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DUOYI®

DY4300

2/ 3/ 4-Wire Digital Earth Resistance Tester

CONTENTS

1. SAFETY WARNINGS

This instrument has been designed, manufactured and tested according to IEC61010: Safety requirments for Electronic Measuring apparatus, and delivered in the best condition after passing quality control tests.

This instrument manual contrains warnings and safety rules which have to be observed by the user to ensure safe operation of the instrument and to maintain it in safe condition. Therefire, read throught these operating instructions before using the instrument.

> ⚠WARNING
> Please carefully read this manual before use.
> Keep custody in order to access when needed.
> Please observe the instrument to use is specified in the manual.
> Understand and follow the safety instructions in the book. Must strictly comply with the above instructions. Failure to comply with instructions may result in injuries and accidents.

Instrument of ⚠ signs in order to use security, you must read the instruction manual.

> ⚠ DANGER: Indicates to ignore this flag to the operation of error, resulting in a high risk of death or serious injury.
> ⚠WARNING: Indicates to ignore this flag is wrong operation may cause death or serious injury.
> ⚠Note: to ignore this flag is wrong operation may cause death or serious injury and equipment and other items of damage.

⚠The flag is divided into the following three kinds of attention to its content.

⚠Danger
Do not use loop-to-ground voltage AC/DC300V above.
Do not measured in inflammable places, may spark and cause an explosion.
Do not use instruments or with wet hands.
Please note that the simple measurement not to cause the metal head of the test line and short-circuit of the power cord. Doing so may cause personal injury.
Do not exceed the test range test input.
When the test lines are connected, do not press the test button
Do not open the battery cover in the the testing process.

⚠Warning
Use, if the instrument or the test line cracking or metal parts exposed to immediately stop the test
The analyte connection with the test line, do not switch range.
Do not remove the instrument to carry out the decomposition, alteration, replacement alternative parts.
Repair or adjustment is required, please contact the us.
When the instrument is wet, do not replace the battery.
When using the test line, the plug is fully inserted.
When open the battery cover and replace the batteries, please set the range switch to OFF.

Note
Before the test, make sure that the range switch is set in the appropriate range. 。
After use, set the range switch to OFF, and remove the testing line. Remove the battery, if long time not in use.
Do not place the instrument in high temperature, humidity, dew and direct sunlight place.
Do not use abrasives or solvents to clean instrument. Please use the cloth to clean with neutral detergent or water.
Keep dry storage.
To ensure safety, please ues in the temperature range-10 ℃ ~ 50 ℃, height of 2000m or less.

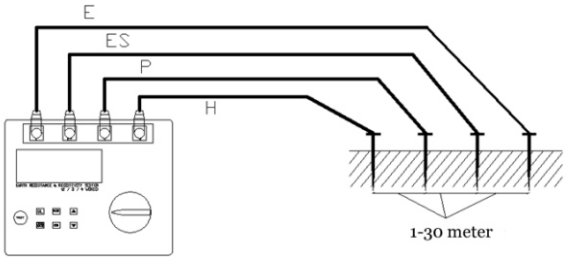
SYMBOLE

CAT.IV	The circuit from the service drop the service entrance, and to the power meter and primary overcurrent protection device(distribution panel)
CAT.III	Primary electrical circuits of the equipment connected directly to the distribution panel, and feeders from the distribution panel to outlets.
⧈	Instrument with double or reinforced insulation.
⚠	User must refer to the explanstions in the instruction manual.

This instrument meets CAT.III 300V/CAT.IV 150V. To ensure safe operation of measuring instrumens, IEC 61010 established safety standards for varous electrical enviinments, categorized as CAT.I to CAT.IV, and called measurement categories. Highrt-numbered categories correspond to electrical envirinments with greater momentary energy, so a measuring instrument designed for CAT.III environments can endure greater momentary energy than one designed for CAT.II.

10. Accessories
1 x Auxiliary Earth Spikes
4 x Earth Test Leads(one Red Earth Test Leads 15 meters, one Yellow Earth Test Leads 10 meters, one Green Earth Test Leads 5 meters, one Black Earth Test Leads 15 meters)
8 x 1.5V(AA) Batteries
1 x manual
1 x Certificate
1 x Toolbox
1 x Bags

Terminals to be used : E, ES, S(P), H(C) Terminals
Test Leads : connect to the E, ES, S(P) and H(C) Terminals
Auxiliary Earth Spike: 4 pcs
(1) Setting of Wiring System
Select wire (r) with reference to 8-2-2 Setting for measurement in this manual.
Note) The instrument doesn't accept any setting change on Rk while measuring earth resistivity( ).
(2) Connection of Auxiliary Earth Spikes and Test Leads
Stick the four Auxiliary Earth Spikes into the ground deeply. They should be aligned at an interval of 1-30m. The depth should be 5% or less of the interval between the spikes.



