

RK2678XM/YM

Earthing Resistance Tester

Instruction Manual

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I. Introduction

Earthing resistance tester is used for measuring internal earthing resistance of electrical equipment, which reflects the (contact) resistance between exposed conductive part at each position of electrical equipment and general earthing terminal of electrical equipment. Earthing resistance tester uses 4-end measurement method in order to eliminate the influence of contact resistance to test, namely, a current (generally about 25A) is applied between the exposed conductive part of tested appliance and general earthing terminal and the voltage between these two ends is then measured and its resistance value is calculated.

RK2678X earthing resistance tester is designed according to the following safety standards: GB, IEC, ISO, BS, UL, JIS, etc. The earthing resistance is one of important indicators for assessing safety performance of electrical equipment. It measures the resistance of earthing circuit in the condition of high current (25A or 10A), and also tests high current bearing indicator of earthing circuit to avoid body hurt when insulation performance falls down (or is damaged). This tester is developed for supplying high-performance testing devices for workshop and laboratory according to the above requirements. This tester has low requirements to voltage of power supply, high measurement accuracy, fast speed and convenient operation, especially suitable for use in high-end laboratory and on automatic testing line. The new function, interruption warning optional function (i.e. warning on open circuit), can be very convenient to know whether the tester is in normal testing status, and a user can select this function or not according to actual demand. This tester adopts 3½ digital display and it is easy to read the value. The whole tester has

very high reliability and stability for optimised design is used. This tester is suitable for different standards: for example, in accordance with the safety standard of China GB 4706.1-1998 Safety Standard for Domestic Appliances and Appliances with Similar Purposes; RK 2678 AM tester is in accordance with GB 9706.1 Medical Standard.

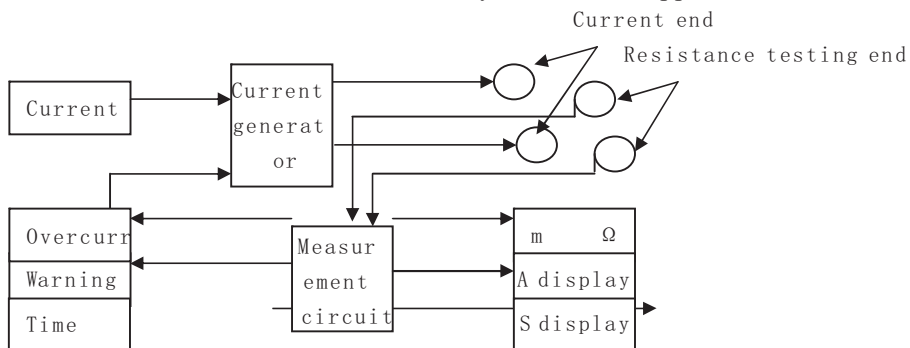
II. Technical specifications

1. Range of measurement 0~200mΩ (5%+2scales) (25A)
 200~600mΩ (5%+2scales) (10A)

2. Testing time	0~99s (continually adjustable)
3. Testing voltage	<AC 12V/6V (RK2678YM)
4. Testing current	AC 5~30A±5%
5. Overcurrent warning	>AC 30A
6. Warning resistance value	0~200mΩ (5%+2scales) (AC 25A) continually adjustable 200~600mΩ (5%+2 scales) (AC 10A) continually adjustable
7. Operating conditions	
(1) Temperature	0~40℃
(2) Relative humidity	<80%RH
(3) Power supply	AC 220V±10% 50Hz
8. Overall size	315mm×260mm×165mm
9. Weight	15kg

III. Principle of operation and block diagram

Earthing resistance tester consists of testing power source, testing circuit, indicator and warning circuit. Testing power source generates measuring current, testing circuit handles current signal and voltage signal generated when current goes through the measured resistance, completes AC/DC transformation, and performs operation of division. Indicator indicates value of current and resistance. If the measured resistance is larger than warning value, the tester gives out continuous audible and visible warning. If the testing current is larger than 30A, it will give out continual audible and visible warning, and the testing current will be cut off so as to ensure safety of the tested appliance.



