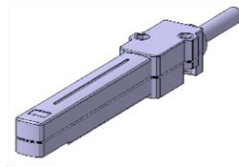




ORIGINAL INSTRUCTIONS

Instruction Manual
Electrostatic sensor
IZD10-110 / IZD10-510



The intended use of this product is to detect an electrostatic potential and provide an output signal.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) ⁽¹⁾, and other safety regulations.

- ⁽¹⁾ ISO 4414: Pneumatic fluid power - General rules relating to systems.
- ISO 4413: Hydraulic fluid power - General rules relating to systems.
- IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
- ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

	Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

2.1 Ionizer Specifications

Model	IZD10-110	IZD10-510
Potential Measurement ^(Note)	±0.4 kV (at detection distance: 25 mm)	±20 kV (at detection distance: 50 mm)
Output Voltage	1 to 5 V (output impedance: approx. 100Ω)	
Effective Detection Distance	10 to 50 mm	25 to 75 mm
Linearity	±5% F.S. (at detection distance: 25 mm)	±5% F.S. (at detection distance: 50 mm)
Output Delay time	100 ms or less	
Power supply voltage	21.6 to 26.4 VDC (24 VDC ±10%)	
Current Consumption	40 mA or less	
Ambient temperature	0 to 50°C	
Ambient Humidity	35 to 85% RH (no condensation)	
Material	Head and amplifier case: ABS	
Vibration resistance	Durability 50 Hz, Amplitude 1 mm (X,Y,Z each for 2 hours)	
Shock resistance	100 m/s ²	
Weight	185 g (including cable)	

Note) The relationship between the measured potential and output voltage varies depending on the detection distance.

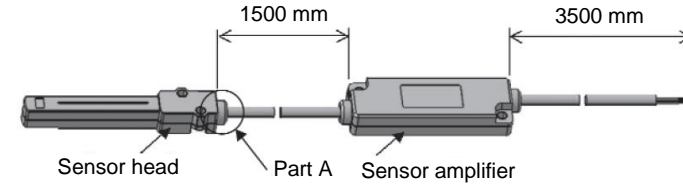
Warning

Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

2 Specifications (continued)

2.2 Product Outline

The electrostatic sensor consists of a sensor head and sensor amplifier.



There are 2 type of electrostatic sensor as follows:

IZD10-110

The purpose of this sensor is to confirm the static electricity elimination effect of the ionizer. The sensor is set so that the detected charged potential is output in a relatively small range of charged potential. Refer to the drawing below for the sensor output voltage for a given level of charge when the distance between the sensor and measured subject is 25mm.

For identification the colour of Part A on the sensor head is equal to the sensor head.

IZD10-510

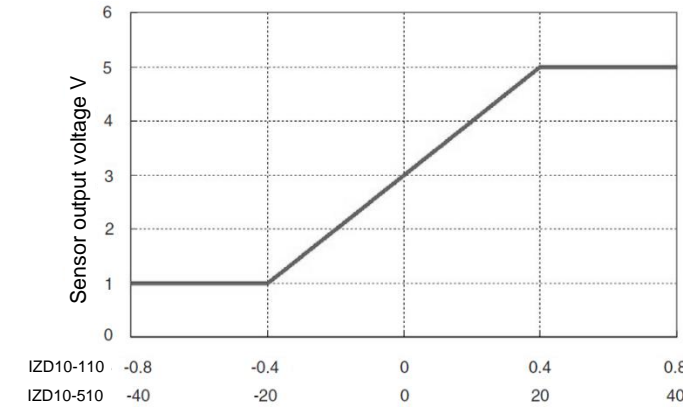
The purpose of this sensor is to confirm the potential of the charged object. Therefore, the sensor is set so that it detects the charged potential of high voltage.

Refer to the drawing below for the sensor output voltage for a given level of charge when the distance between the sensor and measured subject is 50mm.

For identification the colour of Part A on the sensor head is yellow.

