

# Intelligent Static Sensor

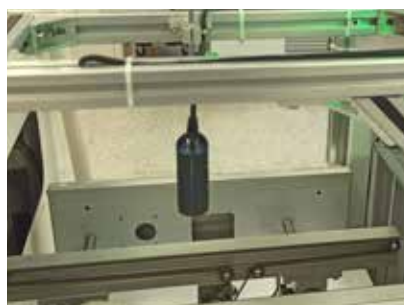


# Suitable for electronics, optoelectronics, textile industries

24 X 7 online static electricity Monitoring Set static alarm threshold



SPECIALITY  
CREATES  
VALUE



Reduce people and increase efficiency



Online monitoring linkage control



Open protocol seamless connection



Defective rate traceability



Low power consumption, environmental protection and energy saving



Systematic online intelligent monitoring

# Using non-contact vibration capacitance electrostatic detection technology...

## Intelligent

Set static alarm threshold

By using the remote control or monitoring software to set the static safety(Alarm) threshold, red light alarms beyond the threshold, the threshold alarm indicator is in green within the static threshold.

## Online

Set static alarm threshold

It can be fixed on the top of the object to be detected, static electricity on the surface of the object can be detected without holding it.

## Adjustable

Adjustable detection distance

Detection distance can be selected via dial switch.

## Closed-loop System

Detection/monitoring/elimination of static electricity

It consists of electrostatic sensor detection equipment, elimination equipment, power supply equipment, display equipment and IMS (ionization monitoring system) to form a closed-loop monitoring and elimination system. Realize automatic and unmanned static electricity monitoring and elimination.

## Networking

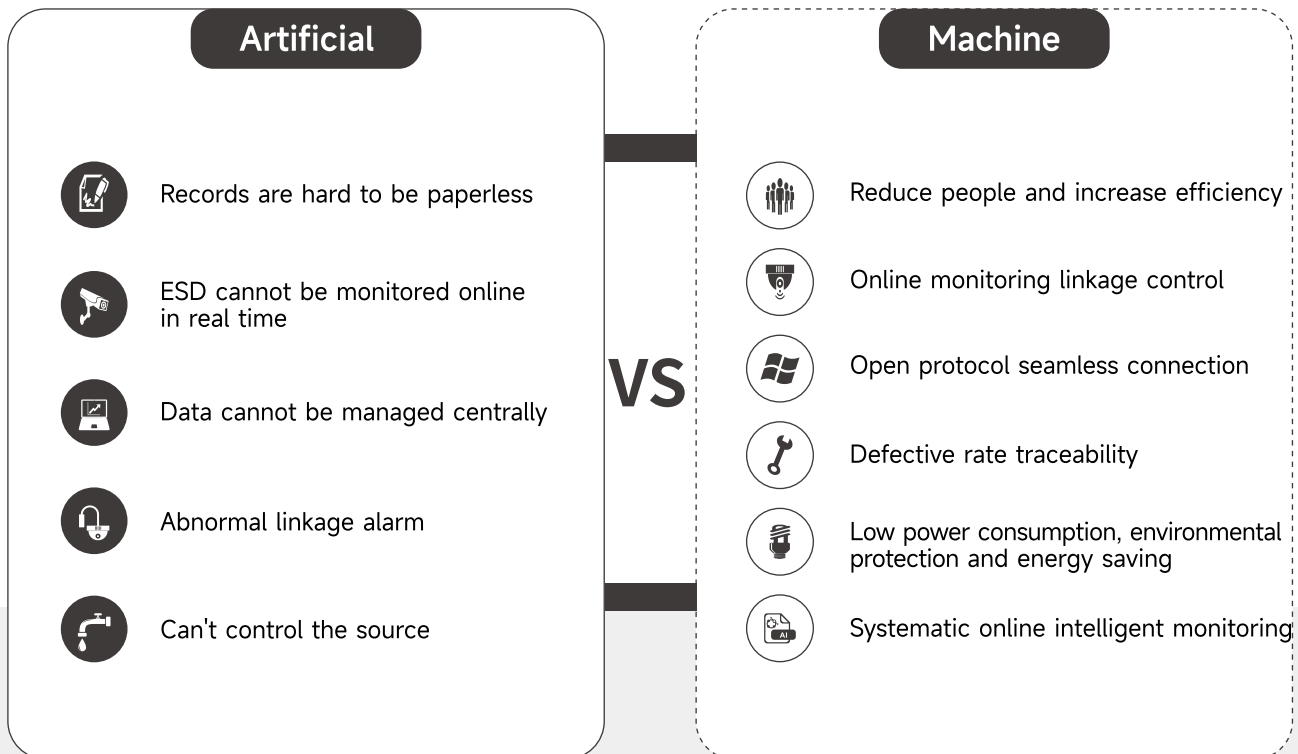
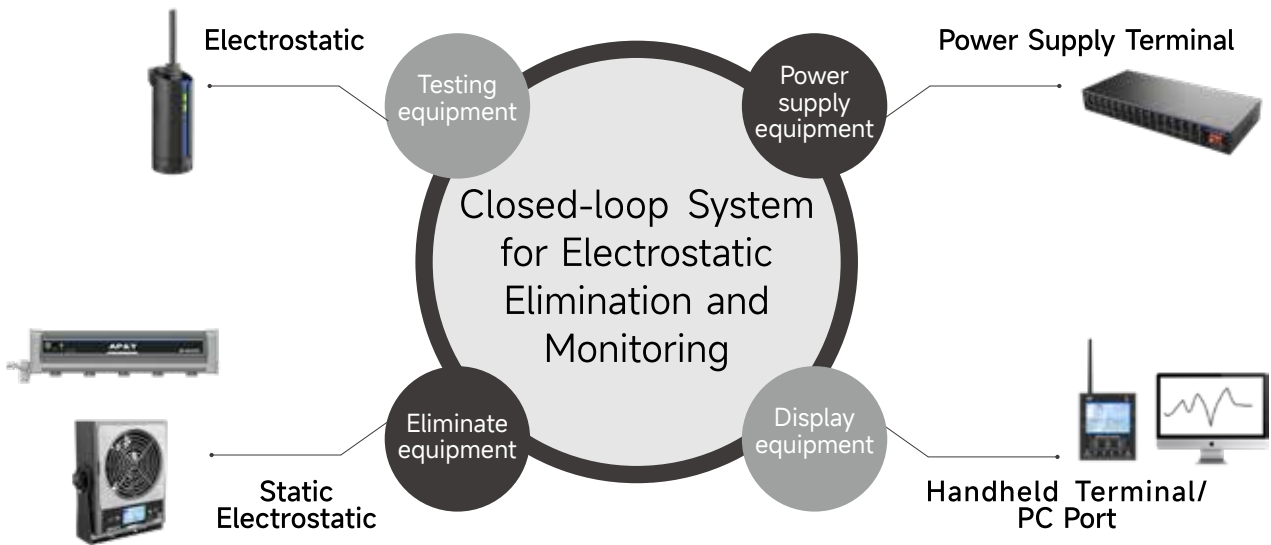
Real-time transmission of monitoring data to PC