(e.g. The spike should be stuck in the depth of 25cm or less when the interval of the Auxiliary Earth Spikes is 5m.)
If the Spikes stuck too deep, it may result in inaccurate earth resistivity measurement.
Note) The supplied Test Leads can be used for the Spikes stuck at the interval of max 20m.
Connect the green, black, yellow Test Leads connected to the E , ES ,
S(P) and H(C) Terminals on the instrument to the Auxiliary Earth Spikes from the closest to the farthest in this order.
(3) Setting of the Interval between Auxiliary Earth Spikes
The interval of the Spikes should be entered according to the setting made at the step of 8-2-5 Setting for the interval between Auxiliary Earth Spikes at Earth Resistivity ( )
(4) Earth Resistivity( ) Measurement
Select a Range (any Range is ok) when the connection is done, and press the TEST Button.
Then the measured earth resistivity ( ) and the earth resistance Rg between the ES-S Terminals are displayed.
Press the Key to return to the Main Screen.
If the Rg value is too large, the display reads as shown.. In this case, rotate the Range Switch and select an upper Range.
Pressing the Key while the measured result of 8-2-5 describes the detailed setting procedure.
Note) The depth should be 5% or less of the interval between the spikes.
If the Spikes stuck too deep, it may result in inaccurate earth resistivity measurement.
Note) Accurate earth resistivity measurement will be affected and errors in measured result becomes large if the Rg value is smaller than the full-scale value at the selected Range. When the Rg an values vary widely at each Range, measurements should be made again at proper Rg Range.
Note) If a message Rh>limit or Rs>limit appear on the LCD, auxiliary earth resistance is too high to make measurements. Recheck the connection of Test Leads.

9、BATTERIES REPLACEMENT

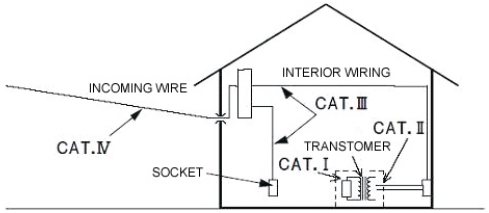
When the cover is wet, do not open the battery cover.

Please do not replace the batteries when the instrument testing ; Avoid electrical shock, Turn the range switch to OFF before replace the batteries, and remove the test leads and auxiliary grounding rods.

Unscrew the battery cover screw and open the battery cover; Replace the new batteries, put the battery cover and tighten the screws.

CAT.I: Secondary electrical circuits connected to an AC electrical outlet throught a transformer or similar device.

CAT.II: Primary electrical circuits of equipment connected to an AC electrical outlet by a power cord.



CAT.III: See above table
CAT.IV: See above table

2. FEATURES

DY4300 is a 2/ 3/ 4-Wire Digital Earth Resistance/ Earth Resistivity Tester equipped with a microcomputer and can measure earth resistances and calculate earth resistivities ( ) instrument can measure earth resistances on power distribution lines, in-house wiring system and electrical appliances etc. due to the low output voltage: approx 10Vrms or less.

Designed to meet following safety standards.
IEC 61010-1 (CAT.III 300V, CAT.IV 150V, Pollution degree 2)
IEC 61010-031(Requirements for hand-held Probes)
IEC 61557-1, 5 (Earth Resistance Tester)
Stable measurement results can be obtained under a noisy environment by introducing the FFT (Fast Fourier Transform) technology.
Dot-matrix 192x64, Monochrome LCD
Backlight function to view the test results in dimly areas
Rk Function is available to cancel the residual resistance on the Test Leads.
Battery Check Function
Auxiliary Earth Resistance Measurement Function
Auxiliary earth resistances are measured and displayed.
Warning for Auxiliary Earth Resistance Measurements
Warnings are displayed on the LCD when auxiliary earth resistances are too high and may result in inaccurate measurements.
Auto-Power-Off Function
The instrument is automatically powered off when 5min passes without any Key operation.
Data storage
Save 1000 test data

