KWS-X1操作使用说明书

注意：正常稳定使用不应该长时间超过典型推荐值

技术规格

KWS-X1	最小值	典型值	最大值
绝对耐压	0.0V	-	40.0V
绝对电流	0.0A	-	16.0A
绝对功率	0.0W	0.0-140.0W	240.0W
测量电压	3.3V	3.3-30.0V	40.0V
测量电流	0.0A	0.0-8.0A	0.0-12.0A
测量功率	-	280.0W	-
测温范围（°C）	0.0	-	99.0
断电记忆次数	1	-	1
PD协议支持版本	2.0	3.0	3.1 AVS EPR
PPS支持范围	3.3V	-	36.0V
PDO数量捕获	0	-	7
QC协议支持版本	2.0	3.0	4.0+
采样频率	2MHz	-	5Mhz
纹波测量范围	0mV	-	1.0V
屏幕调光频率		10KHz	

屏幕调光范围	-	50%	100%
电流方向指示门限	-	-	0.02A
电压指示门限	-	-	0.02V
CC IO电源测量范围	0.0V	0.4-1.2V	5.0V
DN DP电源测量范围	0.0V	-	3.3V
重力旋屏	支持		
离线保存	支持		
Emarker模拟	支持		
PDO报文解析	支持		
语言切换	中文（英文）		
PDO档位诱骗	支持		
QC档位诱骗	支持		
统计信息	支持		
容量测量	支持		
数据IO电压显示	支持		
纹波测量	支持		
曲线绘图	支持		
纹波采样档位切换	支持		
暂停展示数据	支持		
协议组合测试	支持		
直通模式	支持		
电流方向指示	支持		
实时量程展示	支持		
自动屏保	支持		
屏幕亮度调节	支持		
表体温度读取	支持		

操作说明

按键，以屏幕面为正面，从左往右4个按键依次为（返回）（确认）（-）（+）

菜单-主页

进入条件，在“**主页-测量**”界面长按（返回） 按键。

说明：此界面区分选项，选项被选中后会呈现为浅色块，选择逻辑为（+/-）切换，（确认）键进入选项，进入选项具体页面后（返回）键可以回到此界面或者主页中。

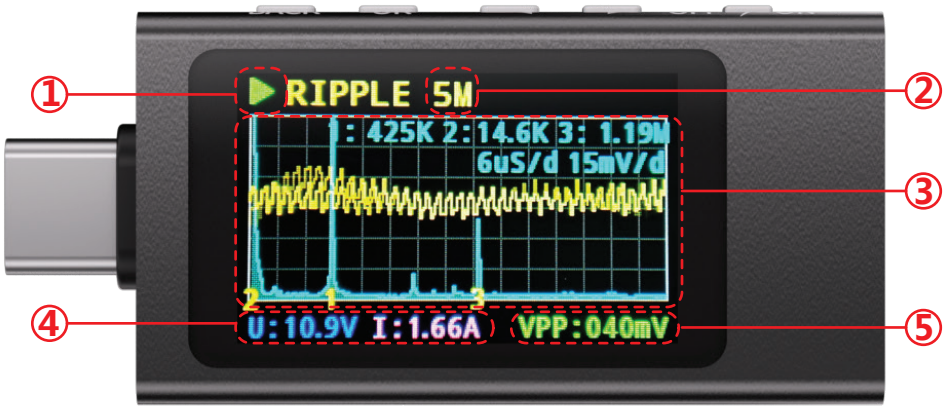
1：主页-测量

1. 电流方向指示流水灯 颜色随着功率大小变化（绿 -> 紫）。
2. 电压、电流和功率测量实时显示加上独立量程显示（有协议的时候量产会随着握手协议改变）默认是表体的推荐最大量程。
3. 握手协议名称展示加上（PD协议握手的档位）或者（QC当前的档位）。
4. 数据IO DP DN CC1 CC2 总线电压实时测量显示，并且在使用CC引脚的协议中会自动标深协议传输使用的IO。