The monitoring data is transmitted to the PC in real time to realize data storage and data collection.



# Closed-loop System for Electrostatic Elimination and Monitoring...

The closed-loop system for electrostatic elimination and monitoring consists of detection equipment, elimination equipment, power supply equipment, display equipment and IMS (ionization monitoring system). Under the control of the system software, real-time monitoring, data storage and dynamic display functions are realized to solve the long-term recording problems of static electricity monitoring and data collection. It can be customized and developed according to customer needs and truly realize the increase of production capacity, efficiency, fully automatic and intelligent electrostatic monitoring.

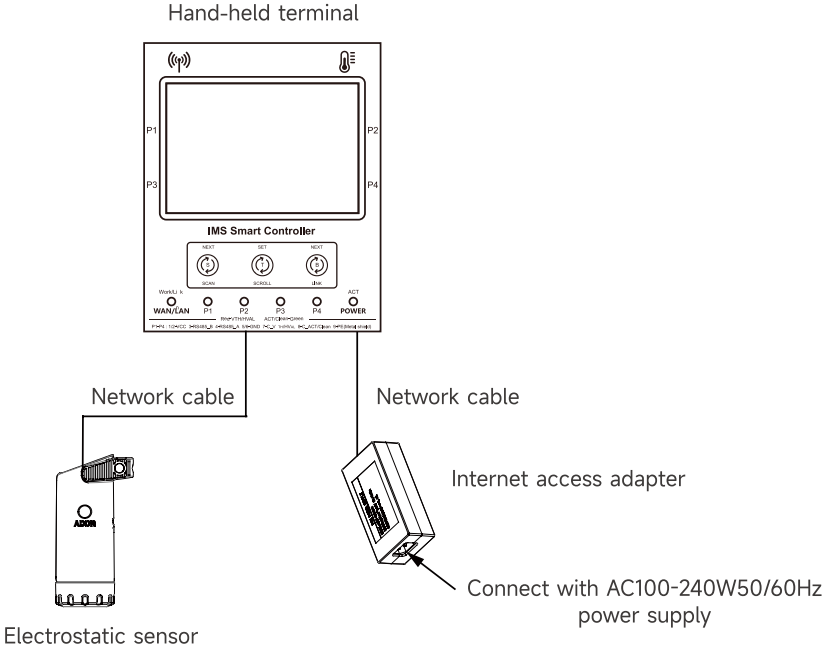


# Electrostatic sensor networking method...

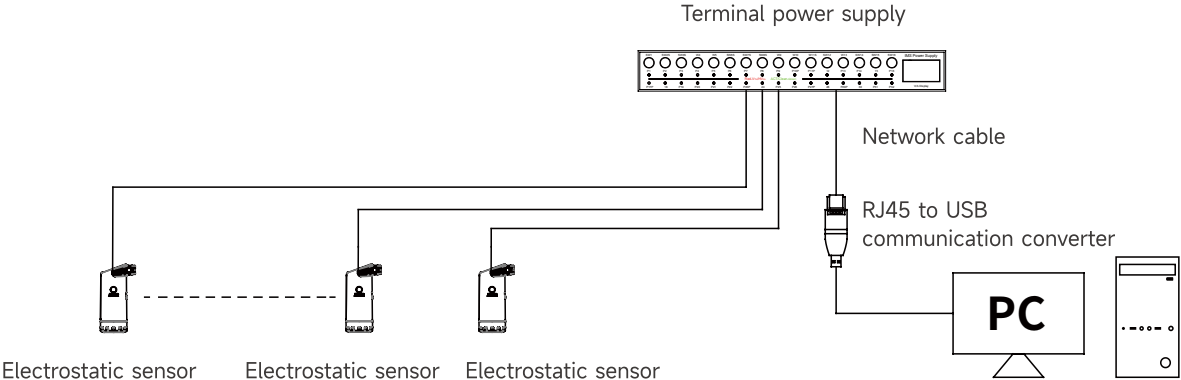
## Two networking methods

Connection with monitoring terminal; Connection with PC  
(Monitoring terminal, integrated power supply and communication software must be purchased separately)

### ◆ Connection with monitoring terminal



### ◆ Connection with PC



Tip: The power output network port, monitoring terminal network port and electrostatic sensor network port of the 24V power adapter are both power supply ports and communication ports. The network ports on the three devices can be used universally.

## ◆ Product prompts of operating technologies

- ▶ During operation, align with the front LED of the product (the distance is not more than 1m), press the unlock key at first, then press the corresponding functional keys to set, and the red light flashes when the key is pressed.
- ▶ During zeroing setting, the calibration plate should be much larger than the detection window of sensor, and the polar plate and sensor should be well grounded.
- ▶ During the calibration operation, the calibration plate should be much larger than the detection window of sensor and the sensor should be well grounded.
- ▶ There should be no shield between the sensor and the detected object; otherwise the accuracy of the detection result will be affected.
- ▶ There should be no electrical equipment that may affect the sensor within the detection range of the sensor.
- ▶ To accurately measure the charged object, the plane of the sensor detection window must be parallel to the surface of the detected object.
- ▶ When the charged object is smaller than the calibration plate, the measured value will be smaller than the actual electrostatic value of the charged object.
- ▶ When the charged object is larger than the calibration plate, the measured value will be larger than the actual electrostatic value of the charged object.