3. SPECIFICATIONS

IEC 61010-1 (CAT.III 300V, CAT.IV 150V, Pollution degree 2)
IEC 61010-031（Requirements for hand-held Probes）
IEC 61557-1, 5 (Earth Resistance Tester)
Test range (temperature and humidity 23 5℃ 45～75%RH)

Function	Range	Resolution	Testing range	Accuracy
Earth resistance Re (Earth resistance =Rg)	2	0.01	0.05 2.09	3%rdg 0.05
	2	0.1	0.5 20.9	3%rdg. 5dgt (Remaks 1)
	2	1	5 209	

Function	Range	Resolution	Testing range	Accuracy
Earth resistance Re (Earth resistance =Rg)	2000	10	0.05~2.09 K	3%rdg. 5dgt (Remaks 1)
	20	100	0.5~20.9 K	
Auxiliary earth resistanceRh , Rs				Re+Rh+Rs 8%
Soil resistance	2	0.3~393.7 .m		
	2	3~3937 .m		= 2 x II x a x Rg (Remaks 2)
	2	0.03~39.37 .m		
	2	0.3~393.7 .m		
	2	3~1999 .m		

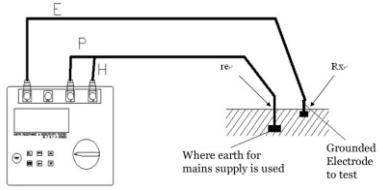
(remarks 1) revised Auxiliary Earth Resistance 100 Rk.
(remarks 2) Depending on the test value of Rg. Between the auxiliary ground rods[a]1.0~30.0m
Ground resistance test methods
Voltage drop method (Probe current and voltage testing)
Test method of soil resistivity ( ): 4-pole
Output: Test voltage Um Max: 10Vrms 125Hz
Test current Im Max: 80mA/ Im x (Re+Rh) < Um
Data save: 1000
LCD Dot-matrix 192 x 64, monochrome Backlight
Earth resistance: max 209.9k
Earth resistivity : 1 m Series Interference Voltage : max 50.9V
Low Battery Warning: Battery mark appears.
Continuous Measurement: 400 times or more with manganese batteries; repeating measurements at every 30 sec with a load of 1
Over-range Indication :OL
Auto-Power-Off Function
The instrument is automatically powered off when 5 min passes without any Key operation.
Location for use: Indoor/ Outdoor use (Not completely waterproof), altitude 2000m or less
Applicable range: Testing earth resistance on power distribution lines, in-house wiring system and electrical appliances
Temperature & Humidity range (guaranteed accuracy) :
23℃ 5℃ , relative humidity 85% or less (no condensation)
Temperature and humidity range: 0℃ ~40℃, relative humidity 85% or less (no condensation)
Operating Temperature & Humidity range :-10? ~ 50? , relative humidity 75% or less (no condensation)
* Supplied Test leads cannot be used at 0℃ or less.
Storage Temperature & Humidity range :-20℃ ~ ~60℃ , relative humidity 75% or less (no condensation)
Overload Protection : between E-S(P) and between E-H(C) terminals AC280V / 10 secetary
Withstand Voltage : between the electrical circuit and enclosure
AC3540V(50/60Hz) / 5 secetary
Insulation Resistance : between the electrical circuit and enclosure 50M or more / DC1000 V
Dimension: 167 (L) x 185 (W) x 89 (D) mm
Weight: 900g (including batteries)
Power source: DC12v: size AA manganese dry battery((R6P)*8
**In a use of this instrument under low temperature below 0℃, a use of alkaline batteries with low temperature spec is recommended.

(4) Earth Resistance Measurement
Select a Range (any Range is ok) when the connection is done, and press the TEST Button. The measured earth resistances Re are displayed on the LCD.
The operation procedure is same to that for 3-Wire measurements.
Note) If a message Rh>limit or Rs>limit appear on the LCD, auxiliary earth resistance is too high to make measurements. Recheck the connection of Test Leads.

8-1-3 Simplified Measurement (2-Wire) *with Simplified Test Probes

Use this method when the Auxiliary Earth Spike cannot be stuck. In this method, an existing Earth Electrode with a low earth resistance, such as a metal water pipe, a common earth of a commercial power supply and an earth terminal of a building, can be used with the 2-Wire method. However, the measured earth resistances contain the auxiliary earth resistance and the resistance of the E Test Lead.