2：主页-统计信息

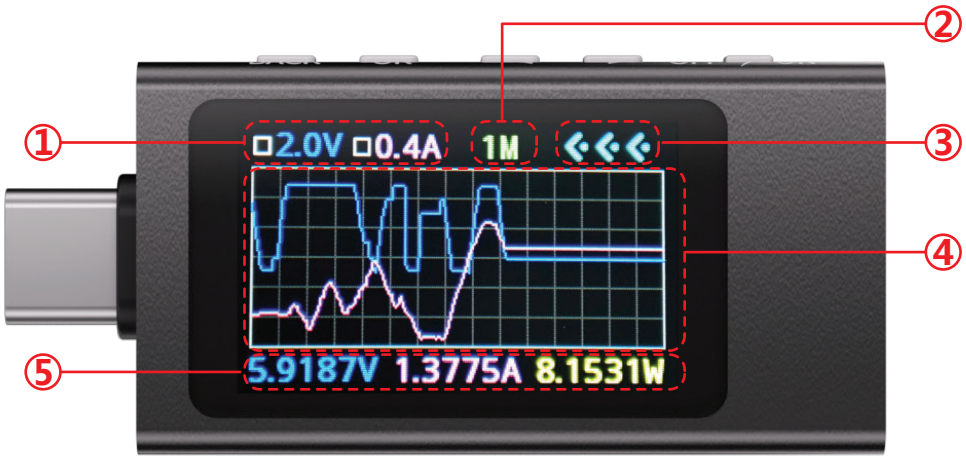
1. 实时电压，电流和功率展示。
2. 实时协议状态。
3. 容量统计（支持离线掉电保存），可长按（确认）键清零。
4. 统计信息 电流，电压，功率 最大值。
5. MCU片上温度传感器 温度实时显示。

3：菜单-纹波测量



1. 状态指示，实时测量 或者 暂停测量（展示某一刻的数据）（确认键切换状态）。
2. 采样速度展示（+/-切换速度）。
3. 绘制曲线区域。
4. 实时电压，电流展示 （支持被暂停某一刻显示）。
5. 100mS内平均纹波实时显示 跟随VBUS电压实时变化测量。

4：菜单-曲线测量



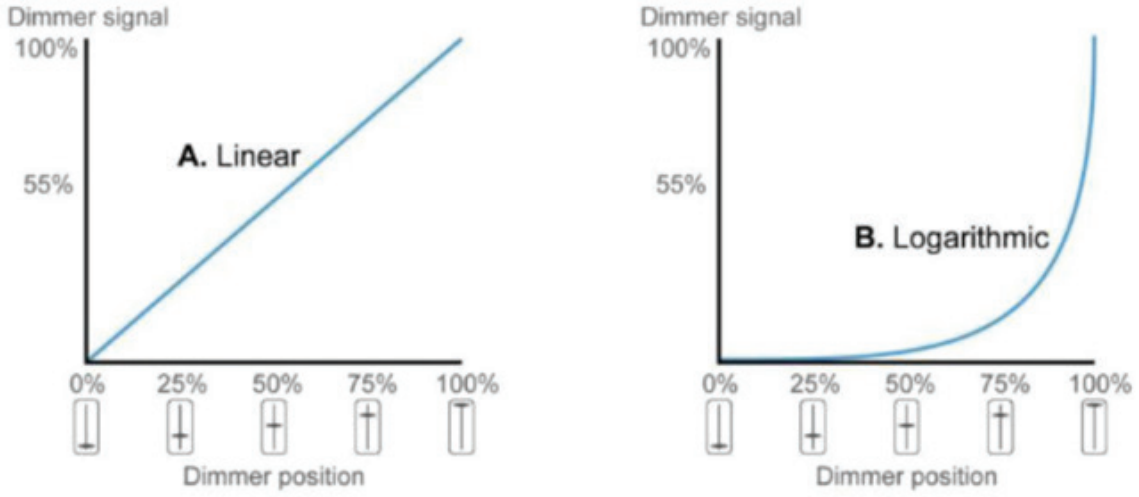
1.（4区域内的曲线）的单位格电压展示 跟随总电压自适应。
2. 采样时间展示 指展示的表格部分总时间 （+/-切换速度）。
3. 电流方向指示 （跟随电流大小试试更新流速）。
4. 曲线实时绘制。
5. 实时电压，电流和功率展示。

