HIOKI

# CLAMP ON EARTH TESTER FT6380-50

NEW

## Easy pole earth resistance measurement with super slim jaw

For multi grounded systems only

Easy Open Jaw
Light Weight




NEW




**WIRELESS ADAPTER**
**Z3210**
(Option)







**GENNECT Cross is a free app.**

Download on the App Store

GET IT ON Google Play

Measurements can be transferred to a smartphone or tablet and reports can be created with site photos, maps and drawings. Can be transferred to an Excel® file. (It will be supported by the 2021 upgrade.)

Z3210 Website





CE

3 year Warranty

Bluetooth®
When Z3210 is installed

Wireless Adapter Compatible

# Get Things Done with Super Slim Jaws

## Easy clamping!

Open jaws easily with just two fingers.



## Clamp at the narrowest point!

The dramatically slim 0.79 inch (20mm) jaws let you finish your job easily and efficiently.



## Quick Start!

No wait time after powering on.
Start measuring instantly without zerocalibration.

## High Accuracy and Repeatability

Well-designed magnetic shields eliminate the leakage flux between the two cores that often affect measurement accuracy.

## LCD with beautiful back light

With the bright back light, you can easily read the measurement value even in dark locations.



## Alarm Function

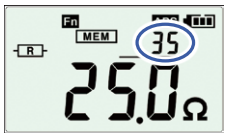
Set the alarm to audibly and visually notify yourself that the resistance or current value exceeds the threshold.




## Large storage capacity (up to 2,000 data)

You can store up to 2,000 measurement values in the field and recall them in your office later.

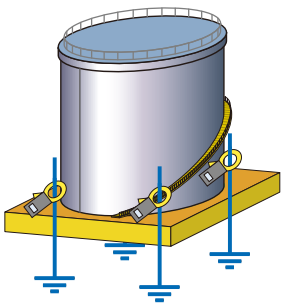
Memory number



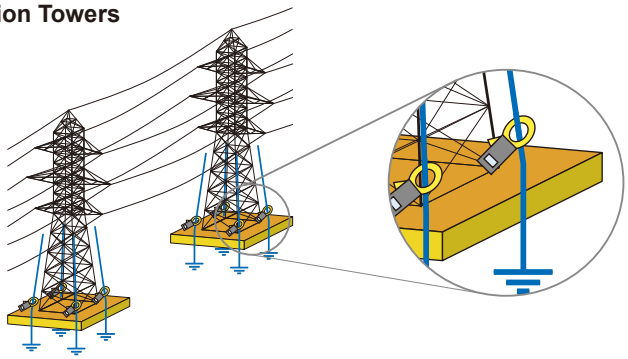

## Applications

Multiple grounding can be easily checked with the clamps.

**Hazardous Storage Tanks**



**Transmission Towers**



# Wireless transmission of measurements to smartphones and tablets

**Attach to enable Bluetooth® wireless technology**



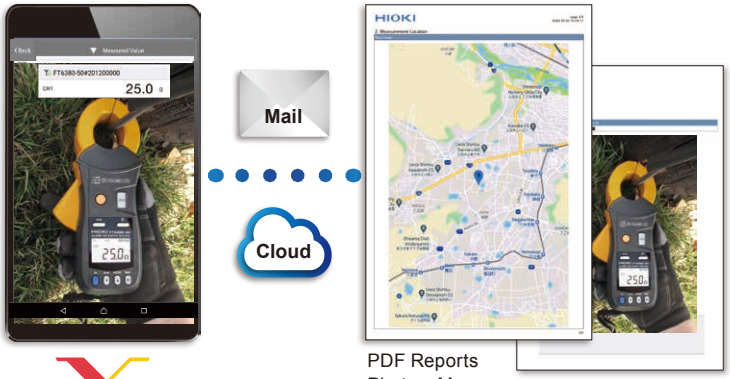
**WIRELESS ADAPTER Z3210** (Option)





## Transport to GENNECT Cross

GENNECT Cross, a free app designed specifically for use with Hioki measuring instruments, lets you check and manage measurement results and create reports. Data can be smoothly managed in the field by linking with photos, maps and drawings taken at the measurement site.




