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# OPERATION MANUAL

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PRODUCT NAME: Ionizer

MODEL: IZN10 Series

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- Read this operation manual carefully to understand before installation and operation.
- Pay extra attention on the clause concerning the safety.
- Keep this operation manual available whenever necessary.


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# 1. Safety instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard by labels "**Caution**," "**Warning**" and "**Danger**" to ensure safety. be to observe ISO4414, JIS B8370 and other safety precautions.

 CAUTION Operator error could result in injury or equipment damage.

 WARNING Operator error could result in serious injury or loss of life.

 DANGER In extreme conditions, there is a possibility of serious injury or loss of life.

- 1) ISO 4414: Pneumatic fluid power – Recommendation for application of equipment to transmission and control systems
- 2) JIS B 8370: Rule for Pneumatic System

## WARNING

### **1. The compatibility of equipment is the responsibility of the person who designs the system or decides its specifications.**

Since the products specified here are used in various operating conditions, their compatibility with the specific system must be based on specifications or analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

### **2. Only trained personnel should operate machinery and equipment.**

This product generates high voltage, so it can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of systems should be performed by trained and experienced operators.

### **3. Do not service machinery/equipment or attempt to eliminate components until safety is confirmed.**

- 1) Inspection and maintenance of the machinery and equipment should be performed after confirmation of safety such as grounding, prevention of electric shock and prevention of other types of injury.
- 2) When equipment is to be eliminated, confirm the safety process as mentioned above. Cut air pressure supply and electric power supply that are the energy source for the equipment, and exhaust all residual compressed air in the system.
- 3) Before machinery/equipment is re-started, take measures to prevent short circuit etc. with care.

### **4. Contact SMC if the product is to be used in any of the following conditions.**

- 1) Conditions and environments beyond the given specifications, or if product is used outdoors.
- 2) Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
- 3) An application which has the possibility of having negative effects on people, property, or animals requiring special safety analysis.

## Selection

### **WARNING**

1. The ionizer (hereinafter referred to as the “product”) is intended to be used for the general FA devices. If other applications (especially those indicated in 4 on page 2) are used, contact SMC before use.
2. Use under specified voltage and temperature.  
Voltage out of specification may cause malfunction, breakage, electric shock or fire.
3. Use clean compressed air for fluid.  
Do not use inflammable or explosive gas for fluid. It may cause fire or explosion. When fluid other than compressed air is used, contact a SMC service representative.
4. The product doesn't incorporate explosion-proof construction.  
Do not use this product in a place where a dust explosion might be triggered or inflammable or explosive gas is present. It may cause fire.

### **CAUTION**

1. The product has not been washed.  
Flush and confirm its purification level before bringing into a clean room.

## Handling

### **CAUTION**

1. Do not drop, hit or otherwise apply excessive impact (10 G or more) when handling.  
Though the product itself doesn't break, the inside construction may be broken and cause malfunction.
2. When cable is mounted or removed, pinch the modular plug claw with fingers and insert or take out the plug vertically. If mounted or removed in an inappropriate direction, the mounting part of the modular jack may be damaged and cause operation failure.

## 2. Specifications

Model number of ionizer		IZN10-□□ (NPN)	IZN10-□□P (PNP)
Ion generating method		Corona discharge type	
Voltage applying method		High frequency AC type	
Discharge output <sup>Note 1)</sup>		2500V	
Ion balance <sup>Note 2)</sup>		±10 V at max.	
Ozone generated amount <sup>Note 3)</sup>		0.03 ppm (0.05 ppm for energy saving charge elimination nozzle)	
Air purge	Fluid	Air (clean and dry)	
	Operating pressure <sup>Note 4)</sup>	0.05 MPa~0.7 MPa	
	Connected tube diameter	□6 and □1/4 inch	
Power supply voltage		24VDC ± 10%	
Current consumption		80 mA (When input and output signals are not used)	
Input signal	Discharge stop signal	GND to connection The voltage to turn on is 0.6V or less. Current consumption: 5 mA or less	+24V to connection The voltage to turn on is from +19V to the power supply voltage.  Current consumption: 5 mA or less
	Reset signal		
	External switch signal		
Output signal	Discharge signal	Max. load current: 40 mA Residual voltage: 1 V or less (with load current of 40 mA) Max. applied voltage: DC 28 V	Max. load current: 40 mA Residual voltage: 1 V or less (with load current of 40 mA)
	Error signal		
	Maintenance signal		
Effective charge eliminating distance		20~500 mm	
Ambient temp. Fluid temp.		0~55°C	
Ambient humidity		35~65% RH (With no condensation)	
Material		Body: ABS, Stainless Nozzle: Stainless Electrode needle: Tungsten	
Vibration resistance		Durable to 50 Hz with amplitude 1 mm for 2 hours in each X, Y and Z direction	
Impact resistance		10 G	
Weight		120 g	
Applicable standard/directive		CE (EMC directive: 89/336/EEC, 92/31/EEC, 93/68/EEC, 2004/108/EC, Low-voltage directive: 73/23/EEC, 93/68/EEC)	

Note 1) This is the value when measured by a probe with 1,000 MΩ and 5 pF.

Note 2) This specification is applicable when the distance between the charged object and the ionizer is 100 mm using the power saving static elimination nozzle, and the air purge pressure is 0.3 MPa.

