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FUZRR GT-FR3010

FUZRR FR3010E Digital Soil Resistivity Meter User Manual

Model: GT-FR3010

1. Introduction

The FUZRR FR3010E is a digital soil resistivity meter and ground resistance tester designed for precise measurement of earth resistance and soil resistivity. This instrument supports two-wire, three-wire, and four-wire test resistance methods, making it suitable for various applications requiring accurate ground system analysis. It features a wide measurement range, high accuracy, and convenient data management functions.



Figure 1: The FR3010E meter, highlighting its versatility for various resistance and resistivity tests.



Figure 2: The FR3010E meter, emphasizing its primary function as a ground resistance and soil resistivity tester with data storage and alarm capabilities.

2. Safety Information

Read all safety warnings and instructions carefully before operating the instrument. Failure to follow these instructions may result in electric shock, fire, or serious injury.

- Always ensure the instrument is in good working condition before use.
- Do not operate the instrument in wet conditions or in the presence of explosive gases or fumes.
- Use only the provided test leads and accessories.
- Ensure proper grounding connections are made before initiating any test.
- Avoid touching exposed wires or terminals during measurements.
- Replace batteries promptly when the low battery indicator appears.
- Do not attempt to repair or modify the instrument. Refer servicing to qualified personnel.

3. Package Contents

Verify that all items listed below are present in your package. If any items are missing or damaged, contact your supplier.

FR3010 datasheet	
Earthing Resistance Range	0.01Ω ~ 3000Ω Accuracy±1.5%rdg±5dgt
Ground resistance resolution	0.01Ω
Grounding voltage range	0.01 ~ 600V AC Accuracy±1.5%rdg±3dgt
Ground voltage resolution	0.01V
Reference conditions	23°C±5°C, 75%rh or less (Auxiliary earth resistance 100Ω±5%, voltage to ground <10V)
Function	Earth ground resistance measurement, voltage to ground measurement, low value resistance measurement
Power Supply	DC 6V 1.5V LR14 battery
Backlight	Controllable gray screen backlight, suitable for use in dim places
Measuring Mode	Precise 3-pole measurement, simple 2-pole measurement
Measuring Method	Earth ground resistance: rated current change-pole method, Test current >20mA (sine wave), 128Hz; Voltage to ground: average value rectification
Wire Resistance Verification	Avoid error caused by testing wire that is failed to be fully inserted into tester interface or by poor contact or by users' replacing or lengthening testing wires, making it more accurate for earth ground resistance measurement.
Display Mode	4-digital super-large LCD display, gray screen backlight
Measuring indicator	During measurement, LED flash indicator, LCD count down display
LCD Dimension	108mm×65mm
Dimension	L×W×H: 240mm×188mm×85mm
Testing Wires	Three wires: each for Red 15m, Yellow 10m, and Green 5m
Simple Testing Wire	2 wires: each for Red 1.5m and Green 1.5m
Auxiliary earthing rod	2 PCS
Measuring Rate	Voltage to ground: about 2 times/second; earth ground resistance: about 5 seconds/time
Measuring Times	Over 5000 times
Circuit Voltage	Measuring voltage to ground: measuring below AC 600V
Data Storage	500 sets, flash display "**FULL**" icon to indicate storage is full
Data Read	Data read function: "**MR**" icon display
Overflow Display	Exceeding measuring range overflow function: "**OL**" icon display
Alarm Function	When measuring value exceeds alarm setting value, there is beeper alarming
Battery Voltage	Battery power indicate in real time, the battery voltage is low and remind to charge in time
Power Consumption	Backlight: 25mA Max Standby: 25mA Max(Backlight shut off) Measurement: 70mA Max(Backlight shut off)
Weight	Tester: 1230g (including battery) Testing Wires: 610g (including simply testing wires) Auxiliary earthing rod: 360g(2 PCS) Meter bag: 1200g
Working Temperature & Humidity	-10℃ ~ 40℃; below 80%rh
Storage temperature & humidity	-20℃ ~ 60℃; below 70%rh
Overload Protection	Measuring earth resistance: between each interfaces of **E-H**、**E-S**, AC 280V/3 seconds
Insulation Resistance	Over 10MΩ(between circuit and enclosure it is 500V)
Withstanding Voltage	AC 3700V/rms (Between circuit and enclosure)
Electromagnetic Features	IEC61010-4-3, radio frequency electromagnetic field ≤ 1V/m
Protection Type	IEC61010-1、IEC1010-2-31、IEC61557-1,5、IEC60529(IP54)、Pollution grade 2、CAT III 300V

Figure 3: All components included in the FR3010E product package.

