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UNI-T®



UT71 系列 使用手册

智能型数字万用表
Intelligent
Digital Multimeters

UNI-T®

UT71A/B/C/D/E

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的保管，与仪表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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一、概述

UT71系列产品具有全功能模拟条图显示，全量程过载保护和独特的外观设计，使之成为性能更为优越的高精度电工测量仪表。

型号UT71A/B是20000计数4 1/2数位，自动量程真有效值数字万用表。

型号UT71C/D/E是40000计数4 3/4数位，自动量程真有效值数字万用表。

本系列仪表可用于测量：真有效值交流或（AC+DC）电压和电流、直流电压和电流、电阻、二极管、电路通断、电容、频率、占空比、温度、（4~20mA）%、有功功率、功率因数、视在功率、最大/最小值、相对测量等参数。并具有双重背光、用户设置、插错报警、USB数据传输、数据存储、数据保持、欠压显示和自动关机功能。

本使用说明书包括有关的安全信息和警告提示等，请仔细阅读有关内容并严格遵守所有的警告和注意事项。

二、UT71系列功能对照表：

功能	UT71A	UT71B	UT71C	UT71D	UT71E
最大显示	20000	20000	40000	40000	40000
最高精度	± (0.1%+8)	± (0.05%+5)	± (0.025%+5)	± (0.025%+5)	± (0.025%+5)
数据存储	-----	100	100	9999	100
(4~20mA)%	-----	√	√	√	√
温度	-----	√	√	√	√
功率	-----	-----	-----	-----	√

本说明书的内容包括UT71系列所有产品功能、操作及指标，相应资料仅对有该功能的产品型号有效

三、开箱检查

打开包装盒取出仪表，请仔细检查下列附件是否缺少或损坏，如发现有任何一项缺少或损坏，请即与你的供应商联系。

- | | |
|---|----|
| ● 使用说明书 | 一本 |
| ● 表笔 | 一副 |
| ● 带护套鳄鱼夹 | 一副 |
| ● 测试短线 | 一副 |
| ● 点式K型(镍铬~镍硅)热电偶(仅适用于230℃以下温度的测量)(仅UT71B/C/D/E) | 一个 |
| ● USB接口连接线 | 一条 |
| ● 接口软件CD | 一张 |
| ● 布包 | 一个 |
| ● 合格证 | 一张 |
| ● 功率测量转接器(仅UT71E) | 一个 |
| ● 负载排插(仅UT71E) | 一只 |

四、安全工作准则

本仪表严格遵循GB4793电子测量仪器安全要求以及IEC61010-1安全标准进行设计和生产。符合双重绝缘过电压标准CAT III1000V、CAT IV600V和污染等级II的安全标准。如果未能按照有关的操作说明使用仪表，则可能会削弱或失去仪表为你提供的保护。

1. 使用前要检查仪表和表笔，谨防任何损坏或不正常的现象，如果发现任何异常情况：表笔裸露、机壳损坏、液晶显示器无显示等等，请不要使用。严禁使用没有后盖和后盖没有盖好的仪表，否则有电击危险。
2. 表笔破损必须更换，并须换上同样型号或相同电气规格的表笔。
3. 当仪表正在测量时，不要接触裸露的电线、连接器、没有使用的输入端或正在测量的电路。
4. 测量高于直流60V或交流30V以上的电压时，务必小心谨慎，切记手指不要超过表笔护指位，以防触电。

5. 在不能确定被测量值的范围时，须将功能量程开关置于最大量程位置。
6. 切勿在端子和端子之间，或任何端子和接地之间施加超过仪表上所标注的额定电压或电流。
7. 测量时功能开关必须置于正确的量程档位。在功能量程开关转换之前，必须断开表笔与被测电路的连接，严禁在测量进行中转换档位，以防损坏仪表。
8. 进行在线电阻、二极管或电路通断测量之前，必须先将电路中所有的电源切断，并将所有的电容器放尽残余电荷。
9. 测量电流以前，应先检查仪表的保险丝是否完好，在仪表连接到电路上之前，应先将电路的电源关闭。
10. 不要在高温、高湿、易燃、易爆和强电磁场环境中存放或使用仪表。
11. 请勿随意改变仪表内部接线，以免损坏仪表和危及安全。
12. 当LCD显示器显示“ ”标志时，应及时更换电池，以确保测量精度。
13. 测量完毕应及时关断电源。长时间不用时，应取出电池。

五、国际电气符号

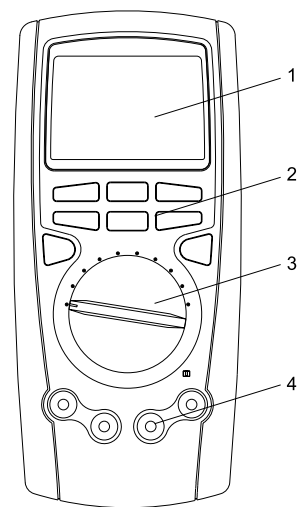
	交流或直流
	接地
	警告注意安全标志
	电池欠压
	双重绝缘
	符合欧洲工会 (European Union) 指令
	美国电器质量标准

六、综合指标

1. 信号输入端和COM端之间最大电压: 详见各量程输入保护电压说明
2. μA mA输入端子设有保险丝: (CE) 0.5A 250V快熔式保险丝 $\phi 5 \times 20\text{mm}$
3. A输入端子设有保险丝: (CE) 10A 250V快熔式保险丝 $\phi 5 \times 20\text{mm}$
4. 显示: 全字符及模拟条, 最大读数为40000, 每秒约更新2~3次。
5. 量程: 自动
6. 极性显示: 自动
7. 过量程提示: 显OL (在(4~20mA)%量程中显LO或HI除外)
8. 电池欠压提示: 
9. 工作温度: 0~40°C (32°F~104°F)
10. 存储温度: -10~50°C (14°F~122°F)
11. 相对湿度: 0°C~30°C ≤75%
30°C~40°C ≤50%
12. 电磁兼容性: 在1V/m的射频场下: 总精度=指定精度+量程的5%, 超过1V/m以上的射频场没有指定指标。
13. 供电电源: 6F22 9V
14. 外形尺寸: 177x85x40mm
15. 重量: 约340g (含电池)
16. 安全标准: IEC 61010: CATIII1000V、CATIV600V
17. 鉴定 **CE**、UL

七、外形结构图(见图1)

1. LCD显示窗
2. 按键组
3. 功能量程选择旋钮
4. 输入端口

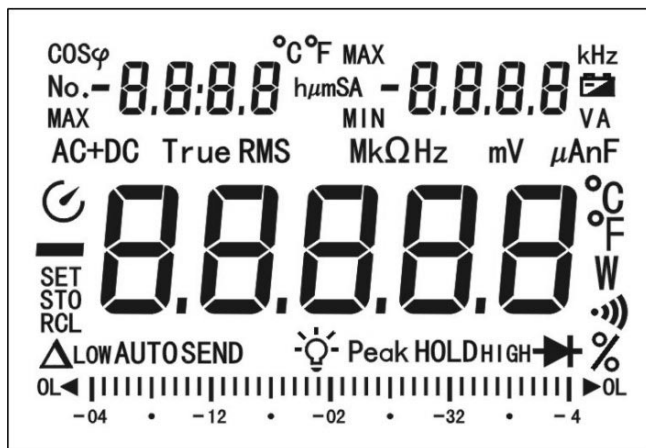


(图1)

八、旋钮开关及按键功能

开关位置	功能说明	开关位置	功能说明
OFF	电源关机	STORE	存储键
V	直流电压测量	HOLD	数据保持键
V	交流电压测量	EXIT	功能退出键
mV	直流毫伏电压测量	MAX MIN	最大、最小值键
Hz	频率测量	REL	相对测试键
%	频率信号占空比测量	黄色按键	AC+DC键
Ω	电阻测量	兰色按键	附加功能选择键
	二极管PN结电压测量	SETUP	设置键
	电路通断测量	RECALL	回读数据键
	电容测量	◀	左选择键
℃	摄氏温度测量	Peak HOLD	峰值保持键
℉	华氏温度测量	▶	右选择键
μA	μA交直流电流量程测量	LIGHT	背光开关键
mA	mA交直流电流量程测量	SEND	数据发送键
A	10A交直流电流量程测量	-	递减键
(4~20mA) %	(4~20mA) 百分比测量	+	递增键
RANGE	量程切换键		

九、LCD显示器 (见图2)



(图2)

序 号	符 号	说 明	序 号	符 号	说 明
1	MAX MIN	最大或最小值提示符	19	RCL	数据回读提示符
2	No.	记录数据序号	20	Δ	相对测量REL提示符
3	°C	温度单位：摄氏度	21	LOW	数据设置下限值提示符
4	°F	温度单位：华氏度	22	AUTO	自动量程提示符
5		显示负的读数提示符	23	SEND	数据发送提示符
6		电池欠压提示符	24		背光功能提示符
7	SET	功能设置提示符	25	HOLD	数据保持提示符
8	AC	交流测量提示符	26	PEAK HOLD	峰值数据保持提示符
9	DC	直流测量提示符	27	HIGH	数据设置上限值提示符
10	TrueRMS	真有效值提示符	28		二极管测量提示符
11	Ω 、k Ω 、M Ω	电阻单位：欧姆、千欧姆、兆欧姆	29	$\blacktriangleright$ OL	超量程提示符
12	MHz kHz Hz	频率单位：兆赫兹 千赫兹 赫兹	30	%	频率信号占空比测量或(4~20mA) 百分比测量提示符
13	mV、V	电压单位：毫伏、伏	31	模拟条显示器	提供当前输入的模拟指针显示
14	μ A、mA、A	电流单位：微安、毫安、安培	32	COS ϕ	功率因数提示符
15	nF、 μ F、mF	电容单位：纳法、微法、毫法	33	VA	视在功率提示符
16		自动关机功能提示符	34	W	有功功率提示符
17		电路通断测量提示符			
18	STO	数据存储提示符			

十、测量操作说明

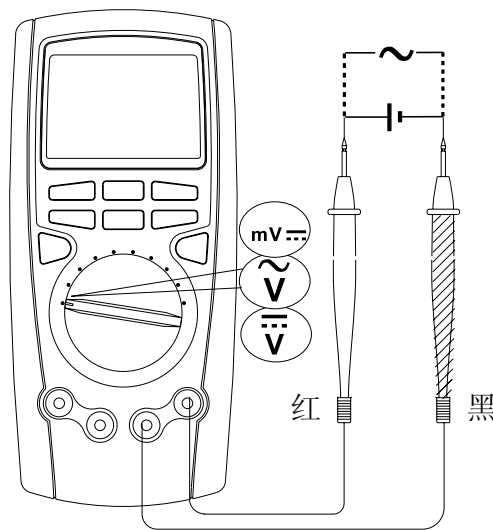
1. 交直流电压测量(见图3)

1. 将红表笔插入“V”插孔，黑表笔插入“COM”插孔。
2. 将功能量程开关置于 V_{DC} 直流电压测量档或 V_{AC} 交流电压测量档或 mV_{DC} 直流毫伏电压测量档，并将表笔并联到待测电源或负载上。
3. 从显示器上直接读取被测电压值。交流测量显示值为真有效值。
4. 仪表的输入阻抗在 V_{DC} 和 V_{AC} 功能约为 $10M\Omega$ ，在 mV_{DC} 功能输入阻抗约为 $2G\Omega$ ，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）。



注意：

- 不要输入高于1000V的电压。测量更高的电压是有可能的，但有损坏仪表的危险。
- 在测量高电压时，要特别注意避免触电。
- 在完成所有的测量操作后，要断开表笔与被测电路的连接。



(图3)

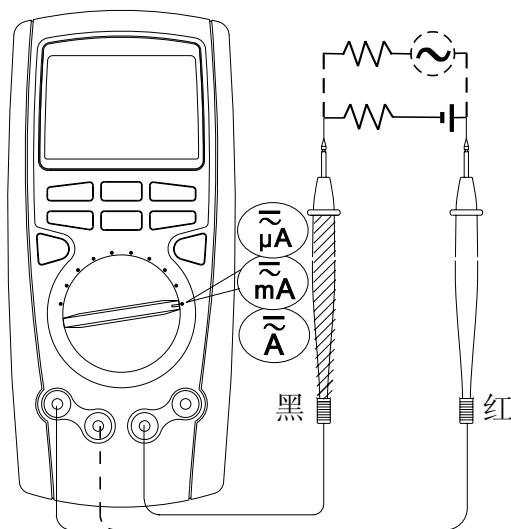
2. 交直流电流测量(见图4)

1. 将红表笔插入“ μA 、mA”或“A”插孔，黑表笔插入“COM”插孔。
2. 将功能量程开关置于电流测量档，按兰色键选择所需测量的交流或直流电流，并将仪表表笔串联到待测回路中。
3. 从显示器上直接读取被测电流值，交流测量显示值为真有效值。



注意：

- 在仪表串联到待测回路之前，应先将回路中的电源关闭。
- 测量时应使用正确的输入端口和功能档位，如不能估计电流的大小，应从大电流量程开始测量。
- $\leq 5A$ 允许连续测量； $5A \sim 10A$ 连续测量时间，为了安全使用，每次测量时间应 ≤ 10 秒，间隔时间应大于15分钟。
- 当表笔插在电流输入端口上时，切勿把表笔测试针并联到任何电路上，会烧断仪表内部保险丝和损坏仪表。
- 在完成所有的测量操作后，应先关断电源再断开表笔与被测电路的连接。对大电流的测量更为重要。



(图4)

