AP&T®

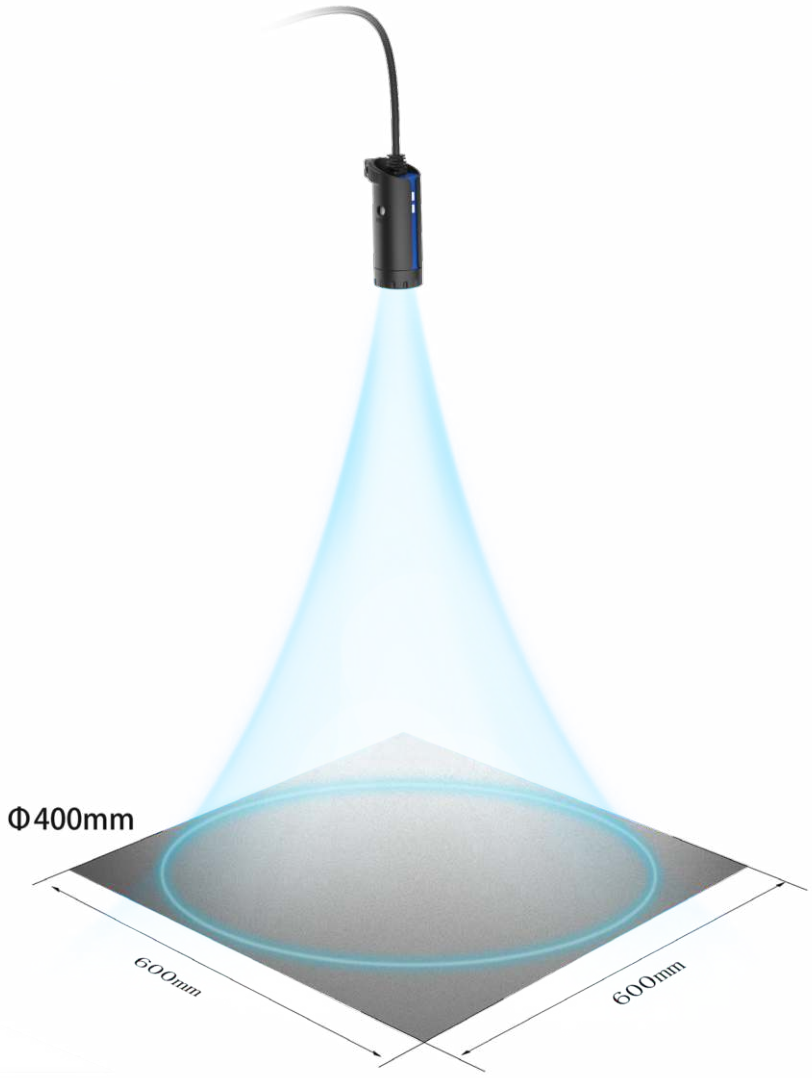
Shanghai Anping Static Technology Co.,Ltd