IV.Features

RK2678XM earthing resistance tester is suitable for measuring the resistance value between metallic part of motors, appliances, instruments, meters, domestic apparatuses that are supplied power with power grid, and their protective earthing terminal. The tester has two scales of testing resistance value ($200\text{m}\Omega$ or $600\text{m}\Omega$). The testing time can be set between $0\sim 99\text{s}$. when the measured resistance value is larger than the preset resistance value, it has audible and visible warning function, and overcurrent ($>AC30\text{A}$) protection function. This tester uses the principle of divider for measurement, and fluctuation of testing current cannot affect measurement accuracy, therefore, it has the following advantages: accurate measurement, convenient operation, small volume and low requirement to power. The tester uses $3\frac{1}{2}$ digital display and the reading is convenient and simple, and reliability is very high. The new optional function of broken wire warning (i.e. open circuit warning) can be very easy to know whether the tester is working in normal test status, and a user can select this function upon actual demand.

V.Attention for operation

1. Operator shall be familiar with the operation procedures of this tester before operation.
2. Shall not adjust other keys at will in the whole testing course.
3. Warning shall be given out only when the test current is larger than 5A .
4. In order to ensure stable test, it is suggested use of AC power with stabilized voltage.
5. The connection wire can be taken down after test only when it is in "RESET" status.
6. The short circuit piece connected on the current output terminal of the tester is used for setting the warning resistance, and shall be taken down while measurement.

VI. Instructions for operation and operating processes

1. Description of panel (see Fig. 1)

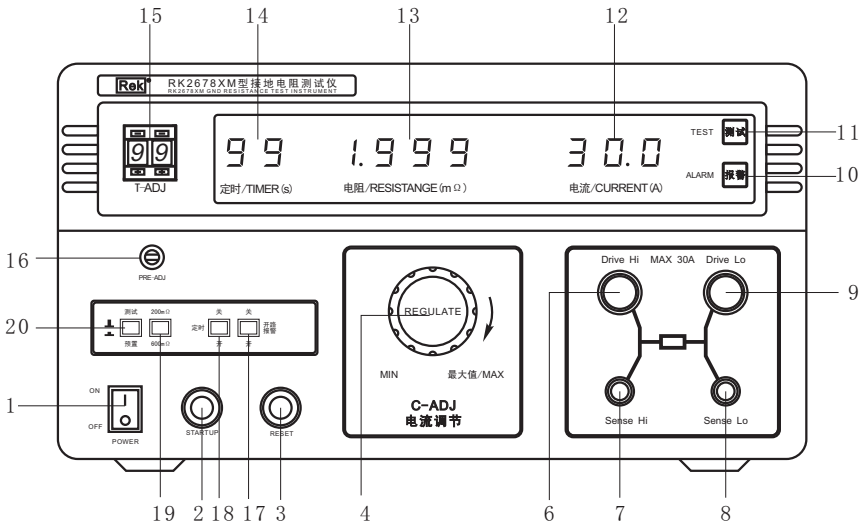


Fig. 1: Schematic chart of RK2678XM panel

- (1) Power switch is used for controlling whether the power is turned on or not.
- (2) START: if you press this key, the test lamp is on, and the tester works.
- (3) RESET: if you press this key, the test lamp is off or excessive resistance warning and overcurrent warning stop. There is no current output this time.
- (4) CURRENT ADJUST: adjust this key to make current output as 5A30A.
- (5) Remote control interface: connect with remote control testing gun (equipped upon client's demand)
- (6) Current output end. If remote control testing gun is used, this end will be connected with the end of testing gun (end of thick wire).
- (7) Resistance testing end.
- (8) Resistance testing end. If remote control testing gun is used, this end will be connected with the resistance end of testing gun.
- (9) Current output end. If remote control testing gun is used, this end will be connected with the resistance end of testing gun.
- (10) Overresistance and overcurrent warning indicator: when the measured resistance exceeds the warning setting value, this indicator will flash, and

the beeper will beep intermittently; when overcurrent appears, the indicator shines and the beeper continually beeps.

