**YR1035+ user manual**

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**(1) Overview**

YR1035+ battery internal resistance tester is a true four-wire internal resistance tester, which can

measure the internal resistance and voltage at the same time. It can also be used to measure the

resistance. The measurement results are displayed on the same screen. This product is suitable

for battery configuration, battery performance testing, battery screening and other aspects.The

machine structure exquisite, easy to carry, is your ideal electrician, electronic testing machine.

**(2) Safety instructions**

The machine shall not input DC voltage greater than 100V. No AC voltage can be input under

any conditions. MicroUSB port is used for charging and 4.5V-5.5V voltage is input.

**(3) Part names and functions**

**Button function:**

【POWER】 key (Power /Set/Cancel)1.

Short press to start up in shutdown state.

2.

From the menu options, click the 【POWER】 key to unset and return to the menu list.

3.

In normal mode and sorting mode, click 【POWER】 to enter the menu list.

4.

Under the menu list, click 【POWER】 to enter the selected menu options.

5.

In normal mode and sorting mode, long press 【POWER】 key to enter the shutdown

interface, and use【HOLD】key and 【RANGE R】 key to determine whether shutdown is required.

【HOLD】 key (Save/confirm)

1.

Under the "Power Off?" interface, click【HOLD】to confirm shutdown.

2.

In normal mode and sorting mode, short press【HOLD】on the left side of the screen will

display HOLD, indicating that the screen is locked. Click to unlock again.

3.

Under the menu list, short press【HOLD】to exit directly from the menu list.

4.

From the menu options, click【HOLD】to save the Settings and return to the menu list. Click

【HOLD】 again to save the Settings and return to the measurement interface.

5.

In parameter setting, click【HOLD】to switch 【RANGE R】 and 【RANGE U】.

【RANGE R】key (Move up/add)

1.

Under the "Power Off?" interface, click 【RANGE R】key to cancel the shutdown.

2.

In normal mode and sorting mode, click 【RANGE R】key to switch the RANGE of internal

resistance.

3.

Under the menu list, click the 【RANGE R】 key to move up menu options.Long press

ultra-3s.

4.

From the menu options, click the 【RANGE R】 key to move up to select the parameter, or

change the parameter value.Long press more than 3S will continuous motion.

【RANGE U】key (Move down/reduce )

1.

In normal mode and sorting mode, click 【RANGE U】key to switch the voltage range.

2.

Under the menu list, click the 【RANGE U】 key to move down menu options.Long press

ultra-3s.

3.

From the menu options, click the 【RANGE U】 key to move down to select the parameter,

or change the parameter value.Long press more than 3S will continuous motion.

**(4) Parameter setting**

Click the 【POWER】 Key in the measurement interface to enter the menu list, switch the selected

menu through the 【RANGE R】 Key and the 【RANGE U】 Key, and press the 【POWER】 key

to enter the setting after selecting, press the【HOLD】Key to exit the setting and return to the

measurement interface.

1.

General mode: General Test common mode, the display interface is the measurement

interface.

① The upper part on the left side is the internal resistance range (AUTO is the automatic

range, 20mR is the 20 mΩ range, 200mR is the 200 mΩ range, 2R is the 2 OHM range, 20R is the

20 OHM range, 200R is 200 OHM range),② the following part is the voltage range (AUTO is the automatic range, 1V is the 1V range,

10V is the 10V range, 100V is the 100V range).

2.

Sorting mode: used for battery screening. Before using the sorting mode, you need to set it

in the menu 【5. Setting of grading】.After the setting is completed, enter the sorting mode to

measure and sort. The battery to be tested shows stable read-out value, and the battery that

meets the sorting setting parameters will show whether it passes through YES or NO and which

parameter is unqualified.

3.

Backlight Settings: Backlight parameter Settings.Brightness (10%-99%);Trigger (close,

operate, always on);Delay time (5S-60S)

4.

Energy saving setting: Automatic shutdown function setting. Automatic shutdown (on,

off);Time delay (5min-60min);Low power consumption (on, off).When entering the low-power

mode, the position displaying the measured value displays the "--" symbol. You can exit the

low-power mode by pressing any button on the panel.

5.