UT71A/B/C/D/E 使用说明书

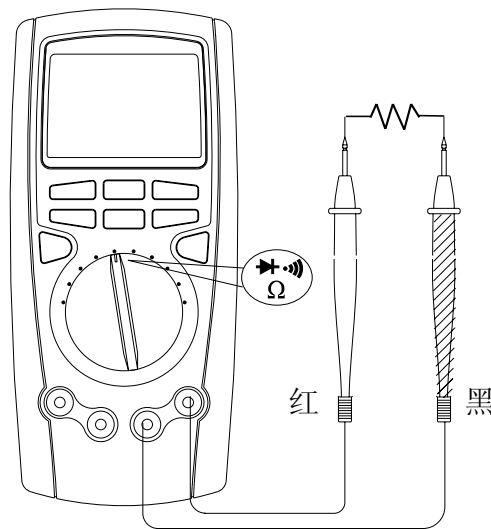
3. 电阻测量(见图5)

1. 将红表笔插入“ Ω ”插孔，黑表笔插入“COM”孔。
2. 将功能开关置于“ Ω ”测量档，按兰色键选择电阻测量 Ω ，并将表笔并联到被测电阻二端上。
3. 从显示器上直接读取被测电阻值。



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“OL”。
- 当测量在线电阻时，在测量前必须先将被测电路内所有电源关断，并将所有电容器放尽残余电荷。才能保证测量正确。
- 在低阻测量时，表笔会带来约 $0.1\Omega \sim 0.2\Omega$ 电阻的测量误差。为获得精确读数可以利用相对测量功能，首先短路输入表笔再按REL Δ 键，待仪表自动减去表笔短路显示值后再进行低阻测量。



(图5)

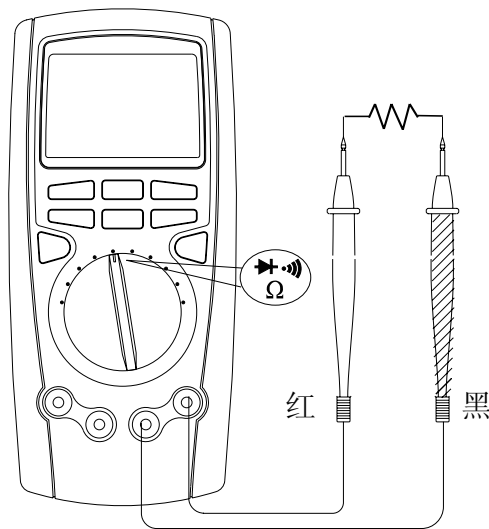
- 测量 $1\text{M}\Omega$ 以上的电阻时，可能需要几秒钟后读数才会稳定。这对于高阻的测量属正常。为了获得稳定读数可用测试短线进行测量。
- 不要输入高于直流60V或交流30V以上的电压，避免伤害人身安全。
- 在完成所有的测量操作后，要断开表笔与被测电路的连接。
- 测量非固定电阻时，请按下RANGE键开机，使用仪表的模拟电阻信号测量模式，此测量模式下仪表最后一位数字不显示，测量精度不变。

4. 电路通断测量(见图6)

1. 将红表笔插入“ Ω ”插孔,黑表笔插入“COM”插孔。
2. 将功能开关置于“ $\Omega \cdot \text{蜂鸣}$ ”测量档,按兰色键选择电路通断测量 蜂鸣 ,并将表笔并联到被测电路负载的两端。如果被测二端之间电阻 $\leq 50\Omega$,认为电路导通,蜂鸣器连续声响。
3. 从显示器上直接读取被测电路负载的电阻值。
单位为: Ω 。

注意:

- 当检查在线电路通断时,在测量前必须先将被测电路内所有电源关断,并将所有电容器放尽残余电荷。
- 电路通断测量,开路电压约为 -1.2V ,量程为 400Ω 测量档。
- 不要输入高于直流 60V 或交流 30V 以上的电压,避免伤害人生安全。
- 在完成所有的测量操作后,要断开表笔与被测电路的连接。



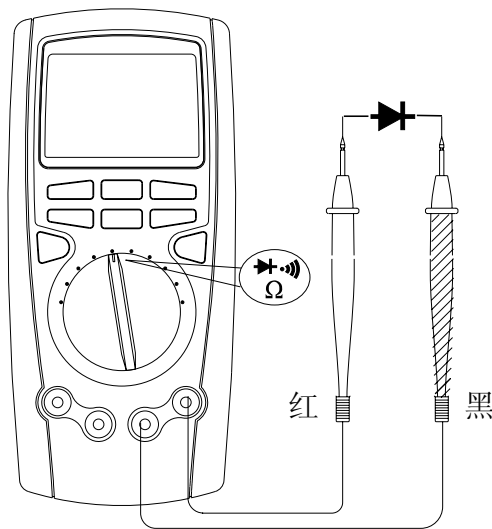
(图6)

5. 二极管测量 $\rightarrow$ (见图7)

1. 将红表笔插入“ Ω ”插孔,黑表笔插入“COM”插孔。红表笔极性为“+”,黑表笔极性为“-”。
2. 将功能开关置于“ $\Omega \rightarrow$ ”测量档,按兰色键选择二极管测量,红表笔接到被测二极管的正极,黑表笔接到二极管的负极。
3. 从显示器上直接读取被测二极管的近似正向PN结电压。对硅 PN结而言,一般约为500~800mV确认为正常值。

注意:

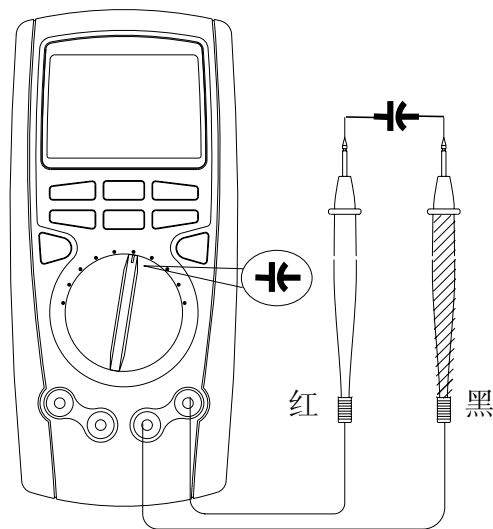
- 如果被测二极管开路或极性反接时,显示“OL”。
- 当测量在线二极管时,在测量前必须首先将被测电路内所有电源关断,并将所有电容器放尽残余电荷。
- 二极管测试开路电压约为2.8V。
- 不要输入高于直流60V或交流30V以上的电压,避免伤害人生安全。
- 在完成所有的测量操作后,要断开表笔与被测电路的连接。



(图7)

6. 电容测量(见图8)

1. 将红表笔插入“ $\text{--}\text{||}\text{--}$ ”插孔, 黑表笔插入“COM”插孔。
2. 将量程开关置于“ $\text{--}\text{||}\text{--}$ ”档位, 此时仪表可能会显示一个固定读数, 此数为仪表内部的分布电容值。对小于10nF电容的测量, 被测量值一定要减去此值, 才能确保测量精度。在测量中可以利用相对测量功能, 首先按REL Δ 键, 待仪表自动减去开路显示值后再进行小电容测量。
3. 建议用测试短线输入进行电容测量, 可以减小分布电容的影响。



(图8)



注意：

- 如果被测电容短路或容值超过仪表的最大量程时,显示器将显示“OL”。
- 电容测量模式下模拟条指针被禁止。对于大于 $400\ \mu\text{F}$ 电容的测量,会需要较长的时间,此时模拟条指针会指示完成测量过程的存余时间,便于正确读数。
- 为了确保测量精度,在测量过程中仪表内部会对被测电容进行放电,在放电模式下LCD会显示“DIS.C”,但放电过程较慢。建议电容在测试前将电容全部放尽残余电荷后再输入仪表进行测量,对带有高压的电容更为重要,避免损坏仪表和伤害人身安全。
- 在完成测量操作后,要断开表笔与被测电容的连接。

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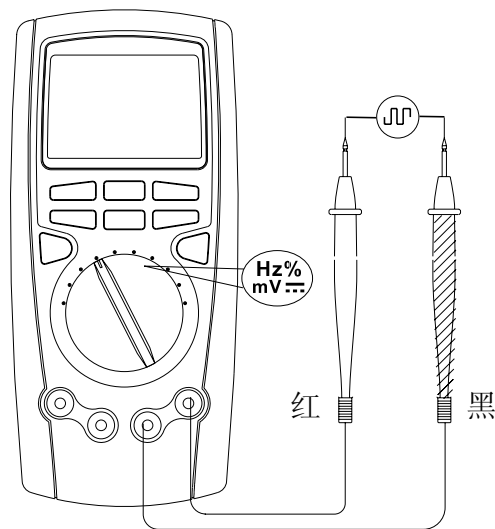
7. 频率/占空比测量(见图9)

1. 将红表笔插入“Hz”插孔,黑表笔插入“COM”。
2. 将功能量程开关置于 $\text{Hz}\%$ (UT71A)或 $\frac{\text{Hz}\%}{\text{mV}}$ (UT71B/C/D)或 $\frac{\text{Hz}\%}{\text{V}}$ (UT71E)测量档位,并按兰色键选择Hz功能,将表笔并联到待测信号源上。
3. 从显示器上直接读取被测频率值。
4. 按下兰色键可选择占空比测量。



注意:

- 测量时必须符合输入幅度a要求:
 $10\text{Hz} \sim 40\text{MHz}$ 时: $200\text{mV} \leq a \leq 30\text{Vrms}$
 $>40\text{MHz}$ 时 : 未指定
- 不要输入高于 30Vrms 被测频率电压, 避免伤害人身安全。
- 在完成所有的测量操作后, 要断开表笔与被测电路的连接。



(图9)

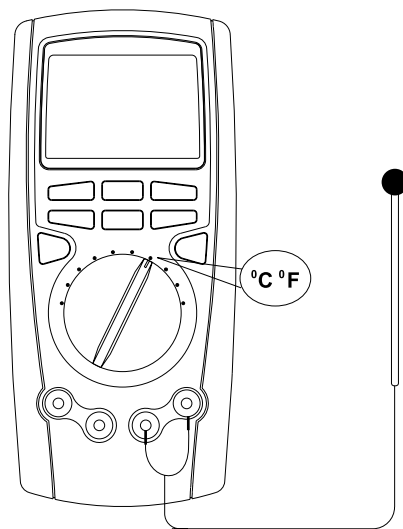
8. 温度测量(见图10)

1. 将量程开关置于“°C/°F”档位，此时LCD显示0L，短路表笔则显示室温。
2. 将温度K型插头按图示插入对应孔位。
3. 将温度探头探测被测温度表面，数秒后从LCD上直接读取被测温度值。
4. 按下兰色键可选择摄氏温度、华氏温度测量。



注意：

- 仪表所处环境温度不得超出18-23℃范围之外，否则会造成测量误差，在低温环境测量更为明显。
- 不要输入高于直流60V或交流30V以上的电压，避免伤害人身安全。
- 在完成所有的测量操作后，取下温度探头。
- 点式K型(镍铬～镍硅)热电偶(仅适用于230℃以下温度的测量)。



(图10)

9. (4~20mA)%测量

将量程开关置于“ $\frac{4-20mA}{mA} \%$ ”档位，按兰色键选择 (4~20mA)% 功能，测试方法类同直流电流测量(见图4);4~20mA范围按百分比显示：<4mA显LO; 4mA显0%; 20mA显100%; >20mA显HI。

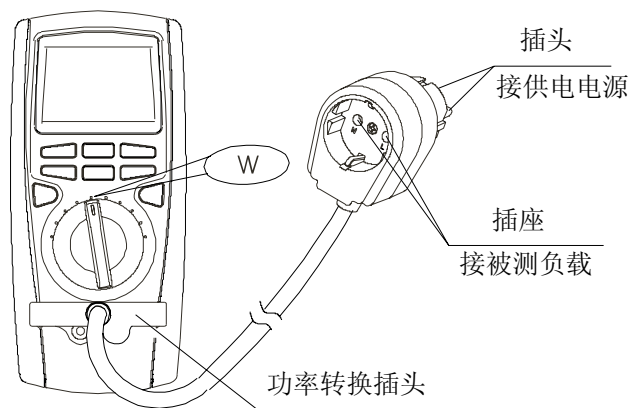
10. 功率测量

1. 将功率测量转换插头连接到仪表对应输入插孔，另一端转换插头座的插头插入供电网络插孔；被测负载电源插头插入转换插头座的插座。
2. 将量程开关置于“W”档位。
3. 从显示器上直接读取被测电路的有功功率值、功率因数及视在功率值。
4. 按仪表兰色键可选择被测电路的电压、电流、频率测量。



注意：

- 在仪表及被测负载连接到待测回路之前，应先将回路中的电源关闭。
- 不要输入高于250V的供电电压，。测量更高的电压是有可能的，但有损坏仪表的危险。



(图11)

- 被测负载最大电流不得 $>10\text{A}$, $\leq 5\text{A}$ 允许连续测量;
5A~10A连续测量时间, 为了安全使用, 每次测量时间应 ≤ 10 秒, 间隔时间应大于15分钟。
- 在测量时, 要特别注意避免触电。
- 在完成所有的测量操作后, 应先关断电源再移开转换插头座的插头与供电网络插孔的连接。

11. 电源档位 (OFF)

仪表关闭电源。

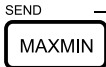
12. 自动关机功能

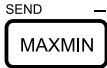
当仪表在用户设定的关机时间 (仪表默认10分钟) 内没有转动旋钮开关或按键动作, 显示器将消隐显示, 随即仪表进入微功耗休眠状态。如要唤醒仪表重新工作, 只要按一次兰色按键即可, 转动旋钮开关也能唤醒仪表。