5：菜单-设置

菜单选项区分深浅颜色，深色表示未选中，浅色表示当前正在操作的选项。
操作逻辑为，（+/-）选中选项 （确认键）进入被选中的选项，选项内（+/-）修改内容，（返回退出选中的选项回到选项目录的选中逻辑中）。

1. 语言选择 中文（English）。
2. 屏保时间切换，支持常亮永不休眠。

3. 屏幕亮度，适配了类似商用显示器的调光曲线，此处调整的百分比不是线性关系。



（左图）普通线性调光　　（右图）对数曲线调光

本产品的调光选项百分比关系使用的是右图中的对数曲线关系对应的百分比。

4. 重力感应，适用于全局屏幕UI显示旋转等操作。

6：菜单-协议测试-入口

1. 触发默认选项卡，（+/-）切换 （确认键）选中。

2. 模拟Emarker选项卡 前置条件（需要拨码开关处于诱骗档，非直通模式）。

说明：此处的品牌信息对应的各家私有数据线存储的信息，开启的时候可以触发对应的私有协议，或者仅仅模拟品牌信息后使用普通数据线+表模拟成私有数据线使用，具体的作用是使用公头诱骗的时候无数据连接的时候获取最大测试档位，或者使用母座诱骗的时候使用无芯片的数据线获取最大档位，**此处模拟的信息可能超出实际数据线最大能承载的电流。**

2.1 选项 （ +/- ）切换 （ 确认键 ）选中。

2.2 进度条

7：菜单-协议测试-自动测试

说明： 绿色 支持，红色 不支持

1. 状态指示（等待自动操作完成后提示）。
2. PD状态指示（包含PD2.0-3.1 Fixed AVS EPR）。
3. PDO最大档位和功率显示。
4. 是否支持PPS，以及最大可调PPS档位功率显示。
5. Fixed档位支持的电压，以及PDO电压可调组数和范围。
6. QC2.0 Fixed档位支持状态。
7. QC3.0 可调档位最大触发电压，步进200mV。
8. PD协议版本最大指示（特殊协议例如小米私有的时候此处会对应的指示特别信息）。

8：协议测试-PD单项诱骗

说明：此处（+/-）选中的档位不会立即触发，需要再次按下（确认键）确认诱骗，才会同步显示至顶部+执行操作。显示颜色（红色+绿色）同步上述的逻辑。

1. 协议详细版本和档位数量显示（通常默认为PDO在支持AVS EPR拓展部分的协议的时候会特别显示）。
2. 当前档位显示。
3. 实时电流。
4. 电流方向。
5. 支持的档位列举部分，如果超过最大能显示的数量会自动合并区间保证显示数据不会丢失。
6. 选中的档位信息

9：协议测试-PD-单项诱骗-PPS

此界面在“**协议测试-PD-单项诱骗**”中选中PPS档位后进入

特别说明：此处的调整逻辑和上一个界面不同，此处的操作是实时响应执行的，无需确认，所以务必明确你需要执行的操作。

1. PPS模式的具体调压板框。

- 调压板框分为电压和电流设置。
- 红色实线框中的白色下划线代表选中光标。

说明：调压逻辑对应的深浅板框选择逻辑同上叙述，选中进入特定选项后可以（+/-）移动光标，（确认键）进入修改光标选中的某一个数字，选中后可以（+/-）切换，编辑完成后（返回键）退出这个选项的编辑，返回（+/-）移动光标的模式。

10：协议测试-QC

QC2.0

1. 基本一致，只不过状态信息修改为展示DP DN握手电压。
2. 协议电压选择档位 同样的灰色深浅代表（+/-）选中逻辑，选中后（确认键）执行操作。

QC3.0

说明：QC2.0为固定档位，QC3.0 QC4+支持200mV步进调节，对应就是0.2V为最小调整单位。

3. 基本一致，只不过状态信息修改为展示DP DN握手电压。
4. QC协议调压板块 同样的灰色深浅代表（+/-）选中逻辑，选中后（确认键）执行操作。

KWS-X1 Operating Instructions

NOTE: Normal and stable use should not exceed the typical recommended values for extended periods.