- ▶ Do not set zero in electrostatic charge state or in the electrostatic measurement process (non-static calibration process); if zero clearing is made during the electrostatic test, the displayed electrostatic value will be zero.
- ▶ Influence of temperature and humidity on electrostatic detection:
  - ① The lower the temperature is, the smaller the humidity is, the less water is contained in the space, and the more easily the surrounding object triboelectric and the greater the interference to the electrostatic detection is.
  - ② The higher the temperature is, the higher the humidity is, the more water is contained in the space, and the more active the movement of water molecules is, which is easy to produce corona or spark discharge to the calibration device and the greater the influence on the uniform electric field generated by the calibration device, the weaker the uniform electric field will be.
  - ③ Under the same humidity, the lower the temperature is, the less water is contained in the space and the more easily the surrounding object triboelectric and the greater the influence on the electrostatic detection is.
- ▶ Therefore, during electrostatic calibration/detection, the environmental temperature and humidity should be clearly indicated during calibration/detection.

## ◆ Product operating steps

- ▶ According to the static electricity quantity and the operating environment of the charged object, rotate the circular dial switch with the 3mm diameter cross screwdriver to select the test distance.
- ▶ According to the static electricity quantity and the operating environment of the charged object, turn the bar dial switch and select the detection gear.
- ▶ According to withstand static voltage value of the protected product, set the safety (alarm) threshold of static electricity via the remote controller or monitoring software.

Notes: when the detected static voltage value is within the set threshold of static electricity, the threshold alarm indicator light is green, and it will be red if the set threshold is exceeded.
- ▶ According to the production station, rotate the circular dial switch with the 3mm diameter cross screwdriver to set the equipment address.



## ◆ Calibration environmental conditions

**Environmental temperature: 20°C ±5°C**

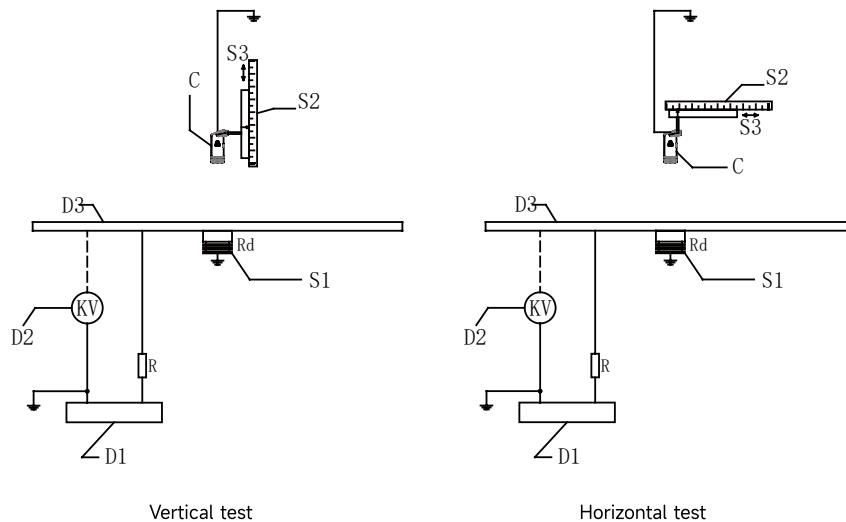
**Relative humidity: 40 - 45%RH**

There is no measurable electrical field, magnetic field as well as positive and negative ions around  
 There is ground wire and the resistance of ground is < 100Ω

## ◆ Equipment for calibration

The instrument and equipment for calibration should be calibrated by the institution of metrological technology, which should meet calibration use requirements within the validity period.