Note 3) This is the value from which the background is drawn with a distance of 300 mm from the front face of the nozzle.

Note 4) Charge elimination is not available without air purge. Also, without air purge, internal ozone concentration will increase and adversely affect the product and peripheral equipment.

### 3. How to Order

**IZN10 - 01 P 06 Z - B1**

Series name

IZN10	High frequency AC nozzle type
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Nozzle shape

NIL	Type	
01	Energy saving charge elimination nozzle	
02	Large flow nozzle	
11	Piping female Note 1)	Rc1/8

Output specification

NIL	NPN
P	PNP

Piping diameter

06	f6: metric
07	f6.35 (1/4"): inch
16	f6: metric (elbow)
17	f6.35 (1/4"): inch (elbow)

Power supply cable

NIL	3m
Z	10m
N	Not provided

Bracket

NIL	Not provided
B1	L-bracket
B2	Swing bracket
B3	DIN rail mounting bracket

#### Service parts

##### Electrode needle assembly

· IZN10-NT

##### **B** Body Assembly

· IZN10 - A002 - 01 06

Nozzle shape

NIL	Type	
01	Energy saving charge elimination nozzle	
02	Large flow nozzle	
11	Piping female Note 1)	Rc1/8

Piping diameter

06	f6: metric
07	f6.35 (1/4"): inch
16	f6: metric (elbow)
17	f6.35 (1/4"): inch (elbow)

##### **B** Cartridge Assembly

· IZN10 - A003 - P

Output specification

NIL	NPN
P	PNP

#### Option

##### Manifold mounting parts set

Hexagon socket head bolts, spacer and hexagon nuts are included.

The ionizer and L-bracket or DIN rail mounting need to be ordered separately.

Manifold mounting parts

· IZN10 - ES 2

Mounting pitch

ES	17mm
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Number of manifold

2	2 stations
3	3 stations
4	4 stations

##### Electrode needle cleaning kit/IZS30-M2

#### Accessories

##### Power supply cable

· IZN10-CP(3m) · IZN110-CPZ(10m)

##### Bracket

- L-bracket/IZN10-B1
- Swing bracket/IZN10-B2
- DIN rail mounting bracket/IZN10-B3

## 4. Mounting

### 4-1. Precautions for mounting

#### Mounting

### WARNING

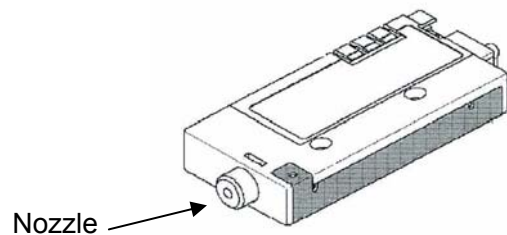
1. Provide required space for maintenance, wiring and piping at installation.  
Install connector and One-touch fitting for air supply to allow removal and mounting of cable and tube.  
Do not bend cable and tube at steep angles. Affix them straight, within the minimum bending radius to prevent applying stress to the installation base of the connector and One-touch fitting.  
Forcible installation and removal may cause malfunction, broken wires, fire or air leakage.  
Minimum bending radius: Power supply cable ······35 mm  
(Note: This is the allowable bending radius when affixing wiring at 20°C. If bending cable at lower temperatures, excessive force may be applied to the connector even within or below the minimum bending radius.)  
See instructions or catalog for minimum bending radius for tube.
2. If the product is mounted directly, mount it on a flat face.  
If the mounting face has a concave, convex, distortion and/or step, excessive force is applied to the product, which may cause damage and failure of the product. Also, dropping and other strong impact may cause failure and accident.
3. Do not use in a place subject to noise (electromagnetic wave, surge etc.)  
It may cause malfunction, or deteriorate or damage internal elements. Take measures to prevent noise sources and prevent lines from touching and mixing together.
4. Tighten within the specified torque.  
See the following table for the tightening torque. When exceeding the tightening torque, mounting screws, mounting bracket, etc. may be broken. The screw may loosen if tightened less than prescribed torque range.

Screw size	Recommended tightening torque
M3	0.61 to 0.63 Nm

5. Do not allow foreign matter or tools to enter the nozzle.  
The inside of the nozzle has electrode needles. If a metal tool makes contact with the electrode needles, it can cause electric shock, resulting in a sudden movement by the operator that can cause further injuries by such as hitting its body to peripheral equipment. Also, if the tool damages the electrode needle, the product may fail or cause an accident.

### High voltage

The electrode needles are subject to high voltage. If a foreign matter is put in the nozzle and makes contact with them, electric shock can make a sudden movement by the operator, which can cause injury. Therefore, do not to touch them.



6. Do not attach tape or seal on the product body.  
If conductive adhesive or reflective paint is contained in the tape or seal, dielectric phenomenon will occur due to the produced ion and it may lead to electrostatic charge and electric leakage.
7. Be sure to cut off the power supply before installing and adjusting the product.