Technical

KWS-X1	Minimum Value	Typical Value	Maximum Value
Absolute Dielectric Strength	0.0V	-	40.0V
Absolute Current	0.0A	-	16.0A
Absolute Power	0.0W	0.0-140.0W	240.0W
Measured Voltage	3.3V	3.3-30.0V	40.0V
Measured Current	0.0A	0.0-8.0A	0.0-12.0A
Measured Power	-	280.0W	-
Temperature Measurement Range (°C)	0.0	-	99.0
Power-Off Memory Count	1	-	1
Supported PD Protocol Versions	2.0	3.0	3.1 AVS EPR
PPS Supported Range	3.3V	-	36.0V
Number of PDOs Captured	0	-	7
Supported QC Protocol Versions	2.0	3.0	4.0+
Sampling Frequency	2MHz	-	5Mhz
Ripple Measurement Range	0mV	-	1.0V
Screen Dimming Frequency		10KHz	

Screen Dimming Range	-	50%	100%
Current Direction Threshold	-	-	0.02A
Voltage Threshold	-	-	0.02V
CC and IO Power Measurement Range	0.0V	0.4-1.2V	5.0V
DN and DP Power Measurement Range	0.0V	-	3.3V
Auto-Rotate Screen	Support		
Offline Save	Support		
Emarker Simulation	Support		
PDO Message Parsing	Support		
Language Switching	Chinese (English)		
PDO Mode Deception	Support		
QC Mode Deception	Support		
Statistical Information	Support		
Capacity Measurement	Support		
Data IO Voltage Display	Support		
Ripple Measurement	Support		
Curve Plotting	Support		
Ripple Sampling, Mode Switching	Support		
Pause Display Data	Support		
Protocol Combination Test	Support		
Pass-Through Mode	Support		
Current Direction Indication	Support		
Real-Time Range Display	Support		
Auto Screen Saver	Support		
Screen Brightness Adjustment	Support		
Body Temperature Reading	Support		

Operating Instructions

Buttons, with the screen facing forward, from left to right are: (Back), (Confirm), (-), (+)

Menu - Home Page

Entry condition: In the "Home - Measurement" screen, long press the (Back) button.
Note: This interface distinguishes options, which appear as light-colored blocks when selected. Selection logic is toggled with the (+/-) buttons. The (Confirm) button enters the option, and after entering the specific page of the option, the (Back) button can return to this screen or the home page.

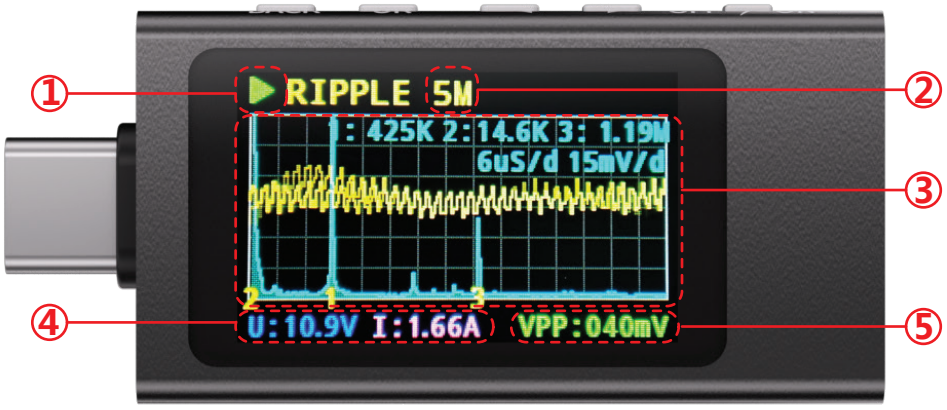
1：Home - Measurement

1. Current direction indicator light changes color according to power level (green -> purple).
2. Real-time display of voltage, current, and power measurements, along with a separate range display (the production range changes with the handshake protocol when active), default is the recommended maximum range of the meter.
3. Display of the handshake protocol name along with (PD protocol handshake gear) or (current QC gear).
4. Real-time measurement display of data IO DP DN CC1 CC2 bus voltage, with automatic highlighting of the IO used in protocol transmission over CC pins.