This instrument is supplied with a set of Simplified Measurement Test Leads for which both of Alligator Clips and Flat Test Bar can be replaced and used if necessary.
Terminals to be used : E, S(P), H(C) Terminals
Test Leads: one to the E Terminal, Simplified Measurement Probes to the S and H Terminals and short- circuit these Terminals.
Auxiliary Earth Spike: None is used
(1) Setting of Wiring System
Select Wire(2) with reference to 7-2-2 Setting for Measurement Method in this manual.
(2) Setting of Rk
1. Put the Alligator Clips to the 2 Test Leads (green, red), and connect the green Plug to the E Terminal and the two red Plugs to the S(P) and H(C) Terminals respectively.
2. Select the 2W or 20W Range.
3. Engage 2 Alligator clips to short-circuit both of them.
4. Save the Rk values with reference to 7-2-6 Setting for the residual resistance (Rk) on the Test Leads.
Note) A break in Test Leads or burnout of Fuse is suspected when the LCD show Rk=OL while 4 Test Leads are being shorted.
(3) Connection
Connect the Test Leads as shown in Fig.16



Note) When the supplied Simplified Measurement Probes are not used, the S(P) and H(C) Terminals should be shorted.
(4) Earth Resistance Measurement
Select a high resistance Range when the connection is done, and press the TEST Button. Then the earth resistance values Re are displayed on the LCD. Select a lower Range for the low earth resistances.
(5) Measured resistances at simplified measurements
Two-Wire method is used for the simplified measurements. In this method, earth resistance of the earthed electrode (re) connected to the
S(P) Terminal is added to the true earth resistance Rx and shown as an indicated value Re.

Re (indicated value) = Rx + re

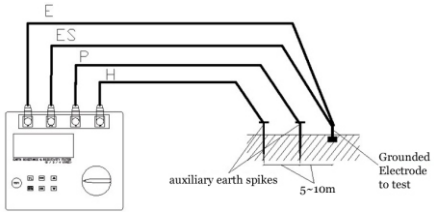
If the Re is known beforehand, true earth resistance value Rx is calculated as follows.

Rx = Re - re

Note) The Re cannot be canceled by the setting of Rk.

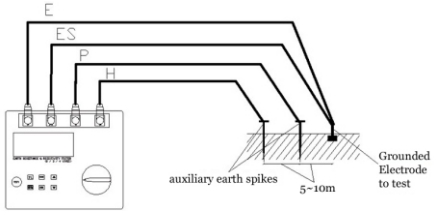
8-2 Earth Resistivity ( ) Measurement

Making a setting of the interval between Auxiliary Earth Spikes first and measuring the earth resistances with the 4 Auxiliary Earth Spikes stuck into the ground at even intervals. Then the instrument can calculate and display earth resistivity on the LCD automatically.



(4) Earth Resistance Measurement
Select a Range (any Range is ok) when the connection is done, and press the TEST Button. The measured erath resistance Re are displayed on the LCD. The operation procedure is same to that for 3-wire measurements.
Note) The readings may not correct when the auxiliary earth resistance is too high. Stick the Auxiliary Earth Spikes S(P) and H(C) in the moist part of the soil.
Note) If a message Rh>limit or Rs>limit appear on the LCD, auxiliary earth resistance is too high to make measure-ments. Recheck the connection of Test Leads.

8-1-2 Precise Measurement (4-wire)* with earth Test Leads
The ES terminal is also used with the other terminals used at the 3-wire Precise measurements. In this case, more precise results can be obtained because auxiliary earth resistances of the measured earth resistances are excluded, moreover, resistance of the Test Leads connected to the E Terminal can be canceled.
Terminals to be used: E, ES, S(P), H(C) Terminals Test Leads: Connect to the E, ES, S(P), H(C) Terminals (the ES Test Lead should be connected to the earthed equipment under test where the E Test Lead is connected)
Auxiliary Earth Spike: 2 pcs
(1) Setting of wiring System
Select Wire(4) with reference to 6-2-2 Setting for Measurement Method in the manul.
(2) Setting of Rk
The measured results obtained at 4-Wire system are not be influenced by the Test Leads Connected to the E Terminal, but setting of Rk can be made on this instrument.
1. Firmly insert each plug of 4 Test Leads (green, black, yellow, red), to the corresponding connectors on the instrument.
2. Select the 2W or 20W Range.
3. Engage 4 Alligator clips to short-circuit all of them.
4. Save the Rk values with reference to 6-2-7 Setting for the residual resistance (Rk) on the Test Leads.
Note) A break in Test Leads or burnout of Fuse is suspected when the
LCD shows Rk=OLW while 4 Test Leads are being shorted.
(3) Connection of Auxiliary Earth Spikes and Test Leads
Stick the Auxiliary Earth Spikes S(P) and H(C) into the ground deeply. They should be aligned at an interval of 5-10m from the earthed equipment under test. Connect the green Test Lead to the earthed equipment under test, the yellow Test Lead to the Auxiliary Earth Spike S(P) and the red Test Lead to the Auxiliary Earth Spike H(C).
The black Test Lead connected to the ES Terminal should be connected to the earthed equipment under test.