- FR3010E Earth Tester (Main Unit)
- Auxiliary Ground Rods (4 PCS)
- Instrument Box
- Standard Test Lines (Red 15m, Yellow 10m, Green 5m)
- Simple Test Lines (Red 1.5m, Green 1.5m)
- Instruction Manual
- Certificate of Guarantee
- Batteries (6 PCS, Lithium-ion)

4. Product Overview

The FR3010E features a clear LCD display and intuitive controls for ease of use.



Figure 4: Front Panel Layout of the FR3010E Earth Tester.

1. **LCD Display Screen:** Shows measurement readings, battery status, and other indicators.
2. **MEM (Data Retrieval) Button:** Accesses stored measurement data.
3. **Alarm Function Button:** Activates or deactivates the alarm for exceeding set values.
4. **Backlight Function Button:** Toggles the display backlight for use in dim conditions.
5. **SET (Setting) Button:** Enters the setting menu.
6. **Data Scaling Up Button:** Used for navigating menus or increasing values.
7. **Data Reduction Button:** Used for navigating menus or decreasing values.
8. **Test Key:** Initiates a measurement.
9. **Tap Selection Key:** Selects different measurement modes or functions.
10. **Rotary Switch:** Selects measurement functions (OFF, PE, RE, VE, OFF+).

5. Setup

5.1 Battery Installation

The FR3010E uses 6 Lithium-ion batteries. Open the battery compartment cover on the back of the instrument, insert the batteries according to the polarity indicators, and then close the cover securely.

5.2 Connecting Test Leads and Auxiliary Rods

Depending on the measurement method (2-pole, 3-pole, or 4-pole), connect the appropriate test leads and auxiliary ground rods to the instrument's terminals (C, P, E, H) and into the ground as per the specific test configuration. Refer to the detailed diagrams in the full instruction manual for correct setup for each measurement type.

6. Operating Instructions

6.1 Power On/Off

Turn the rotary switch to any measurement function (PE, RE, VE) to power on the instrument. To power off, turn the rotary switch to the 'OFF' position. The instrument also features an automatic power-off function (APO) to conserve battery life.

6.2 Measurement Modes

The FR3010E supports precise 3-pole measurement and simple 2-pole measurement for earth resistance, and 4-pole measurement for soil resistivity.

- **Earth Resistance (RE):** For measuring the resistance of grounding electrodes.
- **Earth Voltage (VE):** For measuring AC voltage to ground.
- **Soil Resistivity (PE):** For measuring the resistivity of the soil.

6.3 Performing a Measurement

1. Set up the test leads and auxiliary rods according to the desired measurement method.
2. Turn the rotary switch to the appropriate measurement function (e.g., RE for earth resistance).
3. Press the **TEST** key to initiate the measurement.
4. The measurement result will be displayed on the LCD screen.
5. During measurement, the LED flash indicator will be active, and the LCD will count down.

6.4 Data Storage and Retrieval

The instrument can store up to 500 sets of data. After a measurement, press the **MEM** button to save the reading. To retrieve stored data, press the **MEM** button repeatedly or use the data scaling buttons to navigate through the records. The display will show 'FULL' if storage is full.

6.5 Backlight Function

Press the backlight button (indicated by a sun icon) to turn the display backlight on or off, improving visibility in low-light conditions.

6.6 Alarm Function

The alarm function can be set to alert the user when a measured value exceeds a predefined threshold. When activated, the instrument will beep to indicate an over-range condition.

7. Maintenance

- **Cleaning:** Wipe the instrument with a soft, dry cloth. Do not use abrasive cleaners or solvents.

- **Battery Replacement:** When the battery voltage is low, the instrument will display a low battery indicator and remind you to charge or replace the batteries. Ensure to use the correct type of batteries.
- **Storage:** Store the instrument in a cool, dry place, away from direct sunlight and extreme temperatures. If storing for an extended period, remove the batteries to prevent leakage.
- **Calibration:** Regular calibration by qualified personnel is recommended to ensure continued accuracy.