2：Home - Statistical Information

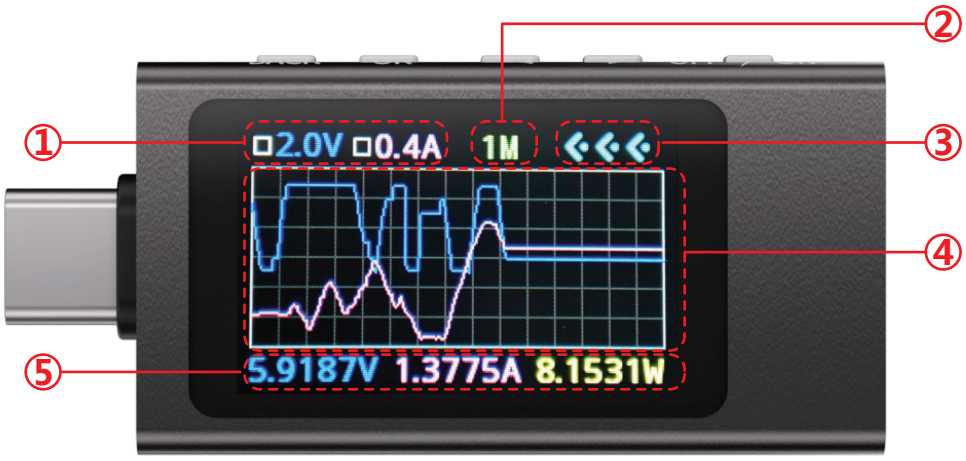
1. Real-time display of voltage, current, and power.
2. Real-time protocol status.
3. Capacity statistics (supports offline power-off saving), can be reset by long pressing the (Confirm) button.
4. Statistics Current, Voltage, Power Maximum
5. MCU on-chip temperature sensor displays temperature in real-time.

3：Menu - Ripple Measurement



1. Status indication: real-time measurement or paused measurement (display data at a specific moment) (toggle status with Confirm button).
2. Display sampling speed (adjust speed with +/-).
3. Drawing curve area.
4. Real-time display of voltage and current (supports pausing to display a specific moment).
5. Real-time display of average ripple within 100ms, tracking real-time changes in VBUS voltage.

4： Menu - Curve Measurement



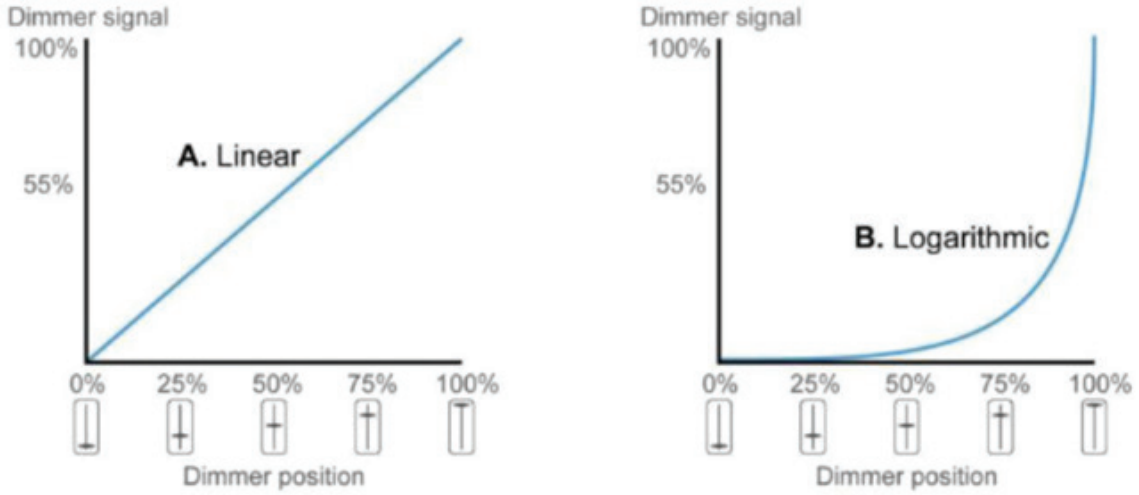
1. Display of per-grid voltage in area 4, adapting automatically to the total voltage.
2. Display of sampling time, showing the total time of the displayed section (adjust speed with +/-).
3. Current direction indication (updates flow rate based on current magnitude).
4. Real-time drawing of curves.
5. Real-time display of voltage, current, and power.