### CAUTION

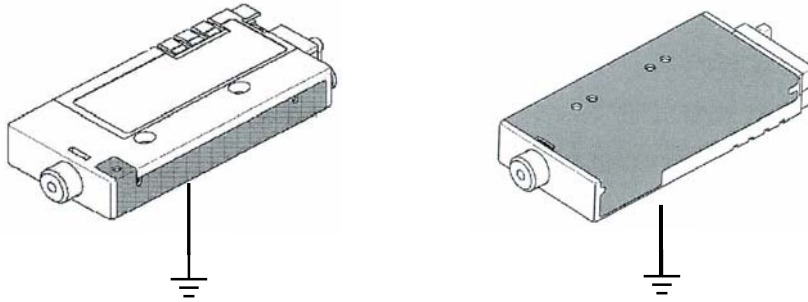
1. Be sure to check for proper charge elimination after mounting the product.  
The charge-elimination effect largely depends on ambient mounting conditions, operating conditions, etc. After mounting the product, check for proper charge elimination.  
Particularly, if there is a wall near the product, emitted ions can not reach a charged object for effective

charge elimination, and the charge-elimination effect can decrease.

## Wiring and piping

### **WARNING**

1. Check that power supply capacity is enough and voltage meets specification before piping.
2. Always use a UL listed/recognized power supply that is a class-2 power supply with DC 24 V and under 2.1 A.
3. To keep specified performance of the product, provide class D grounding to the metal (shaded) part around the external face of the product.  
Otherwise, not only can the charge-elimination capability of the product decrease, but electric shock and damage to the product and power supply can occur.



4. Be sure to cut off power supply before wiring (including connector plug-in/out).
5. Turn on the power after examining the wiring and surrounding situation thoroughly, and confirming safety.
6. Do not connect and disconnect connectors while supplying the power. The product may be broken and cause malfunction.
7. Installation of a high-voltage line and the power line in the same wiring route may cause malfunction due to noise. Install them separately.
8. Be sure there is no incorrect wiring before operation. Incorrect wiring may cause the product to break or malfunction.
9. Flush pneumatic piping before installing. Make sure that all dust, water droplets, oil etc. are eliminated before piping.

## Operating and storage Environment

### **WARNING**

1. Use within operating fluid and ambient temperature range.  
Operating fluid and ambient temperature range for the product, feedback sensor and auto-balance sensor are 0 to 50°C. Though ambient temperature is within specification, dew condensation may be generated where temperature is suddenly changed. Therefore do not use under such conditions.
2. Do not use the product in an enclosed space.  
The product utilizes a corona discharge and generates a slight amount of ozone and NOx. If it is used in a closed space, ozone is concentrated so much as to possibly affect human body. Therefore, it is necessary to set up a ventilation system in the space. Also, even with ventilation, the use of plural ionizers in a narrow space can increase the concentration of ozone, and so it should be noted that the ozone concentration must be 0.1ppm or less, which is a standard value for working place.
3. Take prevention measures against ozone.  
Equipment used around the product should have ozone-prevention measures. Also, check regularly that nearby equipment will not be affected adversely by exposure to ozone.



#### 4. Environment to avoid

Do not use or store under the following environments, as these may cause operation failure. If it is unavoidable, take the appropriate measures.

- a. Where ambient temperature exceeds 0 to 50°C.
  - b. Where ambient humidity exceeds 35 to 65% RH.
  - c. Where dew condensation is generated due to sudden temperature change.
  - d. Where there is corrosive gas, inflammable gas, or where volatile inflammable substances are stored.
  - e. Where the product is exposed to conductive powder such as iron powder and dust, oil mist, salt and organic solvent or machining chips, particles and cutting oil (water, liquid).
  - f. Where the product is directly exposed to the blow from air-conditioners.
  - g. Where seals and ventilation is not installed.
  - h. Where the product is exposed to direct sunlight and radiant heat.
  - i. Where strong electromagnetic noise is generated. (Strong electric field/strong magnetic field/surge.)
  - j. Where electricity is discharged on the product.
  - k. Where a strong high frequency is generated.
  - l. Where lightning disaster is expected.
  - m. Where the product is directly exposed to vibration and impact.
  - n. Where force or weight that causes deformity to the product is applied.
5. Do not use air containing mist or dust.  
Air containing mist or dust may lower the function and shorten the maintenance cycle. A dryer (IDF series), air filter (AF/AFF series) and mist separator (AFM/AM series) can be used to produce clean compressed air.
6. The product does not incorporate a protection to lightning surges.
7. The product can not be used without air purge.  
Without air purge, not only is the charge elimination not available, but also internal ozone concentration will increase and adversely affect the product and peripheral equipment. Therefore, be sure to perform air purge when energizing the product.

