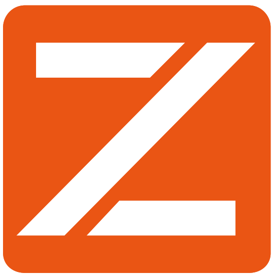
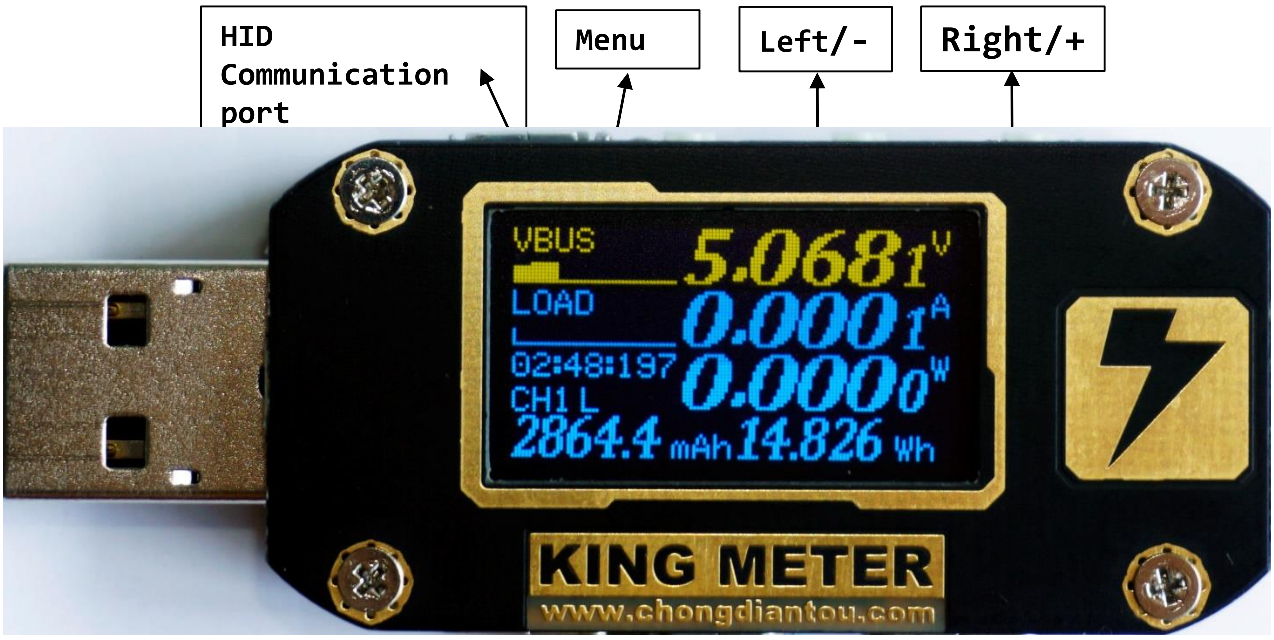
POWER-Z KING METER



Manual

V1.0

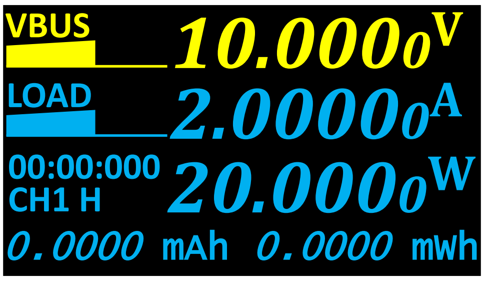
2017.5


HID Communication port
Menu
Left/-
Right/+
VBUS
5.0681 V
LOAD
0.0001 A
02:48:197
0.0000 W
CH1 L
2864.4 mAh
14.826 Wh
KING METER
www.chongdiantou.com

General Technical Specifications	
Main Control IC	Cortex^{TM}-M3 72MHz
Display screen	OLED 128X64 50Hz(Refresh rate 50/s)
Internal storage memory life	About 30 years random storage algorithm
Operating temperature	0-40C°
Interface	USBA 、Micro USB 、TYPE-C
Long-term Stability	±50ppm/1000Hrs
Dimension（Length X Width X High)	62X24X12
Weight	20g
Power Supply Type	HID port 5V ,other port self pickup electricity 3.7-24V
Maximum input voltage except HID port	24V
Working current	4-15mA （Standby 3mA@5V)
QC2.0 QC3.0 Test Sniffing	Support
Power Delivery Test sniffing	Support Pro version support PD2.0 protocol packet capture
Typical interface contact resistance	TYPE-C to TYPE-C 28mΩ / TYPE-A to TYPE-A 30mΩ
Line resistance evaluate	Support
Offline data	2560 X 5 group 512KBIT memory