Learn more

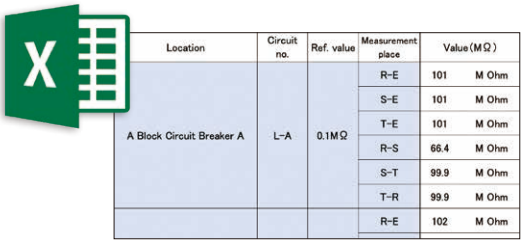
Download on the App Store

GET IT ON Google Play

**GENNECT Cross** is available for Android and IOS.

## Transport to the Excel® file (It will be supported by the 2021 upgrade.)

Open an Excel® file and select a cell. The measured value being held on the instrument's display will be transferred to the computer and entered into the selected cell.



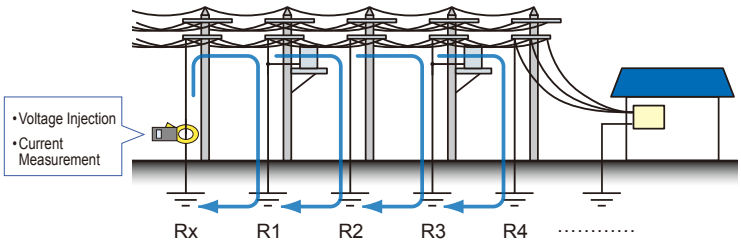
| Location | Circuit no. | Ref. value | Measurement place | Value (MΩ) |
|---|---|---|---|---|
| A Block Circuit Breaker A | L-A | 0.1MΩ | R-E | 101 M Ohm |
| | | | S-E | 101 M Ohm |
| | | | T-E | 101 M Ohm |
| | | | R-S | 66.4 M Ohm |
| | | | S-T | 99.9 M Ohm |
| | | | T-R | 99.9 M Ohm |
| | | | R-E | 102 M Ohm |

Z3210 Website

# Measurement Principle

## Can measure Multi-Grounded systems.

Clamp on the earth cable. The instrument has two cores for voltage injection and current measurement.




1. The voltage transducer injects a defined voltage into the multi-grounded system.
2. From the defined voltage and measured current, the total circuit loop resistance is calculated in the following equation.

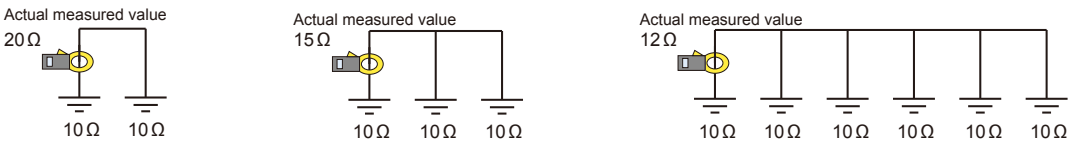
$$Rx + \frac{1}{\frac{1}{R1}+\frac{1}{R2}+\frac{1}{R3}+\frac{1}{R4}} = \frac{V}{I}$$

In a typical multi-grounded system, the parallel resistance value is small enough to be ignored and the equation as referred on the left can be simulated as follows.

$$Rx = \frac{V}{I}$$

# Measurement Examples

In multi-grounded system, the larger the number of grounding poles, the more accurate the measured value. Where the number of grounding poles are few, if just only one carries a very small resistance (e.g., 1 Ω), the measured value will be close to the true value.
On the other hand, poles with large resistances (e.g., 100 Ω) will result in greater measurement uncertainties.