Operating error Operating error (B) from the error within the rated operating conditions, the use of machinery inherent errors (A and variable error (En) is calculated.

$$B = \pm\left(|A| + 1.15\sqrt{E_2^{\,2} + E_3^{\,2} + E_4^{\,2} + E_5^{\,2}}\right)$$

A : Inherent error
E2 : Changes by changes in supply voltage
E3 : Changes by temperature changes
E4 : Series interference voltage changes
E5 : change by the resistance of auxiliary earth electrode

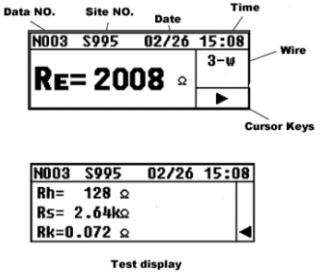
Range to keep the maximum operating error
Measurement range within which the maximum operating error (30%) applies.
2 Range:0.5 ~ 2.099
20 Range:2 ~ 20.99
200 Range:20 ~ 209.9
2000 Range:200 2099
20k Range: 20k 20.99k
200k Range:20k 209.9k

Variation of Supply Voltage : until the Battery Warning mark appears
Temperature Variation : -10℃ ~ 50℃
Series Interference Voltage : 16, 2/3Hz, 50Hz, 60Hz, 400Hz and DC3V
No need to consider DC Series interference voltages at 2
Auxiliary earth electrode resistance : within following range or 50k

Rh,Rs limit		Accuracy
Re<0.40	1k	5%rdg 1%fs
0.4 Re 1.00	2k	
Re 2.00	3.5k	
2.00 Re	Rex100+5k (Rh,Rs	

4.NAMES OF PARTS

1 LCD
2 TEST
3 Background light
4 ENTER/SAVE
5 MENU
6 ESC
7 Cursor Key
8 Range power
9 E port
10 ES port
11 S port
12 H port



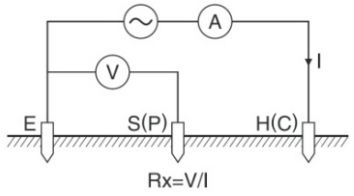
5. MARKS AND MESSAGE DISPLAYED ON THE LCD

Marks and Message	Details
BATT Batt Error	Battery voltage is low. Replace the batteries.
Measuring...	This mark is being displayed during a measurment.
OL	Measuring range for the selected Range is exceeded. In case of Ust measurments, 50V or more is detedted.
--	Failed to make successful mesurements
Rh>limit	Rk is exceeded the limit value;exceeding 2 at 2 or lower.
Range<=20	Setting for Rk can be made at 20
Only 2 /3 /4	Setting for Rk can be madeonly at 2w,3w,4w measurements.
Voltage Hight!	Ust is Regulated value or more.
Rs>limit Rh>limit	Rh and rs values exceed the allowable range. Correct results might not be obtained.
No Saved data	No saved data exists.
Memory Full	Memory is full. No more data can saved.
Delete This Item?	A confirmation message before deleting the selected.
Delete All Item?	A confirmation message before deleting all selected.
Data Succedd Delete	All items have been deleted.
NO03/095	Nxxx is a memory no.,and the left message saying 95 data have been stored. (Displayed at the Data Review Screen.)
No03	Indicating the measured result is saved with Memory NO. 003.
S005	The character S stands for Site. Selectable from 000 to 999.
Saved	Data is successfully saved.