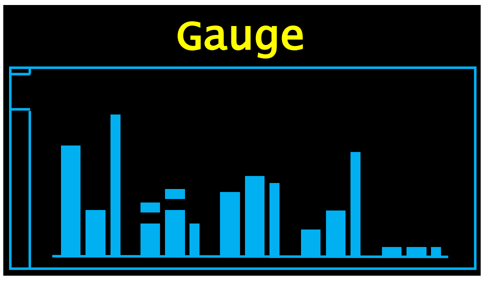
Functional Technical Specifications	Range	Resolution	Basic errors
VBUS Voltage	0-24V	0.1mV	±0.05%+5d (L)
LOAD Current	0-5A	0.1mA	±0.05%+5d (L)
Capacity/Power	0-199999Ah/Wh	0.0001mAh/mWh	±0.2%
Accumulate 1 time every 100ms, write to memory every 3.6s			
L 表示采集速度最低时，在主界面观察到的数据 “L” means the data observed at the main interface when sampling low speed			

Function Features	
High accuracy measurement	Internal typical 0.02% accuracy measurement error and typical 10ppm temperature drift ADC chip. The performance is better than MCP3421.In order to ensure the accuracy of the current sampling, use a high quality typical temperature drift of 20ppm 3W power rate sampling resistance. Up to 0.01% reading error.
Fast measurement	While guaranteed accuracy, fast speed sampling, each 10mS gather the voltage and current data, 10 times faster than the other manufacturers, high-speed sampling to test the power supply’s output ripple, response speed, noise and other data.
Ripple Test	A function similar to Oscilloscopes, actually different to Oscilloscopes in measurement speed, can meet the usually test ripples frequency lower than 50Hz
Off-line curve	Internal mass storage memory, total 5 record groups, record maximum 50 hours each group. Can test the charge curve of electrical equipment, the save interval can be manual set.
Upper System APP	Powerful PC communication software, features such as: online data/offline data management , calibrate , firmware update, no driver needed, plug and play. Pro version can test PD2.0 protocol, monitor the data on cc wires and decode display. For example, can capture the 10 packets of Mac’s handshake, decode and display each packet in characters, suitable for development.
QC Protocol Test	Sniff the USB interface of power adapter whether support QC2.0、3.0 or not
PD Protocol Test	Internal PD communication chip, Pro version can capture data through PC communication software, the Standard version also can monitor and sniff the power bank or power adapter’s USB interface whether support PD2.0 protocol or not
Plentiful interfaces	Total 6 USB interfaces, one is HID communication and independent power supply, two Type-C USB interfaces consist a pair for Type-C test and PD communication, two Micro USB interfaces can test old standard data cables, two Type-A interface is common use test interfaces.


VBUS 10.00000V
LOAD 2.00000A
00:00:000
CH1 H 20.00000W
0.0000 mAh 0.0000 mWh

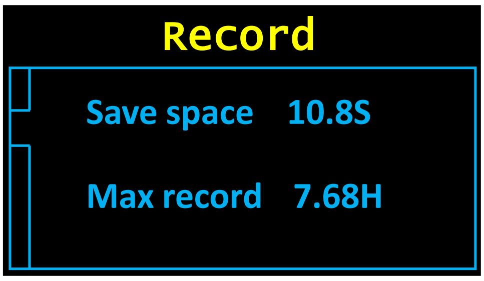
Main screen1：Big font Histogram Measurement information

Menu button	Click enter **Gauge measurement** screen, press to start or stop continue current storage channel measurement
Left|Right button	Switch to other main screen
00：00：000	Time of measurement ， Accumulate the voltage and current data every 100mS
CH1	Identify the internal record channel , total 5 channels, each channel record the capacity , power , measurement time, offline curve,CH1 is the first channel
H	Sample speed High(H) Middle(M)Low(L) for voltage sampling, high speed increase response speed will increase the power consumption, low speed can guarantee better accuracy and resolution.
VBUS、LOAD	VBUS stand for voltage of USB interface, LOAD stand for current of load



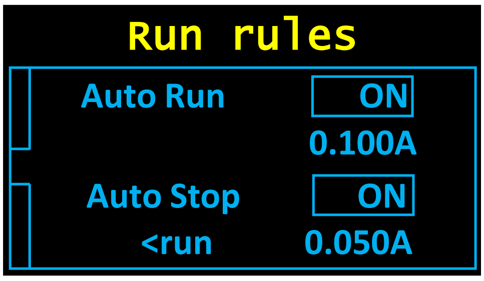
Menu screen1：Gauge measurement

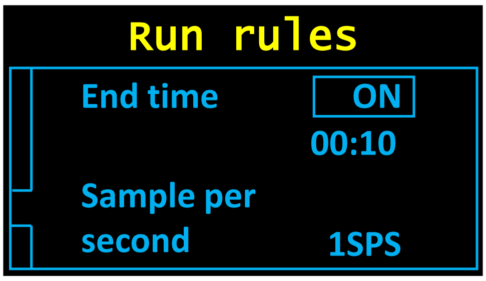
Menu button	①Switch next menu option ②Quit
Left|Right button	①Manage storage channel ②Start,Stop ③ delete information