Intelligent Electrostatic Sensor

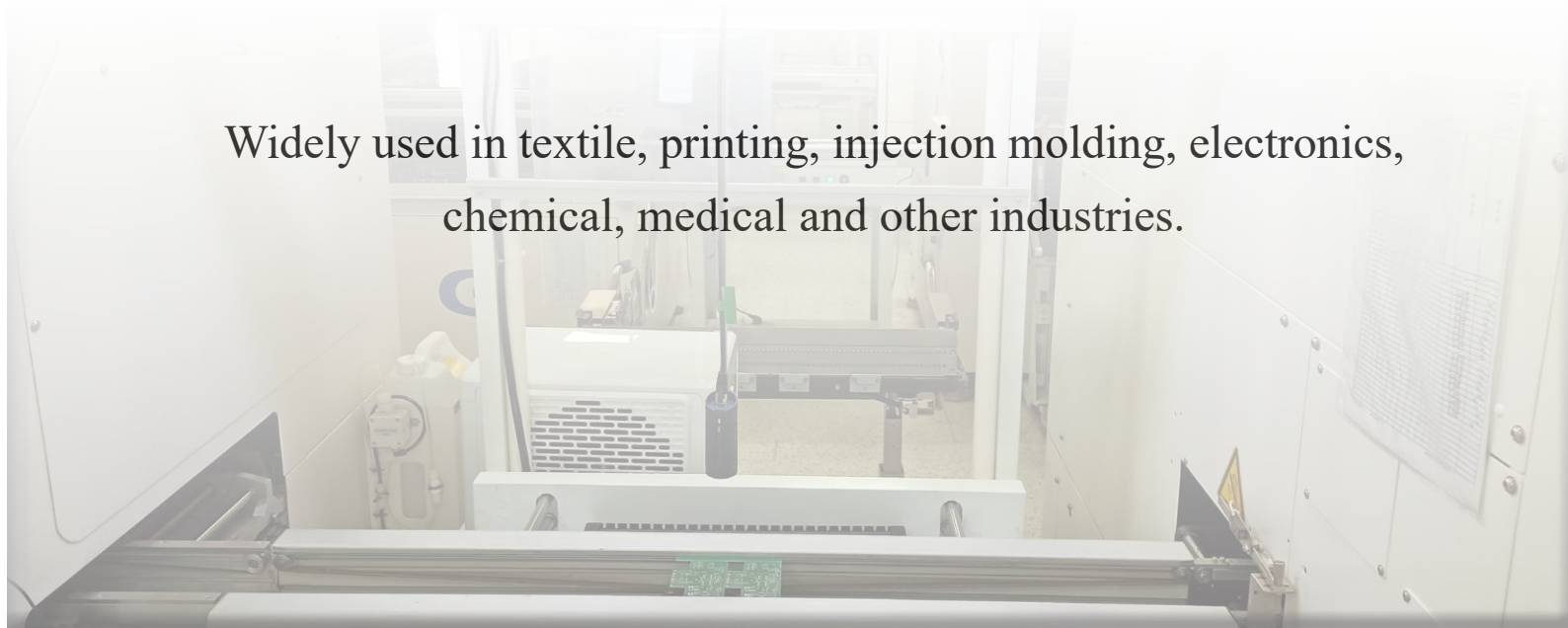
AP-YV3302

— AP&T—

Using non-contact vibration capacitance electrostatic detection technology



Widely used in textile, printing, injection molding, electronics, chemical, medical and other industries.



Non-handheld intelligent detection of static electricity

Intelligent Set static alarm threshold

Alarm threshold can be set and red light alarm indicatesexceeding threshold.

Online Automatic online detection

The static electricity on the surface of the object can be detected by being fixed above the object to be detected.

