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



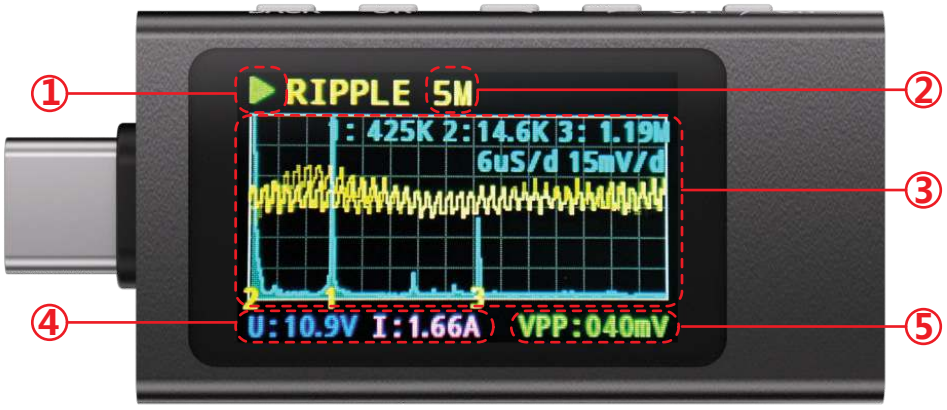
1. Current direction indicator light changes color according to power level (green -> purple).
2. Real-time display of voltage, current, and power measurements, along with a separate range display (the production range changes with the handshake protocol when active), default is the recommended maximum 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



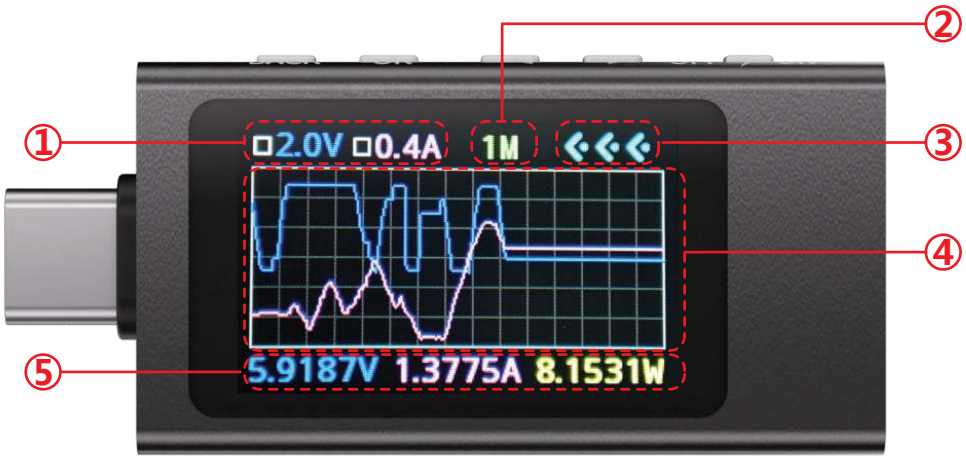
1. Real-time display of voltage, current, and power.
2. Real-time protocol status.
3. Capacity statistics (supports offline power-off saving), can be reset by long pressing the (Confirm) button.
4. Statistics Current, Voltage, Power Maximum
5. MCU on-chip temperature sensor displays temperature in real-time.

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.

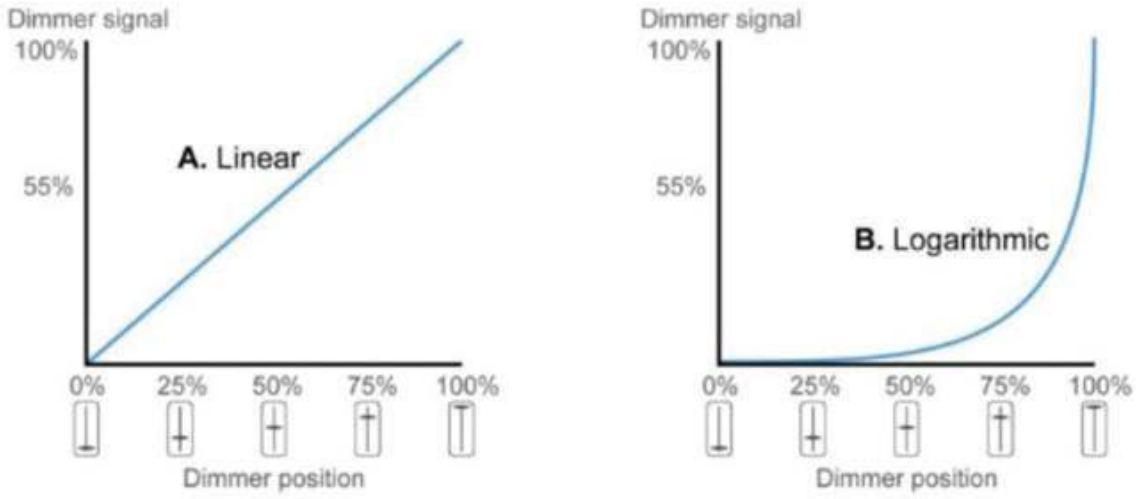
5： Menu - Settings



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.