The main calibration equipment mainly consists of DC high voltage meter, DC high voltage power supply, standard plate electrode and distance regulator, etc. The sensor is placed on the central line of the calibration plate and the block diagram of the calibration device for the non-contact electrostatic voltmeter



### The requirements for the equipment and device are as follows:

C—calibrated product: electrostatic sensor

D1—DC high voltage power supply: output range is  $-20\text{KV} \sim +20\text{KV}$ , continuously adjustable, or the minimum stepping is  $10\text{V}$ , and measurement uncertainty is less than  $1/4$  of the allowable error limit of the calibration table.

D2—DC high voltage meter: measurement range is  $-40\text{KV} \sim +40\text{KV}$  and the measurement uncertainty is less than  $1/4$  of the allowable error limit of the calibration table.

D3—standard plate electrode: the plate electrode should be circular or square rounded corner. It's appropriate that the radius of curvature on the edge of the electrodes does not generate corona and it's recommended that the edges of the electrodes should be wrapped with insulating materials; the plate area should be large enough and the diameter or side length should be no less than  $0.4\text{m}$ . Our calibration plate is square stainless steel plate with the dimension of  $600\text{mm} \times 600\text{mm}$ .

R—protective resistance: the withstand voltage strength of resistance is  $20\text{KV}$  and the current through the protective resistance and human body is  $< 5\text{mA}$  and the resistance value R conform to the following formula requirement:

$$R/(R+R_d) < 0.1\%$$

Where: R is protective resistance, the unit is Ohm ( $\Omega$ )

$R_d$  is the resistance of insulating support, the unit is Ohm ( $\Omega$ ), resistance value  $> 10^{13}\Omega$ , the withstand voltage strength is  $> 25\text{KV}$

**The above two kinds of resistance may cause different static voltage values in detection under the same standard voltage due to the different resistance values.**

S1 — insulating support

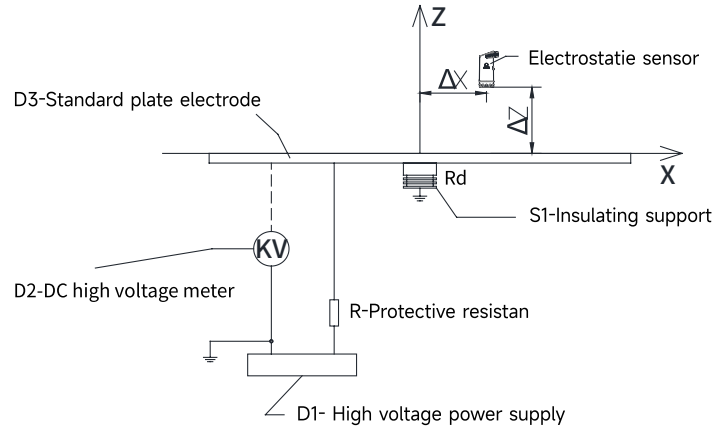
S2 — graduated scale, the measurement range is  $0\text{mm} \sim 750\text{mm}$  and the measurement uncertainty is less than  $0.5\text{mm}$ .

S3— distance regulator: the sensor should be placed on the calibration device to extend out the front end. The geometrical shape and materials of the support should minimize the impact on the distribution of the electrical field around the front end of the sensor.



## ◆ Product inspection performance test

- The test is divided into vertical test and horizontal test. The schematic diagram of the sensor test device is as follows:



- The test data of the standard plate electrode is as follows:

The static voltage values under 3 groups of test distances were detected. The standard plate electrode is 600mm\*600mm stainless steel electrode. The test distance is the distance between the surface of plastic shell on one side of the detection window of the electrostatic sensor. The light grey heavy line in the figure is the calibration voltage line when the slope is 1 to that of the plate electrode. This calibration line is a virtual line to indicate that the voltage measured by the sensor in an ideal situation is exactly the same as the voltage applied by the standard plate.