13. 按键功能定义

按 键	功能定义
	按RANGE键仪表由自动量程转入手动当前量程模式，提示符“Auto”消隐。 每按一次递增一个量程；依次循环。按 EXIT 键即退出手动量程模式，恢复原始测量模式，仪表默认“Auto”自动量程模式。 按下此键开机，仪表进入模拟电阻信号测量模式
	按SETUP键进入设置状态，按SETUP依次循环设置项目 ◀▶ :选择可修改位；+ -: 修改设定值；EXIT:保存设定值；具体见设置操作详表
	第一次按下STORE键，左小显示当前存储记录数，按▶键切换选择清除原有记录并从1条记录开始或从当前记录号开始存储；右小显示原有记录条数。提示符显示：“ST0”，“no. xxxx” 第二次按下STORE键，左小显示自动记录间隔时间秒数，默认0秒即不自动记录，按+/-可设置间隔时间(长按时为快速设置)（最大255秒），提示符显示：“ST0”，“s” 第三次按下STORE键，左小显示：递增一个存储记录序号xxxx、右小显示：对应存储序号的在线测量值xxxx、主显示：在线测量值 xxxx 。若选择了间隔时间，仪表将自动存储测量记录。若没有选择间隔时间每按一次STORE增加存储一条记录。自动增加记录时，增加到本表所能够存储的最大记录后停止。提示符显示：“ST0”，“no. xxxx”

按 键	功能定义
RECALL ◀ STORE	按EXIT退出并确认存储记录，若不按此键直接关机，则丢失本次操作存储数据； 进入此功能后，仪表将关闭自动关机功能。
	按RECALL键，回读存储数据。提示符显示“RCL” 左上小显示：显示存储序号“no. xxxx”；主显示：显示存储序号对应的存储数据；右小显示总存储数据条数；按 ▶ 键，自动打开SEND功能，将所有存储数据通过USB快速发送到电脑接口软件。通过电脑接口软件，可显示记录存储时间与记录值。所有数据发送完成后，仪表将自动关闭SEND功能； 按 + / - 键，循环回读上/下一条记录。（长按为快速回读） 按 EXIT 键即退出
	在SETUP模式下按“◀”键，见设置操作详表
Peak HOLD ▶ HOLD	按下HOLD保持键仪表停止更新显示，提字符：“HOLD”显示。 按EXIT键即退出HOLD模式，恢复原始测量模式。
	按下Peak HOLD峰值保持键，仪表进入峰值保持状态，提字符：“Peak”显示。 按 EXIT 键即退出
	在SETUP模式下按“▶”键，见设置操作详表

按 键	功能定义
	执行退出功能。
	按下此键开机，仪表恢复出厂设置值。
	按下LIGHT则进入一级背光(设定的时间后熄灭)，再按则进入二级背光，(设定的时间后熄灭)。 按 EXIT 键即退出
	当按下MAX/MIN 键时，开始以约每秒2次采样速率进入MAX MIN记录模式。 左上小显示：显示最大值及提示符MAX；右上小显示：显示最小值及提示符MIN；主显示：显示在线测量值。 再按一次MAX MIN键，左上小显示：在线测量值；右上小显示：显示最小值及提示符MIN；主显示：显示最大值。 再按一次MAX MIN键，左上小显示：在线测量值；右上小显示：显示最大值及提示符MAX；主显示：显示最小值。 按MAX MIN键可依次循环显示以上三种模式。在以上状态下自动关闭“Auto”模式及提示符。 按 EXIT 键即可退出MAX / MIN模式，恢复原始测量模式。 在MAX/MIN模式下，按下HOLD键可使仪表停止更新数据。

按 键	功能定义
	将USB接口连接线插入仪表背面靠上位置红外发射窗口卡位，按下此键，启动SEND通讯接口输出，并显示提示符“SEND”；同时关闭自动关机功能 按 EXIT 键即退出；仪表电脑接口软件操作详见软件光盘中“接口软件操作说明” “-”在 SETUP 或RECALL模式下可递减设定值。
	按下 REL Δ 键即进入相对测量模式，显示提示符“Δ”，左上小显示：显示测量值；右上小显示相对值；主显示：显示测量值-相对值。 按 EXIT 键即退出REL Δ 模式，恢复原始测量模式。 “+”在 SETUP 或RECALL模式下可递增设定值。
 蓝 键	按蓝色按键能选择循环切换主/辅测试功能， 仪器进行睡眠状态后，按下此键仪器将回到正常测试模式； 按下此键开机，则仪器进入快速测试模式，此模式无最后一位数字显示
 黄 键	此键为锁定按键，在AC测量时，按下AC+DC，则进入AC+DC测量模式，显示“AC+DC”

按键操作举例说明:

单击: STORE; 长按超过1秒: RECALL; 进入复加按键后单击: ◀

设置操作详表

按下SETUP键进入仪表设置操作功能, 通过 +/- 调整设置值; EXIT 保存设置值;
带*值为本机默认值建议用户设置操作前先将仪表置在DCV功能



提示符	设定值	备 注	提示符	设定值	备 注
HIGH	4 0 0 0 0	超上限值蜂鸣间断声响报警		1 0 *	背光点亮时间设置10秒
	OFF *	◀设置成“OFF”▶ 选择调整位		2 0	背光点亮时间设置20秒
LOW	4 0 0 0 0	超下限值蜂鸣间断声响报警		3 0	背光点亮时间设置30秒
	OFF *	◀设置成“OFF”▶ 选择调整位		OFF	取消背光功能
	1 0 *	10分钟自动关机	模拟条	左边零 *	设置左边零 0 1 2 3 4 ▶
	2 0	20分钟自动关机		中心零	设置中心零 (仅适用于:DC V、 DC I、°C/°F功能) ◀ -4 -2 0 2 4 ▶
	3 0	30分钟自动关机			
	0 FF	关闭自动关机功能			
	1 *	连续发声, 提示符长亮			
	0 FF	关闭发声, 提示符同步闪烁			

功能与显示对照

功 能	主 显	右上小显	左上小显
DCV	被测电压值	-----	满量程值：4；40；400；1000
ACV	被测电压值	被测频率值：45.00Hz~100.0kHz	满量程值：4；40；400；1000
DCmV	被测电压值	-----	满量程值：400
Ω	被测电阻值	-----	满量程值：400；4；40；400；4；40
	被测电阻值	-----	满量程值：400
	被测电压值	-----	满量程值：4
Hz	被测频率值	-----	满量程值：40；400；4；40；400；4；40；400
	被测电容值	-----	满量程值：40；400；4；40；400；4；40
℃	被测℃值	-----	满量程值：1000
℉	被测℉值	-----	满量程值：1832
DC μ A	被测电流值	-----	满量程值：400；4000
AC μ A	被测电流值	被测频率值：45.00Hz~10.00kHz	满量程值：400；4000
DCmA	被测电流值	-----	满量程值：40；400
ACmA	被测电流值	被测频率值：45.00Hz~10.00kHz	满量程值：40；400

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功 能	主 显	右上小显	左上小显
DCA	被测电流值	-----	滿量程值：10
ACA	被测电流值	被测频率值：45.00Hz～10.00kHz	滿量程值：10
W	被测有功功率	视在功率	功率因数
STO	在线测量值	当前存储值	存储序号：no.0001～no.0100
RCL	存储数据值	总存储数据条数	存储序号：no.0001～no.0100
MAX MIN	在线测量值	最大值或最小值最小值或最大值将根据按键功能定义相应显示	
REL Δ	测量值-相对值	相对值	测量值

以上说明以UT71C为例，其他型号参考其最大显示值。

十一、技术指标

误差极限： $\pm (a\% \text{读数} + \text{字数})$ ，保证期一年

环境温度： $18 \sim 28^{\circ}\text{C}$

环境湿度： 不大于75%RH

1. 直流电压测量

量 程	分辩力	误差极限: $\pm (\% \text{读数} + \text{字数})$		量 程	分辩力	误差极限: $\pm (\% \text{读数} + \text{字数})$
		UT71A	UT71B			UT71C/D/E
200mV	0.01mV	$\pm (0.1\% + 8)$	$\pm (0.05\% + 5)$	400mV	0.01mV	$\pm (0.025\% + 5)$
2V	0.0001V	$\pm (0.1\% + 8)$	$\pm (0.08\% + 5)$	4V	0.0001V	$\pm (0.05\% + 5)$
20V	0.001V			40V	0.001V	
200V	0.01V			400V	0.01V	
1000V	0.1V	$\pm (0.15\% + 8)$	$\pm (0.1\% + 8)$	1000V	0.1V	$\pm (0.1\% + 8)$

输入阻抗：200mV/400mV约2.5G Ω 其他均约为10M Ω

过载保护：1000V

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2. 交流电压测量（可AC+DC测量）

量 程	分辨率	频率范围	误差极限: $\pm$ (%读数+字数)		量 程	分辨率	频率范围	误差极限: $\pm$ (%读数+字数)
			UT71A	UT71B				
2V	0.0001V	45Hz~1kHz	$\pm$ (0.8%+40)	$\pm$ (0.6%+40)	4V	0.0001V	45Hz~1kHz	$\pm$ (0.4%+30)
		1kHz~10kHz	$\pm$ (3%+40)	$\pm$ (3%+40)			1kHz~10kHz	$\pm$ (3%+30)
		10kHz~100kHz	$\pm$ (7%+40)	$\pm$ (7%+40)			10kHz~100kHz	$\pm$ (6%+30)
20V	0.001V	45Hz~1kHz	$\pm$ (0.8%+40)	$\pm$ (0.6%+40)	40V	0.001V	45Hz~1kHz	$\pm$ (0.4%+30)
		1kHz~10kHz	$\pm$ (3%+40)	$\pm$ (3%+40)			1kHz~10kHz	$\pm$ (3%+30)
		10kHz~100kHz	$\pm$ (7%+40)	$\pm$ (7%+40)			10kHz~100kHz	$\pm$ (6%+30)
200V	0.01V	45Hz~1kHz	$\pm$ (0.8%+40)	$\pm$ (0.6%+40)	400V	0.01V	45Hz~1kHz	$\pm$ (0.4%+30)
		1kHz~10kHz	$\pm$ (5%+40)	$\pm$ (5%+40)			1kHz~10kHz	$\pm$ (5%+30)
		10kHz~100kHz	参考	参考			10kHz~100kHz	参考
1000V	0.1V	45Hz~1kHz	$\pm$ (1.5%+40)	$\pm$ (1.2%+40)	1000V	0.1V	45Hz~1kHz	$\pm$ (1%+30)
		1kHz~5kHz	$\pm$ (6%+40)	$\pm$ (6%+40)			1kHz~5kHz	$\pm$ (5%+30)
		5kHz~10kHz	$\pm$ (10%+40)	$\pm$ (10%+40)			5kHz~10kHz	$\pm$ (10%+30)

输入阻抗：约10M Ω

过载保护：1000V

显示：1) 真有效值(适用于量程的10%至100%)。

2) 交流波峰因素3.0 (1000V量程为1.5)

3) 输入短路允许有80个字剩余读数。

5) 频率小于100kHz时，精度保证范围10%–100%。

5) AC+DC测量时，在原误差极限上 $\pm(1\%+35)$ 。

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3. 直流电流测量

量 程	分辩力	误差极限: ± (%读数+字数)		量 程	分辩力	误差极限: ± (%读数+字数)
		UT71A	UT71B			UT71C/D/E
200 μ A	0.01 μ A	± (0.2%+20)	± (0.15%+20)	400 μ A	0.01 μ A	± (0.1%+15)
2000 μ A	0.1 μ A			4000 μ A	0.1 μ A	
20mA	0.001mA			40mA	0.001mA	± (0.15%+15)
200mA	0.01mA			400mA	0.01mA	
10A	0.001A	± (0.8%+30)	± (0.7%+30)	10A	0.001A	± (0.5%+30)

过载保护: μ A mA量程: 保险丝 $\phi 5 \times 20\text{mm}$ F 0.5A 250V (CE)

10 A量程: 保险丝 $\phi 5 \times 20\text{mm}$ F 10A 250V (CE)



注意:

10A量程: $\leq 5\text{A}$ 允许连续测量; $5\text{A} \sim 10\text{A}$ 连续测量时间应 ≤ 10 秒, 间隔时间应 ≥ 15 分钟。

4. 交流电流测量

量 程	分辨率	频率范围	误差极限: $\pm$ (%读数+字数)		量 程	分辨率	频率范围	误差极限: $\pm$ (%读数+字数)
			UT71A	UT71B				UT71C/D/E
200 μ A	0.01 μ A	45Hz~1kHz 1kHz~10kHz	$\pm$ (1%+15) $\pm$ (2%+40)	$\pm$ (0.8%+15) $\pm$ (1.5%+40)	400 μ A	0.01 μ A	45Hz~1kHz 1kHz~10kHz	$\pm$ (0.7%+15) $\pm$ (1%+40)
2000 μ A	0.1 μ A				4000 μ A	0.1 μ A		
20mA	0.001mA				40mA	0.001mA		
200mA	0.01mA				400mA	0.01mA		
10A	0.001A	45Hz~1kHz	$\pm$ (2%+20)	$\pm$ (2%+20)	10A	0.001A	45Hz~1kHz	$\pm$ (1.5%+20)
		1kHz~10kHz	$\pm$ (6%+40)	$\pm$ (6%+40)			1kHz~10kHz	$\pm$ (5%+40)

显示: 1) 真有效值 (适用于量程的10%至100%)。

2) 交流波峰因素3.0。

3) 短路允许有80个字剩余读数。

4) 频率小于10kHz时, 精度保证范围10%-100%。

5) AC+DC测量时, 在原误差极限上 $\pm$ (1%+35)

过载保护: μ A mA量程: 保险丝 ϕ 5 $\times$ 20mm F 0.5A 250V (CE)

10A量程 : 保险丝 ϕ 5 $\times$ 20mm F 10A 250V (CE)



注意:

10A量程: $\leq$ 5A允许连续测量; 5A~10A连续测量时间应 $\leq$ 10秒, 间隔时间应 $\geq$ 15分钟。

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5. 电阻测量

量 程	分辩力	误差极限: $\pm$ (%读数+字数)		量 程	分辩力	误差极限: $\pm$ (%读数+字数)
		UT71A	UT71B			UT71C/D/E
200 Ω	0.01 Ω	$\pm$ (0.5%+20) +表笔短路值	$\pm$ (0.4%+20) +表笔短路值	400 Ω	0.01 Ω	$\pm$ (0.3%+8) +表笔短路值
2k Ω	0.0001k Ω	$\pm$ (0.5%+20)	$\pm$ (0.4%+20)	4k Ω	0.0001k Ω	$\pm$ (0.3%+8)
20k Ω	0.001k Ω			40k Ω	0.001k Ω	
200k Ω	0.01k Ω	$\pm$ (1%+20)	$\pm$ (0.8%+20)	400k Ω	0.01k Ω	$\pm$ (0.5%+20)
2M Ω	0.0001M Ω	$\pm$ (1%+40)	$\pm$ (1%+40)	4M Ω	0.0001M Ω	$\pm$ (1%+40)
20M Ω	0.001M Ω	$\pm$ (1.5%+40)	$\pm$ (1.5%+40)	40M Ω	0.001M Ω	$\pm$ (1.5%+40)

过载保护: 1000V

6. 电容测量

量 程	分辨率	误差极限: $\pm$ (%读数 + 字数)		量 程	分辨率	误差极限: $\pm$ (%读数 + 字数)
		UT71A	UT71B			UT71C/D/E
20nF	0.001nF	$\pm$ (1.5%+20) +表笔开路电容值	$\pm$ (1.2%+20) +表笔开路电容值	40nF	0.001nF	$\pm$ (1%+20) +表笔开路电容值
200nF	0.01nF	$\pm$ (1.5%+20)	$\pm$ (1.2%+20)	400nF	0.01nF	$\pm$ (1%+20)
2 μ F	0.0001 μ F			4 μ F	0.0001 μ F	
20 μ F	0.001 μ F	$\pm$ (1.5%+40)	$\pm$ (1.2%+40)	40 μ F	0.001 μ F	
200 μ F	0.01 μ F	$\pm$ (1.5%+40)	$\pm$ (1.5%+40)	400 μ F	0.01 μ F	$\pm$ (1.2%+20)
2mF	0.0001mF	$\pm$ (5%+40)	$\pm$ (5%+40)	4mF	0.0001mF	$\pm$ (5%+20)
20mF	0.001mF	参考	参考	40mF	0.001mF	参考

过载保护: 1000V

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7. 频率测量

量 程	分辨率	误差极限: ± (%读数 + 字数)		量 程	分辨率	误差极限: ± (%读数 + 字数)
		UT71A	UT71B			UT71C/D/E
20Hz	0.001 Hz	± (0.1%+15)	± (0.1%+15)	40Hz	0.001 Hz	± (0.01%+8)
200Hz	0.01 Hz			400Hz	0.01 Hz	
2kHz	0.0001kHz			4kHz	0.0001kHz	
20kHz	0.001kHz			40kHz	0.001kHz	
200kHz	0.01kHz			400kHz	0.01kHz	
2MHz	0.0001MHz			4MHz	0.0001MHz	
20MHz	0.001MHz	参考	参考	40MHz	0.001MHz	参考
200MHz	0.01MHz			400MHz	0.01MHz	

占空比: 测量范围10%~90% (仅适于5Hz~2kHz信号)

过载保护: 1000V

输入幅a: 10Hz~40MHz时: $200\text{mV} \leq a \leq 30\text{Vrms}$

(直流电平为零) >40MHz时: 未指定

备注: 被测信号频率小于工频时, 会受干扰出现轻微跳数, 但不影响正常测量。

8. 二极管测量

量 程	分辨率	备注 (UT71A/B/C/D/E)
	0.0001V	开路电压约2.8V，硅PN结正常电压值约为0.5~0.8V

过载保护：1000V

9. 电路通断测量

量 程	分辨率	备注 (UT71A/B/C/D/E)
	0.01 Ω	开路电压约为-1.2V；电路断开电阻值设定为： $>60 \Omega$ ，蜂鸣器不发声；电路良好导通阻值设定为： $\leq 40 \Omega$ ，蜂鸣器连续发声

过载保护：1000V

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10. 温度测量 (UT71B/C/D/E)

摄氏温度

量 程	分辨率	误差极限: $\pm$ (%读数+字数)	
		UT71A	UT71B/C/D/E
-40℃~40℃	0.1℃	-----	$\pm$ (3%+30)
40~400℃		-----	$\pm$ (1%+30)
400~1000℃		-----	$\pm$ 2.5%

华氏温度

量 程	分辨率	误差极限: $\pm$ (%读数+字数)	
		UT71A	UT71B/C/D/E
-40°F~32°F	0.1°F	-----	$\pm$ (4%+50)
32°F~752°F		-----	$\pm$ (1.5%+50)
752~1832°F		-----	$\pm$ 3%

过载保护: 1000V

温度传感器: 适用K型 (镍铬~镍硅) 热电偶。

附件为点式K型 (镍铬~镍硅) 热电偶, 仅适用于230℃以下温度的测量。

11. (4~20mA) % 测量 (UT71B/C/D/E)

量 程	分辨率	误差极限：±（%读数+字数）	
		UT71A	UT71B/C/D/E
(4~20mA)%	0.01%	-----	±(1%+50)

备注：4~20mA范围按百分比显示：<4mA显LO；4mA显0%~20mA显100%；>20mA显HI。

过载保护：保险丝 $\phi 5 \times 20\text{mm}$ F0.5A 250V (CE)

12. 功率测量 (UT71E)

量 程		分辨率	误差极限：±（%读数+字数）
VA视在功率	2500W	1	±(2%+10)
W有功功率	2500W	0.1	±(2%+10)
Cos ϕ	0~1	0.001	±(1%+10)
按兰色键切换：主显示频率、左小显示电流、右小显示电压			±(1%+10)

功率测量：

功率因数输入范围：0.00~1.00；电压输入阻抗：约为10M Ω ；

输入值小于量程10%时，误差加3W；

电压输入范围：AC50~250V；电压过载保护：1000V；

电流过载保护：保险丝 $\phi 5 \times 20\text{mm}$ F 10A 250V (CE)。

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

- 清洁仪表只能使用湿布和少量洗涤剂，切忌用化学溶剂擦拭表壳。
- 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修。
- 不使用时应关断仪表的电源，长期不用时应取出电池。
- 存放仪表应避免潮湿，高温和强电磁场。

2. 更换保险丝管（见图12）

警告:

为避免仪表错误的显示而导致受到电击或人身伤害。在测量电流时，仪表显示毫无反应，应立即检查仪表内置相关保险丝管有无被烧断，如确认保险丝管已被烧断，应立即按原规格更换保险丝管。

保险丝管规格:F1 0.5A 250V快熔式保险丝 $\phi 5 \times 20\text{mm}$

F2 10A 250V快熔式保险丝 $\phi 5 \times 20\text{mm}$

操作步骤:

- 1) 把电源开关置于“OFF”位置，并从输入插孔中移走表笔；
- 2) 用螺丝刀拧下后盖固定的5颗螺丝，卸下后盖，即可更换已被烧断的保险丝管。

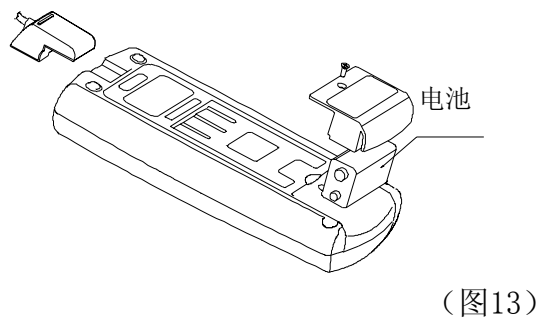
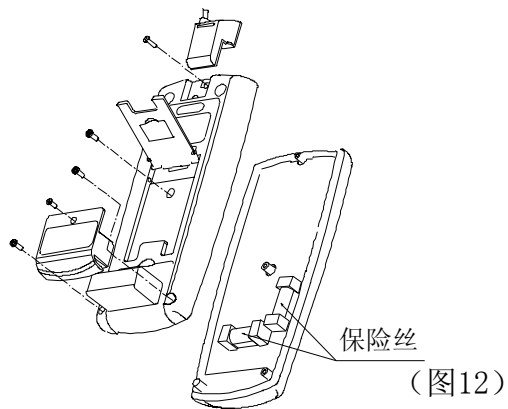
3. 更换电池（见图13）



警告：

当LCD显示欠压“”提示符时，应即时更换内置电池，否则会影响测量精度。电池规格：6F22 9V

操作步骤： 类同更换保险丝管操作步骤。



说明书内容如有变更，恕不另行通知

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Model UT71A/B/C/D/E
OPERATING MANUAL



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Chapter 1 Before You Start

Overview

This Operating Manual covers information on safety and cautions. Please read the relevant information carefully and observe all the **Warnings** and **Notes** strictly.



Warning

To avoid electric shock or personal injury, read the "Safety Information" and "Rules for Safe Operation" carefully before using the Meter.

Digital Multimeter **UT71A/B** (hereafter referred to as "the Meter") is a 20000 counts and 4 1/2 digits with steady operations; Digital Multimeter **UT71C/D/E** (hereafter referred to as "the Meter") is a 40000 counts and 4 3/4 digits with steady operations, fashionable structure and auto ranging instrument. They all not only can measure AC voltage and current, DC voltage and current, Resistance, Capacitance, Temperature, Frequency, Diodes, Continuity, 4~20mA Loop, Max/Min, Relative Mode but also has Data Store, Data Recall, AC True RMS, AC+DC, Low Battery Display, Double Display Backlight, Data Hold, Automatic Power Off and full overload protection.

UT71B/C/D/E has extra Temperature, 4~20mA Loop, Data Store and Data Recall feature; **UT71E** has extra Power Measurement feature.

Unpacking Inspection

Open the package case and take out the Meter. Check the items shown on Table 1-1 carefully to see any missing or damaged part:

Table 1-1. Unpacking Inspection

Item	Description	Qty
1	English Operating Manual	1 piece
2	Test Lead	1 pair
3	K-Type (nickel chromium ~ nickel silicon) Point Contact Temperature Probe (It is only suitable for measuring temperature under 230 oC	1 piece
4	Alligator Clip	1 piece
5	Test Clip	1 pair
6	USB interface cable	1 piece
7	CD-ROM (Installation Guide & Computer Interface Software)	1 piece
8	Carrying Bag	1 piece
9	Power Adaptor (UT71E only)	1 piece
10	9V Battery (NEDA 1604, 6F22, 006P)	1 piece

In the event you find any missing or damage, please contact your dealer immediately.

Safety Information

This Meter complies with the standards IEC61010 safety measurement requirement: in pollution degree 2, overvoltage category (CAT. III 1000V, CAT.IV 600V) and double insulation.

CAT. III: Distribution level, fixed installation, with smaller transient overvoltage than CAT. IV

CAT.IV: Primary supply level, overhead lines, cable systems etc.

Use the Meter only as specified in this operating manual, otherwise the protection provided by the Meter may be impaired.

In this manual, a Warning identifies conditions and actions that may pose hazards to the user, or may damage the Meter or the equipment under test.

A Note identifies the information that user should pay attention to.

International electrical symbols used on the Meter and in this Operating Manual are explained on page 9.

Rules For Safe Operation

Warning

To avoid possible electric shock or personal injury, and to avoid possible damage to the Meter or to the equipment under test, adhere to the following rules:

- 1 **Before using the Meter inspect the case. Do not use the Meter if it is damaged or the case (or part of the case) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connectors.**
- 1 **Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads with identical model number or electrical specifications before using the Meter.**
- 1 **Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding.**
- 1 **The rotary switch should be placed in the right position and no any changeover of range shall be made during measurement is conducted to prevent damage of the Meter.**

- 1 When the Meter working at an effective voltage over 60V in DC or 30V rms in AC, special care should be taken for there is danger of electric shock.
- 1 Use the proper terminals, function, and range for your measurements.
- 1 If the value to be measured is unknown, use the maximum measurement position.
- 1 Do not use or store the Meter in an environment of high temperature, humidity, explosive, inflammable and strong magnetic field. The performance of the Meter may deteriorate after dampened.
- 1 When using the test leads, keep your fingers behind the finger guards.
- 1 Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes.
- 1 Before measuring current, check the Meter's fuses and turn off power to the circuit before connecting the Meter to the circuit.
- 1 Replace the battery as soon as the battery indicator  appears. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.
- 1 When servicing the Meter, use only the same model number or identical electrical specifications replacement parts.
- 1 The internal circuit of the Meter shall not be altered at will to avoid damage of the Meter and any accident.
- 1 Soft cloth and mild detergent should be used to clean the surface of the Meter when servicing. No abrasive and solvent should be used to prevent the surface of the Meter from corrosion, damage and accident.
- 1 The Meter is suitable for indoor use.
- 1 Turn the Meter off when it is not in use and take out the battery when not using for a long time.
- 1 Constantly check the battery as it may leak when it has been using for some time, replace the battery as soon as leaking appears. A leaking battery will damage the Meter.

International Electrical Symbols

Symbols used on the Meter and in this manual are explained in Table1-2.

Table 1-2. International Electrical Symbols

	AC or DC
	DC Measurement
	AC Measurement
	Grounding
	Double Insulated
	Warning. Refer to the Operating Manual
	Deficiency of Built-In Battery
	Conforms to Standards of European Union

Chapter 2 Getting Acquainted

Turning the Meter On

To turn the Meter on, turn the rotary switch from OFF to any switch setting.

Battery Considerations

The Meter uses one 9V Battery (NEDA 1604, 6F22, 006P). The following paragraphs describe several techniques used to conserve battery power.