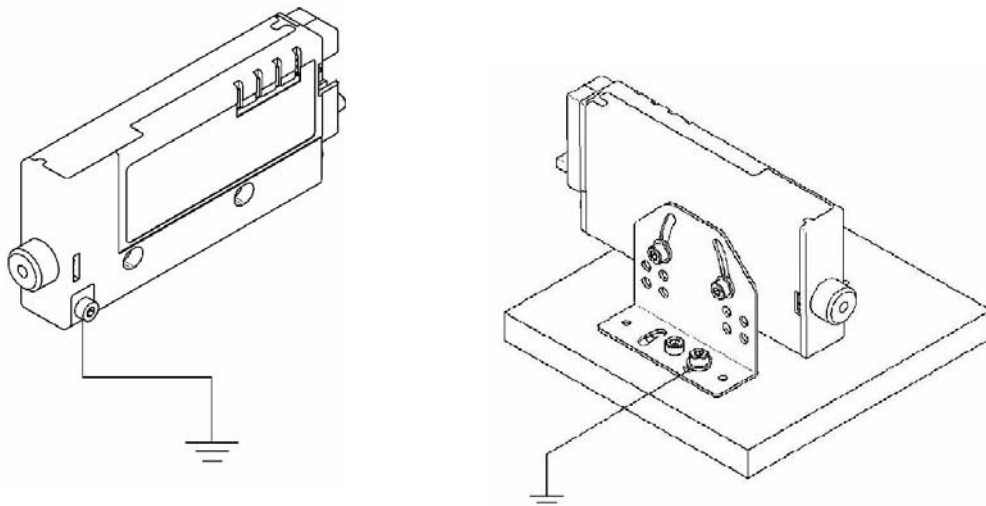
### 4-2.How to mount

Investigate the area generating static electricity, or the process or part emitting electrostatic interference preliminarily, and check the conditions under which effective charge elimination can be performed before mounting the product.

#### 4-2-1 Grounding

Provide class D grounding to the external face of the body or metal part of the bracket. Without grounding, charge elimination capability decreases, the ion balance breaks and electric shock and damage to the product and power supply may occur. Also, if the grounding is provided improperly, a maintenance alarm is outputted.

If the mounting area for the product is not provided with class D grounding, use a grounding tap for wiring.

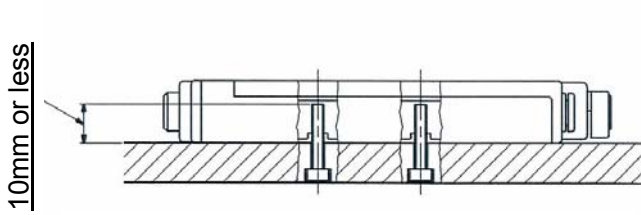


4-2-2 Mounting

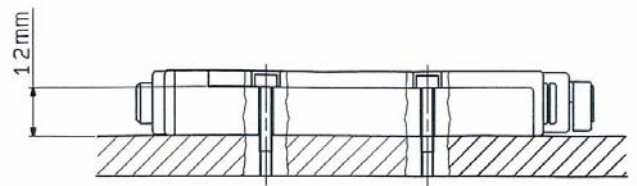
When mounting the product, use a M3 hexagon socket head bolts. Tightening torque is 0.61 to 0.63 Nm.

1) Body mounting tap or through hole

Referring to the figure below, affix the product using hexagon socket head bolts with optimum length.



Use a bolt with a max. screw-in depth of 10 mm or less



Use a bolt with a length of 12 mm or more.

Body tap

Through hole

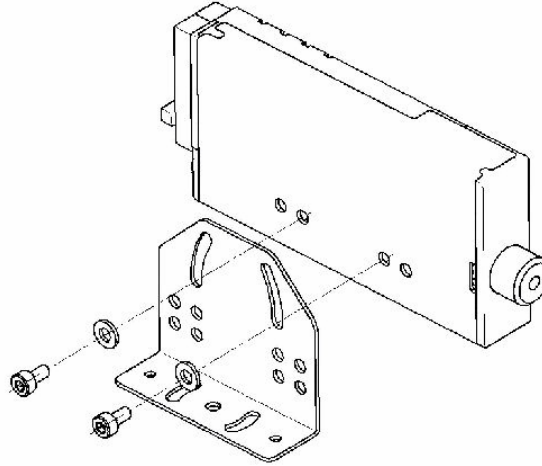
2) L-bracket

The L-bracket can be mounted in 4 different ways as shown below.

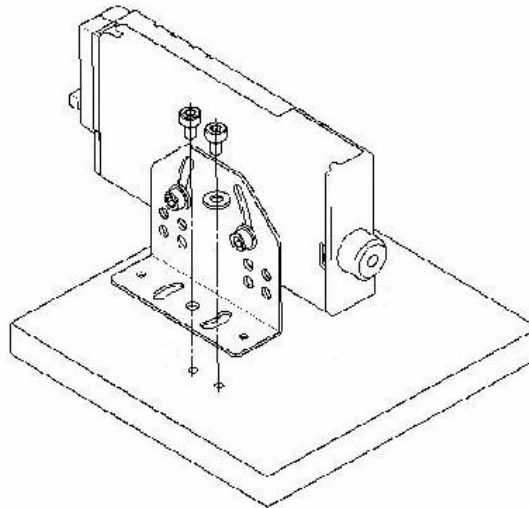
	Outward mounting	Inward mounting
Swing mounting		
Fixed mounting		