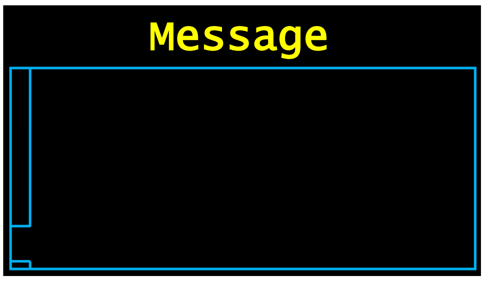

Record
Save space 10.8S
Max record 7.68H

Menu screen2：Record Curve

Menu button	①Switch next menu option ②Quit modify area
Left|Right button	①Change record interval
Save space	Save intervals, min 3.6s,max 72s
Max record	Maximum record time, when record reach Save space X 2560 time will discard the subsequent data

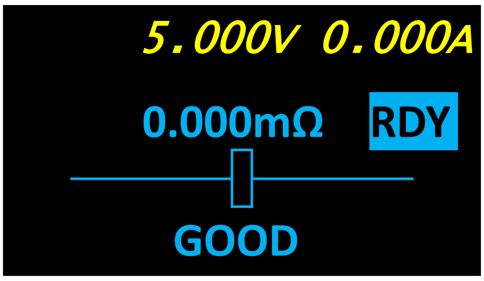

Run rules
Auto Run ON 0.100A
Auto Stop <run ON 0.050A


Run rules
End time ON 00:10
Sample per second 1SPS



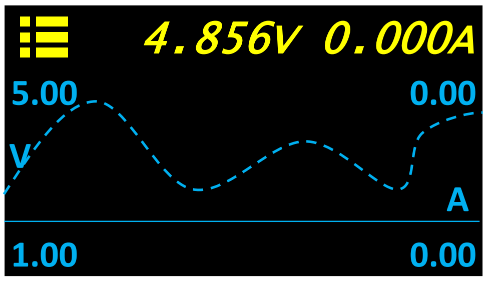
Menu screen3、4：Run rules

Menu button	Switch next menu option
Left|Right button	①Open/Close ②Change current threshold
Auto Run	Open this feature will automatic measure when load current exceed threshold preset such as 0.1A, measurement don't create a new channel, will stay the channel which Gauge choosed
Auto Stop	This parameter must small than value of Auto Run , will stop measurement when load current less than threshold preset such as 0.05A.
End time	Auto stop time, this parameter restrict the maximum record time, maximum 10 hours, suitable for precisely control measurement time.
Sample per second	The number of data sampled per second, actually this is the number of filtering, the greater the value of the refresh rate faster.



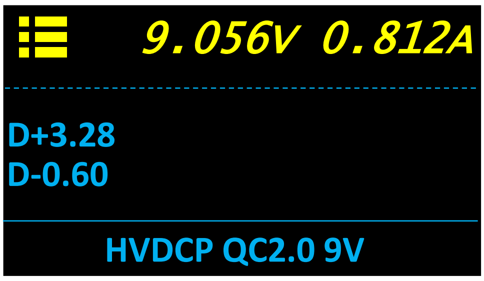
Main screen2：Evaluate the line resistance of the charge cables and the line compensate ability of power adapter

Menu button	Ignore
Left|Right button	Switch to other main screen
RDY	Automatic calibrate when current is 0, RDY indicate for ready to test . Connect load to increase current for evaluate the line performance.
0.000mΩ	The resistance measured, the greater the worse
GOOD	Inferior Ordinary Good Quality Gold Artifact evaluate line compensate ability of power adapter



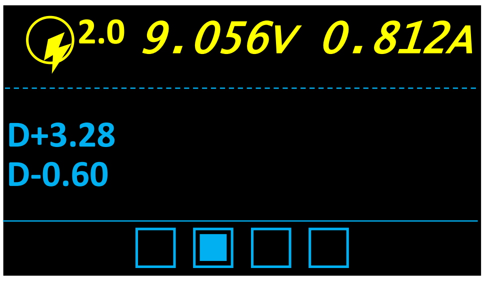
Main screen3：Micro oscilloscope VBUS Curve

Menu button	Adjust the speed and type of curve
Left|Right button	Switch to other main screen
Curve speed	Total 4 levels, maximum 100SPS sample speed
Curve type	Can only display voltage or current, decrease display speed



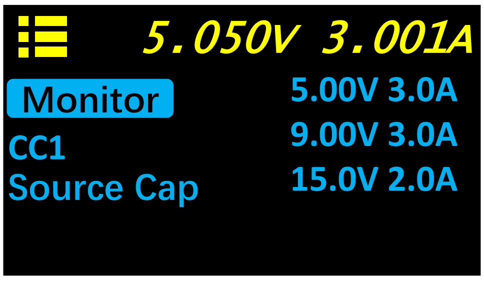
Main screen4：Micro oscilloscope D+、D- Curve