6. MEASUREMENT PRINCIPLE

6-1 Principle of Earth Resistance Measurements

This instrument makes erath resistance measurment with fall-of-potential method, which is a method to obtain earth resistance value Rx by applying AC constant current I between the measurment object E (earth electrode) and H(C) (current electrode), and finding out the potential difference V between E(earth electrode) and S(P)(potential electrode) See Fig.1.



Note) The message shown in Fig.13 is also displayed when a fuse blows.
Following message appears and shows that the data cannot be saved when the ENTER/SAVE Key is pressed with above display.
Note) Following message appears and shows that the 200k or upper Ranges. The Rk values saved at 2 and 20 Ranges are kept effective at 200k .
Note) Following message appears and shows that the data cannot be saved when trying to save Rk at Wire ( ).

7-3 Backlight

To facilitate working in dimly lit situations or in night time, a backlight function is provided which illuminates the LCD.
Press the * Key to operate this function. The backlight will light up for about 30 sec and turned off automatically.
Pressing the * Key while the backlight is on can turn it off.

7-4 Auto-Power-Off

This instrument is automatically powered off about in 5 min after the last switch operation. To exit from the auto-power-off mode, set the Range Switch to OFF position once, and re-set it to the Range at which a measurement to be conducted.

7-5 Auxiliary Earth Resistance Measurement

This instrument can measure and display the auxiliary earth resistances
(Rh, Rs). When the Rh or Rs value is more than Regulated value or 50 , a warning message Rh>limit or Rs>limit appear. The LCD shows Rh=OLW or Rs=OL when the Rh or Rs values exceed 50k .
These parameters are measured automatically at auxiliary earth resistance measurements, and can be checked on the Result Display Screen.
Note) Rh and Rs stand for Auxiliary Earth Pole H(C) and the Auxiliary Earth Resistance of S(P) respectively.

7-6 Connection of Earth Test Leads and Simplified Measurement Probes

Connect the Earth Test Leads and Simplified Measurement Probes to the connectors on the instrument firmly. Otherwise, a contact failure occurs and wrong results may be read out on the LCD.
Note) Some numbers other than OL may be displayed on the LCD when making measurement without connecting any cord or probe at 200 or upper Ranges. This is not a malfunction.

8 . MEASUREMENT METHOD

8-1 Earth Resistance Measurement

8-1-1 Precise Measurement (3-Wire) *with Earth Test Leads
This is a standard method to measure earth resistances. The measured earth resistances are free of auxiliary earth resistances but the resistances on the E terminal are contained.
Terminals to be used: E, S(P), H(C) Terminals
Test Leads: connect to the E, S(P), H(C) Terminals
Auxiliary Earth Spike: 2 pcs, connect to the S(P) and H(C) terminal
(1) Setting of Wiring System
Select Wire (4) with reference to 8-2-2 Setting for Measurement Method in this manual.
(2) Setting of Rk
1. Firmly insert each plug of 3 test leads (green, yellow, red) to the corresponding connectors on the instrument.
2. Select the 2 or 20 Range.
3. Engage 3 Alligator clips to short-circuit all of them.
4. Save the Rk values with reference to 8-2-7 Setting for the residual resistance (Rk) on the Test Leads.
Note) A break in Test Leads or burnout off fuse is suspected when the LCD shows Rk=OL while 3 Test Leads are being shorted.
(3) Connection of Auxiliary Earth Spikes and Test Leads
Stick the Auxiliary Earth Spikes S(P) and H(C) into the ground deeply. They should be aligned at an interval of 5-10m from the earthed equipment under test. Connect the green Test Lead to the earthed equipment under test, the yellow Test Lead to the Auxiliary Earth Spike
S(P) and the red Test Lead to the Auxiliary Earth Spike H(C).
The black Test Lead connected to the ES Terminal should be connected to the earthed equipment under test.(fig.14)

Put the Right Cursor Key to increase numbers and the Left Cursor Key to reduce numbers. Keep the cursor Key pressed down to change numbers quickly. Press the ENTER/SAVE Key to confirm a number.
Repeat this procedure to change the other digits. Pressing the ESC when settings are done return to the Time/Date Setting Screen.
To change the date, proceed to Step (2). Press the ESC Key again to exit from the setting mode and return to the CONFIG-SETTING Screen. Then the clock starts.
(2) Date Setting
Date is displayed in the following order: Month/Day/ Year.
Put the cursor on Date and press the ENTER/SAVE Key to display the Date Setting Screen.
Select a parameter to be changed with the Cursor Key, and press the ENTER/SAVE Key. Then the selected digit is highlighted and ready to be changed.
Press the Right Cursor Key to increase numbers and the Left Cursor Key to reduce numbers. Keep the Cursor Key pressed down to change numbers quickly. Press the ENTER/SAVE Key to confirm a number.
Repeat this procedure to change the other digits. Pressing the ESC Key when settings are done returns to the Time/Date Setting Screen.
Press the ESC Key again to exit from the setting mode and return to the CONFIG_SETTING Screen. Then the clock starts.
Note) The second is not displayed on the Main Screen; only hours and minutes are displayed.
Note) The backup battery may be exhausted when clock becomes wrong after powering on/off the instrument. In this case, please contact our local distributor. The life time of the backup battery is approx 2 years.