Outward mounting of L-bracket

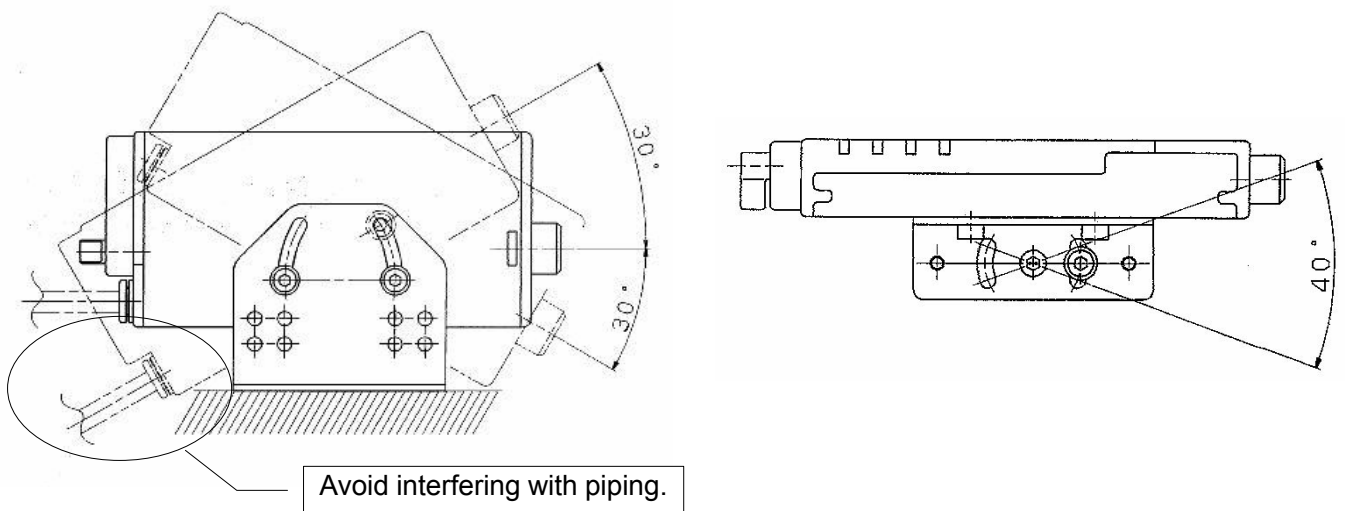
1. Prepare hexagon socket head bolts (M3 X 6) and washers attached to the product and mount the L-bracket.



2. Adjust the product to the desired mounting angle referring to figure 3 and fix it. For the oval hole, use the washer attached to the product. Hexagon socket head bolts are not included and need to be prepared separately.

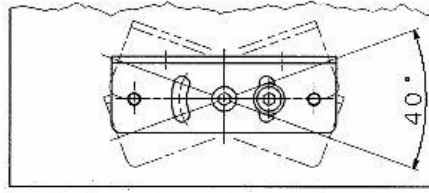


3. The mounting angle of the product can be adjusted in the following range.

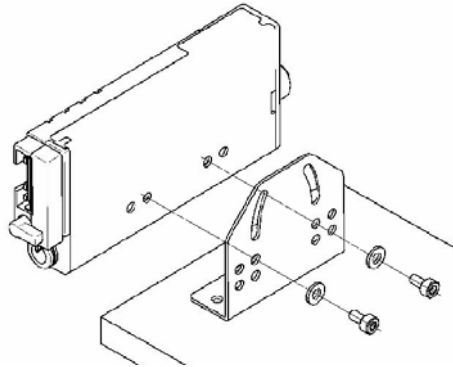


### Inward mounting of L-bracket

1. Before mounting the product, mount the L-bracket where the product will be installed. The mounting angle of the bracket can be adjusted in the following range. Hexagon socket head bolts are not included with the product and need to be prepared separately.

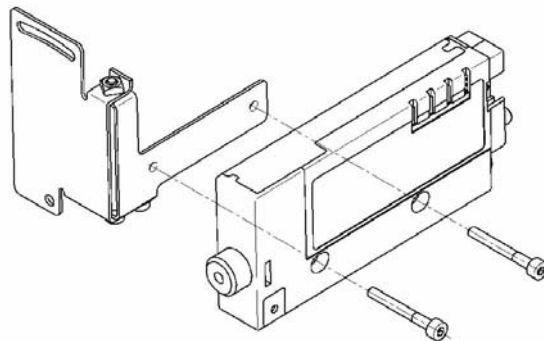


2. Affix the product with the hexagon socket head bolts (M3 X 6) and washers attached to the product. Tightening torque is 0.61 to 0.63 Nm.