Adjuatable Adjustable detection distance

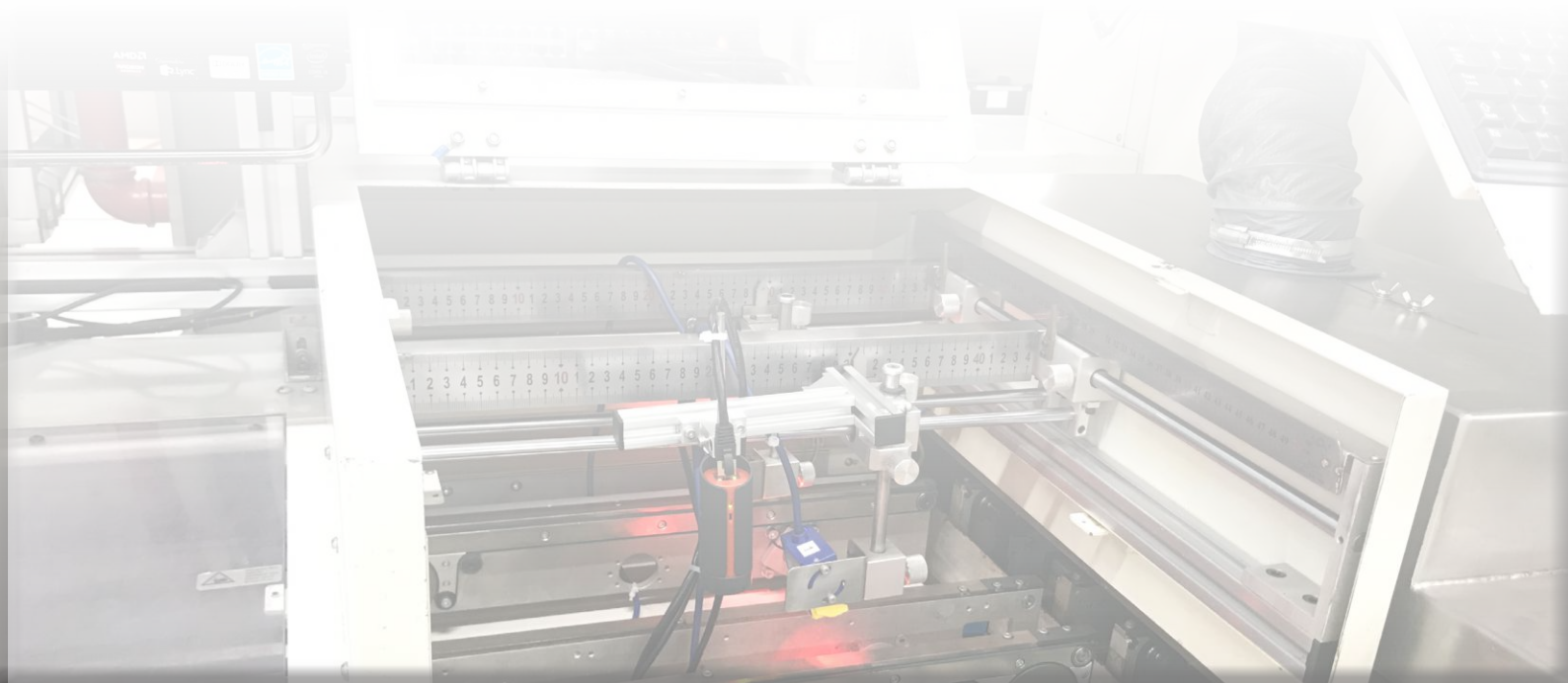
Detection distance can be selected via dial switch.

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.

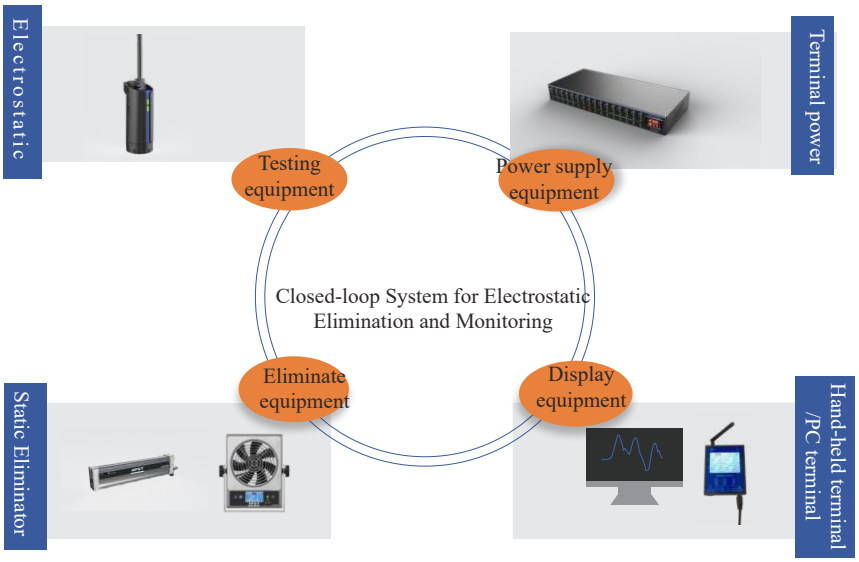
Networking Real-time transmission of monitoring data to PC

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.