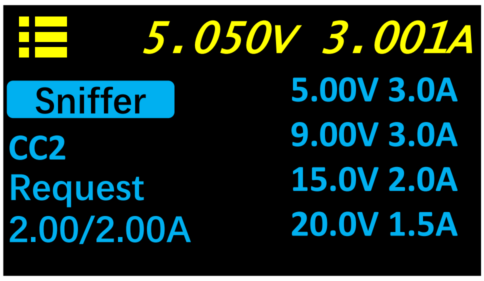
Menu button	Test QC2.0、3.0 protocol
Left|Right button	Switch to other screen
HVDCP	Charge protocol information
Sniff mode	Current support QC2.0, Q3. 0, will support more protocols in future



Main screen4：QC2.0/3.0 Quick charge protocol test

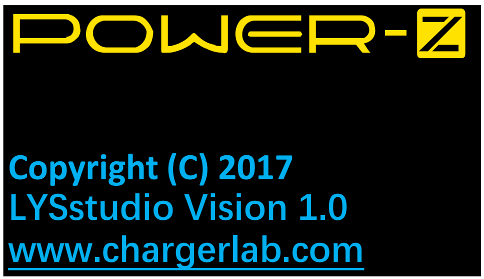
Menu button	Press to test QC2.0、3.0 protocol of power adapter
Left|Right button	Change voltage applied for
Warning	If the phone or devices connected not compatible for high voltage , force apply for high voltage will cause irreversible damage to the devices even burn them. Please test when no load connect to any interface.


☰ 5.050V 3.001A
Monitor
CC1
Source Cap
5.00V 3.0A
9.00V 3.0A
15.0V 2.0A


☰ 5.050V 3.001A
Sniffer
CC2
Request
2.00/2.00A
5.00V 3.0A
9.00V 3.0A
15.0V 2.0A
20.0V 1.5A

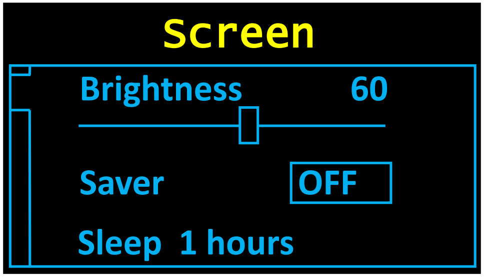
Main screen5：PD communication monitor screen

Menu button	Switch between monitor or sniff mode
Left|Right button	Switch to other main screen
Monitor	Monitor mode(default) only monitor data packets on CC wires, if CC wires doesn't connect will cause Intermittent power failure
Sniffer	Sniff mode , automatic sent handshake packet when press button, can change SRC Fixed Supply PDO
CC1、CC2	The CC wire current used for communication, automatic change
Source Cap	**Source or Sink** packet of PD communication protocol
Request	Upper layer requests to change to a different power supply from Source. We send a new REQUEST message to the Source and the upper layer can start using the new power supply


POWER-Z
Copyright (C) 2017
LYSstudio Vision 1.0
www.chargerlab.com

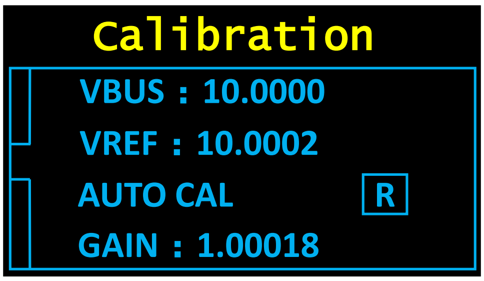
Main screen6：About Logo Help information

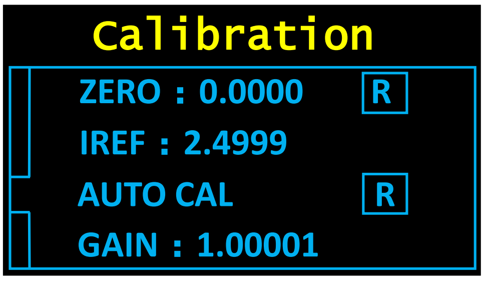
Menu button	click enter **System Setting** screen
Left|Right button	Switch to other main screen
Website	www.chargerlab.com My blog website ,can obtain more help information


Screen
Brightness 60
Saver OFF
Sleep 1 hours

System setting1：Screen parameters

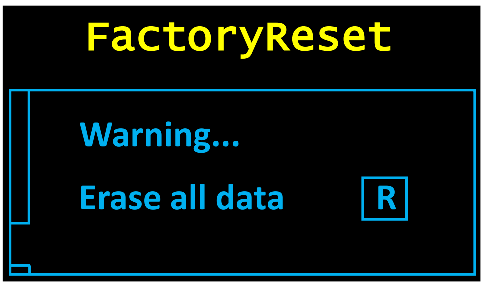
Menu button	Switch to next screen
Left|Right button	①Change screen brightness level ②Open screen saver mode ③Standby time
Brightness	Screen brightness, step 5 range from 0 to 100
Saver	Screen saver mode
Sleep	Standby time, for example enter standby mode 1 hours later, still measure