2.3 Relationship between charged potential and sensor output

Distance from measured object: IZD10-110 = 25 mm
IZD10-510 = 50 mm



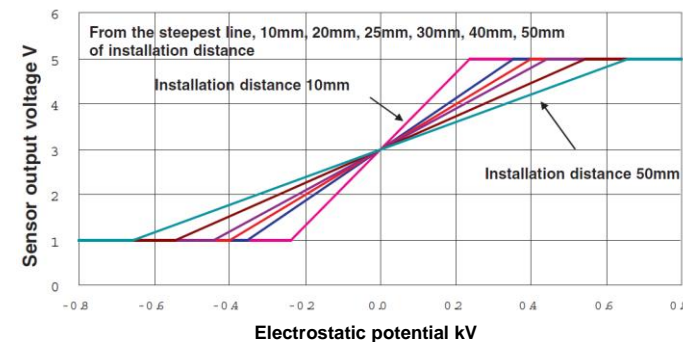
The relationship between the output voltage of the electrostatic sensor and detected electrical charge depends on the distance between the sensor head and measured object.

Refer to the Output signal graphs for the relation between the output voltage of the electrostatic sensor and detected charged potential based on installed distance.

2.4 Output Signal

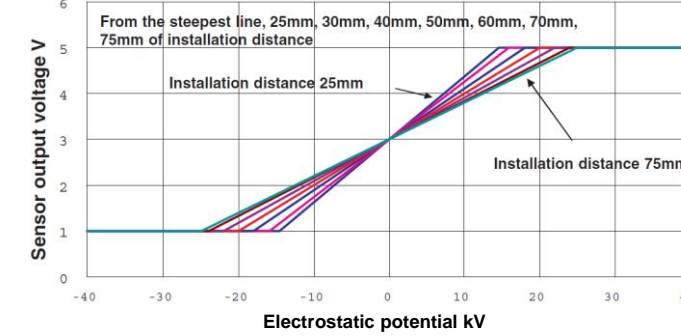
When measuring an object using the electrostatic sensor, the voltage output for a particular level of charged potential varies with the sensor installation distance. (Installation distance in the chart indicates the distance between measured object and the electrostatic sensor).

IZD10-110

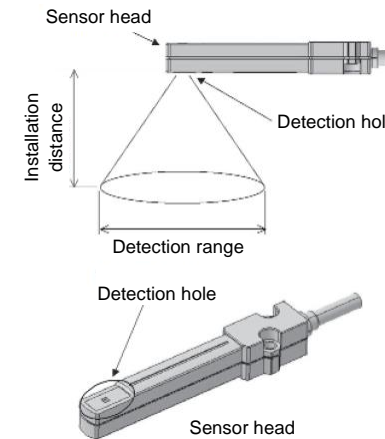


2 Specifications (continued)

IZD10-510



2.5 Detection Range



IZD10-110

Installation distance	Detection range
10 mm	45 mm
20 mm	85 mm
25 mm	100 mm
30 mm	120 mm
40 mm	150 mm
50 mm	180 mm

IZD10-510

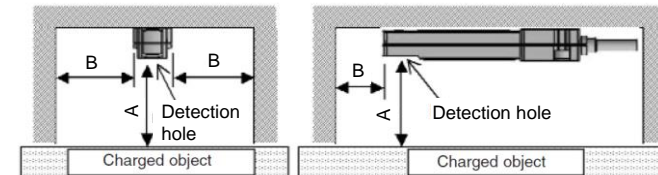
Installation distance	Detection range
25 mm	100 mm
30 mm	120 mm
40 mm	150 mm
50 mm	180 mm
60 mm	205 mm
70 mm	225 mm
75 mm	235 mm

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Install the electrostatic sensor away from any walls, refer to the drawing and table below for minimum installation distances. Correct measurement of electrical potential will not be possible if the clearances are not maintained.