- (12) Current display (0~30A) 。
- (13) Resistance display: 0~199.9mΩ (25A) / 0~600mΩ (10A)。
- (14) Time display: 1~99s under countdown.
- (15) Time presetting panel: can set the desired testing time.
- (16) Warning presetting adjustment potentiometer: adjust this potentiometer in the status of presetting to set warning resistance value.
- (17) Open circuit warning switch: if pressed, it has the function of open circuit warning; it has no such function if popped out.
- (18) Timing switch: perform timing test when it is “ON”, and the test time can be set in the range 1-99s; perform manual test when it is “OFF”.
- (19) TEST/PRESET: when you press this key, you can set and display warning resistance value if you start and adjust the key CURRENT ADJUST to the stated output current; if it is popped out, the tester is in normal test status.
- (20) 200mΩ / 600mΩ selection switch: it is the scale of 600mΩ when this switch is pressed, and the measurement range is 0-600mΩ, the warning value is 0-60mΩ; it is the scale of 200mΩ when this is released, when and the measurement range is 0~199.9mΩ, the warning value is 0-200mΩ.

2. Use and operation:

- (1) This tester is attached with a pair of measuring wires, the thick measuring wire of red wire group connects with red current wiring pole of tester, and the thin measuring wire of red wire group connects with red wiring pole for resistance testing; the thick measuring wire connects with black current wiring pole of the tester. The thin measuring wire of black group connects with black wiring pole for resistance testing.
- (2) Turn on the power and power switch, and digital tube on display panel is lightened.
- (3) Select testing range switch 200mΩ or 600mΩ upon demand. When the switch is pressed, the range is 600mΩ, the resistance measurement scope shown at this time is 0~600mΩ; when the switch is popped out, the

range is $200\text{m}\Omega$. The resistance measurement scope shown at this time is $0\sim 199.9\text{m}\Omega$.

(4) Turn the current adjust button anti-clockwise to zero.

(5) Make short circuit of clamp end of the above two groups of measuring wires.

(6) Manual measurement

a. Put "TIMING" at "OFF" status.

b. Check the steps 2 (3) ~ 2 (5) correctly, press "START", the "test" lamp turns on, adjust "CURRENT ADJUST" and observe the current value on display to the selected current value.

c. Put "PRESET/TEST" at the status "PRESET", adjust the potentiometer for "adjustment of warning resistance", and preset warning resistance value.

d. Press "RESET" button to cut off output current, and turn "CURRENT ADJUST" to the least; open the test clamp and connect the clamp with the testing point on the tested object.

e. Press the key "START", "test" lamp shines, adjust "CURRENT ADJUST" to the desired current value, and read the resistance shown on the display. When the earthing resistance of the tested object is larger than the earthing resistance setting warning value, the tester will give out the intermittent audible and visible warning, or otherwise it will not give out warning. If you want to stop testing, you can press "RESET", "test" lamp will be off, and the current in the circuit will be cut off. Take down the testing clamp from the tested object for next measurement.

(7) Timing measurement

a. Put the tester at "RESET" status.

b. Press "TIMING" to the position "ON", and preset the desired testing time upon demand.

c. Check the steps 2 (3) ~ 2 (5) correctly, press "START", the "test" lamp turns on, the time counter of display starts countdown, adjust "CURRENT ADJUST" and observe the current value on display to the selected current value.

d. Put "PRESET/TEST" at the status "PRESET", adjust the potentiometer for "adjustment of warning resistance", and preset warning resistance value.

(Note: set warning resistance value in the condition of current output).