Calibration
VBUS：10.0000
VREF：10.0002
AUTO CAL R
GAIN：1.00018


Calibration
ZERO：0.0000 R
IREF：2.4999
AUTO CAL R
GAIN：1.00001

System setting3：Calibration parameters

Menu button	Switch to next screen
Left|Right button	①Adjust reference voltage ②One key calibrate ③Manual adjust gain
VBUS	Voltage measured
VREF	Reference voltage input , need very precise voltage source
AUTO CAL	Press right/+ for one key calibrate
ZERO	Press right/+ for one key set current to 0
AMPS	Current of output load

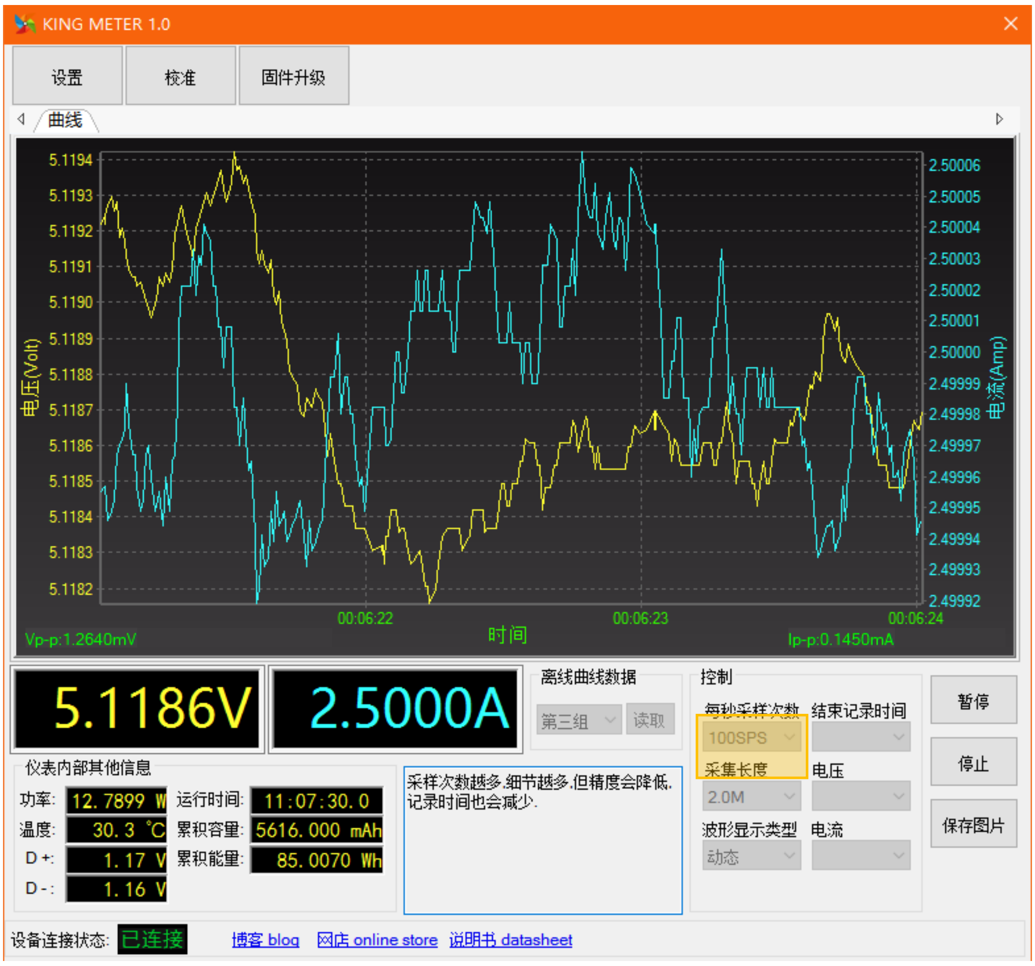

FactoryReset
Warning...
Erase all data R

System setting3：FactoryReset parameters

Menu button	Switch to next screen
Left|Right button	Press right/+ restore reference data and system settings to factory preset

App introduce Online generate curve

Dynamic display curve	Curve window area draw curve dynamic axis, calculate the maximum and minimum values in the window(Vp-p\Ip-p), Curve will scroll from right to left according to sample time. The figure below displays noise of a standard 2.50000A high fidelity current source, the noise actually is the interior noise of instrument in 100SPS high speed acquisition. Could get better performance if set sample speed to 10SPS .