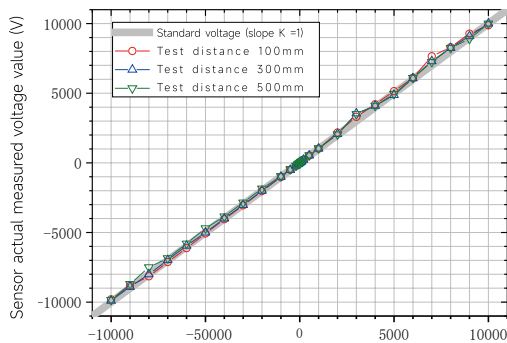


Figure 1-1 Standard test data chart of standard plate electrode

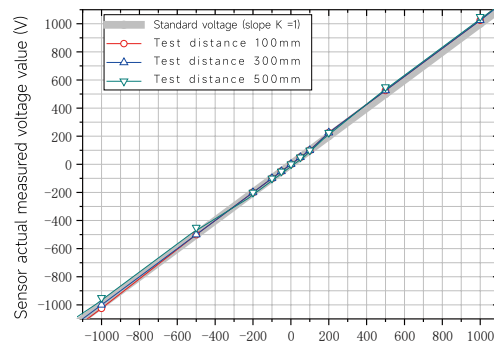


Figure 1-1 Standard test data chart of standard plate electrode

- ① The following two figures are the test data maps under different horizontal test distances when the vertical test distance is 500mm, standard plate electrode is 600mm\*600mm stainless steel electrode and the sensor is relative to the central position of the detection plate:

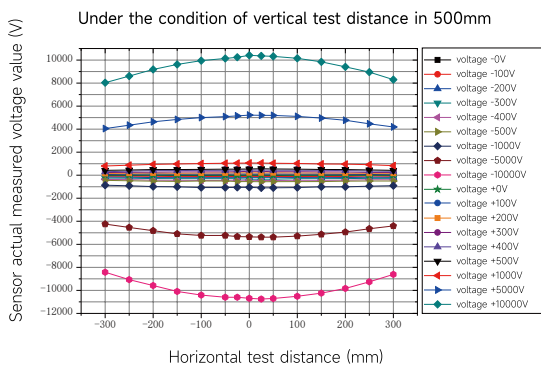


Figure 2-1 Horizontal test data graph of the standard plate electrode when the vertical distance is 500mm

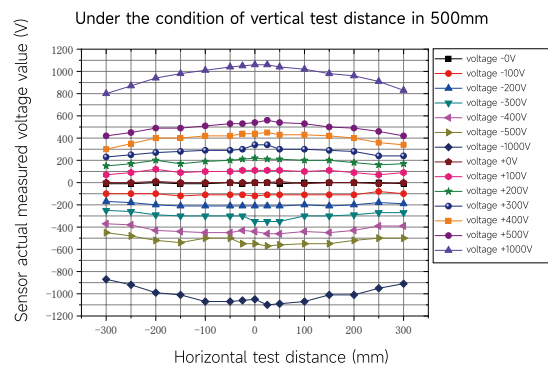


Figure 2-2 Horizontal test data graph of the standard plate electrode when the vertical distance is 500mm

From the above two horizontal test charts, it can be seen that for a 600\*600mm standard plate and a 500mm vertical test distance, the measurement error can be kept within 5% and within  $-200\text{mm} \leq X \leq 200\text{mm}$  horizontal distance.

- ② The following two figures are the test data maps under different horizontal test distances when the vertical test distance is 300mm, standard plate electrode is 600mm\*600mm stainless steel electrode and the sensor is relative to the central position of the detection plate:

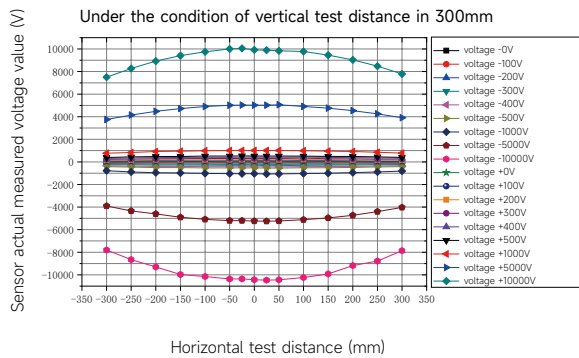


Figure3-1 Horizontal test data graph of the standard plate electrode when the vertical distance is 300mm

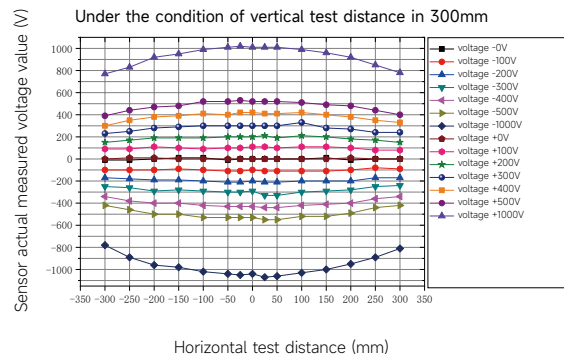


Figure 3-2 Horizontal test data graph of the standard plate electrode when the vertical distance is 300mm

From the above two horizontal test charts, it can be seen that for a 600\*600mm standard plate and a 300mm vertical test distance, the measurement error can be kept within 5% and within  $-200\text{mm} \leq X \leq 200\text{mm}$  horizontal distance.