Artificial VS Machine

- Records are hard to be paperless
- ESD cannot be monitored online in real time
- Data cannot be managed centrally
- Abnormal linkage alarm
- Can't control the source

- 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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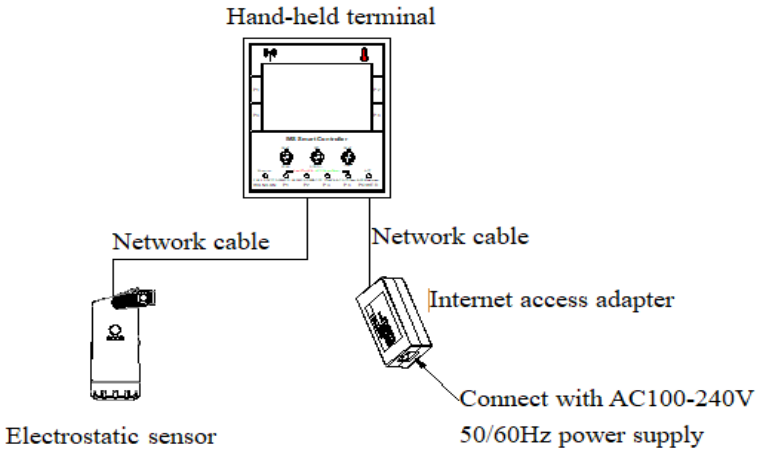
Electrostatic sensor networking method

Two networking methods

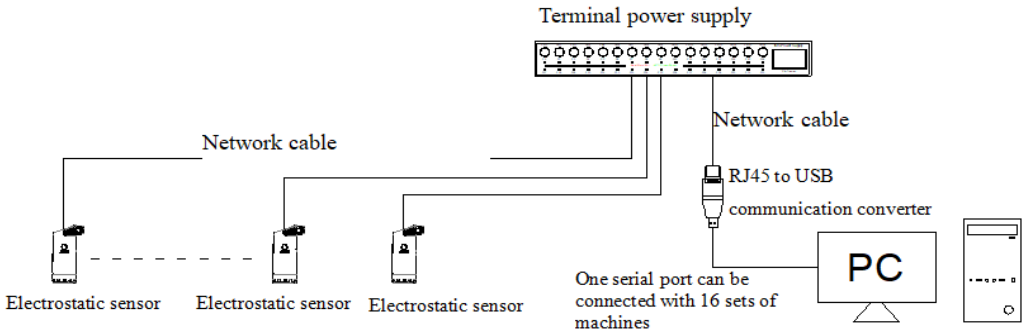
Connection with monitoring terminal; Connection with PC

(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.

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.

Operating steps

① According to the static electricity quantity and the operating environmentof the charged object, rotate the circular dial switch with the 3mmdiameter cross screwdriver to select the test distance.
② According to the static electricity quantity and the operating environmentof the charged object, turn the bar dial switch and select the detection gear.
③ 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.
④ According to the production station, rotate the circular dial switch with the 3mmdiameter cross screwdriver to set the equipment address.

Unlock
30s delay for operation if any key is pressed after unlocking.
Exit and lock if no key is pressed after unlocking.

Remote control button
SRZ: Clear
VTH+/VTH-: threshold adjustment, unit is 10V

Product calibration

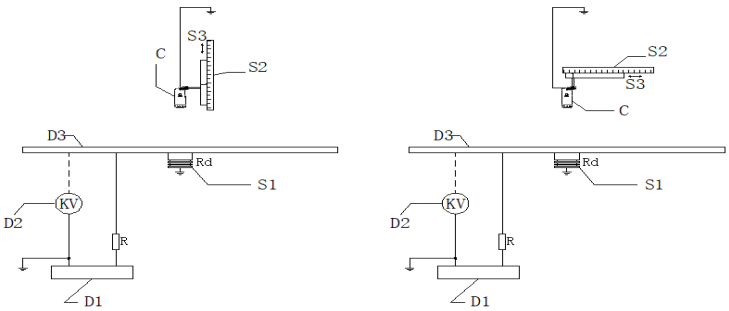
■ Calibration environmental conditions

The calibration environmental conditions and requirements are as follows:
a) Environmental temperature: 20℃±5℃
b) Relative humidity: 30-60%
c) There is no measurable electrical field, magnetic field as well as positive and negative irons around.
d) 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 electrostaticvoltmeter is shown as follows:



The requirements for the equipment and device are as follows:

C——calibrated product: electrostatic sensor

D1——DC high voltage power supply: output range is -20KV ～ +20KV, continuously adjustable, or the minimum stepping is 10V, 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 -40KV ～ +40KV 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 0.4m. Our calibration plate is square stainless steel plate with the dimension of 600mm*600mm.

