one long beep, signifying that the cancellation is complete. Restarting the Meter will restore the auto-off function.
- Beep alert/warning sound during the measurement process:
  - a. When the input voltage is  $\geq 600$  V (AC/DC), the buzzer will sound continuously, indicating that the measurement range is at its limit.
  - b. When the AC current is  $\geq 1000$ A, the buzzer will sound continuously, indicating that the measurement range is at its limit.
- Low voltage detection: When the battery voltage drops to about 2.5V, the screen will display the undervoltage symbol "⚡". Please replace the batteries in time. When it drops to about 2.4V, the screen will show the "LBT" symbol, and the Meter will automatically power off.

## 10. Technical Specifications

Accuracy:  $\pm$  (a% of reading + b digits), guaranteed for 1 year

Ambient temperature: 23°C $\pm$ 5°C (73.4°F $\pm$ 9°F)

Relative humidity:  $\leq$ 75%

### WARNING:

Temperature conditions for accuracy: 18°C to 28°C. The environmental temperature fluctuation should be stable within  $\pm$ 1°C. When the temperature is below 18°C or above 28°C, an additional temperature coefficient error of 0.1 x (specified accuracy) per °C applies.

### 1. DC Voltage Measurement

Range	Resolution	Accuracy
6.000V	0.001V	$\pm$ (1.0%+2)
60.00V	0.01V	
600.0V	0.1V	

- Input impedance: approximately 10 M $\Omega$
- Accuracy guarantee range: 1~100% of the range. Under short circuit conditions, the offset is allowed to be less than 5 counts.
- Maximum input voltage:  $\pm$ 600V. If greater than or equal to 600V, there is an alarm sound. If greater than 610V, LCD displays 'OL'.

### 2. AC Voltage Measurement

Range	Resolution	Accuracy
6.000V	0.001V	$\pm$ (1.2%+5)
60.00V	0.01V	
600.0V	0.1V	
VFD:600.0V	0.1V	$\pm$ (8%) Frequency response: 40~400Hz

- Input impedance: approximately 10M $\Omega$
- Display: True RMS
- Frequency response: 45~400Hz
- Accuracy guarantee range: 1~100% of the range. Under short circuit conditions, the offset is allowed to be less than 5 counts.

- Non-sinusoidal waveform:
  - Crest factor 1.0~2.0, accuracy needs to increase by 3.0%.
  - Crest factor 2.0~2.5, accuracy needs to increase by 5.0%.
  - Crest factor 2.5~3.0, accuracy needs to increase by 7.0%.
- Maximum input voltage:  $\pm$ 600Vrms. If greater than or equal to 600V, there is an alarm sound. If greater than 610V, LCD displays 'OL'.

### 3. Resistance Measurement

Range	Resolution	Accuracy
600.0 $\Omega$	0.1 $\Omega$	$\pm$ (1.0%+5)
6.000k $\Omega$	0.001k $\Omega$	$\pm$ (1.0%+2)
60.00k $\Omega$	0.01k $\Omega$	
600.0k $\Omega$	0.1k $\Omega$	
1.000M $\Omega$	0.001M $\Omega$	

- Overload protection: 600V-PTC
- Range: Measured value = Displayed measurement value – Value of shorted test leads
- Open-circuit voltage: approximately 1V (test current is approximately 0.1mA)

### 4. Continuity Measurement; Diode Measurement

Range	Resolution	Remark
	0.1 $\Omega$	When the circuit is disconnected, the resistance is set to approximately >50 $\Omega$ , and the buzzer does not sound When the circuit is properly conducting, the resistance is set to approximately $\leq$ 30 $\Omega$ , and the buzzer will sound continuously.
	0.001V	Open-circuit voltage: approximately 3.0 V (test current is approximately 1.2 mA) The normal voltage of a silicon PN junction is about 0.5 to 0.8 V.

- Overload protection: 600V-PTC

## 5. Capacitance Measurement

Range	Resolution	Accuracy
6.000 $\mu$ F	0.001 $\mu$ F	$\pm(2\%+5)$
60.00 $\mu$ F	0.01 $\mu$ F	$\pm(5\%+5)$
600.0 $\mu$ F	0.1 $\mu$ F	
6.00mF	0.01mF	$\pm 10\%$
10.00mF	0.01mF	$\pm 10\%$

- Overload protection: 600V-PTC

## 6. Frequency Measurement

### 1) AC Voltage Frequency

Range	Resolution	Accuracy
10Hz~100KHz	0.01Hz~0.1KHz	$\pm(0.1\%+3)$

- Overload protection: 600V-PTC
- When 10 Vrms > input voltage amplitude > 5 Vrms, the measurable frequency band is  $\leq 50$  kHz.
- When the input voltage amplitude is >10 Vrms (for VFD mode, the input voltage amplitude must be >50 V), the measurable frequency band is  $\geq 50$  Hz.
- When the frequency band is greater than 100 KHz, the test values are for reference only.

### 2) AC Current Frequency

Range	Resolution	Accuracy
45Hz~400Hz	0.01Hz~0.1Hz	$\pm(0.1\%+3)$

- When the input current amplitude is greater than 3A, it can meet the current frequency measurement across the full frequency range.
- When the frequency band is greater than 400 Hz, the test values are for reference only.

## 7. AC Current Measurement

Range	Resolution	Accuracy
60.00A	0.01A	$\pm(2.0\%+10)$
600.0A	0.1A	$\pm(2.0\%+5)$
1000A	1A	$\pm(2.0\%+5)$

- Frequency response: 45–400 Hz (current amplitude > 3 A)
- Display: True RMS
- Accuracy guarantee range: 1–100% of the range

## 11. Maintenance and Repair

**⚠ WARNING:** Before opening the back cover, make sure that the power is turned off and the test leads are disconnected from the input terminals and the circuit under test.

### 1. General maintenance and repair

- For maintenance, please clean the Meter casing with a damp cloth and a mild detergent. Do not use abrasives or solvents.
- If any abnormalities are found in the Meter, stop use immediately and sent it for repair.
- When the Meter needs calibration or repair, please have it serviced by qualified professional maintenance personnel or an authorized service center.

### 2. Battery replacement (Figure 4)

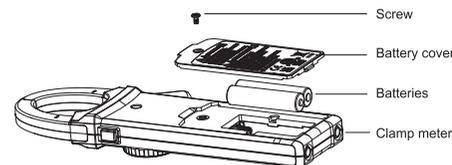


Figure 4

- 1) When the LCD displays the low voltage symbol “”, the built-in batteries should be replaced immediately; otherwise, it will affect the measurement accuracy.
- Set the power switch to the 'OFF' position and remove the test leads from the input terminal.
  - Battery replacement: Use a screwdriver to loosen the screw securing the battery cover (at the top), remove the battery cover, and then you can replace the batteries; be sure to pay special attention to the positive and negative terminals when inserting new batteries.

**⚠ WARNING:**

Do not mix new and old batteries, and do not mix alkaline, carbon, or rechargeable batteries.

- Battery specifications: AAA 1.5Vx2

2) Test leads replacement

If the insulation of the test lead is damaged, please replace it promptly.

**⚠ WARNING:**

Test leads used for power measurements should comply with EN61010-2-032, EN61010-2-033 CAT III 300V CAT II 600V.