## General specifications

Product warranty period: 3 years, (Accuracy guarantee period 1 year, Accuracy guarantee period after adjustment made by Hioki 1 year)

| | |
|---|---|
| Display | LCD, Max. 2,000 count Display refresh rate: Approx. 2 times/sec. |
| Range switching | Auto-range |
| Maximum measurable conductor diameter | ϕ32 mm |
| Power supply | LR6 alkaline battery × 2 |
| Continuous operating time | Approx. 40 hours (25 Ω measurement, backlight off, without Z3210 installed)<br>Approx. 35 hours (25 Ω measurement, backlight off, with Z3210 installed and using wireless communications) |
| Auto-power-save | Instrument automatically turns off approx. 5 min. after last key operation. |
| Operating temperature and humidity range | -10°C (14°F) to 50°C (122°F), 80% RH or less (non-condensation) |
| Storage temperature and humidity range | -20°C (-4°F) to 60°C (140°F), 80% RH or less (non-condensation, except for the battery) |
| Dust-proof and waterproof | IP40 (EN60529) With Jaws Closed |
| Maximum rated terminal-to-ground voltage | 600 VAC measurement category IV (anticipated transient overvoltage 8000 V) |
| Maximum input current (Current measurement) | 100 A AC continuous, 200 A AC for 2 minutes (50 Hz/60 Hz) |
| Effects of conductor position (Current measurement) | Within ±0.5% rdg (using the center of the sensor as the reference, in all positions) |
| Effect of external magnetic field (Current measurement) | 10 mA or less in an external magnetic field of 400 A/m at 50 Hz/60 Hz AC |
| Standards | Safety: EN61010, EN61557-1/-5/-13<br>EMC: EN61326 |
| Dimensions | Approx. 73W × 218H × 43D mm (2.87″W × 8.58″H× 1.69″D) |
| Mass | Approx. 620 g (except for the battery) |
| Accessories | Carrying case, Resistance check loop (1 Ω±2%, 25Ω±1%), Strap, LR6 alkaline battery × 2, Instruction manual |
| Option | Z3210 WIRELESS ADAPTER |

## Current mode

Accuracy guarantee temperature and humidity range: 23°C±5°C (73°F±9°F), 80% RH or less (no condensation)

| Range | Accuracy Range | Resolution | Accuracy | |
|---|---|---|---|---|
| | | | 45 Hz≤f≤66 Hz<br>Specified by filter ON/OFF. | 30 Hz≤f<45 Hz, 66 Hz<f≤400 Hz<br>Only filter off is specified. |
| 20.00 mA | 1.00 mA to 20.00 mA | 0.01 mA | ±2.0% rdg ±0.05 mA | ±2.5% rdg ±0.05 mA |
| 200.0 mA | 18.0 mA to 200.0 mA | 0.1 mA | ±2.0% rdg ±0.5 mA | ±2.5% rdg ±0.5 mA |
| 2.000 A | 0.180 A to 2.000 A | 0.001 A | ±2.0% rdg ±0.005 A | ±2.5% rdg ±0.005 A |
| 20.00 A | 1.80 A to 20.00 A | 0.01 A | ±2.0% rdg ±0.05 A | ±2.5% rdg ±0.05 A |
| 60.0 A | 18.0 A to 60.0 A | 0.1 A | ±2.0% rdg ±0.5 A | ±2.5% rdg ±0.5 A |

Current measurement filter function Cutoff frequency 180 Hz±30 Hz (-3dB)

Zero suppression 0.05 mA less than

## Resistance mode

Accuracy guarantee temperature and humidity range: 23°C±5°C (73°F±9°F), 80% RH or less (no condensation)