Automatic Power Off

The display blanks and the Meter goes into a "sleep" mode if you have not changed the rotary switch position or pressed a button for a set period. While in Sleep mode, pressing the blue button or turning the rotary switch could turn the Meter on. The Meter then returns to the display for the function selected with the rotary switch; all previously activated button features are discarded.

The automatic power off is preset to 10 minutes. From the Setup menu (see Chapter 5), you could specify a time (10 minutes, 20 minutes, 30 minutes or OFF). If you set to OFF, the Meter retains on until you turn the rotary switch to OFF or the battery becomes too weak.

Automatic Backlight Off

Press **LIGHT** button to turn the backlight on and press **LIGHT** again to turn it off. Press **EXIT** to exit the feature.

Press **LIGHT** to select the backlight level (low or high).

In Setup menu (see Chapter 5), you could specify a time to automatically turn off the backlight (10 seconds, 20 seconds, 30 seconds or OFF). If the period is set to OFF, the backlight feature is disabled.

Low Battery Indication

A constant battery icon () in the upper left corner of the display notifies you that the batteries are low and should be replaced.

Warning

To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery icon () appears.

The Meter Structure

The Figure 2-1 shows the Meter structure.

1. LCD Display
2. Functional Buttons
3. Rotary Switch
4. Input Terminals

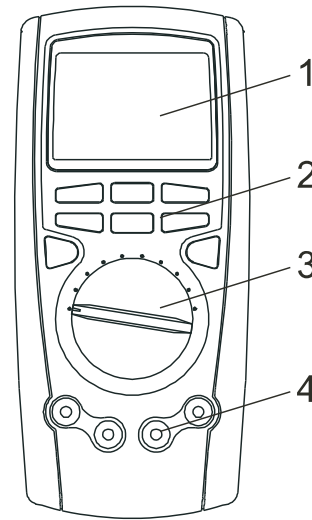


Figure 2-1. Meter Structure

Rotary Switch

Turn the Meter on by selecting any measurement function. The Meter presents a standard display for that function. The display may also be influenced by some of the choices made in Setup.

Use the blue button to select any rotary switch alternate function (labeled in blue letters).

When you turn the rotary switch from one function to another, a display for the new function appears. Button choices made in one function do not carry over into another function.

The Table 2-1 described each rotary switch position

Table 2-1. Rotary Switch Selections

Rotary Switch Position	Rotary Switch Function	Blue Key Function
OFF	Turn the Meter off	None
V $\overline{\overline{\cdot}}$ (UT71A/B/C/D)	DC voltage measurement	None
V $\sim$ (UT71A/B/C/D)	AC voltage measurement	None
V $\overline{\sim}$ (UT71E only)	AC or DC voltage measurement	Toggle between AC or DC voltage measurement
Hz % mV $\overline{\overline{\cdot}}$ (UT71B/C/D)	DC millivoltage measurement	1 Frequency measurement 1 Frequency signal duty cycle measurement
mV $\overline{\overline{\cdot}}$ (UT71A/E)	DC millivoltage measurement	None
$\rightarrow \cdot \cdot \cdot \Omega$	Resistance measurement	1 Diode test 1 Continuity test
W (UT71E only)	Power measurement	None
$\overline{\overline{\cdot}}$	Capacitance measurement	None
°C °F (UT71B/C/D)	Centigrade temperature measurement	Fahrenheit temperature measurement

Rotary Switch Position	Rotary Switch Function	Blue Key Function
Hz % ∫C ∫F (UT71E only)	Centigrade temperature measurement	1 Fahrenheit temperature measurement 1 Frequency measurement 1 Frequency signal duty cycle measurement
μA 	AC or DC current measurement (400 μA ,4000 μA)	Toggle between AC or DC current
mA  (4~20mA) %	AC or DC current measurement (40mA ,400mA)	Toggle between AC or DC current 4~20mA loop current as % reading
A 	AC or DC current measurement (10A)	Toggle between AC or DC current

Functional Buttons

The buttons activate features that augment the function selected with the rotary switch. The buttons are shown in Table 2-2.



Press the button once to access the main feature (e.g. STORE).

To access the first additional feature of the button (e.g. RECALL), press and hold the button for over 1 second to access this additional feature. This additional feature appears right above or on the left hand side of the appropriate keys.

To access the second additional feature of the button (e.g. ◀), press once the button again while the Meter has already entered the first additional feature (e.g. RECALL). The second additional feature appears on the right hand side above the appropriate keys.

The RANGE and EXIT buttons has only one additional feature.

Table 2-2. Functional Buttons

Button	Description	Access Method
	Range feature: Exit AUTO and enter MANUAL ranging. In MANUAL, select next input range. EXIT to return to AUTO. AUTO is default.	Press the button once.
	Testing resistance signal from calibrator: When testing resistance signal from calibrator, it is necessary to press this button to change the maximum display to 4000 counts but the accuracy remains unchanged.	Press and hold the button while turning on the Meter
	Setup feature: Access Setup selections, the display shows "SET". In the Setup mode, each press of SETUP button steps to the next Selection	Press and hold the button for more than 1 second
	Store feature: Store the current measurement value. Press EXIT to exit the Store feature.	Press the button once.

Table 2-2. Functional Buttons

Button	Description	Access Method
	Recall feature: Recall the stored value. Press EXIT to exit the Recall feature.	Press and hold the button for over 1 second
	Setup feature: In Setup, press to select OFF at the selection of HIGH and LOW	Press the button once after entering Setup mode.
	Hold feature: Press HOLD to freeze the displayed value. Press EXIT to release the display.	Press the button once.
	Peak Hold feature: Press to access Peak Hold feature, the primary display shows PEAK HOLD. Press EXIT to exit.	Press and hold the button for over 1 second.
	1 In Setup, each press to select the digit you want to edit. 1 In Recall, press to enable SEND feature 1 In Store, press to toggle between clearing all the stored reading or start storing reading from the current index number.	Press the button once after entering Setup or Recall or Store mode.

Table 2-2. Functional Buttons

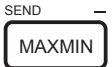
Button	Description	Access Method
	Press to exit certain button functions and the Meter will return to the factory default setting.	Press the button once.
	Press to turn the backlight on. It is possible to toggle between 1 st and the 2 nd backlight level and Exit the feature by pressing this button. After exiting the light feature, it is necessary to press and hold the button for over 1 second to turn the backlight on again.	Press and hold the button for over 1 second.
	Press to display max, min and average values. Press EXIT to stop and return to current measurement mode.	Press the button once.
	Press to output the data, AUTO mode switch off. The primary display shows "SEND". Press EXIT to exit.	Press and hold the button for over 1 second.
	In Setup, each press to decrement an Option. In Recall, each press to go back to the previous stored reading.	Press the button once after entering SEND mode.

Table 2-2. Functional Buttons

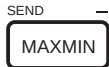
Button	Description	Access Method
	In Store, each press to decrease a second on the storing interval. Press EXIT to exit	
	Press to enter relative mode, the primary display shows Δ. The left secondary display shows the present measurement value. The right secondary display shows the stored value. The primary display shows the present measurement value minus the stored value. Press EXIT to exit relative mode.	Press the button once.
	In Setup, each press to increment an Option. In Recall, each press to recall the next stored reading. In Store, each press to increase a second on the storing interval.	Press and hold the button for over 1 second.
 (UT71A only)	Press to output the data, AUTO mode switch off. The primary display shows "SEND". Press EXIT to exit.	Press the button once.

Table 2-2. Functional Buttons

Button	Description	Access Method
 (UT71A only)	Setup feature: In Setup, press to select OFF at the selection of HIGH and LOW	Press the button once after entering Setup mode.
 Yellow Button	When it is at AC measurement mode, press the button to display AC+DC True RMS value in the primary display and the left secondary display "AC+DC".	Press the button once
 Blue Button	Use the blue button to select any rotary switch alternate function (labeled in blue letters). Press and hold the Button while turning on the Meter to toggle to 4000 counts for all functions. It is faster when the Meter is at 4000 counts measurement mode. After the Meter is resuming from Automatic Power Off or turn on and off again, the Meter will back to normal measurement mode (40000 counts).	Press the button once

The Meter Functions Vs Displays

Table 2-3 shows the cross reference of function and display:

Table 2-3 Functions Vs Displays

Function	Primary Display	Right Secondary Display	Left Secondary Display
DCV	The tested DC voltage value	No display	Full range: 4, 40, 400, 1000
ACV	The tested AC voltage value	The tested frequency value: 45.00Hz~ 100.0kHz	Full range: 4, 40, 400, 1000
DCmV	The tested DCmV value	No display	Full range 400
Ω	The tested resistance value	No display	Full range: 400, 4, 40, 400, 4, 40
	The tested resistance value	No display	Full range value: 400
	The tested resistance value	No display	Full range 4
Hz	The tested frequency value	No display	Full range: 40, 400, 4, 40, 400, 4, 40, 400
	The tested capacitance value	No display	Full range: 40, 400, 4, 40, 400, 4, 40
°C	The tested °C value	No display	1000
°F	The tested °F value	No display	1832
DCμA	The tested DCμA value	No display	Full range: 400, 4000

Table 2-3 Functions Vs Displays

Function	Primary Display	Right Secondary Display	Left Secondary Display
ACμA	The tested AC μ A value	The tested frequency value: 45.00Hz~10.00kHz	Full range: 400, 4000
DCmA	The tested DCmA value	No display	Full range: 40, 400
ACmA	The tested ACmA value	The tested frequency value: 45.00Hz~10.00kHz	Full range: 400, 4000
DCA	The tested DC current value	No display	Full range: 10
ACA	The tested AC current value	The tested frequency value: 45.00Hz~10.00kHz	Full range: 10
W	The tested power value	Apparent power value	Power factor value
RCL	Data recalled is on	— — — .	— — — .

Table 2-3 Functions Vs Displays

Function	Primary Display	Right Secondary Display	Left Secondary Display
STO	The recalled value	The total number of stored value.	Index number: no.0001~no.0100 (For UT71A/B/C/E) no.0001~no.9999 (For UT71D)
MAX MIN	Chapter 2 Getting Acquainted - Using MAX MIN		
REL Δ	The present measurement value minus the stored value	The stored value	The present measurement value.

Selecting the Range

Press RANGE to select either a fixed range or the autorange feature.

Autoranging (AUTO lighted in the display) always comes on initially when you select a new function. In autorange, the Meter selects the lowest input range possible, ensuring that the reading appears with the highest available resolution.

If AUTO is already on, press RANGE to enter MANUAL ranging in the present range. You can then select the next manual range each time you press RANGE. Return to autoranging by press EXIT.

Note that there is no MANUAL ranging on REL feature.

Understanding the Display

Display features are shown in Figure 2-2 and described in Table 2-4.

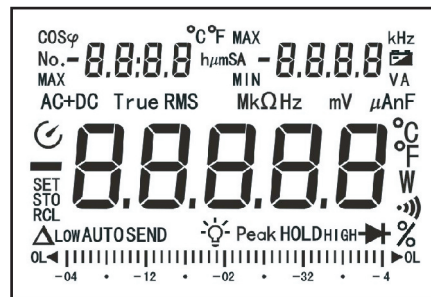


Figure 2-2. Display Features

Table 2-4. Display Features

No.	Symbol	Meaning
1	MAX	Maximum reading displayed.
	MIN	Minimum reading displayed
2	No	The sequence of the reading.
3	°C, °F	Degrees Celsius (default) or Fahrenheit.
4		Indicates negative reading
5		The battery is low.  Warning: To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator appears.
6	SET	Setup feature is on.

Table 2-4. Display Features

No.	Symbol	Meaning
7	TrueRMS	Indicator for True RMS value.
8	AC+DC	For DCV and DCA functions, reading represents the True RMS total of AC and DC measurements
9	Ω, kΩ, MΩ	Ω: Ohm. The unit of resistance.
		kΩ:Kilohm. 1×10^3 or 1000 ohms
		MΩ:Megaohm. 1×10^6 or 1,000,000 ohms
	Hz, kHz, MHz	Hz : Hertz. The unit of frequency in cycles/second.
		kHz: Kilohertz. 1×10^3 or 1000 hertz
		MHz: Megahertz, 1×10^6 or 1,000,000 hertz.
	mV, V	V: Volts. The unit of voltage.
		mV: Millivolt. 1×10^{-3} or 0.001 volts
	μA, mA, A	A: Amperes (amps). The unit of current.
		mA: Milliamp, 1×10^{-3} or 0.001 amperes.
		μA:Microamp. 1×10^{-6} or 0.000001 amperes.

Table 2-4. Display Features

No.	Symbol	Meaning
9	nF, μ F, mF	Farad. The unit of capacitance
		nF: Nanofarad. 1×10^{-9} or 0.000000001 farads.
		μ F: Microfarad. 1×10^{-6} or 0.000001 farads.
		mF: Millifarad. 1×10^{-3} or 0.001 farads.
10		Automatic power off feature is on
11		Continuity test
12	STO	Data store is on
	RCL	Data recall is on
13		The relative mode is on to display the present value minus the stored value.
14	LOW	The indicator for the lowest setup limit.
	HIGH	The indicator for the highest setup limit.
15	AUTO	The Meter is in the auto range mode in which the Meter automatically selects the range with the best resolution.
16	SEND	Data output is in progress

Table 2-4. Display Features

No.	Symbol	Meaning
17		Backlight feature is on
18	HOLD	Data hold mode is active
19	PEAK HOLD	Peak hold mode is active
20		Diode test
21	%	1 Frequency signal duty cycle.
		1 4~20mA loop current as % reading
22	 OL	The input value is too large for the selected range.
23	Analogue Bar Graph	Provides an analog indication of the present input, quick response.
24	COS ϕ	Indicator of power factor.
25	VA	Indicator of apparent power unit.
26	W	Indicator of power measurement

Analogue Bar Graph

The bar graph provides an analogue indication of the measured input. For most measurement functions, the bar graph updates 10 times per second.

