Product Name	GAOTek E1 Tester
Product SKU	GAOTek-EIT-193
Product URL	https://gaotek.com/product/gaotek-e1-tester-6/

Contents

GAOTek E1 Tester

Introduction

- ETCR series E1 Tester is our company's technology research and development team on technical quality of the pursuit of excellence, through continuous innovation to improve, upgrade with the old product. s performance is mainly reflected in: Breakthrough in self-test the boot a long time to waiting, start immediately into the test Breakthrough relay self-test mode, using the most advancedprocessing algorithms and digital integration technology. Breakthrough the old product to heavy issues, more in line with characteristics of hand-held devices
- New design, panel operation with 6 buttons, better performance. Increase sound and light alarm function, with "beep-beep-beep" alarm sound. Increase the interference signal recognition indicator function, with "beep-beep-beep" indicator Measurement range: 0.010-12000 Stored data 99 Units. Lower power consumption, Maximum operating current less than 50mA.
- ETCR series E1 Tester is widely used in the grounding resistance measurement of the power, telecommunications, meteorology, oilfield, construction and the industrial and electrical equipment. In the measurement of a grounding system with loop, does not require breaking down the grounding down lead, and no need the auxiliary grounding electrode. It is safe, fast and simple in use.The tester can measure ground faults which cannot be measured by traditional methods. It can be used in applications where traditional methods cannot be measured, because the ETCR series damp grounding resistance meter measures the combined value of grounding body resistance and grounding lead resistance ETCR series E1 Tester have long jaw and round jaw style. Long jaw style I sittable for the occasion of flat steel grounding. C Type damp grounding

resistance tester can measure leakage current grounding system and the neutral current ETCR2000B + type E1 Tester has passed the certification of explosion-proof and met GB3836-2000 explosive gas environment with electrical equipment The explosion-proof marks is Exia 1l BT3Ga. Explosion-proof qualified number: CE13.2263.1t can be applied to the corresponding inflammable and explosive environment

Specification

1.1 Model series

Model	Jaw size（mm）		Resistance Range（Ω）		Current Range	Explosion-proof function	Storage 99sets	Alarm
	Φ32	65×32	0.01-200	0.01-1200	0-20A			
ETCR2000+		√		√			√	√
ETCR2000A+		√	√				√	√
ETCR2000B+		√		√		√	√	√
ETCR2000C+		√		√	√		√	√
ETCR2100+	√			√			√	√
ETCR2100A+	√		√				√	√
ETCR2100C+	√			√	√		√	√

Note: "√" means available.

1.2 Range and Accuracy

Mode	Range	Resolution	Accuracy
Resistance	0.010Ω-0.099Ω	0.001Ω	± (1%rdg+0.01Ω)
	0.10Ω-0.99Ω	0.01Ω	± (1%rdg+0.01Ω)
	1.0Ω-49.9Ω	0.1Ω	± (1%rdg+0.1Ω)
	50.0Ω-99.5Ω	0.5Ω	± (1.5%rdg+0.5Ω)
	100Ω-199Ω	1Ω	± (2%rdg+1Ω)
	200Ω-395Ω	5Ω	± (5%rdg+5Ω)
	400-590Ω	10Ω	± (10%rdg+10Ω)
	600Ω-880Ω	20Ω	± (20%rdg+20Ω)
	900Ω-1200Ω	30Ω	± (25%rdg+30Ω)
*Current	0.00mA-9.95mA	0.05mA	± (2.5%rdg+1mA)
	10.0mA-99.0mA	0.1mA	± (2.5%rdg+5mA)
	100mA-300mA	1mA	± (2.5%rdg+10mA)
	0.30A-2.99A	0.01A	± (2.5%rdg+0.1A)
	3.0A-9.9A	0.1A	± (2.5%rdg+0.3A)
	10.0A-20.0A	0.1 A	± (2.5%rdg+0.5A)

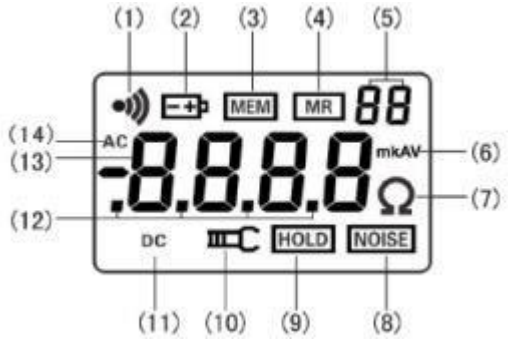
1.3 Specifications

Resistance Range	0.010 Ω - 12000 Ω
Current Range	0.00 mA - 20.0A
Resistance Resolution	0.001 Ω
Current Resolution	0.05 mA
Data Storage	99 groups
Audio - light alarm	"beep--beep—beep - alarm sound. Press "AL" key to tum on an off
Alam Critical Value Setting Range	Resistance:1 Ω - 199 Ω * Current:1 mA - 499 mA
Power	6VDC (4 PCS alkaline dry battery)
Working Temp	-4 °F to 131 °F (-20°C-55 °C) 10%RH-90%RH
LCD Screen	4-bit LCD digital display,