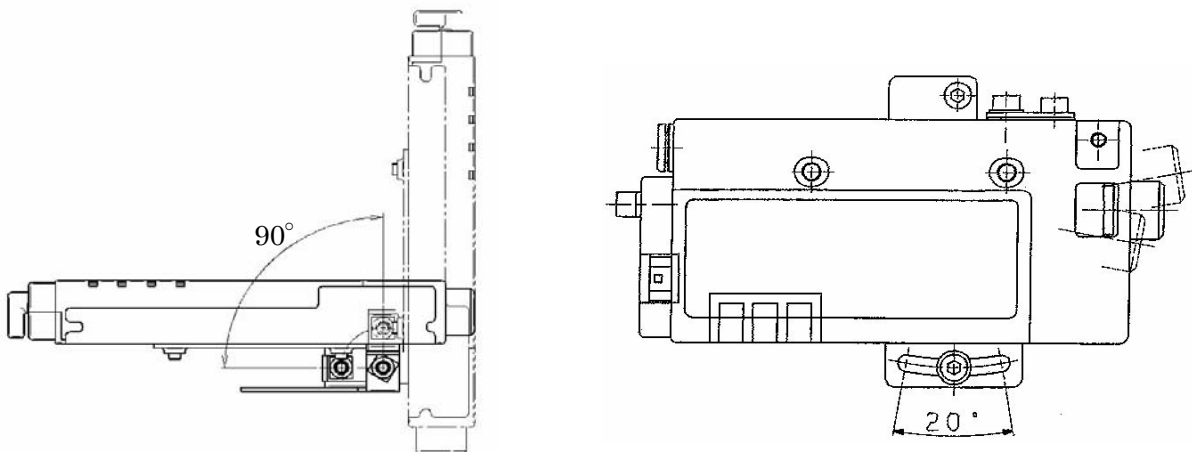


### 3) Swing bracket

1. Mount a swing bracket to the product with the hexagon socket head bolts and washers attached to the product. Tightening torque is 0.61 to 0.63 Nm.

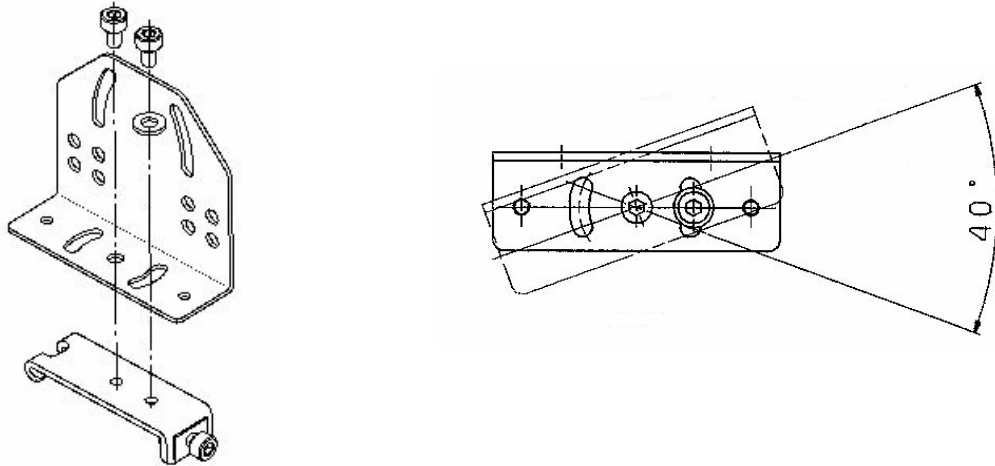


2. Adjust the product to the desired mounting angle and fix it.

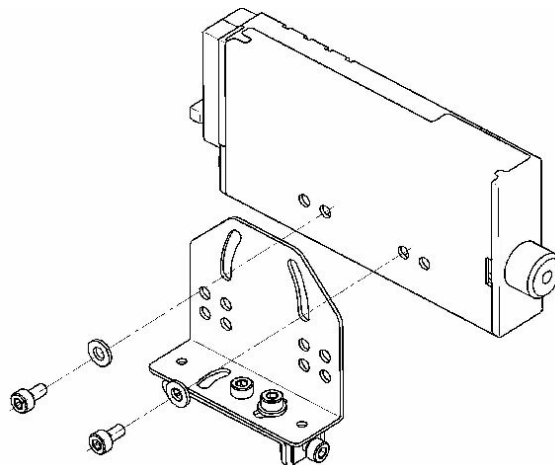


4) DIN rail mounting bracket

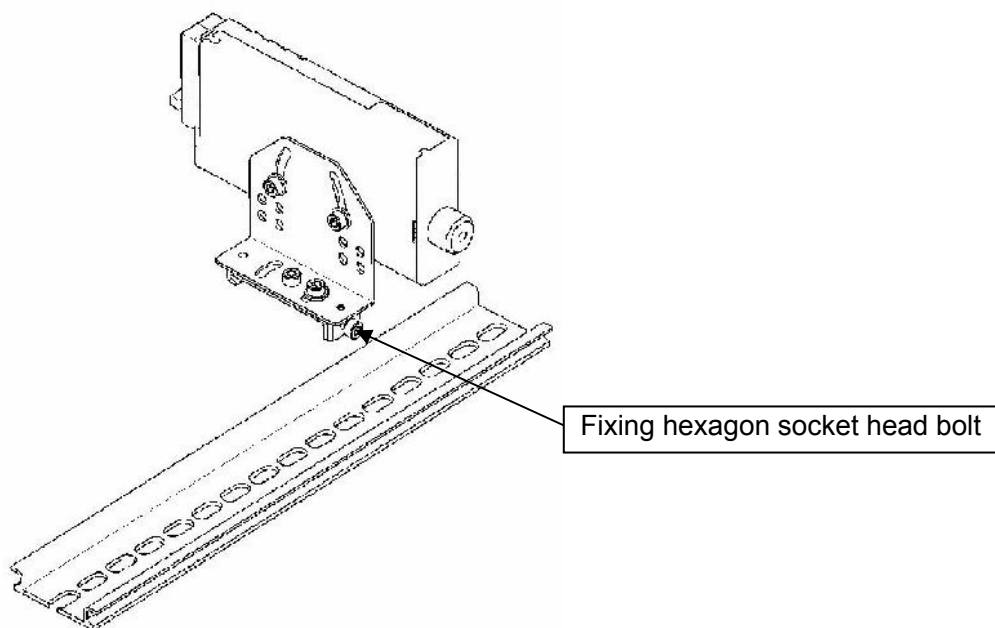
1. Adjust the L-bracket to the desired angle and fix it.