Using MAX MIN

The MAX MIN mode stores minimum (MIN) and maximum (MAX) input values. When the input goes below the stored minimum value or above the stored maximum value, the Meter beeps and stores the new value.

Press **MAX MIN** to enter MAX MIN mode. The sampling time is every 2 seconds. The maximum reading and MAX are shown on the left secondary display. The minimum reading and MIN are shown on the right secondary display. The primary display shows the current measurement reading.

Press MAX MIN the second time, the current measurement reading is shown on the left secondary display. The minimum reading and MIN are shown on

the right secondary display. The primary display shows the maximum value.

Press MAX MIN the third time, the current measurement reading is shown on the left secondary display. The maximum reading and MAX are shown on the right secondary display. The primary display shows the minimum value.

Each subsequent press of **MAX MIN** steps through the above three modes.

To exit MAX MIN mode, press **EXIT**.

Press **HOLD** to stop the Meter updating reading.

MAX MIN mode can only be used under MANUAL ranging mode.

Chapter 3

Making Measurement

Introduction

Chapter 3 explains how to make measurements. Most measurement functions can be selected by using the rotary switch.

While letters or symbols identify primary functions; blue letters or symbols identify alternative functions. Press the **BLUE** button to access these alternate functions.

A. Measuring Voltages



Warning

To avoid harms to you or damages to the Meter from electric shock, please do not attempt to measure voltages higher than 1000V, although readings may be obtained.

To measure voltages, set up the Meter as Figure 3-1 and do the following:

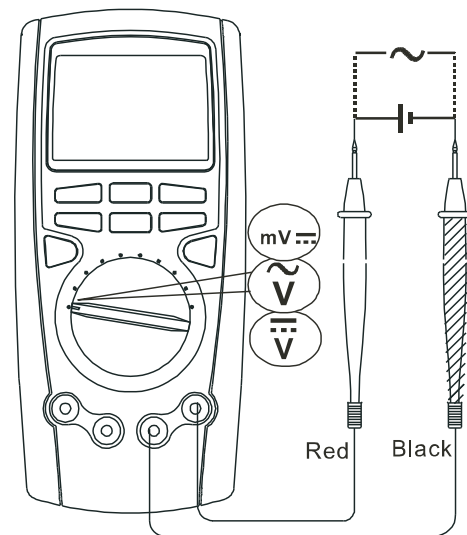


Figure 3-1. Voltages Measurement

1. Insert the red test lead into the **V** terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to $\overline{\text{V}}$ or $\tilde{\text{V}}$ or $\text{mV} \overline{\text{Hz}}$;
Set the rotary switch to or $\text{V} \overline{\text{Hz}}$ or $\text{mV} \overline{\text{Hz}}$ (UT71E).
The default is DC voltage measurement, press BLUE button to switch to AC voltage measurement mode.
3. Connect the test leads across with the object being measured.
4. The measured value shows on the display.
AC measurement displays the True RMS value.
DC measurement displays the effective value of sine wave (mean value response).

When a ACV function is selected, you can press the **Yellow Button** to view the AC + DC True RMS value in the primary display. To exit, please **EXIT** button.

The **BLUE** button cycles among $\text{mV} \overline{\text{Hz}}$, frequency and duty cycle.

Note

- 1 When measuring voltage, the Meter acts around a $10\text{M}\Omega$ ($\overline{\text{V}}$ and $\tilde{\text{V}}$) or $2.5\text{G}\Omega$ ($\text{mV} \overline{\text{Hz}}$) impedance in parallel with the circuit. This loading effect can cause measurement errors in high impedance circuits. In most cases, the error is negligible (0.1% or less) if the circuit impedance is $10\text{k}\Omega$ or less.
- 1 Special care should be taken when measuring high voltage.
- 1 When voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads away from the input terminals of the Meter.

B. Measuring Currents



Warning

If the fuse burns out during measurement, the Meter may be damaged or the operator himself may be hurt.

To avoid possible damage to the Meter or to the equipment under test, check the Meter's fuses before measuring current. Use proper terminals, function, and range for the measurement. Never place the testing leads in parallel with any circuit or component when the leads are plugged into the current terminals.

To measure AC or DC current, set up the Meter as Figure 3-2 and proceed as follows:

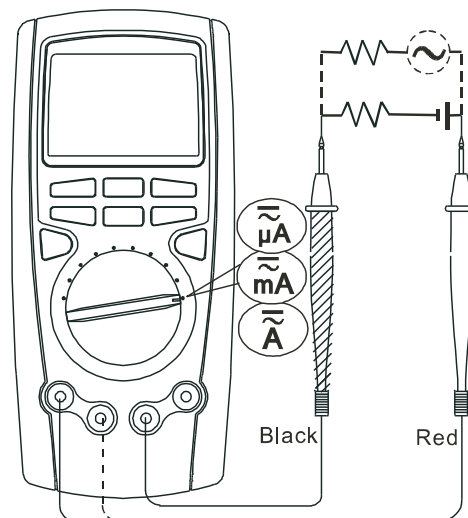


Figure 3-2. Currents Measurement

1. Turn off power to the circuit. Discharge all high-voltage capacitors.
2. Insert the red test lead into the **mA μ A** or **A** terminal and black test lead into the **COM** terminal.
3. If you are using the **A** terminal, set the rotary switch to **A $\sim$** . If you are using **mA μ A** terminal, set the rotary switch to **μ A $\sim$** for currents below 40000 μ A (UT71A is 20000 μ A), or **mA $\sim$** for current above 40000 μ A (UT71B is 20000 μ A).
4. DC measurement is default, press **blue button** to select AC measurement.
5. Open the circuit path to be tested. Touch the red testing leads to the more positive side of the break; touch the black probe to the more negative side of the bread. Reversing the leads will produce a negative reading, but will not damage the Meter.
6. Turn on power to the circuit; then read the display. AC measurement displays the True RMS value. DC measurement displays the effective value of sine wave (mean value response)
7. Turn off power to the circuit and discharge all high-voltage capacitors. Remove the Meter and restore

When a ACA function is selected, you can press the **Yellow Button** to view the AC + DC True RMS value in the primary display. To exit, please **EXIT** button.

Note

- 1 If the value to be measured is unknown, use the maximum measurement position and reduce the range step by step until a satisfactory reading is obtained.
- 1 When the measured current is $\leq 5A$, continuous measurement is allowed.
- 1 When the measured current is between 5A-10A, continuous measurement ≤ 10 seconds and interval more than 15 minutes.
- 1 When current measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads away from the input terminals of the Meter.

C. Measuring Resistance

Warning

To avoid harms to you, please do not attempt to input voltage higher than 60V DC or 30V rms AC.

To avoid possible damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring resistance.

To measure resistance, set up the Meter as shown in Figure 3-3 and follow the following procedure:

1. Insert the red test lead into the Ω terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to Ω  ; press **BLUE** button to select Ω measurement mode.
3. Connect the test leads across with the object being measured.

The measured value shows on the display.

The **BLUE** button cycles among resistance, continuity, and diode.

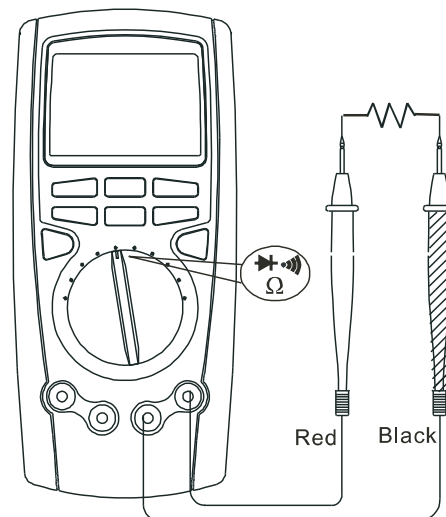


Figure 3-3. Resistance Measurement

Note

- 1 When measuring low resistance, the test leads can add 0.1Ω to 0.2Ω of error to resistance measurement. To test the leads, touch the probe tips together and read the resistance of the leads. If necessary, you can press **REL**  to automatically subtract this value.
- 1 For high-resistance measurement ($>1M\Omega$), it is normal taking several seconds to obtain a stable reading. In order to obtain precision readings, use the test lead as short as possible.
- 1 The LCD displays **OL** indicating open-circuit or the tested resistor value is higher than the maximum range of the Meter.
- 1 When testing the resistance signal from the calibrator, it is necessary to press and hold the **RANGE** while turning on the Meter to change the maximum display to 4000 counts but the accuracy remains unchanged.
- 1 When resistance measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove testing leads away from the input terminals.

D. Testing for Continuity

Warning

To avoid harms to you, please do not attempt to input voltage higher than 60V DC or 30V rms AC.

To avoid possible damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring continuity.

To test for continuity, set up the Meter as Figure 3-4 and do the following:

1. Insert the red test lead into the Ω terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to Ω  ; press **BLUE** button to select  measurement mode and connect the test leads across with the object being tested.
3. The beeper comes on continuously for open conditions, that is test resistance $\leq 50\Omega$.

The **BLUE** button cycles among resistance, continuity, and diode.

Note

- I Open circuit voltage around -1.2V and range is 400 Ω measurement range.
- I When continuity testing has been completed, disconnect the connection between the testing leads and the circuit under test and remove the test leads away from the input terminals.

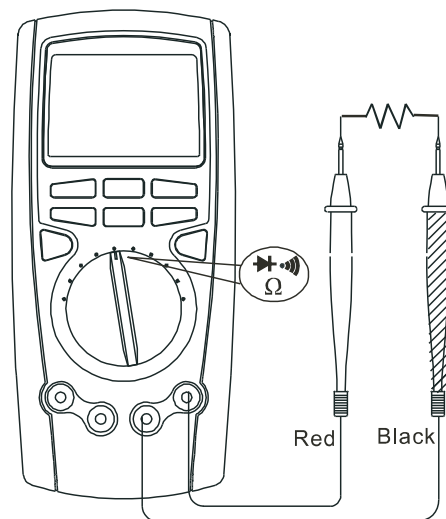


Figure 3-4. Continuity Test

E. Testing Diodes



Warning

To avoid harms to you, please do not attempt to input voltages higher than 60V DC or 30V rms AC.

To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before testing diodes.

Use the diode test to check diodes, transistors, and other semiconductor devices. The diode test sends a current through the semiconductor junction, then measure the voltage drop across the junction. A good silicon junction drops between 0.5V and 0.8V

To test the diode out of a circuit, set up the Meter as Figure 3-5 and proceed as follows:

1. Insert the red test lead into the Ω terminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to $\Omega \rightarrow \text{diode symbol}$; and press **BLUE** button to select $\rightarrow$ measurement mode.

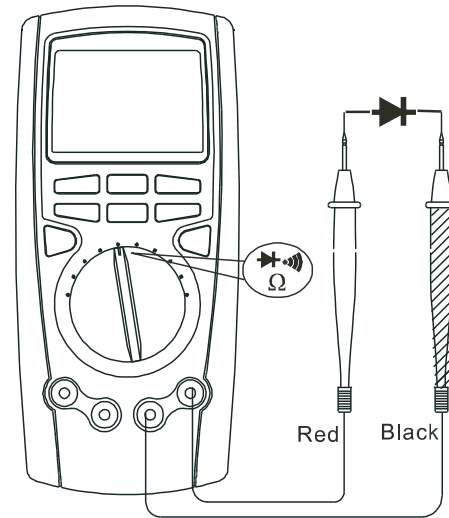


Figure 3-5. Diode Test

3. For forward voltage drop readings on any semiconductor component, place the red test lead on the component's anode and place the black test lead on the component's cathode. The red test lead polarity is "+" while the black test lead polarity is "-". The measured value shows on the display.

The **BLUE** button cycles among resistance, continuity, and diode.

Note

- 1 In a circuit, a good diode should still produce a forward voltage drop reading of 0.5V to 0.8V; however, the reverse voltage drop reading can vary depending on the resistance of other pathways between the probe tips.
 - 1 Connect the test leads to the proper terminals as said above to avoid error display.
 - 1 The LCD will display **OL** indicating either open circuit or wrong polarity connection.
 - 1 The unit of diode is volt (V), displaying the positive-connection voltage-drop value.
 - 1 Open circuit voltage approximate 2.8V.
- 1 When diode testing has been completed, disconnect the connection between the testing leads and the circuit under test and remove the test leads away from the input terminals.

F. Measuring Capacitance



Warning

To ensure accuracy, the Meter inside is discharged against the tested capacitor. "DIS.C" will be shown on the display when it is under discharging, this process will be quite slow.

To avoid damage to the Meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance.

Use the DC Voltage function to confirm that the capacitor is discharged.

To measure capacitance, set up the Meter as shown in Figure 3-6 and proceed as follows:

1. Insert the red test lead into the  terminal and the black test lead into the **COM** terminal.

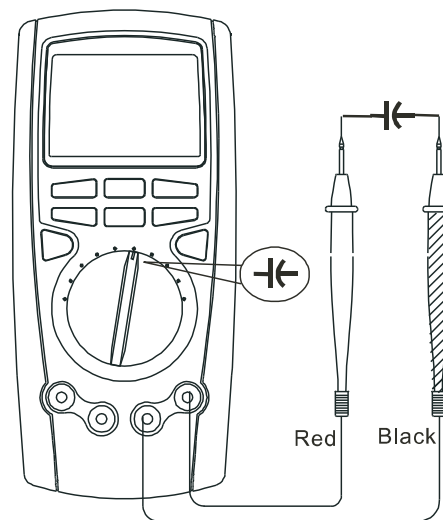


Figure 3-6. Capacitance Measurement

2. Set the rotary switch to  measurement mode, the Meter may display a fixed reading which is a internal distributed capacitor value. For testing less than 10nF capacitor, the tested value must subtract the internal distributed capacitor value to maintain the accuracy.