- e. Press "RESET" button to cut off output current, and turn "CURRENT ADJUST" to the least; open the test clamp and connect the clamp with the testing point on the tested object.
- f. Read the resistance reading shown in the display. When the earthing resistance of the tested object is larger than the warning value of earthing resistance, the tester will give out intermittent audible and visible warning, or otherwise, it will not give out warning. When the testing time closes, the current on the circuit will be automatically cut off, then the testing clamp can be taken from the tested object for next measurement.
- (8) This tester has optional function of open circuit warning. If the earthing circuit is open circuit or the testing clamp does not clamp the tested object, it can select whether to give out audible and visible warning according to actual demand.
- (9) This tester has overcurrent protection function. When the current in circuit is more than 30A, the tester gives out audible and visible warning for overcurrent, and the overcurrent lamp keeps shining, the beeper continually beeps and the current in circuit is automatically cut off. Press "RESET" to eliminate warning status, turn the "CURRENT ADJUST" anti-clockwise for next measurement.
- (10) The tester utilizes principle of divider to measure low resistance, i.e. $R=U/I$. When the tester is in status of "RESET", for $I = 0$, the resistance display window of tester shows unstable status, which is normal.

3. Example

- (1) Common test: connect wires as shown in Fig. 2, put one test clamp at general earthing end and another clamp at the tester's metallic part that can be touched.

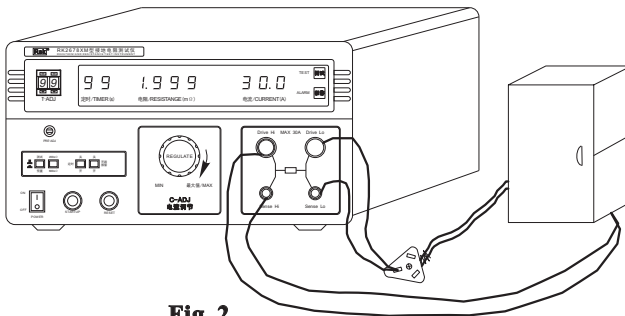


Fig. 2

(1) Accurate test: complete wiring according to Fig. 3, and connect four-end testing line respectively to the tested appliance.

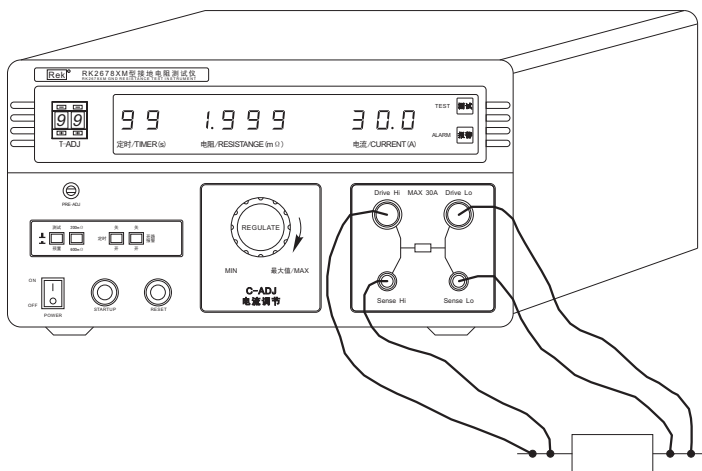


Fig. 3

VII. Accessories and warranty

Accessories:

- | | |
|-------------------------------|--------|
| 1. Earthing test clamp | 1 PC |
| 2. Instructions for operation | 1 copy |
| 3. Certificate of quality | 1 copy |
| 4. Power cable | 1 PC |
| 5. Document bag | 1 PC |

A user shall open the package to check the above content after receiving tester, and contact the marketing department of the company immediately if finding any loss.

Warranty:

1. Warranty term: the warranty term is 12 months, which is calculated from delivery date of the company for a user buying tester from the company from the delivery date of the marketing department for a user buying tester ; from the marketing department.
2. Warranty: the warranty card for the tester shall be produced for warranty. The company provides lifelong repair services for all testers delivered.
3. The user shall bear the repair expenses arising from damage of tester due to improper operation of the user in the warranty term.