2. Mount the L-bracket to the product with the hexagon socket head bolts (M3 X 6) and washers attached to the product.



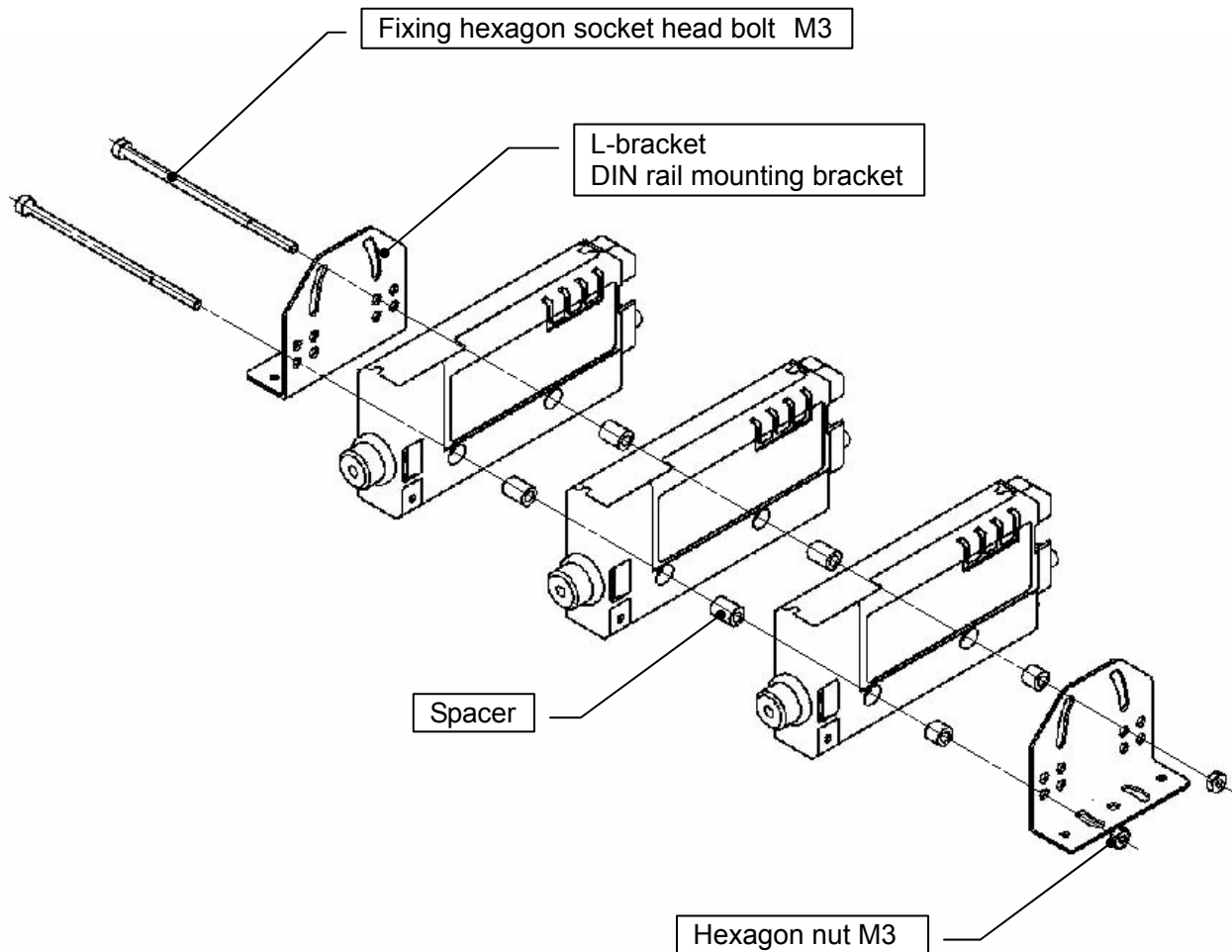
3. Mount the product to the DIN rail and tighten the socket head bolts to fix it.



## 5) Mounting

1. Insert the spacers between the counter bores of the body.
2. Hold the product by L-brackets from both ends and tighten the hexagon socket head bolts. Tightening torque is 0.61 to 0.63Nm.

The composition of parts to connect 3 ionizers is shown below.