| Range | Accuracy Range | Resolution | Accuracy |
|---|---|---|---|
| 0.20 Ω | 0.02 Ω to 0.20 Ω | 0.01 Ω | ±1.5% rdg ±0.02 Ω |
| 2.00 Ω | 0.18 Ω to 2.00 Ω | 0.01 Ω | ±1.5% rdg ±0.02 Ω |
| 20.00 Ω | 1.80 Ω to 20.00 Ω | 0.01 Ω | ±1.5% rdg ±0.05 Ω |
| 50.0 Ω | 18.0 Ω to 50.0 Ω | 0.1 Ω | ±1.5% rdg ±0.1 Ω |
| 100.0 Ω | 50.0 Ω to 100.0 Ω | 0.1 Ω | ±1.5% rdg ±0.5 Ω |
| 200.0 Ω | 100.0 Ω to 200.0 Ω | 0.2 Ω | ±3.0% rdg ±1.0 Ω |
| 400 Ω | 180 Ω to 400 Ω | 1 Ω | ±5% rdg ±5 Ω |
| 600 Ω | 400 Ω to 600 Ω | 2 Ω | ±10% rdg ±10 Ω |
| 1200 Ω | 600 Ω to 1200 Ω | 10 Ω | ±20% rdg |
| 1600 Ω | 1200 Ω to 1600 Ω | 20 Ω | ±35% rdg |

Measurement frequency Approx. 2,400 Hz

Zero suppression 0.02 Ω less than

## Alarm function

(Beeps when measured value is less than or greater than threshold.)

| | |
|---|---|
| Alarm HI/LO | Separate HI/LO settings for resistance measurement and current measurement |
| | Resistance measurement: HI/LO |
| | Current measurement: HI/LO |
| Alarm threshold setting range | Resistance measurement: 0.02 Ω to 1600 Ω Initial value 25.0 Ω |
| | Current measurement:0.05 mA to 200.0 mA, 0.201 A to 60.0A Initial value: 1.00 mA |

## Model name

| Model name | Model No. (Order Code) |
|---|---|
| CLAMP ON EARTH TESTER | FT6380-50 |
| CLAMP ON EARTH TESTER/ WIRELESS ADAPTER | FT6380-90 |

## Option

| Model name | Model No. (Order Code) |
|---|---|
| WIRELESS ADAPTER | Z3210 |

## Package Contents



Strap



Resistance check loop



CLAMP ON EARTH TESTER FT6380-50



LR6 alkaline battery × 2



Instruction manual



Carrying case
260W × 250.6H × 119.5D mm
(Handle, excluding protruding parts)

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HIOKI

# CLAMP ON EARTH TESTER
# FT6380, FT6381

## Easy pole earth resistance measurement with super slim jaw







**High Accuracy**

**Easy Open Jaw**
**Light Weight**

True RMS

For multi grounded systems only

**0.02 Ω to 1600 Ω wide measurement range for earth resistance measurement 1.00 mA to 60.0 A covering small leakage current to load current**

**CAT IV 600 V**

**FT6381** Data transfer to Android™ phones using *Bluetooth*® wireless technology.*

Real time data transfer, automatic report generation on Android™ phone.

CE

3 year Warranty

Bluetooth®

Please see www.hioki.com for list of supported regions.

* Please download and install the "FT6381 Communication Software" from the Google Play™ store in order to use the wireless connection function with an Android™ phone. The software is free, but the user is responsible for any Internet connection costs incurred in the course of downloading or using the application.

# Get Things Done with Super Slim Jaws

## Easy clamping!

Open jaws easily with just two fingers.
Only half the grip power is needed compared to typical clamp earth testers.





## Clamp at the narrowest point!

Now you can easily clamp the earth cable on the pole without digging. The dramatically slim 0.79 inch (20mm) jaws let you finish your job easily and efficiently.



0.87 inch
(22 mm)




0.79 inch (20 mm)

### High Accuracy and Repeatability

Well-designed magnetic shields eliminate the leakage flux between the two cores that often affect measurement accuracy.

### LCD with beautiful back light

With the bright back light, you can easily read the measurement value even in dark locations.



### Quick Start!

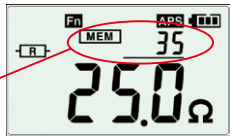
No wait time after powering on.
Start measuring instantly without zero-calibration.

### Alarm Function

Set the alarm to audibly and visually notify yourself that the resistance or current value exceeds the threshold.