7-2-6 Setting for the residual resistance (Rk) on the Test Leads

This instrument can store the residual resistance (Rk) of the Test Leads before starting Re measurements on 2/3/ 4-wire system, and can deduct the resistance from the measured result. The setting of Rk can be done in following procedure.
Select Rk with the Cursor Key on the CONFIG_SETTING Screen, and press the ENTER/SAVE Key to display the Rk Setting Screen (Fig.12)

Fig.12

Press the Test Button to measure Rk. The measured results will not be saved until the ENTER/SAVE Button is pressed. The CONFIG_SETTING Screen is displayed when the Button is pressed down and the data is saved.

The Rk value is being kept even powering off the instrument. To clear the saved Rk values, select Clear on the Rk Setting Screen and press the ENTER/SAVE Key. Then the value restores to 0.000 . Then CONFIG_SETTING Screen is displayed again.
Note) Rk values exceeding following values cannot be saved.
2 Range: max 2 20 Range: max 9
A message shown in Fig.13 is displayed when the measured
Rk is exceeding above values.

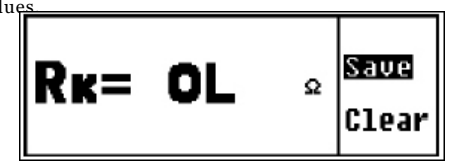


Fig.13

6-2 Principle of Earth Resistivity

Accoring to the Wenner 4-pole method, apply AC current I between the E (earth electrode) and H(C) (current electrode) to find out the potential difference V between the potential electrode S(P) and auxiliary earth electrodes ES.
To Obtain the earth resistance "Rg( )" where the interval beteewn electrodes is a(m). Then use a formula: =2 aRg(m)

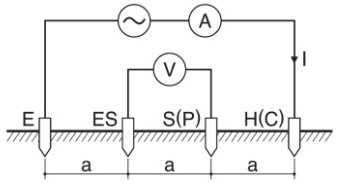


Fig.2

7. PREPARATION FOR MEASUREMENT

7-1 Battery Voltage Check

Power on the instrument. If the display is clear without the Low battery mark "LOW-B" showing, battery voltage is sufficient. Measurements cannot be made, even the Test Button is pressed, while the Low Battery Mark is displayed on the LCD. Measurements are hault when the Low Battery Mark appears on the LCD.

7-2 Test parameter setting

7-2-1 Setting Items

This instrument starts with Measurement mode (Fig.3 Main Screen) when it is powered on while the Range Switch has been set to the position other than OFF.

Fig.3

Measurement conditions should be set before starting measurements. Setting the date and time enables a saving measured data with time information. Press the MENU Key and enter into the SYSTEM_MENU.

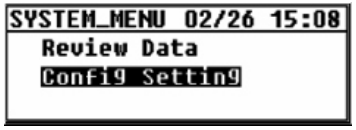


Fig.4

Then select CONFIG_SETTING with Cursor Keys, and press the ENTER/SAVE Key to enter into the CONFIG_SETTING mode. (Fig.5)

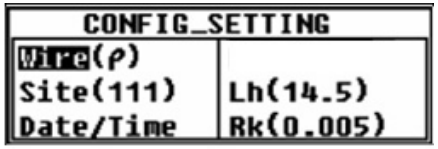


Fig.5

Pressing the ESC Keytwice exits from theCONFIG_SETTING mode and returnsto Measurement mode.
Settings of following parameterscan be madeon this instrument
Wire: Measurement method（Wiring System） Freq: Measurement frequency
Site: Site (location)No
Lh: Interval ofthe auxiliary earthspikes at Earth resistivity ( ) measurement
Date/Time: Year/ Month/ Day, Time (24-hour display）
Rk : Residualresistance on theTest Leads

7-2-2 Setting forMeasurement Method

Measurement method is selectable from: 2-wire (2-wire system), 3-wire (3-wire system),4-wire (4-wire system) and(earth resistivity).
SelectWirewith the Cursor Keyon the CONFIG_SETTING Screenand press the ENTER/SAVEKey to proceed to the WiringSetting Screen.
Select the appropriate Wiring System withthe Cursor Keyand press theENTER/SAVE Key. Thenthe CONFIG_SETTING Screen with theselected Wiring
System will bedisplayed .