Installation distance (mm)

	A	10	20	25	30	40	50	60	70	75
B	20	40	45	55	65	75	90	100	105	

- After installation, confirm that the charged potential is correctly measured. Detected value of charged potential depends upon local installation conditions. Confirm these conditions before operation.
- Keep adequate space for maintenance and wiring when mounting. Electrical entry of sensor shall have sufficient space for attachment / removal of cable after installation.

3 Installation (continued)

- Do not bend the cable more than the minimum bend radius. This is to ensure that the mounting bases at any of the electrical entry points on the sensor or amplifier, are not overly stressed. To avoid any acute bends in the cable, securely fix it as close to the sensor and amplifier as possible.
- Stressed wiring can lead to malfunction, disconnection and even fire. Minimum bend radius of sensor cable = 25mm. Note. The bend radius is that allowed for fixed wiring at 20°C. If the cable is bent with the temperature below 20°C, then excess stress will be applied to the electrical entries of the sensor and amplifier units. Increased stress will be applied even if the bend radius is greater than the minimum allowed.
- Install only on a flat surface. A curved or uneven mounting surface may cause excessive force to be applied to the frame or case, which may result in damage and failure.
- Do not drop or hit. Do not drop, hit or apply excessive shock to the product. This may result in damage and failure.
- Do not use in areas subject to electrical noise. It may cause malfunction, deterioration or damage to internal components. Take measures to prevent noise at source and avoid power and signal lines from coming into close contact.
- Tighten with the specified torque. If the tightening torque is exceeded the mounting screws and brackets may be broken. If the tightening torque is insufficient, the mounting screws and brackets may become loose.
- Do not allow any metal objects to come into contact with the sensor detector head. Damage to the sensor may lead to improper performance or failure.
- Do not apply tape or seal to the product. If conductive adhesive or reflective paint is contained in the tape or seal, it is possible that due to the dielectric effect, charge could build up causing an electro-static discharge or electrical leakage.
- Install or adjust the product only after power supply is turned off.

3.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat.
- Use only within the specified ambient temperature range. The operating ambient temperature range is 0 to 50°C. Rapid temperature changes can cause condensation to form, even if the ambient temperature does not exceed the operating temperature range.
- This product is not immune to lightning strikes. Protection against lightning should be provided for the device.
- Environments to avoid. Do not use or store under the following conditions, as these may cause equipment failure:
 - Ambient temperatures outside the range 0 to 50°C.
 - Ambient humidity outside the range 35 to 85 % RH.
 - Areas where rapid temperature changes may cause condensation.
 - Areas where corrosive gas, flammable gas or other volatile flammable substances are stored.
 - Areas where the product may be exposed to conductive powder such as iron powder or dust, oil mist, salt, organic solvent, machining chips, particles or cutting oil.
 - Directly in the path of air conditioners.
 - In enclosed, poorly ventilated areas.
 - Exposed to direct sunlight and/or radiant heat.
 - Areas where strong electromagnetic noise is generated, such as strong electrical and magnetic fields or supply voltage spikes.
 - Areas where the product may be subject to electro-static discharge.
 - Areas where RF noise is generated.

3 Installation (continued)

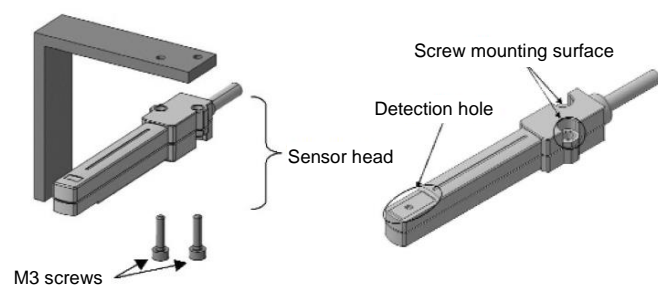
- Areas prone to lightning strikes.
- Areas where the product may receive direct impact or vibration.
- Areas where the product may be subject to forces or weight that could cause physical deformation.

If any of these conditions are unavoidable, take appropriate protection measures.