### Large storage capacity (up to 2,000 data)

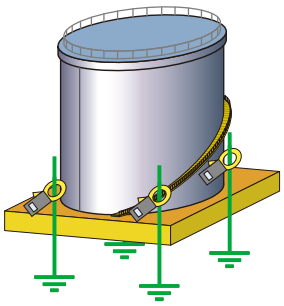
You can store up to 2,000 measurement values in the field and recall them in your office later.




Memory number

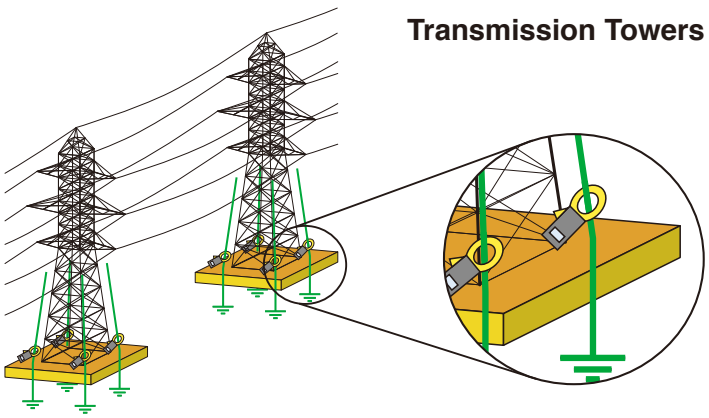
## Applications

### Hazardous Storage Tanks



* The illustration may differ slightly from the field application.

### Transmission Towers



# Automatic Report Generation

Bluetooth®
Please see www.hioki.com for list of supported regions.

**Model FT6381** can create reports instantly in the field using an Android™ phone via a Bluetooth® wireless technology.

## Single Point Report

**1** Real time data transfer

**2** Automatic Report Generation on your Android™ phone




Report includes the Measurement Value, Date and Time, Map with GPS information and Pass/Fail information

**3** Download data

Via e-mail




After making a report, you can see it on the Android™ phone or send the data to your PC at the office via e-mail.

## Summary Report

**1** Store multiple measurement values

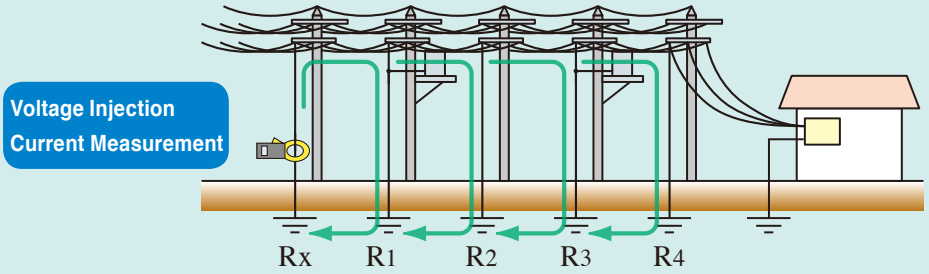
**2** Select all the data for the report

**3** Instant summary report generation from multiple data




## Measurement Principle

FT6380/6381 can measure Multi-Grounded systems.




**Clamp on the earth cable. The instrument has two cores for voltage injection and current measurement.**

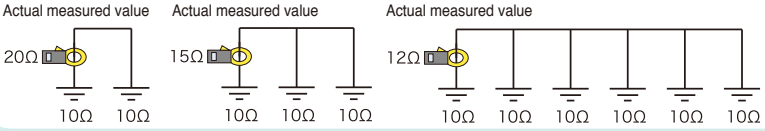
1. The voltage transducer injects a defined voltage into the multi-grounded system.
2. From the defined voltage and measured current, the total circuit loop resistance is calculated in the following equation.

$$Rx + \frac{1}{\frac{1}{R1}+\frac{1}{R2}+\frac{1}{R3}+\frac{1}{R4}\cdots} = \frac{V}{I}$$

In a typical multi-grounded system, the parallel resistance value is small enough to be ignored and the equation as referred on the left can be simulated as follows.

$$Rx = \frac{V}{I}$$

### Measurement Examples




In multi-grounded system, the larger the number of grounding poles, the more accurate the measured value. Where the number of grounding poles are few, if just only one carries a very small resistance (e.g., 1Ω), the measured value will be close to the true value. On the other hand, poles with large resistances (e.g., 100Ω) will result in greater measurement uncertainties.