KING METER 1.0
设置
校准
固件升级
曲线
5.1194
5.1193
5.1192
5.1191
5.1190
5.1189
5.1188
5.1187
5.1186
5.1185
5.1184
5.1183
5.1182
电压(Volt)
2.50006
2.50005
2.50004
2.50003
2.50002
2.50001
2.50000
2.49999
2.49998
2.49997
2.49996
2.49995
2.49994
2.49993
2.49992
电流(Amp)
00:06:22
00:06:23
00:06:24
时间
离线曲线数据
第三组
读取
控制
暂停
停止
保存图片
博客 blog
网店 online store
说明书 datasheet

Vp-p:1.2640mV

Ip-p:0.1450mA

5.1186V

2.5000A

仪表内部其他信息

功率: 12.7899 W

温度: 30.3 ℃

D +: 1.17 V

D -: 1.16 V

运行时间: 11:07:30.0

累积容量: 5616.000 mAh

累积能量: 85.0070 Wh

采样次数越多.细节越多.但精度会降低.
记录时间也会减少.

每秒采样次数: 100SPS

结束记录时间:

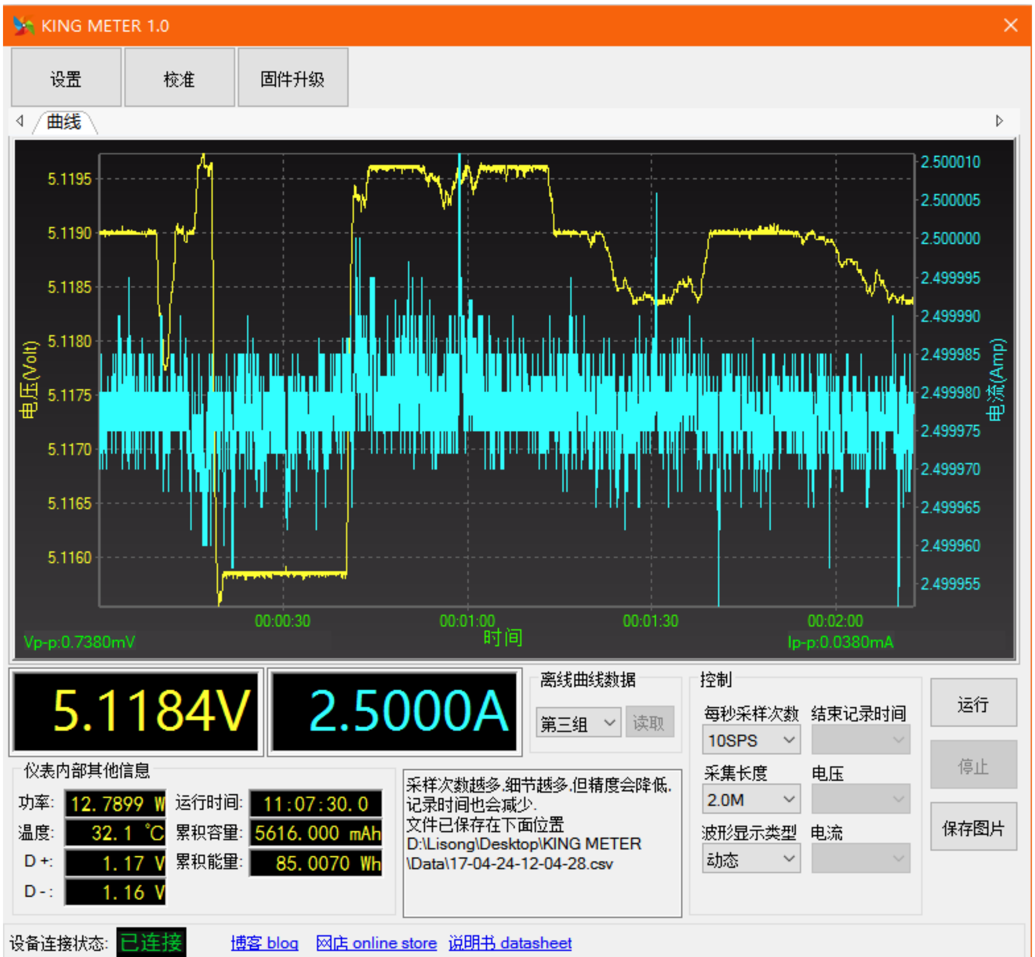
采集长度: 2.0M

电压:

波形显示类型: 动态

电流:

设备连接状态: 已连接


KING METER 1.0
设置
校准
固件升级
曲线
5.1195
5.1190
5.1185
5.1180
5.1175
5.1170
5.1165
5.1160
电压(Volt)
2.500010
2.500005
2.500000
2.499995
2.499990
2.499985
2.499980
2.499975
2.499970
2.499965
2.499960
2.499955
电流(Amp)
00:00:30
00:01:00
00:01:30
00:02:00
时间
离线曲线数据
第三组
读取
控制
运行
停止
保存图片
博客 blog
网店 online store
说明书 datasheet