	1.85 in to 1.10 in (47mm x 28.5mm
Jaw Size	Long jaw 2.55 in x 1.26 in (65 mm X 32 mm) round jaw: 1.26 in (32mm)
Open Size of Jaw	Long clamp 1.26 in (32mm) round clamp 1.26 in (32mm)
Weight	Long jaw 38 oz (1100 g) Round jaw 35 oz 1030 g (including battery)
Meter Size	Long jaw: 11.22in x3.35 in x 2.20 in (285 mm x 85 mm x 56 mm) Round jaw: 9.66 in x 3.80 in x 3.20 in (260mm x 90 mm x 66 mm)
Protection Level	Double insulation
Structure	Clamp CT
Shift	Automatic shift
External Magnetic	<40A/m; <1Vim
Single Measurement Time	055 s
Resistance Measurement Frequency	> 1 KHz
Measured Current Frequency	50/60hz automatically

2. Liquid Crystal Display

2.1 LCD Screen



- . LCD Screen
- Alarm symbol.

- Low battery voltage symbol
- Full data storage symbol
- Data access symbol
- 2-Digital No. of data storage unit
- Current. voltage unit symbol
- Resistance unit symbol
- Noise signal symbol
- Data lock symbol
- Open jaw symbol
- Direct current symbol
- Metrication decimal point
- 4-digital LCD figures display
- AC Symbol

2.2 Description of Special Symbols

4.2.1. Jaw opening symbol: This symbol is displayed when the jaw is opening. At this point, trigger may be artificially withheld, or the jaw has been seriously polluted. It cannot continue to measure.

4.2.2. "**Er**" Boot error symbol: May be withheld the trigger when boot up or the jaw have open.

4.2.3. Low battery voltage symbol: when the battery voltage is lower than 5.3V, the symbol will show. At this time, it cannot guarantee accuracy of the measurement. It should be replaced the battery.

4.2.4. "**OL Ω**" Symbol indicates that the measured resistance has exceeded upper limit range of the meter.

4.2.5."**L0.01Ω**" Symbol indicates that the measured resistance has exceeded lower limit range of the meter.

***4.2.6.**"**OL A**" Symbol indicates that the measured current has exceeded upper limit range of the meter.

4.2.7. Alarm symbol: When the measured value is bigger than the setting alarm critical value, the symbol will flash. The meter issue by intermittent "beep--beep –beep--" sound.

4.2.8. **MEM** Full data storage symbol: storage data is full of 99 units, it cannot continue to store data. **MEM** symbol will flash.

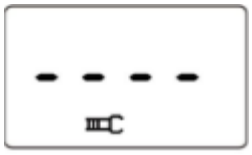
4.2.9. **MR** Data access symbol: display in accessing data, at the same time display the serial number of the stored data.

4.2.10. **NOISE** symbol: This symbol flashes when the grounded circuit with a large interference current in testing. The meter emits "beep--beep--beep--" prompt sound. The accuracy of the test cannot be guaranteed at this time.

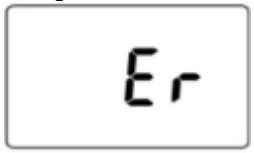
Note: with "*" item is limited to C type

2.3 4.2 Example Illustrated

- Jaw s in open state and cannot measure.

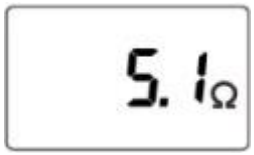


- Boot up error instructions Er (Error)



- Measured loop resistance is less than 0.010Ω.

- Measured loop resistance is 5.1Ω.



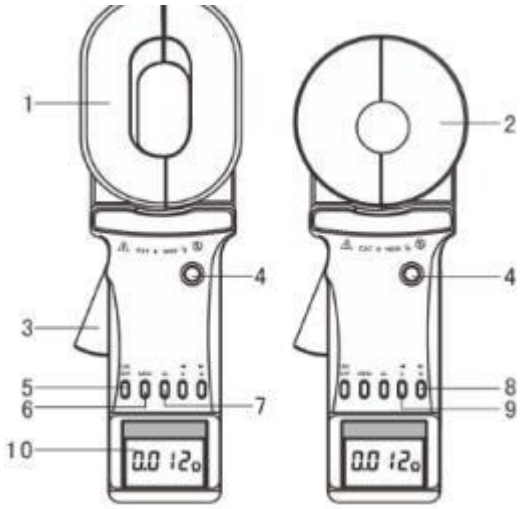
- Measured loop resistance is 2.10 Ω ~-Lock the present measurement value: 2.1Ω ~-Auto storage as the 08 group of data.