- ③ The following two figures are the test data maps under different horizontal test distances when the vertical test distance is 100mm, standard plate electrode is 600mm\*600mm stainless steel electrode and the sensor is relative to the central position of the detection plate:

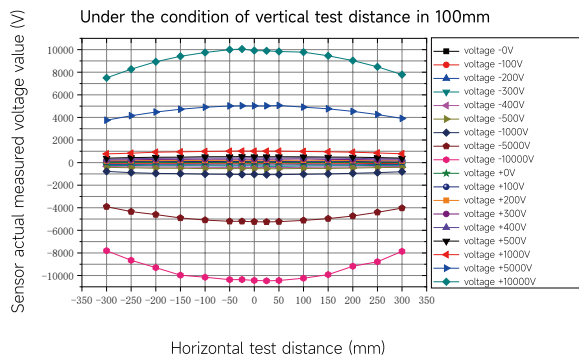


Figure 4-1 Horizontal test data graph of the standard plate electrode when the vertical distance is 100mm

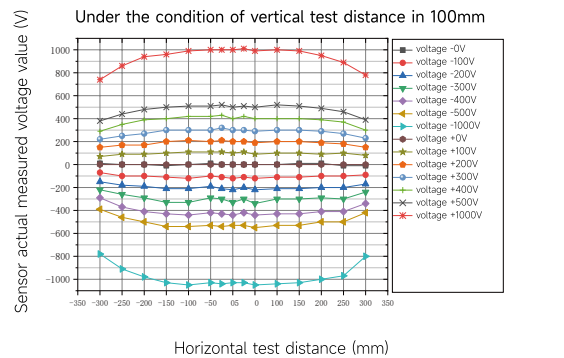


Figure 4-2 Horizontal test data graph of the standard plate electrode when the vertical distance is 100mm

From the above two horizontal test charts, it can be seen that for a 600\*600mm standard plate and a 100mm vertical test distance, the measurement error can be kept within 5% and within  $-200\text{mm} \leq X \leq 200\text{mm}$  horizontal distance and .

## ◆ Product parameters and technical functions

### ► Technical specifications:

NO.	Parameter	
1	Working voltage	DC8-24V
2	Working current	< 50mA
3	Sampling time	About 1ms
4	Vibration	< 1KHz
5	Noise	< 5dB
6	Signal output	RS485(115200bps,8,1,n,n) (≥ 20ms)
		Open Collector (<50V/100mA)
8	Communication distance	< 300m
9	Alarm indication	LED
10	Threshold setting	0 ~ ±5000V
11	Detection angle	< 15°
12	Test plate size	600mm*600mm
13	Dimensions	44*33*85mm
14	Net weight	49.7G
15	Power-on standby test time	5S
16	Infrared controlled range	< 20°, 1m
17	Certification	CE


※ Due to the improvement and upgrading of the product, the specification and performance of the product may be changed; Subject to the real product and please understand that notice cannot be given in advance.

### ► The measurement range of static voltage gear and minimum resolution corresponding to each measuring distance:

Detection gear	Detection distance coding	Detection distance	Measurement range	Resolution	Measuring error	Error Zero jump	Calibration
1	0	5mm	±2000V	1V	10%	±1V	×
	1	10mm	±4000V	3V		±3V	
	2	25mm	±10000V	5V		±5V	
	3	50mm	±15000V	10V		±10V	
	4	100mm	±20000V	10V		±10V	√
	5	150mm	±20000V	10V		±20V	×
	6	200mm	±20000V	15V		±30V	
2	7	250mm	±20000V	20V		±40V	√
	8	300mm	±20000V	10V		±20V	
	9	350mm	±20000V	15V		±30V	×
	A	400mm	±20000V	15V		±30V	
3	B	450mm	±20000V	15V		±30V	√
	C	500mm	±20000V	10V		±30V	
	D	550mm	±20000V	15V		±30V	×
	E	600mm	±20000V	15V	±60V		
	F	700mm	±20000V	20V	±80V		

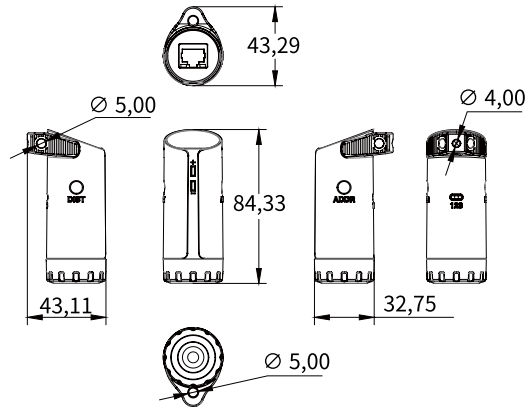
※ Due to the improvement and upgrading of the product, the specification and performance of the product may be changed; Subject to the real product and please understand that notice cannot be given in advance.