3.3 Mounting

3.3.1 Sensor Head mounting

- When using the electrostatic sensor, install it so that the detection hole is within range of the object. Refer to 2.5 Detection range.
Note. The distance between the detection hole and inspected object depends on the sensor model. Refer to Specifications.
- The charged potential of the inspected object may be discharged to the sensor head. Keep the object and the sensor head apart when installing.
- Discharge to the sensor head may lead to damage of the sensor head. The output signal and detection range depend upon the installation distance, refer to 2.4 and 2.5.
- Use two M3 screws for mounting the sensor head (not supplied).



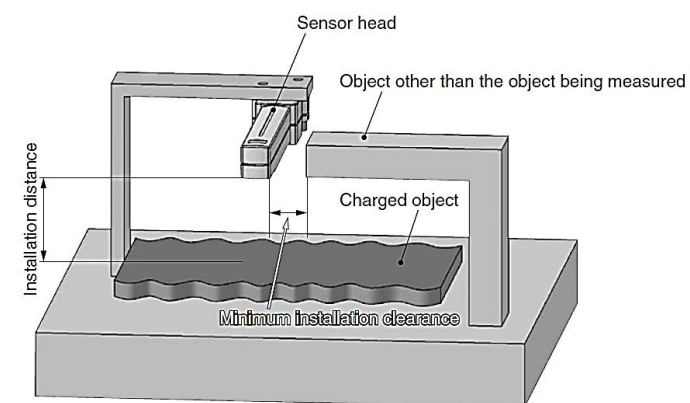
Assemble the M3 screw on the screw mounting surface. Mounting from the opposite side will cause damage to the sensor head.

- Due to its construction, the case of the sensor head is common with GND. Care should be taken not to create a short circuit between the +24V power supply and case during installation. (2) Do not drop, hit or apply excess impact (10m/s² or more). The detection hole is open to enable the sensor to detect static electricity. If foreign material or objects enter the opening, the sensor could be damaged, rendering correct detection of static electricity impossible.
- Do not pull the cable out of the sensor head or twist it from the root of the head. If the cable is pulled or twisted with force, the sensor head may be disconnected or damaged.

• Precautions for installation

- If an object other than that to be measured is placed close to the electrostatic sensor, the output of the sensor may become inaccurate. Any charge on the undesired object can interfere with the correct detection of the charge intended for measurement.
- Do not place any objects, including the electrostatic sensor cable, close to the detection hole.
- If another object must be installed near to the electrostatic sensor, ensure that the minimum installation interval, shown in the table below, is maintained.
- An insulating layer, such as paint or other surface treatment, must not cover any brackets used to fix the electrostatic sensor.

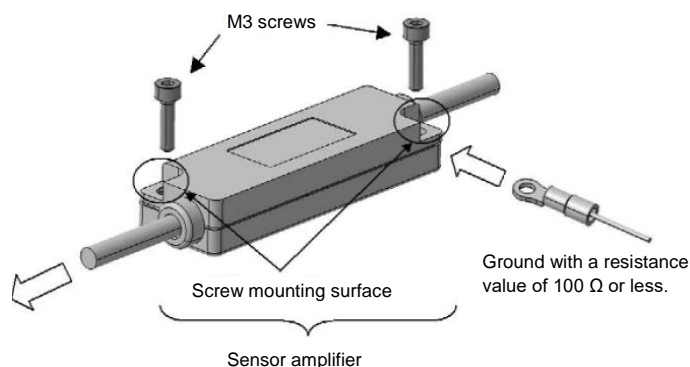
3 Installation (continued)



Installation distance	10	20	25	30	40	50	60	70	75
Installation interval	20	40	45	55	65	75	90	100	105

3.3.2 Sensor Amplifier mounting

- Mount the sensor amplifier with two M3 screws (not supplied with sensor amplifier). Assemble the M3 screw on the screw mounting surface. Mounting from the opposite side will cause damage to the sensor amplifier.
- Recommended tightening torque for M3 screws: 0.61 to 0.63 N•m.
- Do not pull the cable out of the sensor amplifier or twist it from the root of the amplifier. If the cable is pulled or twisted with force, the sensor amplifier may be disconnected or damaged.
- Sensor amplifier case is common with FG. It must be grounded with a resistance less than 100 Ω .
- Recommended crimp terminal: Insulated crimp terminal manufactured by Nichifu, part number TMEV1.25-3.