- Measured loop resistance is 0.0280Ω, Reading stored data of group No.26

- Alarm function activated; the measured current exceeded the critical value of alarm — Low battery voltage s displayed. At this time, it cannot guarantee the accuracy of the measurement Measured current is 8.40A Lock the current display value -—Store the current value as the data group No. 37 *

- Reading stored data group No.8 -Measured resistance is 30.00 This data was measured in a larger signal interference

3. Meter Structure



- Long Clamp Jaw: 65mmx32mm
- Round Clamp Jaw: ¢32mm
- Trigger: control the draw open and close
- [HOLD Key: Lock / Release display / Storage
- ON/OFF Key: Boot Up / Shutdown /Quit /Clear Data
- key: Data Access / Clear Data
- Alarm Function Key: Alarm Open / Tum Off / Alarm Critical Value Setting
- Resistance Measure Switch Key Q /Right Arrow Key
- Current Measure Switch Key A /Left Arow Key 3.10. Liquid Crystal Display (LCD)

4. Operating Method

4.2 start up

⚠	In booting, user cannot withhold the trigger ,cannot open jaw, and cannot clamp any wires
	After boot up and display "OL Ω", then withhold the trigger, open jaws and clamp the measured wire
	Before booting up, the trigger should withhold one or two times to ensure the jaws are well closed.
	In booting, must be sure to keep the natural static state of the Meter; do not overturn the Meter, nor impose any external force on the clamp. Otherwise, the accuracy of measurement cannot be guaranteed.

- Press ONIOFF key, and the meter switched into boot-up state, automatically test LCD at first and display all symbols as figure 1. The meter automatic calibration at the same time, after boot-up will display "OLQ" and automatically enter the resistance measurement model as figure 2. If not automatic calibration in normal boot up, the meter will display [Elf symbol and means error in boot up as figure3.

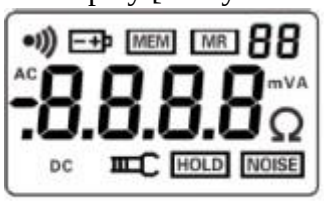


Figure1

Figure2

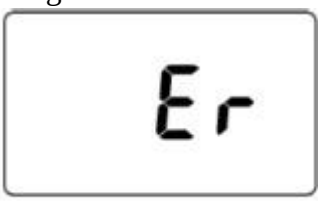


Figure3

- there was not an [OL appearing after auto-inspection, but a larger resistance value displayed, as shown I figure 4; But the test loop detection can still get correct result. This shows that the meter has a larger error only in measuring the large resistance (e.g. more than 1000), whereas in measuring the small resistance, and can still keep the original accuracy, users can be rest assured in use.

Figure4

4.3 Shutdown

- After the meter is switched on, press ON/OFF Key to shut down. After the meter started up 5 minutes, the LCD screen entered flashing state, and would automatically shut down after the flashing state is sustained for 30 seconds to reduce battery consumption. Press ON/OFF key in flashing state may delay the shutdown and keep it working. In state, it is required to first press HOLD key or Power key to quit from the state, then press ON/OFF key to shut it down. In state of setting alarm critical value, should first press ONIOFF key or AL key for 3 sec to quit from the state, then press ON/OFF key to shut it down

4.4 Resistance Measurement

- After the booting and auto-inspection, display "OL Q" and will be able to proceed with resistance measurement. At this point, press the trigger and open the jaws, clamp the measured loop, reading and getting the resistance value If user thinks it necessary, the test can be done with the test ring as shown in the following figure. It shows value should be consistent with the normal value on the test ring (5.1 Q) (User uncertainty the meter could normally work or not, could refer and judge with this method). The normal value on the test rings is the value at a temperature of 20 °C.
- It is normal to find the difference of 1 unit between the show value and the nominal value. E g If the nominal value of test ring is 5.1 0, it would be normal with showing 5.0 Ω or 5.2 Ω Display "OL @, indicate that the measured resistance value " exceeded the upper limit range of Meter, refer figure 3. Display "L0. Ω 10Y, indicate that the measured resistance value exceeded the lower limit range of Meter, refer figure 6. Flashing display symbols))), go with intermittent "beep--beep—beep--" sound, indicate that the measured resistance exceeds alarm critical value of the resistance state, it is required to press HOLD key to quit the state before continue to measuring In[MR] state, it is required press MEM key to exit the [MR] state, then continue to measure. In setting Alarm Critical Value state, user need to press the ONIOFF key or press the AL key for 3 seconds and exit from Alarm Critical Value state, then continue to measure “In the current test mode, press Q key to switch to _resistance test mode.