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

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

Where: is protective resistance and the unit is Ohm (Ω);

is the resistance of insulating support and the unit is Ohm (Ω); resistance value ＞ 1013Ω and the withstand voltage strength is ＞ 25KV.

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.

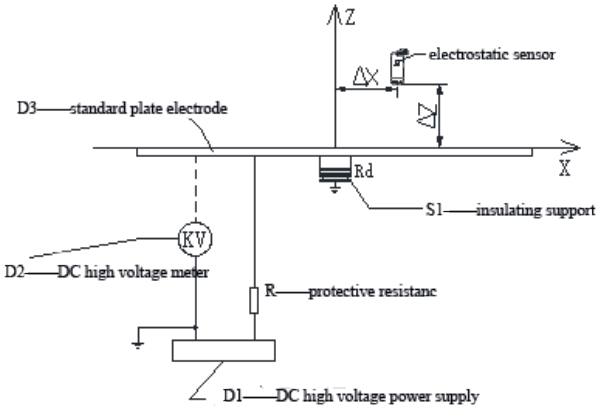
S1——insulating support

S2——graduated scale, the measurement range is 0mm ～ 750mm and the measurement uncertainty is less than 0.5mm.

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 performance

■ 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 virtural 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.

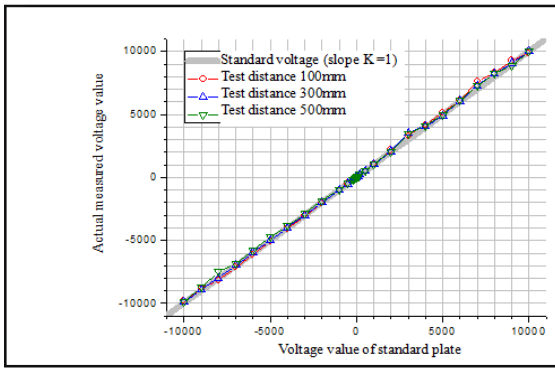


Figure 1-1 Standard test data chart of standard plate electrode

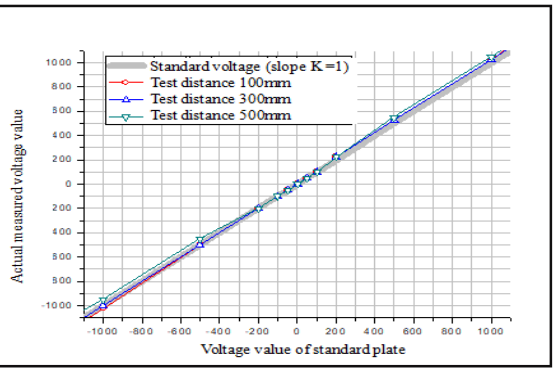


Figure 1-2 Vertical test data chart of standard plate electrode

■ 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:

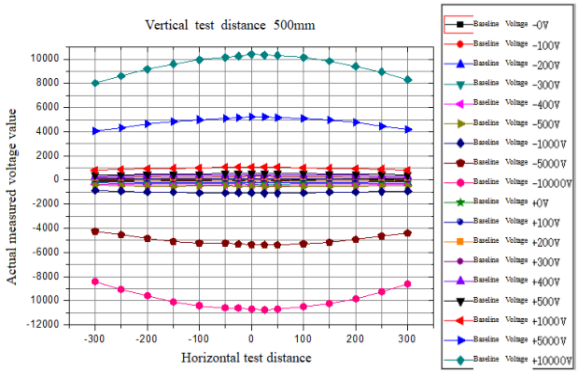


Figure 2-2 Horizontal test data graph of the standard plate electrode when the vertical distance is 500mm

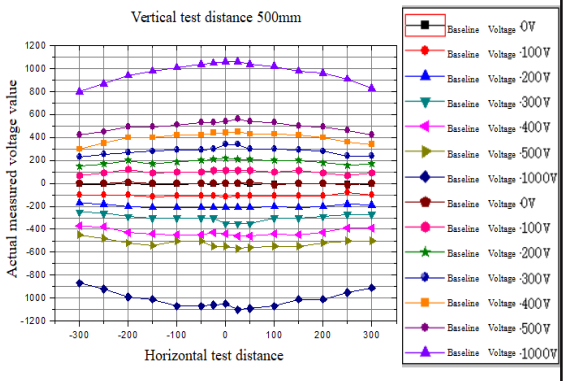


Figure 2-2 Horizontal test data graph of the standard plate electrode when the vertical distance is 500mm

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 -200mm≤X≤200mm horizontal distance.