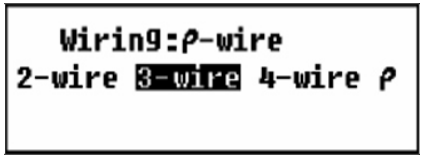


Fig.6

7-2-3 Site (location) no.setting

The site (location)where measurements donecan be savedwith numbers. Selectsite with theCursor Key on theCONFIG_SETTING screen, andpress the ENTER/SAVEkey to displaythe site number setting screen.
Select any digitto be changedwith the Cursor Key, and pressthe ENTER/SAVE Key.Then the selected digot is hightedand ready to bechanged.(Fig.7)

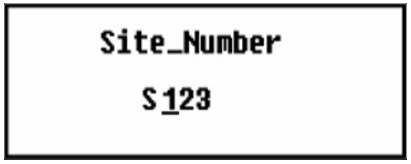


Fig.7

Repeat this procedure tochange the other dididts.Press the ESC keywhen settings are done.
Then the CONFIG-SETTINGScreen(Fig.8) with theselected site No.will be displayed.
Note) Site No.is selectable from000 to 999.

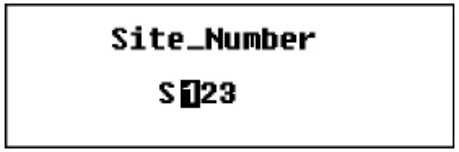


Fig.8

7-2-4 Setting forthe interval betweenAuxillary Earth Spikesat Earth Resistivity ( )

Making setting of the intervals between auxiliary earth spikes is necessary to measure earth resistivity
Select Lh with theCursor Key on theCONFIG-SETTING Screen, and pressthe ENTER/SAVE key to dosplay the length SettingScreen.
Select any digits to be changed with the Cursor Key, and press the ENTER/SAVE Key. Then the selected difits ishighlighted and reasyto be changed.

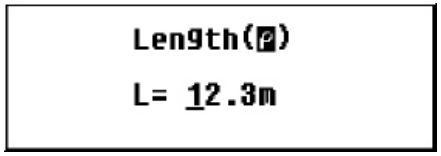


Fig.9

Press the Right Cursor Key to increase numbers and the Left Cursor Key to reduce numbers. Keep the Cursor Key pressed down to change numbers quickly. Press the ENTER/SAVE Key to confirm a number.
Repeat this procedureto change theother digits. Pressthe ESC Keywhen settings aredone. Then the CONFIG-SETTING Screen with a new intervalwill be displayed.
Note) Intervals van be set within a range of 1.0 to 30.0m. If a longer interval out of this range is entered at the Setting Screen, it automatically changedto 30.0m when pressing the ENTER/SAVE key.
Note) Intervals upto 30m canbe selected withthe supplied Test Leads.

7-2-5 Date andTime Setting

This instrument has aclock function and cansave the mesaured datawith time and dateinformation. The clock will not be reset once it has been set even after powering off the instrument. A manual adjustment is requiredto keep theclock time alwaysright.
Time setting can bedone in following procedure.
Select Date/Time with theCursor Key on theCONFIG-SETTING Screen, and pressthe ENTER/SAVE Key to display theTime and DateSetting Screen.

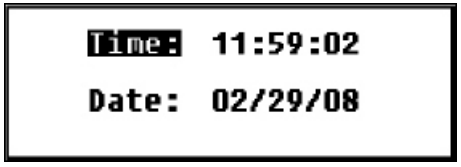


Fig.11

(1) Time Setting
Put thecursor inTime and pressthe ENTER/SAVE Key,and display thetime Setting Screen. Select a parameter to be changed with the Cursor Key, and press the ENTER/SAVE Key. Then the selected digit is highlighted andready to bechanged. (Fig.21) Theclock is 24-hourdisplay.