Vp-p:0.7380mV

Ip-p:0.0380mA

5.1184V

2.5000A

仪表内部其他信息

功率: 12.7899 W

温度: 32.1 ℃

D +: 1.17 V

D -: 1.16 V

运行时间: 11:07:30.0

累积容量: 5616.000 mAh

累积能量: 85.0070 Wh

采样次数越多.细节越多.但精度会降低.
记录时间也会减少.
文件已保存在下面位置
D:\Lisong\Desktop\KING METER
\Data\17-04-24-12-04-28.csv

每秒采样次数: 10SPS

结束记录时间:

采集长度: 2.0M

电压:

波形显示类型: 动态

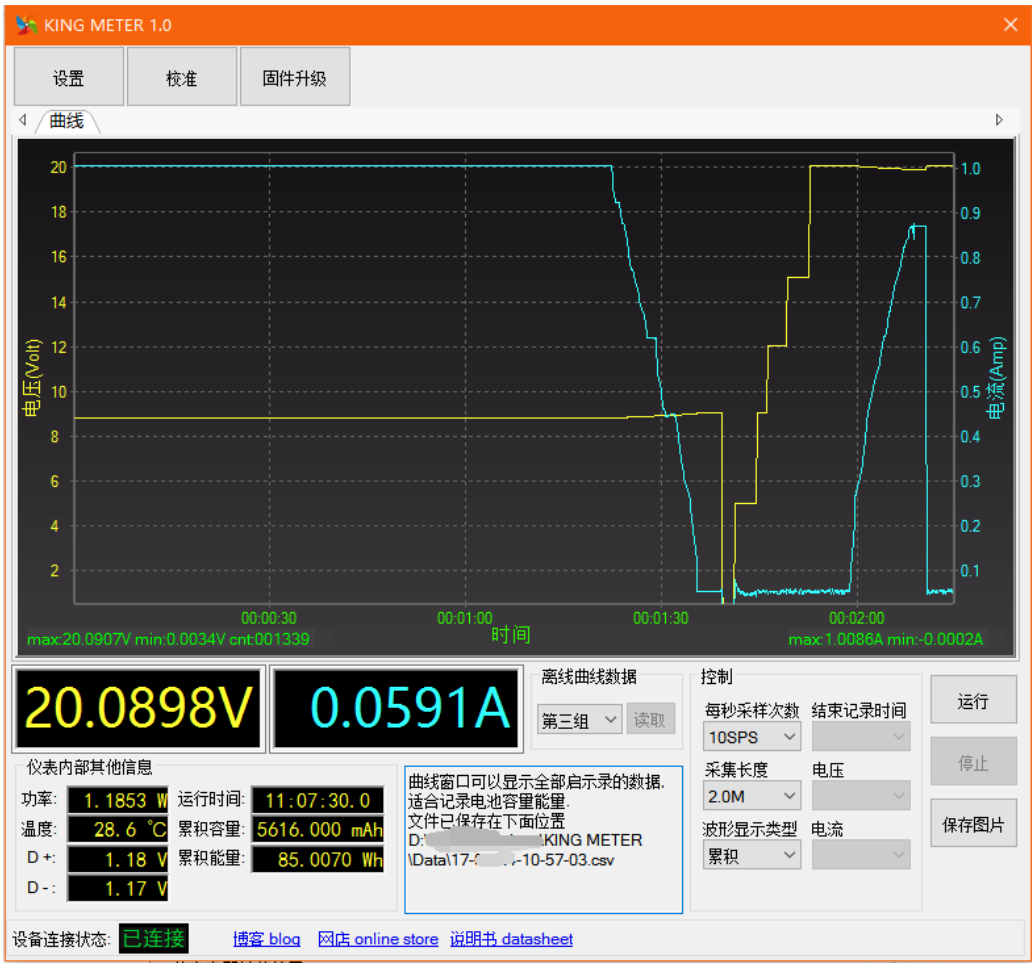
电流:

设备连接状态: 已连接

POWER-Z KING METER

App introduce Offline data fetch and generate curve

Cumulative display curve	The time axis of curve remain 0, the curve will continuous compress
Application case	The figure below displays charge curve of a power bank


KING METER 1.0
设置
校准
固件升级
曲线
电压(Volt)
电流(Amp)
20
18
16
14
12
10
8
6
4
2
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
00:00:30
00:01:00
00:01:30
00:02:00
时间
离线曲线数据
读取
控制
运行
停止
保存图片
仪表内部其他信息
博客 blog
网店 online store
说明书 datasheet

max:20.0907V min:0.0034V cnt:001339

max:1.0086A min:-0.0002A

20.0898V

0.0591A

第三组

每秒采样次数: 10SPS

结束记录时间:

采集长度: 2.0M

电压:

波形显示类型: 累积

电流:

功率: 1.1853 W

温度: 28.6 ℃

D +: 1.18 V

D -: 1.17 V

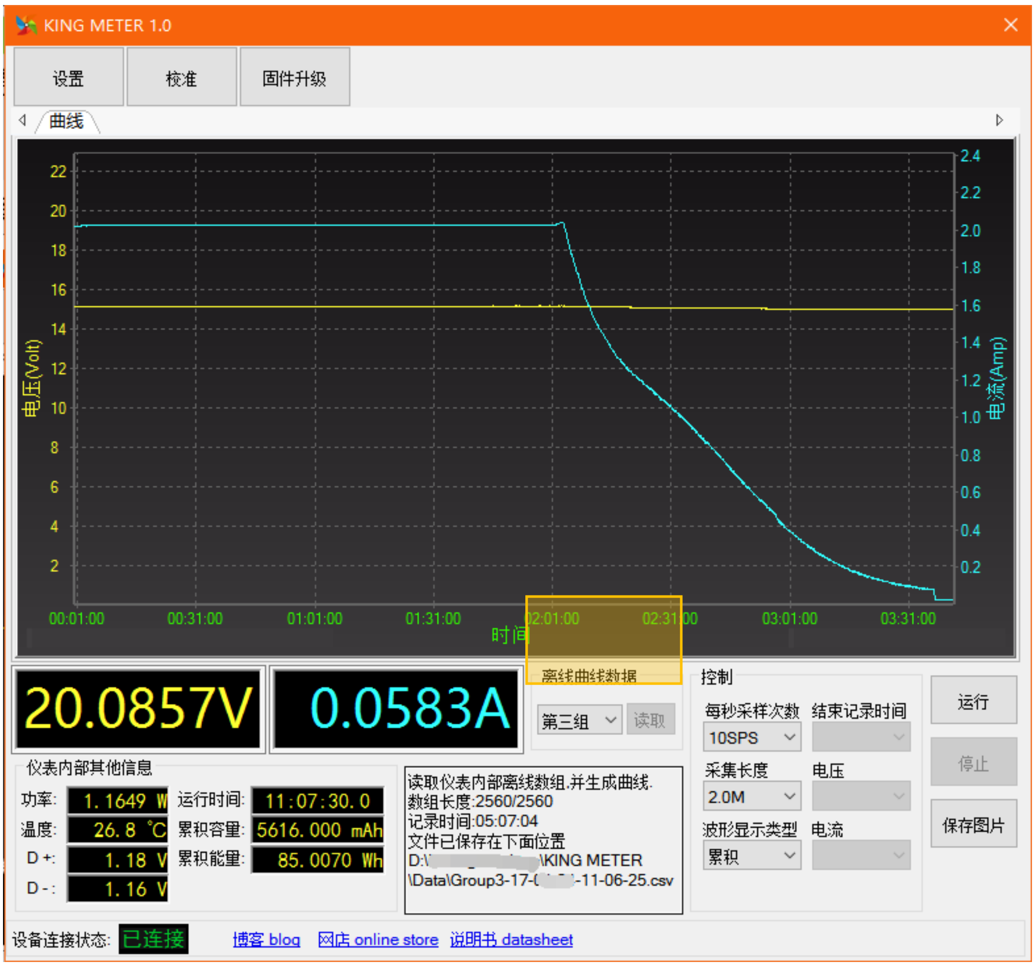
运行时间: 11:07:30.0

累积容量: 5616.000 mAh

累积能量: 85.0070 Wh

曲线窗口可以显示全部启示录的数据.
适合记录电池容量能量.
文件已保存在下面位置
D:[redacted]KING METER
\Data\17-[redacted]-10-57-03.csv

设备连接状态: 已连接


KING METER 1.0
设置
校准
固件升级
曲线
电压(Volt)
电流(Amp)
22
20
18
16
14
12
10
8
6
4
2
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
00:01:00
00:31:00
01:01:00
01:31:00
02:01:00
02:31:00
03:01:00
03:31:00
时间
离线曲线数据
读取
控制
运行
停止
保存图片
仪表内部其他信息
博客 blog
网店 online store
说明书 datasheet

20.0857V

0.0583A

第三组

每秒采样次数: 10SPS

结束记录时间:

采集长度: 2.0M

电压:

波形显示类型: 累积

电流:

功率: 1.1649 W

温度: 26.8 ℃

D +: 1.18 V

D -: 1.16 V

运行时间: 11:07:30.0

累积容量: 5616.000 mAh

累积能量: 85.0070 Wh

读取仪表内部离线数组.并生成曲线.
数组长度:2560/2560
记录时间:05:07:04
文件已保存在下面位置
D:\[redacted]\KING METER
\Data\Group3-17-[redacted]-11-06-25.csv

设备连接状态: 已连接