4.5 Current Measurement

- After the booting and auto-inspection, the meters automatically enter into the resistance measurement mode. After display "OL 0", press A key, and the meter enter into the current measurement mode and display "0.00mA”, refer figure 7. At this point, withhold the trigger and open the jaws, clamp the measured wire, reading and getting the current value.

Figure 7

Figure 8

- The meter display "OL A", indicate that the measured current value exceeded the upper limit range of meter, refer Figure 8. Flashing display symbols))), go with intermittent "beep —beep—beep—" sound, indicate that the measured current exceeds alarm critical value of the current state, press HOLD key to quit from the tate, then continue to measure. In [MR] state, press MEM key to quit from the [MR] state, then continue to measure. In setting alarm critical value state, need to press the ONIOFF key or press the AL key for 3 seconds, quit from alarm critical value state, then continue to measure: In the resistance test model, press A key to switch to current test model.

4.6 Data Lock/Release/Storage

- In test model, press HOLD key to lock the present display value and display [HOLD) symbol. This lock value is automatically numbered and stored as a set of data. Then press HOLD key to release locking, symbol would disappear and return to measurement state. By repeat the above operations, it can store 99 sets of data. If the memory is full, the [MEM] symbol will flash display. As indicate in figure 9, lock the measured resistance 0.0160, and save it as data unit No.1 As indicated in figure 10, lock the measured current 278mA, and save it as data unit No.99. If the storage is full, the MEM] symbol flashes.

Figure 9

Figure 10

- In the data reading mode, should press [MEM| key to quit from data reading, and then lock and save data. In setting Alarm Critical Value state, press the ONIOFF key or press the AL key for 3 seconds, to quit from alarm critical value state, then it can lock and storage the data. Switching on after shutdown will not lose the saved data.

4.7 Data Access

- Press MEM key to enter into reading data storage mode and the default display 01 set of data, as shown in figure 11. Then press the right arrow keys to read the data stored and press the left arrow key, scrolling down to the data stored. If not store data, display shown in Figure 12 In setting alarm critical value state, press the ON/OFF key or press the AL key for 3 seconds, quit from alarm critical value state, then pressing MEM key to enter data storage model.

Figure 11

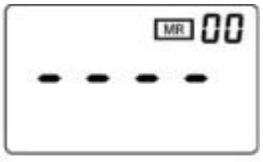


Figure 12

4.8 Alarm Setting

- In the test model, press AL key to turn on or shutdown alarm function in test model, press AL key for 3 sec and enter into the setting function of alarm critical value. At this point, the highest digit begins to flash. First set the highest digit as indicate in figure 13 and figure 14. Press AL key to switch from high to low digits. As the current figure flashes, press left or right arow key to change the figures of "0, 1...9"; After setting all the digits, press AL key for 3 seconds to confirm the alarm critical value currently setting. Successful setting would open alarm function, and then automatically return to the measurement mode. f the load is greater than the alarm critical value, the instrument will flash and display alarm symbol, and emit intermittent “beep-beep--beep—"sound. In setting process, press ONIOFF key to quit from alarm critical value setting function, returning to measurement state, and will not change the previous setting value in data reading model, press MEM key to quit from data reading state, then can set alarm critical value operation.

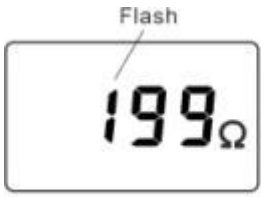


Figure13 The threshold setting of resistance alarm

Figure14 The threshold setting of current alarm

4.9 Alarm Critical Value Check

- In test mode, press down AL key 3 seconds and enter into the alarm critical value checking, which will flash highest digit number the value checks each time is that setting in the last time. Press AL key 3 seconds or ON/OFF key to quit from the check state and Ω retum to the measurement state. As figure 15, the alarm critical value of resistance setin the last time was 200 Ω.

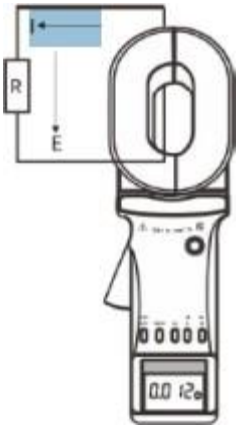
4.10 Clear Data

- In data reading model, press MEM+ON/OFF combination key automatically dear all the stored data. After clearing, it shows as Figure 12. The data can't be restored after clear.