Product performance

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:

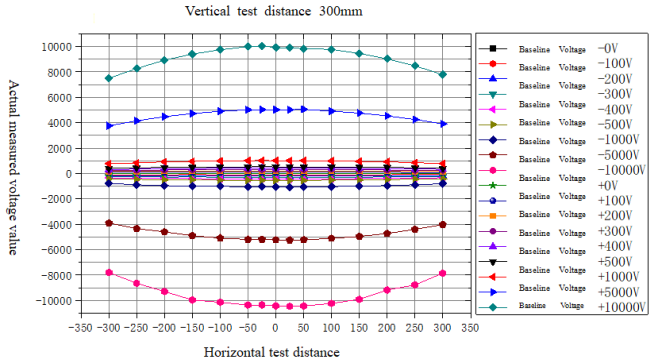


Figure3-1 Horizontal test data graph of the standard plate electrode when the vertical distance is 300mm

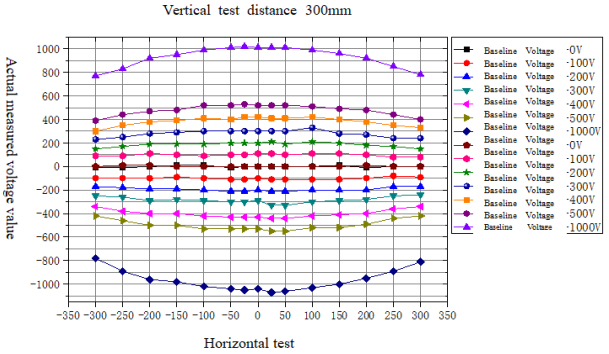


Figure 3-2 Horizontal test data graph of the standard plate electrode when the vertical distance is 300mm

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 -200mm≤X≤200mm 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:

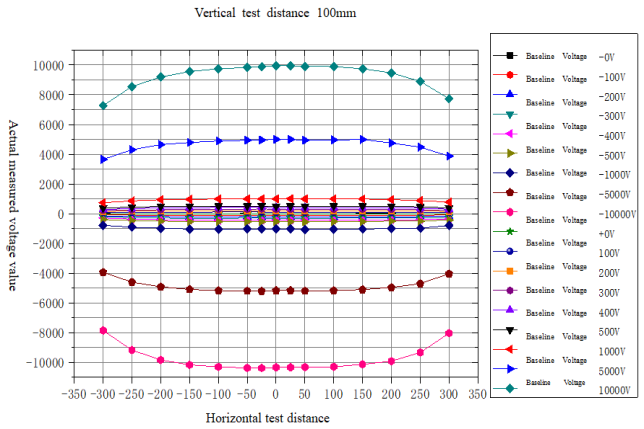


Figure 4-1 Horizontal test data graph of the standard plate electrode when the vertical distance is 100mm

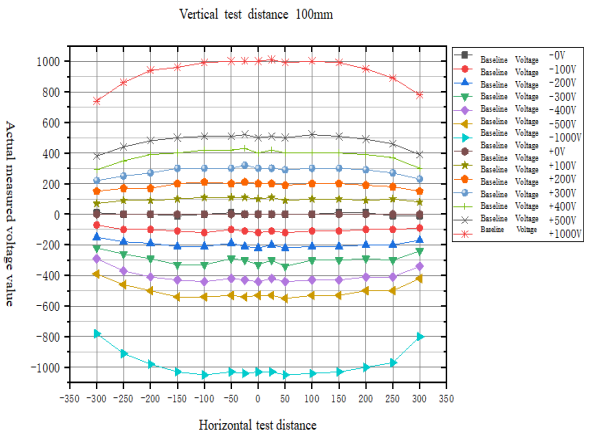


Figure 4-2 Horizontal test data graph of the standard plate electrode when the vertical distance is 100mm

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 -200mm≤X≤200mm horizontal distance and .