## Specifications (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Current measurement specifications

| | |
|---|---|
| Display | Digital/ LCD, max. 2000 digits Display update rate: 2 times / s |
| Range switching | Auto-range |
| Maximum conductor diameter for measurement | ø 32 mm (1.26 in) |
| Power supply | LR6 alkaline battery ×2, Continuous operating time: Approx. 35 hours With display backlight off, Bluetooth OFF (FT6381) |
| Auto power save | Power save state when 5 minutes have elapsed since the last operation |
| Operating temperature and humidity | -10°C (14°F) to 50°C (122°F), 80 % RH or less (non-condensation) |
| Storage temperature and humidity | -20°C (-4°F) to 60°C (140°F), 80 % RH or less (non-condensation, except for the battery) |
| Dust-proof and waterproof | IP40 (EN60529) With Jaws Closed |
| Maximum rated voltage to earth | 600 VAC measurement category IV (anticipated transient overvoltage 8000 V) |
| Dielectric strength | Between the Case and the Clamp core 7400 Vrms 1 minute |
| Maximum input current | 100 A AC continuous, 200 A AC for 2 minutes (50/60 Hz) |
| Conductor position effects | Within ±0.5% rdg. (using the center of the sensor as the reference, in all positions) |
| Magnetic field interference | 10 mA or less in an external magnetic field of 400 A/m at 50/60 Hz AC |
| Applicable standards | Safety: EN61010, EMC: EN61326, Wireless (For FT6381 only): FCC Part 15.247/ IC RSS-210/ EN 300 328, 301 489-1, 301-489-17/ Singapore DA106438/ Mexico (COFETEL) RCPHIWT13-0616/ Vietnam wireless standards not covered(60mWeirp or less)/ thailand (SDoC) module recognize/ Indonesia (SDPPI) 33081/ SDPPI/ 2014 |
| Dimensions, Mass | Approx. 73 mm (2.87 in) W × 218 mm (8.58 in) H × 43 mm (1.69) D , Approx 620 g (21.9 oz) |

## FT6381 Interface

| | |
|---|---|
| Interface | *Bluetooth*® v2.1+EDR |
| Communication Distance | 10 m (Class 2.1) |
| Communication Protocol | SPP (Serial Port Profile) |
| Compatibility | Smartphone/ Tablet (Android™) |
| Applicable OS | Android™ 2.1 or later |

The application supports Android OS 2.1 or later, but proper operation is not guaranteed on all Android. handsets. For more information about the devices on which proper operation has been confirmed, see Hioki's website.

## Alarm function

| | |
|---|---|
| Alarm Hi/Lo | Separate Hi/Lo settings for resistance measurement and current measurement |
| | Resistance measurement: Hi.AL/Lo.AL |
| | Current measurement: Hi.AL/Lo.AL |
| Alarm threshold setting range | Resistance measurement: 0.02 Ω to 1,600 Ω<br>Resistance measurement initial value: 25.0 Ω |
| | Current measurement: 0.05 mA to 200.0 mA, 0.201 A to 60.0 A<br>Current measurement initial value: 1.00 mA |