8. Troubleshooting

- **No Display/Instrument Not Turning On:** Check battery installation and charge level. Replace batteries if necessary.
- **"Overflow Display" or "OL" on Screen:** This indicates that the measured value exceeds the instrument's range. Check connections, ensure auxiliary rods are properly inserted, or verify the measurement setup.
- **Inaccurate Readings:** Ensure test leads are securely connected and not damaged. Verify auxiliary rod placement and soil conditions. Calibrate the instrument if readings remain inconsistent.
- **Alarm Beeping:** This indicates that a measured value has exceeded the set alarm threshold. Check the measurement and adjust settings if needed.

9. Specifications

The following table details the technical specifications of the FUZRR FR3010E Digital Soil Resistivity Meter.



Figure 5: FR3010E Detailed Datasheet.

Parameter	Specification
Model	GT-FR3010
Earthing Resistance Range	0.01Ω ~ 3000Ω Accuracy ±1.5%rdg ±5dgt
Ground Resistance Resolution	0.01Ω
Grounding Voltage Range	0.01V ~ 600V AC Accuracy ±1.5%rdg ±3dgt

Parameter	Specification
Grounding Voltage Resolution	0.01V
Reference Conditions	23°C ±5°C, 75%RH or less (Auxiliary earth resistance 100Ω ±5%, voltage to ground <10V)
Function	Earth ground resistance measurement, voltage to ground measurement, low value resistance measurement
Power Supply	DC 6V LR14 battery
Backlight	Controllable gray screen backlight, suitable for use in dim places
Measuring Mode	Precise 3-pole measurement, simple 2-pole measurement
Measuring Method	Earth ground resistance: rated current change-pole method. Test current >20mA (sine wave), 128Hz; Voltage to ground: average value rectification
Wire Resistance Verification	Avoid error caused by testing wire that is failed to be fully inserted into tester interface or by poor contact or by users' replacing or lengthening testing wires, making it more accurate for earth ground resistance measurement.
Display Mode	4-digital super-large LCD display, gray screen backlight
Measuring Indicator	During measurement, LED flash indicator, LCD count down display
LCD Dimension	108mm × 65mm
Dimension	L×W×H: 240mm × 188mm × 85mm
Testing Wires	Three wires: each for Red 15m, Yellow 10m, and Green 5m
Simple Testing Wire	2 wires: each for Red 1.5m and Green 1.5m
Auxiliary Earthing Rod	2 PCS
Measuring Rate	Voltage to ground: about 2 times/second; earth ground resistance: about 5 seconds/time
Measuring Times	Over 5000 times
Circuit Voltage	Measuring voltage to ground: measuring below AC 600V
Data Storage	500 sets, flash display "FULL" icon to indicate storage is full
Data Read	Data read function: "MR" icon display
Overflow Display	Exceeding measuring range overflow function: "OL" icon display

Parameter	Specification
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Battery Voltage	Battery power indicate in real time, the battery voltage is low and remind to charge in time
Power Consumption	Backlight: 25mA Max Standby: 25mA Max (Backlight shut off) Measurement: 70mA Max (Backlight shut off)
Weight	Tester: 1230g (including battery) Testing Wires: 610g (including simply testing wires) Auxiliary earthing rod: 360g (2 PCS) Meter bag: 1200g
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Insulation Resistance	Over 10MΩ (between circuit and enclosure it is 500V)
Withstanding Voltage	AC 3700V/rms (Between circuit and enclosure)
Electromagnetic Features	IEC61010-4-3, radio frequency electromagnetic field ≤ 1V/m
Protection Type	IEC61010-1, IEC61010-2-31, IEC61557-1-5, IEC60529 (IP54), Pollution grade 2, CAT III 300V

10. Warranty and Support

The FUZRR FR3010E Digital Soil Resistivity Meter comes with a standard manufacturer's warranty. Please refer to the included Certificate of Guarantee for specific terms and conditions. For technical support, service, or warranty claims, please contact your authorized FUZRR dealer or customer service representative.
Keep your purchase receipt and the Certificate of Guarantee as proof of purchase for warranty purposes.

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