Classification setting:

①Press the 【POWER】 Key in the measurement interface to enter the setting

②Select 【5. Grading settings】 by pressing 【RANGE R】 or 【RANGE U】, and then press

【POWER】 to enter the grading settings interface

③Press the 【RANGE U】 button to select the parameter to be set

④After selecting the parameters to be set, Press 【RANGE R】 button to start setting (note:

【RANGE R】 Key to set the value, and 【RANGE U】 Key to select the setting position)

⑤After setting, Press【HOLD】Key twice to save and exit, and then return to the measurement

interface

⑥Then press the 【POWER】 key to enter the Menu Settings, select 【2. Sorting mode】

, then

press the 【POWER】 key to enter the sorting mode interface, and then directly test it. (Note: LO

is the lowest value and UP is the highest value. Those in this range are qualified.)

6.

Serial port settings: expansion options, consult the manufacturer for details.

7.

Calibration: the internal resistance is calibrated, the voltage is set to zero, and each gear

can be calibrated separately.

①Internal resistance calibration

Calibration resistance of the corresponding gear of the test line connection

during the calibration of the internal resistance gear:

20mΩGear

10mΩ--20mΩ

200mΩGear

100mΩ--200mΩ

2ΩGear

1Ω--2Ω

20ΩGear

10Ω--20Ω

200ΩGear

100Ω--200Ω

Select the gear and press the 【RANGE R】 or 【RANGE U】 key to adjust the

measurement display value to the value closest to the external

resistance.Save Settings to exit.

Note: unconnected resistance cannot be calibrated. The displayed value is

random.

②The voltage is set to zero

When the display value of the short-connection voltage of the watch pen

cannot return to zero, it needs to be adjusted to zero. Short the stylus, selectthe tap position, then select the voltage display value, and press 【RANGE R】

key to zero.Save exit.

8.

Restore calibration: restore the factory calibration settings of internal resistance gear

without opening the lid to adjust potentiometer.

9.

Setting: Press the【RANGE R】key to switch the language version. EN is the English version

and CNS is the Chinese version. After selection, press the【HOLD】Key twice to save and exit the

built-in battery charging current setting；Buffer function, when measuring voltage above 30V, in

order to prevent or reduce the spark in contact, the machine will automatically turn on the buffer

BU (For this function, you need to set the buffer status to enabled in 【9. Settings】. The default

value is disabled"). At this time, the test will show a delay display, which needs to be turned off

manually (press the 【POWER】 Key in the measurement interface to enter the setting, and press

the【RANGE U】Key to select【9. Settings】

, press the【POWER】Key again to enter the settings,

press the 【RANGE U】 Key to select the buffered "open", and press 【RANGE R】 again], "Open"

changes to "close", press the middle 【 HOLD 】 Key twice again, save and return to the

measurement interface); The contrast ratio can be set to 0~9, the larger the value, the deeper the

display.

**(5) Precision specifications**

Format of precision specification: ± ([degree percentage]+[minimum significant digit])

Range※

Maximum resolution

Precision

display mode

20mΩ

0.01mΩ

0.7%+7

22.00mΩ

200mΩ

0.1mΩ

0.5%+5

220.0 mΩ

2Ω

1mΩ

0.5%+5

2.200 Ω

20Ω

10mΩ

0.5%+5

22.00 Ω

200Ω

0.1Ω

0.6%+5

220.0 Ω

※The range of gear range is 5%-95%, and the error may be greater than the above precision if

the range is not within this range (less than 5% range, or greater than 95% range).

Voltage measurement: ±(% reading +% range)

Range

Maximum resolution

Precision

display mode

1V

0.00001V

0.15+0.015

.99999V

10V

0.0001V

0.15+0.010

9.9999V

100V

0.001V

0.15+0.015

99.999V

Positive and negative symmetry error ±(0.012% +5 words)

Temperature Drift 100ppm/℃ within normal service temperature (10℃-40℃)

**(6) Maintenance**

Host maintenance:

1. Avoid high temperature and humidity environment. Prevent interface and circuit frommoisture oxidation.

2. Avoid direct sunlight to the LCD screen for a long time to avoid aging.

3. If not used for a long time, please keep the battery at 50% power (or between 3.7V-3.9V

battery voltage) to extend the life.

External test line:

1. Check the on-off condition of each signal line of the test line frequently to avoid the test

error caused by the broken line.

2. Avoid high temperature and humid environment. Prevent the interface and probe from

moisture oxidation.