5： Menu - Settings

Menu options are differentiated by deep and light colors; deep color indicates unselected, light color indicates the currently active option.
Selection logic involves using (+/-) to select options, pressing the (Confirm) button to enter the selected option, using (+/-) inside the option to modify content, and pressing (Back) to exit the selected option and return to the selection logic of the menu directory.

1. Language selection: Chinese (English).
2. Screen saver timing switch, supports always on, never sleeps.

3. Screen brightness adapts a dimming curve similar to commercial displays; the percentage adjusted here is not linear.



(Left image) Standard linear dimming (Right image) Logarithmic curve dimming

The dimming option for this product uses the percentage corresponding to the logarithmic curve shown in the right image.

4. Gravity sensing, applicable to global screen UI display rotation and other operations.

6：Menu - Protocol Test - Entry

1. Trigger the default tab, (+/-) to switch, (Confirm) to select.

2. Simulate Emarker tab, prerequisite (requires the dip switch to be set to deception mode, not pass-through mode).

Note: Here, the brand information corresponds to the data stored in each proprietary data cable. When activated, it can trigger the corresponding proprietary protocol, or simply simulate brand information and use an ordinary data cable + meter to simulate a proprietary data cable. The specific purpose is to obtain the maximum test gear when deceiving with a male plug without a data connection, or to use a mother socket deception with a non-chip data cable to achieve the maximum gear. The simulated information here may exceed the actual current carrying capacity of the data cable.

2.1 Option: toggle with (+/-), select with (Confirm) button.

2.2 Progress bar

7： Menu - Protocol Test - Automatic Test

Note: Green indicates support, red indicates no support.

1. Status indicator (wait for the automatic operation to complete before prompting).
2. PD status indicator (includes PD2.0-3.1 Fixed AVS EPR).
3. Display of maximum PDO gear and power.
4. Support for PPS and the maximum adjustable PPS gear power display.
5. Supported voltages for Fixed gear, and the number and range of adjustable PDO voltages.
6. Support status for QC2.0 Fixed gear.
7. Maximum trigger voltage for QC3.0 adjustable gear, steps of 200mV.
8. Maximum indicator for PD protocol version (special protocols like Xiaomi's private will indicate specific information here).

8： Protocol Test - PD Single Deception

Note: The gear selected here with (+/-) will not trigger immediately; it requires pressing the (Confirm) button again to confirm the deception, which will then be displayed at the top and the operation executed. Display color (red + green) follows the above logic.

1. Display of detailed protocol version and number of gears (typically highlighted for PDOs that support AVS EPR extensions).
2. Current gear display.
3. Real-time current.
4. Current direction.
5. Supported gear listing section; if exceeding the maximum displayable amount, intervals will automatically merge to ensure no data is lost.
6. Information about the selected gear.

9： Protocol Test - PD - Single Deception - PPS

This interface is accessed after selecting the PPS gear in "Protocol Test - PD - Single Deception".

Special note: The adjustment logic here is different from the previous interface; operations here are executed in real-time without confirmation, so be sure you understand the operation you need to perform.

1. Specific voltage adjustment panel for PPS mode.

• The voltage adjustment panel is divided into voltage and current settings.
• A white underline in a red solid frame represents the selected cursor.

Note: The logic for adjusting voltage corresponds to the deep and light panel selection logic described above. After entering a specific option, you can move the cursor with (+/-), enter to modify a selected number by pressing the (Confirm) button, switch the selection with (+/-), and upon completion, exit the editing of this option with the (Back) button, returning to the cursor movement mode with (+/-).

10：Protocol Test - QC

QC2.0

1. Essentially the same, except that the status information is modified to display DP DN handshake voltage.
2. Protocol voltage selection gear: The same grey depth indicates the (+/-) selection logic, execute the operation after confirmation with the (Confirm) button.

QC3.0

Note: QC2.0 has fixed gears, while QC3.0 and QC4+ support 200mV step adjustment, corresponding to 0.2V as the minimum adjustment unit.

3. Essentially the same, except that the status information is modified to display DP DN handshake voltage.
4. QC protocol voltage adjustment panel: The same grey depth indicates the (+/-) selection logic, execute the operation after confirmation with the (Confirm) button.