Product parameters and technical functions

① Technical specifications

No.	Technical specifications	
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）
		NPN （<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	Startup stand-by time	5S
14	Infrared control distance	＜ 20°，1m

※ 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.

② 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	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	
	7	250mm	±20000V	20V		±40V	
2	8	300mm	±20000V	10V		±20V	√
	9	350mm	±20000V	15V		±30V	×
	A	400mm	±20000V	15V		±30V	
	B	450mm	±20000V	15V		±30V	
3	C	500mm	±20000V	10V		±30V	√
	D	550mm	±20000V	15V		±30V	×
	E	600mm	±20000V	15V		±60V	
	F	700mm	±20000V	20V		±80V	

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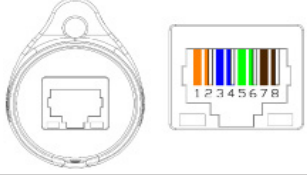
③ Wiring information of network interface:

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	C1
	8	White -brown	C2
	9	Metallic shield shell	PE

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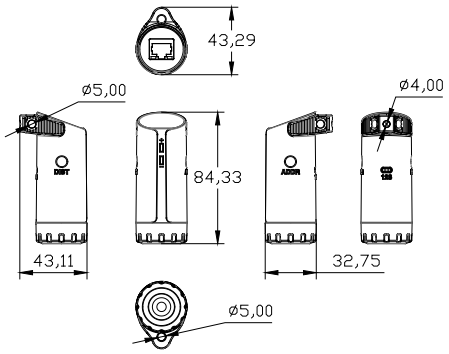
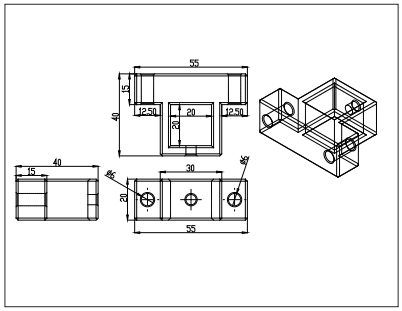
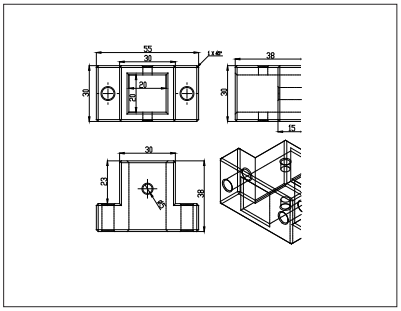
Dimension of electrostatic sensor

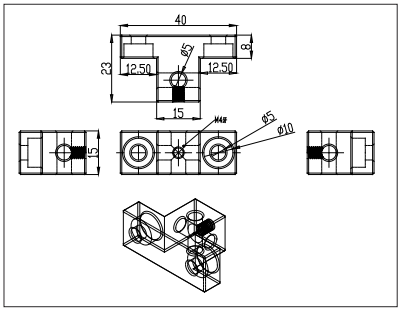
Unit : mm



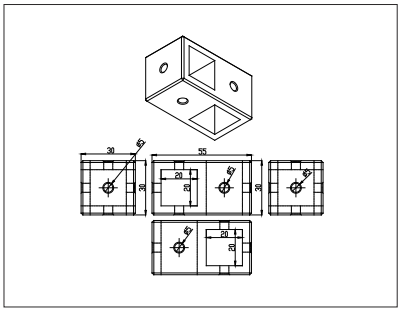
Structure chart of fixing parts



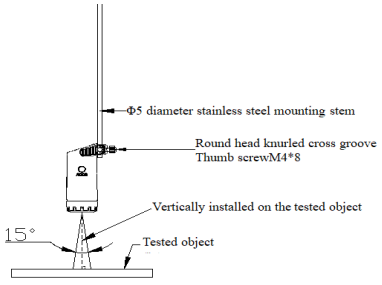




Structure chart of installation rod connection



Schematic diagram for installation position



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Speciality Creates Value

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