**(7) General technical indicators**

Maximum voltage between any terminals: 100V

Display:

Internal resistance number: 2,000 count voltage number: 99,999 count

updated 4 times per second

Temperature:

Working: 10℃-40℃, storage:-20℃-60℃ internal resistance temperature

coefficient: 0.1 \* (specified accuracy)/℃(<18℃ or >28℃)

Battery type:

3.7V 2000mAh 18650

Power consumption: <60mA (200mΩ and above range, when the power supply is 3.7V, the

backlight is off)

< 120 ma (20 m Ω range, the power supply of 3.7 V, the backlight off)

<10mA (enter low power mode)

0mA (Power off)

**(8) Matters needing attention in the test**

1. The machine has been calibrated before delivery, and there is no need to calibrate or reset

the machine.

2. After starting up, check the internal resistance and voltage range. For example, connect the

test line to test directly on the automatic range AUTO.

3. The twined test wire should not be disassembled, but should be wound in red and black

when received, and should be wound in vain.Double stranded can enhance anti-interference and

improve measurement accuracy.

4. Each test line of the indicator pen shall be in good contact with the battery under test, and

there shall be no connection between each test line.

5. Use of Kelvin plus test wire: the clamp must be open when measuring the battery. There

should be no direct contact between the two metal pieces of each clamp and the battery

electrode.

6. Use of 18650 battery stand: align the back edge of the movable stand with the length scale

according to the length of the battery, and compress the negative contact with the battery

before putting it in.So that the positive and negative poles can not expose the middle of theyellow needle, otherwise it can not be stable and accurate measurement.

7. Use of probe test line: the positive and negative poles of the vertical battery press down the

probe to shrink part of the probe and make both probes touch the battery independently.Make

sure that the positive and negative surfaces of the battery are clean, otherwise poor contact can

not be stable and accurate measurement.

**(9) Summary and classification of common problems**

**1. Voltage value jitter when not measured after starting up**

A: Under the condition of no test after starting up, it is normal that the voltage has a numerical

jitter. The value is a random value, meaningless and has no influence on the measurement

results.

**2. Could you tell me how to adjust YR1035+ to zero?There is also a 0.0X mΩ resistance**

**between the two Kelvin clips**

A: There is a wiring sequence for the direct short circuit of the Test line. The clamping sequence is

red line, black line, white line, white line. Only when the probe test line contacts the same metal

surface can it be the minimum value. The minimum value is generally not zero, but does not

affect the measurement accuracy. No processing is required. (The machines are all calibrated

before shipment, and no zero adjustment is required normally.)

**3. Can YR1035+ measure large single lithium iron phosphate battery?**

A: Lithium iron phosphate is generally recommended to measure batteries within 100 ampere

hours. The internal resistance of the battery above 100 ampere hours is generally lower than the

recommended measurement of 0.3 mΩ or more. This battery can be measured with internal

resistance below 100V and above 0.3~0.5 mΩ.

**4. The internal resistance below 0.3 mΩ cannot be measured, can it?**

A: It is not impossible to measure, and the reading error is large. For example, 1 mΩ error plus

or minus 0.03 m Ω , if it is 0.2 m Ω error plus or minus 0.05 m Ω , so more than 0.3 m Ω is

recommended. The measured value of 0.05 mΩ is sometimes very accurate, but the uncertainty

will make the reference of little significance.

**5. To measure the internal resistance of the 18650 battery, should it be fully charged or**

**not?**

A: If you want to get a general idea, you can test directly.To be precise, if it's a new battery, test it

on a full charge. Old batteries are tested after they have been drained. But under normal

conditions, the change in internal resistance is very small. The better the battery's internal

resistance, the less it is affected by the amount of charge.

**6.**

**Is the instrument measuring time positive and negative?Will the connection be**

**damaged?**

A: connect opposite have no influence, divide positive and negative pole. As long as it doesn't

exceed 28V.

**7. The figures change quickly and cannot be measured.**

A: The test line is not in good contact with the battery, there is strong interference around or the

battery is charging and discharging.Normal use will not appear jump.

**8. Is it necessary to take off the battery line to test one of the multiple connections ofelectric cars?Or can you just measure it?**

A: As long as it is not in startup, or charging, you can directly test one section.