To improve the measurement accuracy of small value capacitors (less than 10nF), press **REL**  with the test leads open to subtract the residual capacitance of the Meter and leads.

3. It is recommended to use test clip to carry out measurement to reduce the effect of internal distributed capacitor.

- 1 When capacitance measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove the test leads away from the input terminals of the Meter.

Note

- 1 The LCD displays **OL** indicating the tested capacitor is shorted or it exceeds the maximum range.
- 1 Capacitors larger than 400μF take longer time. The analogue bar graph shows the time left before finishing the measurement.

G. Measuring Frequency / Duty Cycle

⚠ Warning

To avoid harms to you, please do not attempt to input voltage higher than 30V rms.

To measure frequency and duty cycle, connect the Meter as Figure 3-7 and do the following:

1. Insert the red test lead into the Hz terminal and the black test lead into the COM terminal.
2. Set the rotary switch to $\text{Hz}\%$ (UT71A), $\text{Hz}\%$ (UT71B/C/D) or $\text{Hz}\%$ (UT71E) and press BLUE button to select the Hz measurement mode for frequency measurement or % for duty cycle measurement. The BLUE button cycles among mV , frequency and duty cycle for UT71C and UT71E.
3. Connect the test leads across with the object being measured.

The measured value shows on the primary display.

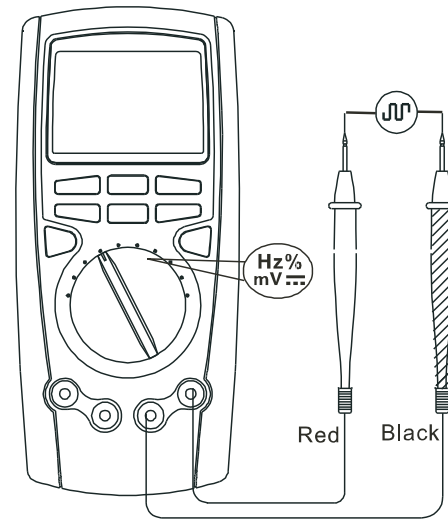


Figure 3-7. Frequency / Duty Cycle Measurement

Note

- 1 The requirement of Input amplitude "a" is as follows:
When 10Hz~40MHz: $200\text{ mV} \leq a \leq 30\text{Vrms}$;
> 40MHz: Un-specified
- 1 When Hz measurement has been completed, disconnect the connection between the testing leads and the circuit under test and remove the test leads away from the input terminals.

H. Measuring Temperature



Warning

To avoid harms to you, please do not attempt to input voltages higher than 60V DC or 30V rms AC.

To measure temperature, set up the Meter as shown in Figure 3-8 and proceed the following.

1. Set the rotary switch to °C °F, the display shows OL. Short circuit the test leads to show the room temperature. The Meter is default to Celsius °C degree unit, you can change units by press the BLUE button once you have selected the temperature function.
2. Insert the point contact temperature probe into the Meter as figure 10.
3. Place the temperature probe to the object being measured.
The measured value shows on the display after several seconds.

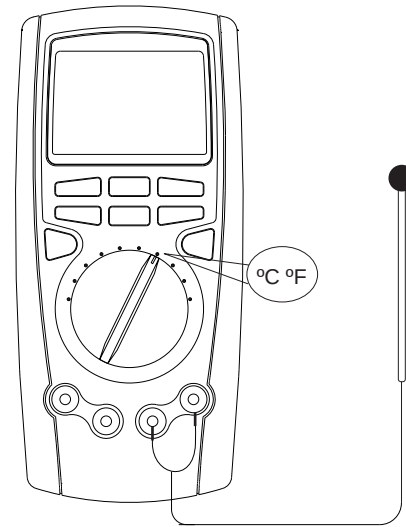


Figure 3-8. Temperature Measurement

Note

- 1 Place the Meter in an environment of 18°C~23°C otherwise false reading may be obtained especially in testing low temperature.
- 1 The included point contact temperature probe can only be used with temperature 230°C below.
- 1 When temperature measurement has been completed, remove the temperature probe away from the multi-purpose socket, and remove the multi-purpose socket away from the Meter.

2. The rest procedure, please follow B. Measuring Current: DC current measurement (Figure 3-2).
3. When the readings obtained is:
 - 1 < 4mA, the primary display shows LO
 - 1 14mA, the primary display shows 0%.
 - 20mA, the primary display shows 100%
 - 1 > 20mA, the primary display shows HI

I. 4~20 mA loop current as % readout(UT71B/C/D/E)

It shows the mA measured value or output level in %, in a 4-20mA scale

To use 4~20mA Loop feature, connect the Meter as follows:

1. Set the rotary switch to  4~20mA / mA %, and press BLUE button to select (4~20mA)% feature.

J. Power Measurement (UT71E only)

Warning

To avoid damages to the Meter, please do not attempt to input higher than 250V from outlet altogether reading may be obtained.

Take extra care during measurement to avoid electric shock.

Switch off the power before the Meter and the object being measured connect to the circuit.

To measure power, proceed the following:

1. Set the rotary switch to **W**.
2. Insert the power adaptor to the corresponding input terminals, and plug the power adaptor to the outlet.
3. Insert the object to be measured into the outlet of the power adaptor.
4. The measured value shows on the display. The primary display shows the power value, the left secondary display show the power factor value and right secondary display shows the apparent power value.

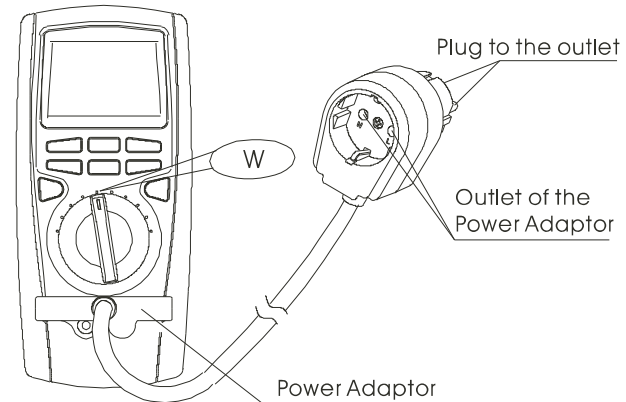


Figure 3-9. Power Measurement

Note

- I The current of the object being measured must > 10A.
≤ 5A continuous measurement is allowed.
- I 5A~10A, only ≤10 seconds continuous measurement is allowed and the interval between each measurement must be greater than 15 minutes.
When power measurement has been completed, first switch off the power, then disconnect the connection between the adaptor and the outlet.

Chapter 4

Using Store, Recall & Send Features

Introduction

Chapter 4 shows you how to use stores, recall and communication features available on the Meter

Storing and Clearing Readings

To store readings, proceed as follows:

- 1 Press **STORE** once, STO and "no.xxxx" appears to confirm the operation and the left secondary display shows the current measurement reading. Press ► to toggle between clearing the stored readings and start from the first readings or start from the last stored reading. Right secondary display shows the original number of records.
- 1 Press **STORE** the second time, STO appears. The left secondary display shows the storing time interval in second, it is preset to zero. To change the interval in second by pressing + or - button. The interval can

be as high as 255 seconds or as low as 0 second. Press and hold **STORE** to access the quick setting.

- 1 Press **STORE** the third time, STO and no appears. The left secondary display shows the index number increase one. The right secondary display shows the value of the corresponding index number, the primary display shows the current measurement reading.
- 1 If there is not set time to store the reading, each press of **STORE** to store one reading. An index number increase one.
- 1 The maximum number of stored reading is 100 (for UT71C and UT71E) and 9999 (for UT71D). When the stored readings memory is full, the Meter will stop storing data.
- 1 To exit, press **EXIT**. Automatic power off feature will be disabled after entering this mode.

Recalling Stored Readings

Use the following procedure to recall the stored reading:

- 1 Press **RECALL** to recall the stored value and RCL appears to confirm the operation.
- 1 The left secondary display shows the index number "no.xxxx".
- 1 The primary display shows the corresponding recalled data.
- 1 The right secondary display shows the total number of the stored data.
- 1 Press ► button to enable the SEND feature to export the data to the computer via USB. The software shows the data storing time and also the data value. After the data transferring is completed, the SEND feature will be disabled automatically.
- 1 Press + or - button to view additional stored reading. Press and hold **RECALL** to access quick recalling.
- 1 Press **EXIT** to exit recalling.

Using Send

When using a Send feature, please refer to the Installation Guide of the included CD-ROM.

Chapter 5

Changing the Default Setting

Introduction

The Meter allows you to change the default operating configuration of the Meter by changing setup options made at the factory.

These settings are stored and can be changed in the Setup mode using the procedure described in this chapter.

Selecting Setup Options

To enter the Setup mode, turn the Meter on and press and hold **SETUP** button for over 1 second. It is recommended to change the default setting only when the Meter is at DCV measurement mode.

In the Setup mode, each press of **SETUP** button steps to the next Selection. Each press of **-** or **+** button decrement or increment an Option.

Each Setup Selection and Option appears in the primary display in the sequence shown in Table 5-1.

Table 5-1. Setup Selections

Selection	Option	Factory Default	Description
HIGH	Max. 40000. Press ◀ to select OFF Press ▶ to select the digit you want to edit	OFF	Over the upper limits, beeps not continuously.
LOW	Max. 40000. Press ◀ to select OFF Press ▶ to select the digit you want to edit	OFF	Over the lower limits, beeps not continuously.
	10	10 mins	10 mins power off
	20		20 mins power off
	30		30 mins power off
	OFF		Power off feature is disabled
	1	1	Beeps continuously and icon lights on
	OFF		No beep, icon flashes
	10	10	Backlight turn off in 10 seconds
	20		Backlight turn off in 20 seconds
	30		Backlight turn off in 30 seconds
	OFF		Disable backlight feature.

Table 5-1. Setup Selections

Selection	Option	Factory Default	Description
Analogue	Zero is in the left hand side.	Zero is in the center	
Bar	Zero is in the center		
Graph			It can only apply to DCV, DCI and °C/°F functions.

Saving Setup Options

At each setup Option, store your choice and exit setup by press EXIT, advance to the next Option by press +. To exit the Setup mode without saving the present Option, press Setup.

Chapter 6 Maintenance

This chapter provides basic maintenance information including battery and fuse replacement instruction.



Warning

Do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service information.

A. General Service

- | Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- | To clean the terminals with cotton bar with detergent, as dirt or moisture in the terminals can affect readings.
- | Turn the Meter to OFF when it is not in use.
- | Take out the battery when it is not using for a long time.
- | Do not use or store the Meter in a place of humidity, high temperature, explosive, inflammable and strong magnetic field.

B. Replacing the Fuses

Warning

To avoid electrical shock or arc blast, or personal injury or damage to the Meter, use specified fuses **ONLY** in accordance with the following procedure.

Follow Figure 6-1 and proceed as follows to replace the Meter's fuse:

- 1 Turn the rotary switch to OFF and remove all connections from the terminals.
- 1 Remove the 5 screws from the case bottom.
- 1 Remove the fuse by gently prying one end loose, then take out the fuse from its bracket.
- 1 Install **ONLY** replacement fuses with the identical type and specification as follows and make sure the fuse is fixed firmly in the bracket.
 Fuse 1: 0.5A, 250V, fast type fuse, $\phi 5 \times 20\text{mm}$
 Fuse 2: 10A, 250V, fast type fuse, $\phi 5 \times 20\text{mm}$
- 1 Rejoin the case bottom and case top, and install the 5 screws.

Replacement of the fuses is seldom required. Burning of a fuse always results from improper operation.

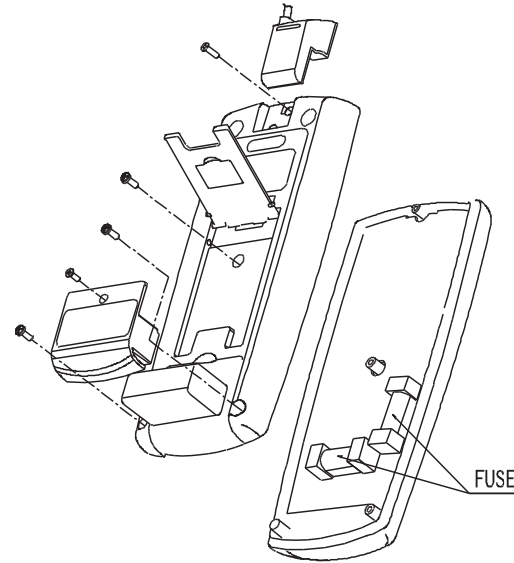


Figure 6-1. Fuse Replacement

C. Replacing the Battery



Warning

To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator "  " appears.

Make sure the test leads are disconnected from the circuit being tested before opening the case bottom.

Follow Figure 6-2 and proceed as follows to replace the battery:

- 1 Turn the rotary switch to OFF and remove all connections from the terminals.
- 1 Remove the screw from the battery compartment, and separate the battery compartment from the case bottom.
- 1 Replace with a new 6F22 9V battery.
- 1 Rejoin the case bottom and battery compartment, and reinstall the screw.