5. Measurement Principle

5.2 Resistance Measurement Principle

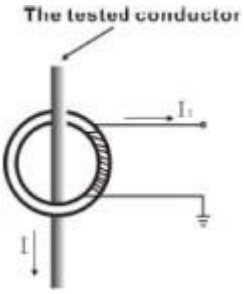
- . Resistance Measurement Principle The basic principle of ETCR in the measurement of resistance is e to measure the loop resistance, as shown in the figure below. The jaw part of the Meter is comprised of voltage coil and current coil. The voltage coil provides excitation signal It will induce a potential E on the measured loop. Under the action of electric potential E will have a current in the circuit to be tested, The Meter will measure E &. The measured resistance R can be obtained by the following formula.



$$R = \frac{E}{I}$$

5.3 Current Measurement Principle

- The basic principle of type C in the measurement of current is the same with that of the measurement of resistance, as shown in the tested conductor figure below. The AC current on the measured wire, through the current magnetic loop and coil, can generate an induction current The Meter will measure |1. The measured current | can be obtained by the following formula.

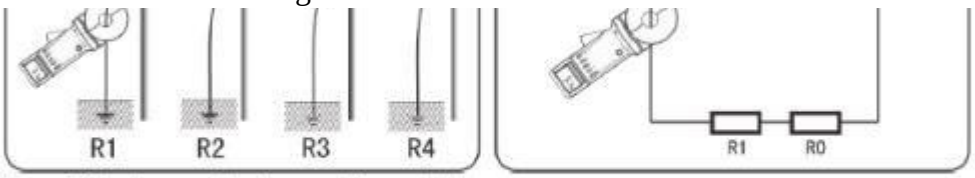


$$I = n \cdot I_1$$

6. Earth Resistance Measurement Methods

6.2 Multi- point Grounding System

- As for the multi-purpose grounding system (such as electricity transmission tower grounding system, grounding cable communications systems, certain buildings, etc.), they usually pass the overhead ground wire (cable shielding layer) connected to form a grounding system. As the Meter is in the above measurement, its equivalent electric circuit is shown in the figure below:



Where: R_1 is the predicted grounding resistance.

- R_0 for all other equivalent resistance after the tower grounding resistance in parallel.

- Although strictly on the theoretical grounding, because of the existence of so-called "mutual resistance", Ro is not usually of electrotechnics in the sense of value in parallel (it will be slightly bigger than a parallel connection of electrotechnics sense value) But because a tower grounding hemisphere was much smaller than the distance between the towers, and with a great number of locations after all, Ro is much smaller than R;. Therefore, it can be justified to assume Ry=0 from an engineering perspective. In this way, the resistance we measured should beR1 Times of comparing tests in different environments and different occasions with the traditional method proved that the above assumption is entirely reasonable.

6.3 Limited Point Grounding System

- This is also quite common. For example, in some towers, five towers are linked with each other through overhead ground wire; besides, the grounding of some of the buildings is not an independent grounding grid. But several grounding bodies connected with each other through the wire. Under such circumstances, the above Ry regarded as 0, will yield more error on the results of the measurement Due to the same reasons mentioned above, we may ignore the impact of the mutual resistance; the equivalent resistance of the grounding resistance paralleled is calculated by the usual sense. Thus, for the grounding system of N (N is smaller, but larger than 2) grounding bodies, it can offer N equations:

$$R_1 + \frac{1}{\frac{1}{R_2}+\frac{1}{R_3}+.....+\frac{1}{R_N}} = R_{1T}$$

$$R_2 + \frac{1}{\frac{1}{R_1}+\frac{1}{R_3}+.....+\frac{1}{R_N}} = R_{2T}$$

.

.

$$R_N + \frac{1}{\frac{1}{R_1}+\frac{1}{R_2}+.....+\frac{1}{R_{(N-1)}}} = R_{NT}$$

Where: **R1**、**R2**、.....R_N are grounding resistances of N grounding bodies.
R_{1T}、R_{2T}、.....R_{NT} are the resistances measured with the Meter in the different grounding branches.

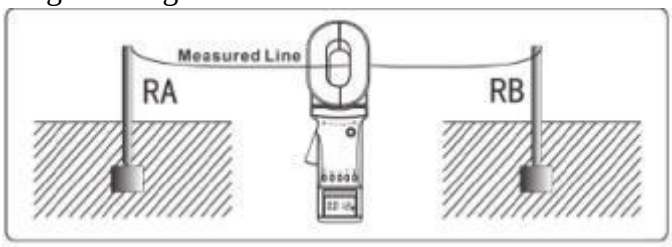
- I nonlinear equations with An unknown numbers and N equations in principle, in addition to ignore the mutual resistance, this method does not have the measurement error caused by neglecting RO. However, users need to pay attention to that: In response to the number of the grounding bodies mutually linked in your grounding system, it is necessary to measure the same number of the testing values, not more or less

6.4 Single-Point Grounding System

- From the measuring principle, ETCR series Meter can only measure the loop resistance, the single-point grounding is not measured. However, users are able to use a testing line very near to the earth electrode of the grounding system to artificially create a loop for testing. The following presented is two kinds of methods for the single-point grounding measurement by use of the Meter. These two methods can be applied to the occasions beyond the reach of the traditional voltage-current testing methods.