**9.**

**Is it OK to measure the battery pack?**

A: As long as the total measured voltage is less than 28V. However, the resistance of the

connecting line between the batteries is often greater than the internal resistance of the battery,

so the series measurement cannot accurately measure the internal resistance. It is best to

measure the battery poles directly.

**10.**

**Can I measure the internal resistance of capacitance?**

A: The internal resistance value of approximate capacitance.

**11.**

**What are the advantages of YR1035+?**

A: The most important thing is that the YR1035+ is a 4-wire measurement, which avoids the

resistance of the test wire and contact resistance with the battery. This enables YR1035+ to be

stable in the range of 0.48mΩ~0.52 mΩ when measuring resistance as small as 0.5 mΩ (this

measurement accuracy is actually higher than the nominal accuracy).In addition, the measured

speed can be stable at 2~3 seconds in the automatic range and 1~2 seconds in the fixed

range.Others have other auxiliary functions.Up to 100V can be measured, which is convenient to

measure some battery packs.

**(10) correlation between internal resistance and other parameters**

**Lithium ion batteries:**

1. The same 18650 battery will gradually lose capacity during use, resulting in smaller capacity

and higher internal resistance.

2. After the same 18650 battery is fully charged, the internal resistance reaches the most stable

and near the minimum at 4.2V. During the use, the voltage drops and the internal resistance rises

slightly.

3. For a battery with the same volume of 18650, the larger the capacity, the greater the internal

resistance may be. Because of the volume limitation, increasing the capacity parameter requires

sacrificing the internal resistance parameter.

4. The same capacity of the battery, the general internal resistance is smaller the better, the

more able to withstand a larger discharge current.

5. The same type of battery does not limit other factors, the larger the capacity is the smaller

the internal resistance, because the plate area thickness electrolytic quality will be greater, so the

internal resistance is smaller.

6. With the same voltage, capacity and volume, the greater the Number of C, the smaller the

internal resistance. Less internal resistance to greater discharge capacity.

7. The internal resistance of the same battery is affected by temperature. The higher the

temperature is, the smaller the internal resistance is. The older the battery is, the more sensitive

it is.

**The conditions of lead-acid batteries are similar to those of lithium batteries above:**

1. The larger the capacity size under the same voltage, the smaller the internal resistance will be.

2. The same volume, capacity of the battery, the lower the internal resistance of the high C

number lower the power discharge capacity, the higher the high C number discharge capacity.3. The internal resistance of the same capacity battery will be different under different

discharge rates. For example, a 12Ah battery at a 2-hour rate has less resistance than a 12Ah

battery at a 5-hour rate.

**Case of cheap dry batteries:**

1. The internal resistance is generally relatively high, for example, the better AA no. 5 battery

has internal resistance of more than 100 mΩ, and the better 9V square battery has internal

resistance of more than 8 Ω. The lower the quality, the higher the internal resistance.

2. The internal resistance is obviously positively related to the remaining power. For example,

the internal resistance of AA No. 5 battery at full charge is 100 mΩ, and the internal resistance

may be as high as 500 mΩ after the power is used up.

3. Alkaline batteries are similar to dry batteries in that the internal resistance is much

lower.Button batteries are similar to dry batteries.

**(11) Internal resistance parameters of some batteries**

①: The following is the list of common battery resistance of 10-hour rate, for reference only.

The 2-hour rate battery is about 62%~70% of the table value, and the 20-hour rate battery is

about 1.4~1.5 times of the table value

**Standard reference for internal resistance of ordinary battery: (unit:mΩ)**

※For specific parameters, refer to the table section of instruction book

②: No.5 dry battery 0.1~0.5 Ω. No. 7 dry battery 0.3-0.8 Ω.

③: the quality of 9V battery is good 8~15 Ω, the quality of the second 20~40 Ω.

④: LR44 button battery 1.5~2.2 Ω.

⑤: The good internal resistance of 18650 lithium battery is within 10 mΩ or even milliohms. The

relatively good one is within 30 mΩ, the general one is within 60 mΩ, and the worse one is

over 100 mΩ.

⑥: No. 5 nickel hydrogen battery 0.01~0.05 mΩ.Power nickel cadmium battery 1~5 mΩ.

⑦: Electric car 12V12Ah day battery internal resistance 8~10 mΩ.