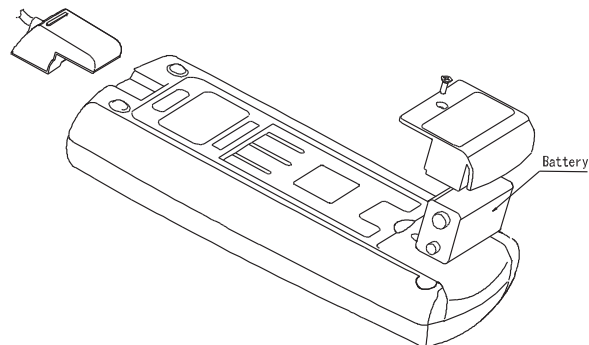


Figure 6-2. Battery Replacement

Chapter 7 Specifications

Safety and Compliances

Maximum Voltage between any Terminal and Grounding	Refer to different range input protection voltage
Certification	CE
Compliances	IEC 61010 CAT.III 1000V, CAT.IV 600V overvoltage and double insulation standard
⚠ Fused Protection for μAmA input terminal:	0.5A, 250V, fast type fuse, ϕ 5x20mm
⚠ Fused Protection for A input terminal:	10A , 250V,fast type fuse, ϕ 5x20mm

Physical Specifications

Display (LCD)	Digital: 40000 counts on primary display; updates 2-3 times / second. 4000 counts on two secondary displays. Analog: 40 segments; updates 10 times / second.
Operating Temperature	0°C~40°C (32°F~104°F)
Storage Temperature	-10°C~50°C (14°F~122°F)
Relative Humidity	≤ 75% @ 0°C~30°Cæ below; ≤ 50% @ 30°C~40°C:
Battery Type	9V NEDA 1604 or 6F22 or 006P.
Electromagnetic Compatibility	1 In a radio field of 1 V/m below: Overall Accuracy = Specified Accuracy + 5% of Range 1 In a radio field of 1 V/m above: No assigned accuracy is specified.
Dimensions (H x W x L)	177 x 85 x 40mm.
Weight	Approx.340g (including battery)

General Specifications

Range	Auto
Polarity	Auto
Overloading	Display OL (except at 4~20mA Loop range which display HI or LO)
Battery Deficiency	Display 

Feature Summary

Tri Digital Displays Analogue Bar Graph	Primary: 40,000 counts Left Secondary: 4000 counts Right Secondary: 4000 counts Bar Graph: 40 segments, updates 10 times / second
Backlight with 2 brightness levels	Bright backlight for clear readings in poorly lighted areas.
Autorange	The Meter automatically selects best range
AC+DC True RMS, AC RMS	Choices for AC only or AC+DC readings
Data Hold	Holds readings on display
Continuity	Beeper sounds for resistance readings below threshold.
Bar Graph	40 segments
Duty Cycle	Measure signal on or off time in %.
MAX MIN Mode	Record maximum and minimum
Battery Access Door	Battery replaceable.

Basic Specifications

Function	Ranges / Description
DC Voltage	0 to 1000V
AC Voltage, True RMS	0 to 1000V, 100kHz bandwidth
Basic Accuracy	DC Voltage: 0.025% AC Voltage: 0.4%
DC Current	0 to 10A (5~10A for ≤ 10 seconds, interval ≥ 15 minutes)
AC Current, True RMS	0 to 10A (5~10A for ≤ 10 seconds, interval ≥ 15 minutes)
Resistance	0 to 40M Ω (UT71A/B is 0 to 20M Ω)
Capacitance	0 to 40mF(UT71A/B is 0 to 20mF)
Frequency	0~400MHz (UT71A/B is 0 to 200MHz)
Temperature	-40°C~1000°C (-40°F~1832°F)(UT71B/C)
STORE Readings	Up to 100 readings for UT71C and UT71E or 9999 readings for UT71D may be saved by the user in a memory. These readings may be viewed by using Recall feature.

Detailed Accuracy Specifications

Accuracy: $\pm$ ([% of reading] + [number of least significant digits]), guarantee for 1 year.

Operating temperature: 18°C~28°C

Relative humidity: $\leq$ 75%RH

A. DC Voltage

Range		Resolution	Accuracy			Overload Protection	Input Impedance
UT71A/B	UT71C/D/E		UT71A	UT71B	UT71C/D/E		
200mV	400mV	0.01mV	±(0.1%+8)	±(0.05%+5)	±(0.025%+5)	1000V	Around 2.5GΩ
2V	4V	0.0001V		±(0.08%+5)	±(0.05%+5)		Around 10MΩ
20V	40V	0.001V					
200V	400V	0.01V					
1000V	1000V	0.1V	±(0.15%+8)	±(0.1%+8)	±(0.1%+8)		

B. AC Voltage (AC+DC measurement is available)

Range		Resolution	Bandwidth	Accuracy		
UT71A/B	UT71C/D/E			UT71A	UT71B	UT71C/D/E
2V	4V	0.0001V	45Hz~1kHz	$\pm(0.8\%+40)$	$\pm(0.6\%+40)$	$\pm(0.4\%+30)$
			1kHz~10kHz	$\pm(3\%+40)$	$\pm(3\%+40)$	$\pm(3\%+30)$
			10kHz~100kHz	$\pm(7\%+40)$	$\pm(7\%+40)$	$\pm(6\%+30)$
20V	40V	0.001V	45Hz~1kHz	$\pm(0.8\%+40)$	$\pm(0.6\%+40)$	$\pm(0.4\%+30)$
			1kHz~10kHz	$\pm(3\%+40)$	$\pm(3\%+40)$	$\pm(3\%+30)$
			10kHz~100kHz	$\pm(7\%+40)$	$\pm(7\%+40)$	$\pm(6\%+30)$
200V	400V	0.01V	45Hz~1kHz	$\pm(0.8\%+40)$	$\pm(0.6\%+40)$	$\pm(0.4\%+30)$
			1kHz~10kHz	$\pm(5\%+40)$	$\pm(5\%+40)$	$\pm(5\%+30)$
			10kHz~100kHz	Not Specified	Not Specified	Not Specified
1000V	1000V	0.1V	45Hz~1kHz	$\pm(1.5\%+40)$	$\pm(1.2\%+40)$	$\pm(1\%+30)$
			1kHz~5kHz	$\pm(6\%+40)$		$\pm(5\%+30)$
			5kHz~10kHz	$\pm(10\%+40)$		$\pm(10\%+30)$

Remarks:

- 1 Input Impedance: Approx 10M Ω .
- 1 Overload Protection: 1000V.
- 1 Display:
 - a) True rms are valid from 10% of range to 100% of range
 - b) AC crest factor can be up to 3.0 except 1000V where it is 1.5.
 - c) A residual reading of 80 digits with test leads shorted, will not affect stated accuracy.
 - d) When frequency is lower than 100kHz, the accuracy guarantee range 10%-100%.
 - e) When making AC+DC measurment, the accuray need to add (1%+ 35 digits) of reading based on the above table.

C. DC Current

Range		Resolution	Accuracy			Overload Protection
UT71A/B	UT71C/D/E		UT71A	UT71B	UT71C/D/E	
200μA	400μA	0.01μA	±(0.2%+20)	±(0.15%+20)	±(0.1%+15)	0.5A, 250V, fast type fuse, φ 5x20mm
2000μA	4000μA	0.1μA			±(0.15%+15)	
20mA	40mA	0.001mA				
200mA	400mA	0.01mA				
10A	10A	0.001A	±(0.8%+30)	±(0.7%+30)	±(0.5%+30)	10A, 250V, fast type fuse, φ5x20mm

Remarks:

At 10A range:

- 1 When the measured current is $\leq 5A$, continuous measurement is allowed.
- 1 When the measured current is between 5A-10A, continuous measurement ≤ 10 seconds and interval more than 15 minutes.

D. AC Current (AC+DC measurement is available)

Range		Resolution	Bandwidth	Accuracy			Overload Protection
UT71A/B	UT71C/D/E			UT71A	UT71B	UT71C/D/E	
200μA	400μA	0.01μA	45Hz~1kHz	±(1%+15)	±(0.8%+15)	±(0.7%+15) ±(1%+40)	0.5A, 250V, fast type fuse, φ5x20mm
2000μA	4000μA	0.1μA	1kHz~10kHz	±(2%+40)	±(1.5%+40)		
20mA	40mA	0.001mA					
200mA	400mA	0.01mA					
10A	10A	0.001A	45Hz~1kHz	±(2%+20)	±(2%+20)	±(1.5%+20)	10A, 250V, fast type fuse, φ5x20mm
			1kHz~10kHz	±(6%+40)	±(6%+40)	±(5%+40)	

Remarks:

1 Display:

- True rms are valid from 10% of range to 100% of range
- AC crest factor can be up to 3.0.
- A residual reading of 80 digits with test leads shorted, will not affect stated accuracy.
- When frequency is lower than 100kHz, the accuracy guarantee range 10%-100%.
- When making AC+DC measurement, the accuracy need to add (1%+ 35 digits) of reading based on the above table.

1 At 10A range:

- When the measured current is ≤ 5A, continuous measurement is allowed.
- When the measured current is between 5A-10A, continuous measurement ≤ 10 seconds and interval more than 15 minutes.

short circuit value

E. Resistance

Range		Resolution	Accuracy			Overload Protection
UT71A/B	UT71C/D/E		UT71A	UT71B	UT71C/D/E	
200Ω	400Ω	0.01Ω	±(0.5%+20)+test leads short circuit value	±(0.4%+20)+test leads short circuit value	±(0.3%+8)+test leads short circuit value	1000V
2kΩ	4kΩ	0.0001kΩ	±(0.5%+20)	±(0.4%+20)	±(0.3%+8)	
20kΩ	40kΩ	0.001kΩ				
200kΩ	400kΩ	0.01kΩ	±(1%+20)	±(0.8%+20)	±(0.5%+20)	
2MΩ	4MΩ	0.0001MΩ	±(1%+40)	±(1%+40)	±(1%+40)	
20MΩ	40MΩ	0.001MΩ	±(1.5%+40)	±(1.5%+40)	±(1.5%+40)	

F. Continuity Test

Range	Resolution	Overload Protection
•)	0.01Ω	1000V

Remarks:

- 1 Open circuit voltage approximate -1.2V.
- 1 The buzzer does not sound when the test resistance is $> 60\Omega$.
- 1 The beeper comes on continuously for open conditions, that is test resistance is $\leq 40\Omega$.

G. Diode Test

Range	Resolution	Overload Protection
$\rightarrow$	0.0001V	1000V

Remarks:

- 1 Open circuit voltage approximate 2.8V.
- 1 A good silicon junction drops between 0.5V and 0.8V.

H. Capacitance

Range		Resolution	Accuracy			Overload
UT71A/B	UT71C/D/E		UT71A	UT71B	UT71C/D/E	Protection
20nF	40nF	0.001nF	$\pm(1.5\%+20)$ + capacitance value of open circuit test leads	$\pm(1.2\%+20)$ + capacitance value of open circuit test leads	$\pm(1\%+20)$ + capacitance value of open circuit test leads	1 0 0 0 V
200nF	400nF	0.01nF	$\pm(1.5\%+20)$	$\pm(1.2\%+20)$	$\pm(1\%+20)$	
2μF	4μF	0.0001μF				
20μF	40μF	0.001μF	$\pm(1.5\%+40)$	$\pm(1.2\%+40)$	$\pm(1.2\%+20)$	
200μF	400μF	0.01μF		$\pm(1.5\%+40)$		
2mF	4mF	0.0001mF	$\pm(5\%+40)$	$\pm(5\%+40)$	$\pm(5\%+20)$	
20mF	40mF	0.001 mF	Not specified	Not specified	Not specified	

I. Frequency

Range		Resolution	Accuracy		Overload Protection
UT71A/B	UT71C/D/E		UT71A/B	UT71C/D/E	
20Hz	40Hz	0.001Hz	$\pm(0.1\%+15)$	$\pm(0.01\%+8)$	1000V
200Hz	400Hz	0.01Hz			
2kHz	4kHz	0.0001kHz			
20kHz	40kHz	0.001kHz			
200kHz	400kHz	0.01kHz			
2MHz	4MHz	0.0001MHz			
20MHz	40MHz	0.001MHz			
200MHz	400MHz	0.01MHz	Not Specified	Not Specified	

Remarks:

- Input amplitude "a" as follows; (DC electric level is zero)
 When 10Hz~40MHz : $200\text{mV} \leq a \leq 30\text{Vrms}$;
 When > 40MHz : Not specified

J. Temperature (UT71B/C/D/E)

Degrees Celsius

Range	Resolution	Accuracy	Overload Protection
-40°C~40°C	0.1°C	$\pm(3\%+30)$	1000V
40°C~400°C		$\pm(1\%+30)$	
400°C~1000°C		$\pm 2.5\%$	

Fahrenheit

Range	Resolution	Accuracy	Overload Protection
-40°F~32°F	0.1°F	$\pm(4\%+50)$	1000V
32°F~752°F		$\pm(1.5\%+50)$	
752°F~1832°F		$\pm 3\%$	

Remarks:

- 1 Included is a K-Type (nickel chromium ~ nickel silicon) point contact temperature probe which could only measure temperature below 230°C. If you want to measure temperature higher than 230°C, you must use the rod contact temperature probe.

K. 4~20 mA loop current (UT71B/C/D/E)

Range	Resolution	Accuracy	Overload Protection
(4~20mA)%	0.01%	$\pm(1\%+50)$	0.5A, 250V, fast type fuse, $\phi 5 \times 20\text{mm}$

Remarks:

When the readings obtained is:

1 < 4mA, the primary display shows LO

1 4mA, the primary display shows 0% ; 20mA, the primary display shows 100%

1 > 20mA, the primary display shows HI

L. Power Measurement (UT71E only)

Range		Resolution	Accuracy	Current Overload Protection	Voltage Overload Protection
POWER	2500W	0.1W	$\pm(2\%+10)$	10A, 250V, fast type fuse, $\phi 5 \times 20\text{mm}$	1000V
VA POWER	2500W	1W	$\pm(2\%+10)$		
Cos ϕ POWER	0 ~ 1	0.001W	$\pm(1\%+10)$		

Remarks:

1 Power factor input range: 0.000~1.000

1 Voltage input impedance: around 10M Ω .

1 Voltage input range: AC50~250V

** END **

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