6.4.1 Two-Point Method

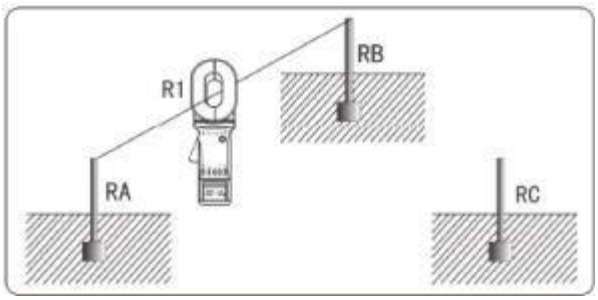
- As shown in the figure below, in the vicinity of the measured grounding body Rs, find an independent grounding body of better grounding state Rs (for example, near a water pipe or a building). Ra and Rs line will connect to each other using a single testing line.



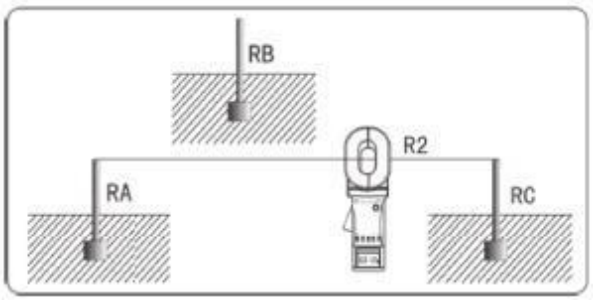
- As the resistance value measured by the Meter is the value of the series resistance from the testing line and two grounding resistances Rr=Ra + Rs + R Where: Arris the resistance value measured with the Meter. Ruis the resistance value of the testing line. Meter can measure out the resistance value by connecting the test lines with both ends. So, if the measurement value of the Meter is smaller than the allowable value of the grounding resistance, then the two grounding bodies are 19acility19 for grounding resistance.

6.4.2 Three-Point Method

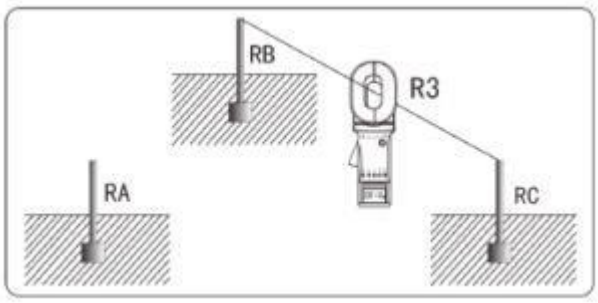
- As shown in the figure below, in the vicinity of the measured grounding body Ra, find two independent grounding bodies of Rs and Re. First, connect the Rand Rs with a test line; use the Meter to get the first reading R+



- Second, connect with the Re and R, as shown in the following figure. Use the Meter to get the second reading R2.



- Third, connect with the Rs and Re, as shown in the following. Use the Meter to get the R3 third reading R3.



- In the above three steps, the reading measured in each step is the value of the two series grounding resistance. In this way, we can easily calculate the value of each grounding RB ™ _ resistance: From: R1=RA+RB R2=RB+RC R3=RC+RB We get RA= (R1+R2-R3) - 2 This is the grounding resistance value of the grounding body Rx. To facilitate the memory of the above formula, these three grounding bodies scan be viewed as a triangle; The measured resistance is equivalent to the value of the resistance values of the adjacent edges plus or minus resistance value of the opposite sides, and divided by 2 As the reference points, the grounding resistance values of the other two grounding bodies are: RB=R1-RA RC=R2-RA

7. Field Application

7.2 Application in power system

7.2.1 Transmission line tower grounding resistance measurement

- Normally, the tower of transmission line connects to the earth to form multi point grounding system, using ETCR series clamp meter to clamp the grounding line. Meter can measure the grounding resistance of the branch circuit.

7.2.2 Transformer neutral point grounding resistance measurement

- There are two situations for transformer to connect the grounding line: iterative earth to form multi point grounding resistance; single point grounding measurement for single point grounding When measuring, if the meter shows ‘L 0.010” may because there are two or more grounding line of tower or transformer connected underground. At this time, user should release the redundant grounding line and just remain one.

7.2.3 The application in power station, power substation

- ETCR series clamp meter can use to test the situation of contact and connect of circuit with the help of one test line, it can be used to test the connect situation of equipment in station and the grounding system. Single point grounding measurement is allowed for the measurement of grounding resistance.