## Current Mode

Accuracy guaranteed for 1 year, Temperature and humidity for guaranteed accuracy:23±5°C 80%rh or less (no condensation)

| Range | Measurement Range | | Resolution | Frequency Range | Accuracy | |
|---|---|---|---|---|---|---|
| | | | | | Filter off | Filter on |
| 20.00 mA | 1.00 mA to | 20.00 mA | 0.01 mA | 45 ≤ f ≤ 66Hz | ±2.0 % rdg. ±0.05 mA | ±2.0 % rdg. ±0.05 mA |
| | | | | 30 ≤ f < 45Hz, 66 < f ≤ 400Hz | ±2.5 % rdg. ±0.05m A | — |
| 200.0 mA | 18.0 mA to | 200.0 mA | 0.1 mA | 45 ≤ f ≤ 66Hz | ±2.0 % rdg. ±0.5 mA | ±2.0 % rdg. ±0.5 mA |
| | | | | 30 ≤ f < 45Hz, 66 < f ≤ 400Hz | ±2.5 % rdg. ±0.5m A | — |
| 2.000 A | 0.180 A to | 2.000 A | 0.001 A | 45 ≤ f ≤ 66Hz | ±2.0 % rdg. ±0.005 A | ±2.0 % rdg. ±0.005 A |
| | | | | 30 ≤ f < 45Hz, 66 < f ≤ 400Hz | ±2.5 % rdg. ±0.005 A | — |
| 20.00 A | 1.80 A to | 20.00 A | 0.01 A | 45 ≤ f ≤ 66Hz | ±2.0 % rdg. ±0.05 A | ±2.0 % rdg. ±0.05 A |
| | | | | 30 ≤ f < 45Hz, 66 < f ≤ 400Hz | ±2.5 % rdg. ±0.05 A | — |
| 60.0 A | 18.0 A to | 60.0 A | 0.1 A | 45 ≤ f ≤ 66Hz | ±2.0 % rdg. ±0.5 A | ±2.0 % rdg. ±0.5 A |
| | | | | 30 ≤ f < 45Hz, 66 < f ≤ 400Hz | ±2.5 % rdg. ±0.5 A | — |

## Resistance mode

Accuracy guaranteed for 1 year, Temperature and humidity for guaranteed accuracy:23±5°C 80% RH or less (no condensation)

| Range | Measurement Range | | Resolution | Accuracy | |
|---|---|---|---|---|---|
| 0.20 Ω | 0.02 Ω | to 0.20 Ω | 0.01 Ω | ±1.5 % rdg. | ±0.02 Ω |
| 2.00 Ω | 0.18 Ω | to 2.00 Ω | 0.01 Ω | ±1.5 % rdg. | ±0.02 Ω |
| 20.00 Ω | 1.80 Ω | to 20.00 Ω | 0.01 Ω | ±1.5 % rdg. | ±0.05 Ω |
| 50.0 Ω | 18.0 Ω | to 50.0 Ω | 0.1 Ω | ±1.5 % rdg. | ±0.1 Ω |
| 100.0 Ω | 50.0 Ω | to 100.0 Ω | 0.1 Ω | ±1.5 % rdg. | ±0.5 Ω |
| 200.0 Ω | 100.0 Ω | to 200.0 Ω | 0.2 Ω | ±3.0 % rdg. | ±1.0 Ω |
| 400 Ω | 180 Ω | to 400 Ω | 1 Ω | ±5 % rdg. | ±5 Ω |
| 600 Ω | 400 Ω | to 600 Ω | 2 Ω | ±10 % rdg. | ±10 Ω |
| 1200 Ω | 600 Ω | to 1200 Ω | 10 Ω | ±20 % rdg. | |
| 1600 Ω | 1200 Ω | to 1600 Ω | 20 Ω | ±35 % rdg. | |

Frequency of measurement Approx. 2,400Hz.




## Model : CLAMP ON EARTH TESTER FT638x

| Model No. (Order Code) | (Note) |
|---|---|
| FT6380 | |
| FT6381 | Built in Bluetooth® wireless technology |

Accessories: Carrying case ×1, Resistance check loop (1 Ω, 25 Ω) ×1, Strap ×1, LR06 (AA) alkaline battery ×2, Instruction manual ×1

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