### ► Wiring information of network interface:

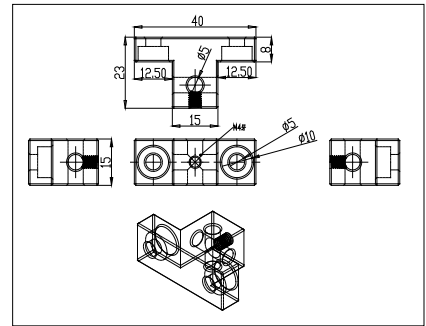
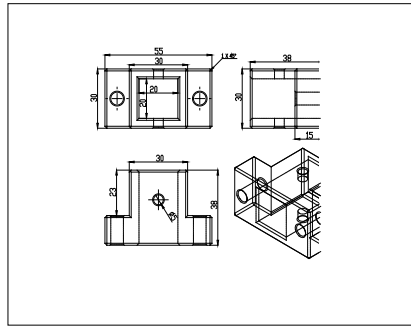
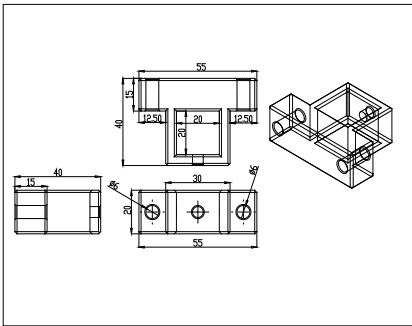
Network interface			
	1、 2	Orange, white -orange	VCC
	3	Blue	RS485+B
	4	White-blue	RS485+A
	5、 6	Green, white-green	GND
	7	Brown	NPN-C1
	8	White -brown	NPN-C2
	9	Metallic shield shell	PE

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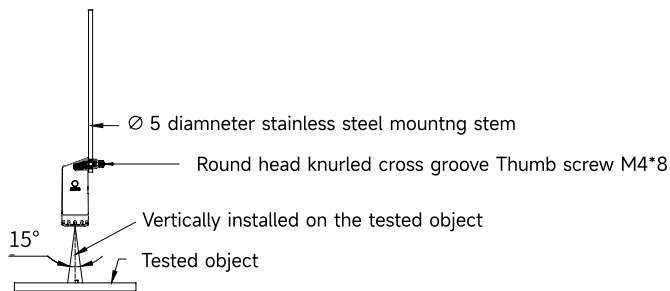
◆ Dimension of electrostatic sensor



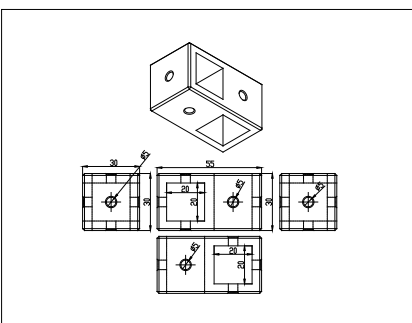
◆ Structure chart of fixing parts















◆ Schematic diagram for installation position



◆ Structure chart of installation rod connection



## ◆ Packaging accessories

Name	Quantity	Part No.	Specification	Picture	Use	Note
Double ended crystal head black shield cable	standard equipment	8WXI00004	Standard:2.5m, 5m/10m:optional		For product power supply data interaction	—
Power Adapter	standard equipment	AP2930003	RT-240200 DC24V 2A P/N:1/2+ 5/6- Port metal PE		For product power supply data interaction	—
National standard power cord	standard equipment	8YXG25110	Standard:1.8m, optional:3m/5m		For connecting adapters	—
Single-ended crystal head black shield cable 2.5m	optional	8WXI00002	FFUTP CAT.5E 26AWG 4Pair Jacket PVC OD:5.6±0.2mm bag packed		For connecting to PLCs, machines, large slitters, etc.	—
Static electricity elimination and monitoring system	optional	AP1970110	Ionization Monitoring System		1、Storage of data 2、Real-time view 3、Data review	—
Interface converter	optional	AP2253003	Signal converter		For communication between the adapter and the COM port of the host computer.	Serial 485 to USB
Sensor Mounting Retainer Bar	optional	AP8009001	5*100		Fixed sensors	—
Network Connectors	optional	AP5117004	RJ45 one to three		For power and data conversion between multiple products	Stainless steel socket head cap screws:M5*8 (1SLN0508U) (Qty. 1)
						Slide Nut: 20 Profile *M5 (AP8939000) (Qty. 1)
Sensor mounting fixture 3	optional	AP8629002	40*15*23		Mounting on profile fixing round bar	Stainless steel socket head cap screws:M5*8 (1SLN0508U) (Qty.2)
						Stainless steel socket head cap screws:M5*8 (1SLN0508U) (Qty. 1)
						Slide Nut: 20 Profile *M5 (AP8939000) (Qty. 2)
Sensor Mounting Rod Connector	optional	AP8629004	55*30*30		Profile-to-profile connectors	Stainless steel socket head cap screws: M5*12 (1SLN0512U) (Qty. 2)
						Slide Nut: 20 Profile *M5 (AP8939000) (Qty. 2)
Sensor mounting bar connector 2	optional	AP8629003	55*30*38		Conversion between fixed profiles	Stainless steel socket head cap screws: M5*12 (1SLN0512U) (Qty. 2)
Sensor mounting bar connector 1	optional	AP8629001	55*20*40		Fixed 20 profiles	Stainless steel hexagon socket head cap screws: M5*18 (AP8926011) (Qty. 2)
						Slide Nut: 20 Profile *M5 (AP8939000) (Qty. 2)
						Screw gasket: M5*16*1.2 (AP8946005) (Qty. 2)
						Stainless steel socket head cap screws: M5*12 (1SLN0512U) (Qty. 2)