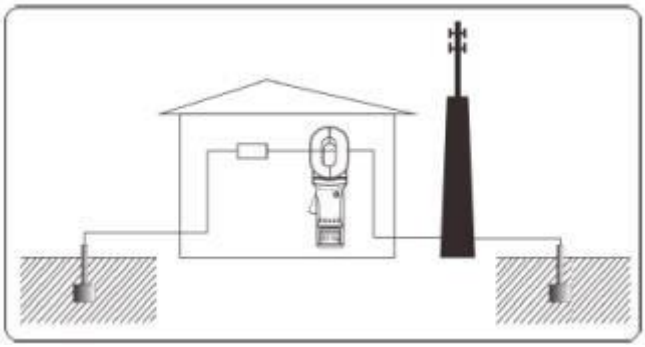
7.3 Application in telecommunications system

7.3.1 The measurement of the grounding resistance of machine room in the building

- The machine room of telecommunication system normally in the upper deck of the building It is hard to use the meg-ohm meter to measure. However, ETCR Clamp meters are very convenient to test. Connect the fire hydrant and the pole being measured by one testing line, then using the meter test the testing line. The value of meter=resistance of machine room + the resistance of testing line + the grounding resistance of fire hydrant If the grounding resistance of fire hydrant is very small, then the grounding resistance of machine room = value of meter - resistance of testing line.

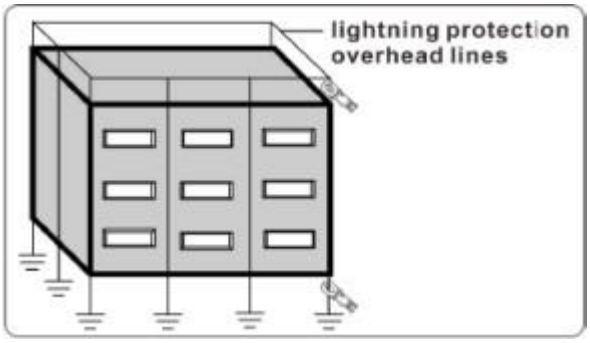
7.3.2 The measurement of grounding resistance of machine room and the launch tower

- It normally forms two-point grounding system when machine room and launch tower connect to ground, as shown below If the value of meter is lower than the allowable value of grounding resistance, then the grounding resistance of machine room and the launch tower is valid. If the value is greater than allowable value, please measure by single point grounding method.



7.3.3 Application in lightning protection system of building

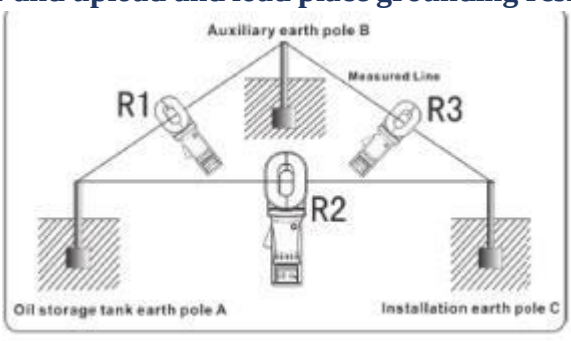
- If the grounding pole of the buildings s independent with each other, the measurement of grounding resistance of each grounding pole as below:



7.4 Application in gas station grounding system

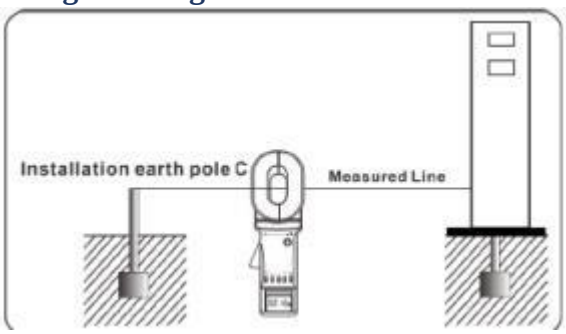
- In explosive gas environment, such as gas stations, oil fields, oil tank and other equipment must use explosion-proof products, Base on JJF2-2003 Grounding Type Anti-static Device Test Specification, gas station mainly need to test the grounding resistance and connect resistance of the facility shows below The meter has to obey the requirement of GB3836-2000 Electrical Equipment Used in Explosive Gas Environment B type has already pass the authentication of anti-explosion, the mark's Ex is I1BT3. The anti-explosion qualified number is: CE082010. It can be used in the environment relevant to flammable and combustible.