4 Wiring

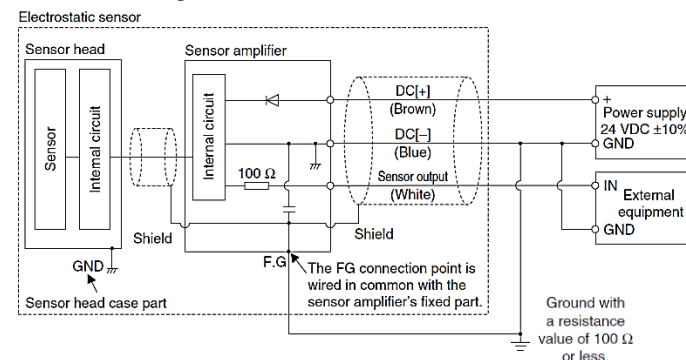
4.1 Electrical Connections

Warning

- Ensure the power supply has adequate capacity to meet the specifications.
- Only connect to SELV type power supplies, which have reinforced insulation to the low voltage mains of the building installation.
- Ensure safety of wiring and surrounding conditions before supplying power.
- Do not connect / remove wiring with power supplied to avoid malfunction of the electrostatic sensor. Remove power supply (including unplugging and removing the connector).
- Using signal lines and high voltage lines close together can lead to errors because of noise. Keep them separate.
- Ensure the wiring is correct before operation. Faulty wiring can lead to product damage and malfunction. Application of 24 VDC from the sensor output will cause damage to the internal circuit.

4 Wiring (continued)

4.2 Circuit Diagram



Warning

Always ground the electrostatic sensor.

Wire colour	Signal	Description
Brown	DC(+)	Power supply 24 VDC
Blue	DC(-)	Power supply 0 V
White	Sensor output	1 to 5 V analogue output

- When cables for connecting external equipment are cut in short lengths, do not connect the shield line (shield line is common with amplifier case). Frame ground should be connected to the amplifier case side).

4.3 Ground connection

Warning

- The GND connection must be grounded to a resistance of 100 Ω or less.
An exclusive power supply is recommended for the power to actuate the sensor. If other components are connected to this power supply when static electricity is discharged to the sensor head or noise interrupt GND, any connected component could malfunction or be damaged.

5 How to Order

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for "How to Order" information

6 Outline Dimensions (mm)

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for "Outline dimensions".

7 Maintenance

7.1 General maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

7 Maintenance (continued)

- Periodic inspection

Periodic inspection is necessary to ensure operation without failure. The sensor should only be inspected by experienced personnel with sufficient knowledge for the task.

- To avoid electric shock, failure, fire etc. do not service or modify the sensor.
- Non-SMC serviced or modified product is not guaranteed to meet the published specification.
- Failure to follow proper procedures may cause the product to malfunction and could lead to damage to other equipment or machinery.
- Do not make any modifications to the product
- Do not disassemble the product, unless required by installation or maintenance instructions.

8 Limitations of Use

8.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

Warning

- Failure to follow proper procedures may cause the product to malfunction and cause damage to other equipment or machinery.
- Do not drop, hit or apply excess impact (10 m/s² or more). Even if the outside of the electrostatic sensor does not appear to be damaged, internal parts may be, resulting in malfunction.
- To avoid electric shock or other potential accidents, do not handle with wet hands.
- Wait for 10 minutes or longer after applying the power.
The detected value may be unstable immediately after supplying the power.

9 Product Disposal

This product shall not be disposed of as municipal waste. Check your

local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

10 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.

SMC Corporation

URL : <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan
Specifications are subject to change without prior notice from the manufacturer.
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