## **▲ Caveat**

- For proper use of the unit, please read the instruction manual carefully before use.
- Before powering up the product, please check the specification of the power supply provided, any power supply that does not meet the specification will cause damage or even malfunction to the product.
- Please operate the product at the specified ambient temperature (0 to 50°C).
- When testing, people and products to maintain a distance of 1m or more to avoid the impact of human static electricity on the test; test personnel must wear electrostatic clothing, electrostatic cap, electrostatic shoes.
- $\phi 5$  diameter stainless steel mounting rod insertion depth shall not exceed the detection gear switch position on the back of the sensor.
- The surface of the  $\phi 5$  diameter stainless steel mounting rod must not have an insulating coating.
- Do not touch the electrostatic detection head during testing.
- Ensure that the sensing window area is free from particles and dust.
- There must be no obstructions between the sensor and the object to be detected, otherwise the accuracy of the detection results will be affected.
- There should not be any electrical equipment within the detection distance of the sensor that affects the sensor, otherwise, malfunction and damage to the internal equipment and chips may occur.
- For accurate measurement of electrically charged objects, the plane of the sensor's detection window must be parallel to the surface of the object to be measured.
- Use it after the power is connected for 5 seconds. Otherwise, the data display may be unstable at times.
- When the charged object is smaller than the calibration plate, the measured value is smaller than the actual electrostatic value of the charged object.
- When the charged object is larger than the calibration plate, the measured value is larger than the actual electrostatic value of the charged object.
- Do not zero the sensor in a state with electrostatic charge or during the electrostatic measurement process (not the electrostatic calibration process); if you zero the sensor during the electrostatic test, the displayed electrostatic value will likely be zero.
- Do not install around high-voltage equipment, such as high-voltage power supplies, electrostatic generators, ionizers, and dissipators; high voltages will affect the sensor's performance and detection accuracy.
- Tighten the sensor when installing in high vibration areas; otherwise, data errors may occur.
- Please check the power cord/communication cable of the product regularly, and replace it immediately if it is damaged, otherwise it will easily cause leakage of electricity, poor communication, abnormal operation and other problems.
- The product is subjected to mechanical shocks such as dropping, collision, etc., which may lead to malfunction.

## **▲ Safety warning**

- The whole set of equipment must be reliably grounded during use, otherwise it will easily lead to abnormal or even damaged sensors.
- It is strictly prohibited to use this equipment in flammable and explosive environments.
- Do not touch the static detection window with sharp objects.
- It is strictly prohibited to contaminate the product with liquids while it is operating, otherwise an abnormality may occur, resulting in electric shock or fire.
- If the detection range is exceeded, the product may malfunction.
- Turn off the power when checking or replacing the product, otherwise it may cause electric shock or fire.
- This tester is a precision device, do not disassemble it.
- Unauthorized disassembly of the product is strictly prohibited, and internal maintenance and repair must be carried out by professionals.
- The product is designed for detecting static electricity on the surface of the object, it is strictly prohibited to do other uses, any abnormal use may cause machine failure, electric shock, fire and other hidden dangers.

## ▲ Trouble shooting

NO	Failure	Possible causes	Prescription
1	Power port indicator does not light up	Poor power cord contact	Verify that the power cord is intact and securely connected
		Incorrect power cord connection	Confirm that the power cord is wired correctly
		Power supply mismatch	Confirmation of power supply specifications (INPUT: 100-240VAC 50/60Hz; OUTPUT: 24VDC 2000mA)
2	The measured static voltage value is abnormal or the error is too large	Poor sensor grounding	Verify that the sensor is well grounded
		The presence of high-voltage equipment around the sensor, ionizing equipment or Electromagnetic equipment	Removal of high-voltage, ionizing or strong electromagnetic equipment
		Incorrect setting of range position or detection distance	Reference gear range setting table
		Improper sensor mounting setup orientation	Confirm the correct mounting position and refer to the operation and use precautions
3	Threshold alarm indicator green light does not light up	—	Return to factory for maintenance
4	Threshold alarm indicator red light does not light up	The set electrostatic threshold is large or exceeds the range	According to the use of the environment and static electricity control requirements, refer to the gear range setting table, reasonably determined Constant Static Alarm Threshold
5	Product has an odor	Component burnout	Return to factory for maintenance
6	If you have any other problems not listed above or if you still cannot solve the problem with the above program, please contact the manufacturer or seller		

## ▲ Maintenance

- In order to ensure the good performance of the product, when not in use, please store the device in a dry place away from light and do not weigh it down.
- This device is a precision detector, do not use strong vibration.

## ▲ After-sales service

- AP-YV3302 electrostatic sensors have been carefully tested and aged before leaving the factory, and their performance fully meets the relevant indexes indicated in the instruction manual. AP&T promises the following to the users: within one year from the date of purchase, we will repair or replace any defective parts that have been inspected by the company free of charge. However, this promise does not apply to the following situations:
  1. The device is being used incorrectly;
  2. Damage caused by negligence or accident during use;
  - 3, their own alteration, disassembly or has been other non-Ampin authorized service department repair;
  4. Failure caused by external factors such as fire, earthquake, flood and abnormal voltage.
- AP&T does not assume any liability related to misuse of the product except for the repair or replacement of parts as specified above.

# AP&T®

**AP&T®**

**SPECIALITY CREATES VALUE**

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Professional electrostatic intelligent monitoring/analysis  
and elimination solution provider

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