7.4.1 Tanker and upload and load place grounding resistance measurement



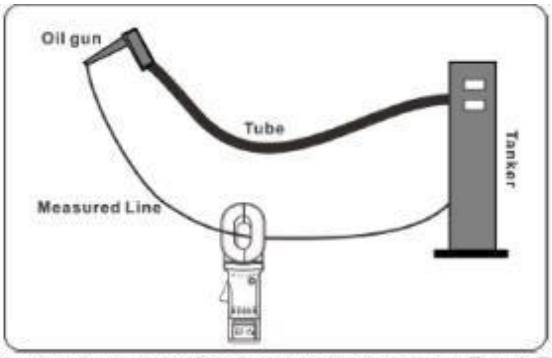
- As show above, in system of gas station, oil tank grounding pole A connect with tanker, the grounding pole C of load and upload position is an independent grounding pole. Find a independent grounding pole as an auxiliary grounding pole B (like the water piper), then base on Three point method to measurement Ry, Rz and Rs Gil tank grounding resistance: RA=(R1+R2-R3)/2 Load and upload place grounding resistance: RC=R2-RA Auxiliary grounding pole grounding resistance: RB=R1-RA NOTE: Cannot connect BC and AC by wires when measuring Ry; the same as Rz, Rs

7.4.2 Tanker grounding resistance measurement



- As shows above, find a grounding pole which is independent with tanker, Like the grounding pole of upload and load place. Connect these two points by testing line, reading the value of Rr by meter. Then can calculate the grounding resistance of tanker R=Rr-Rc and: RTis the value of meter; RC is upload and load place grounding resistance

7.4.3 The measurement of connect resistance of oil transmission piper of tanker.



Connect Fuel truck nozzle and tanker by one testing line. Read R_T by meter, then can figure out:

Tankers hose connection resistance is: $R = R_T - R_L$

NOTE: R_T is the resistance meter measured; R_L is the resistance of testing line.

8. Notes of Earth Resistance Measurement

8.2 Users sometimes may measurement compare ETCR meter with traditional voltage-current method, and with a big difference; to solve this situation, users should pay attention to the problems mention below:

8.2.1

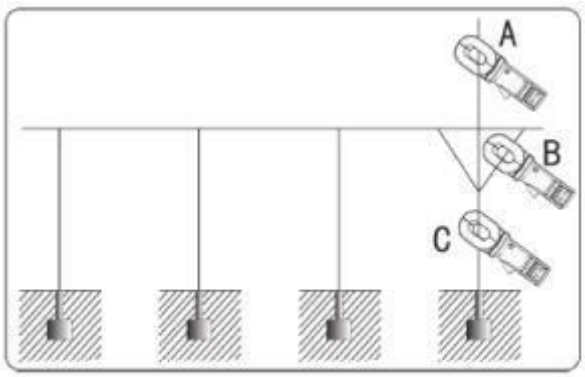
- Whether trip coil or not when tested by the traditional voltage-current method (Whether the tested grounding body separated from the grounding system or not).if not, then the measured grounding resistance is the parallel value of all grounding resistances Itis useless to measure the parallel value of all grounding body resistances, because the purpose of measuring ground resistance is to compare it with an allowable value specified in the relevant standards to determine whether the ground resistance is qualified or not For example: The allowable value of grounding resistance stipulated in GB50061-97 "design code for overhead power lines 66KV and below" is for the so-called "each tower". It is clearly stated in the standard interpretation: "the grounding resistance of each tower refers to the resistance value measured by interrupt electrical continuity between the grounding body and ground wire This standard is very specific As mentioned above, the result measured by ETCR series clamp meter is the grounding resistance of each branch, which is the grounding resistance of a single grounding body when the grounding wire is in good contact Obviously, in this case, test with the traditional voltage-current method and ETCR2200 clamp meter. Their measurement results are not comparable at all, since the subjects are not the same, itis quite normal for the results to be significantly different.

8.2.2

- The grounding resistance measured by the ETCR series damp meter is the composite resistance of the grounding branch. It includes the contact resistance, the lead resistance and the grounding body resistance of the branch to the common ground wire. However, the measured value is only the grounding body resistance under the condition of trip coil by traditional voltage and current method Obviously, the measurement value of the former is larger than that of the latter. The value size of the difference reflects the value size of the contact resistance between the branch and the common ground wire. It should be noted that the grounding resistance specified in the national standard includes grounding lead resistance. The terms in DL/ 1621-1997 "grounding of AC electrical device" include the following stipulation: "the sum of the ground resistance and the ground wire resistance of the ground electrode or natural ground electrode is called the grounding resistance of the grounding device." This kind of stipulations same clear. This is because the lead resistance and the grounding resistance of ground body are equivalent with lightning protection safety.

8.3 Selection of measurement point

- In some grounding system, like the picture show below, should chose a correct point for measurement, or will get different result In measuring at point, the measured branch does not form a circuit, the meter display “OL ", should change the measuring point In measuring at B point, the measured branch form the circuit of metallic conductor, the meter display “L 0.01Q" or a very small resistance value of metallic circuit, should change the measuring point In measuring at C point, the measurement value is the grounding resistance value under the branch.



9. Accessories

Earth Tester	1PCS
Test Ring	1PCS
Meter Case	1PCS
Manual /Warranty Card / Qualification Certificate	1 SET

Contact us: sales@gaotek.com