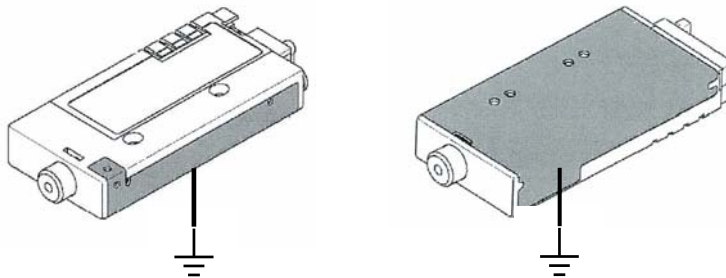
### 4-3.Wiring table

No.	Cable color	Signal name	I/O	Necessity of wiring	Specification
1	Brown	Power supply +24 V	—	○	—
2	Blue	Power supply GND	—	○	—
3	Orange	Discharge stop signal	Input	○	When the signal is turned off, discharge stops.
4	Pink	Reset signal	Input		When the signal is turned on and then off, the error signal is reset. When the signal is turned off: Continues normal operation.
5	White	Discharging signal	Output		The signal holds ON during discharge
6	Purple	Error signal	Output		The signal is turned off when error happens.
7	Yellow	Maintenance signal	Output		The signal is turned on when maintenance is due.
8	Gray	External switch signal 1	Input		When the signal is turned on, discharge stops.
9	Light blue	External switch signal 2	Input		When the signal is turned on, discharge stops.

• Necessity of wiring

○: Wiring necessary to operate the product

- In addition to the above wiring, provide class D grounding to the metal (shaded) part around the external face of the product. If the grounding is not provided or is provided improperly, specified charge elimination capability is not available. Also, the maintenance signal is turned on.



• Input signal

NPN: The signal is turned on when the product is connected with the power supply GND, and turned off when disconnected.

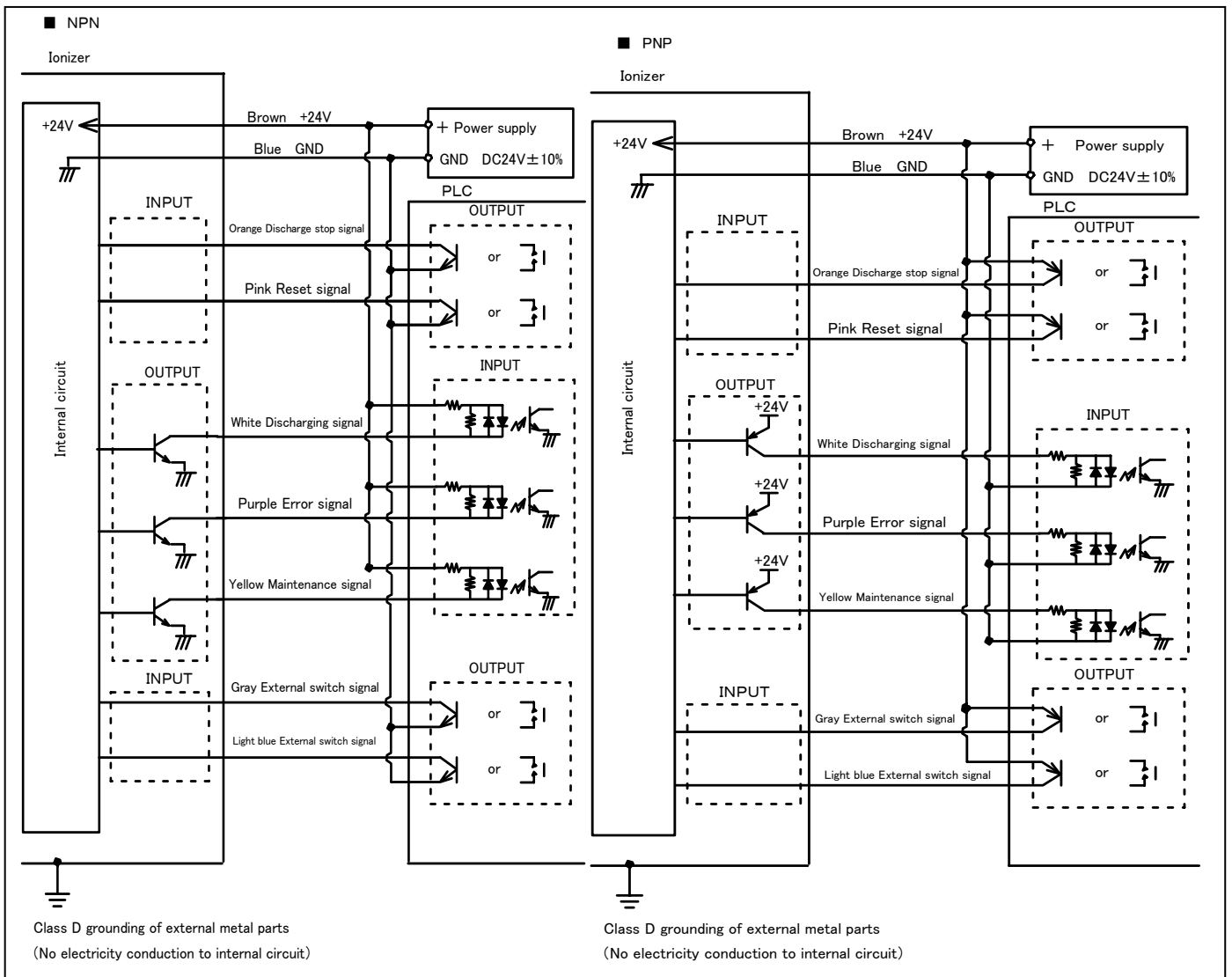
PNP: The signal is turned on when the product is connected with the 24 V power supply, and turned off when disconnected.

• Output signal

NPN: Signal ON when a output transistor is energized (with the power supply GND at the inside of the product) and OFF when de-energized.

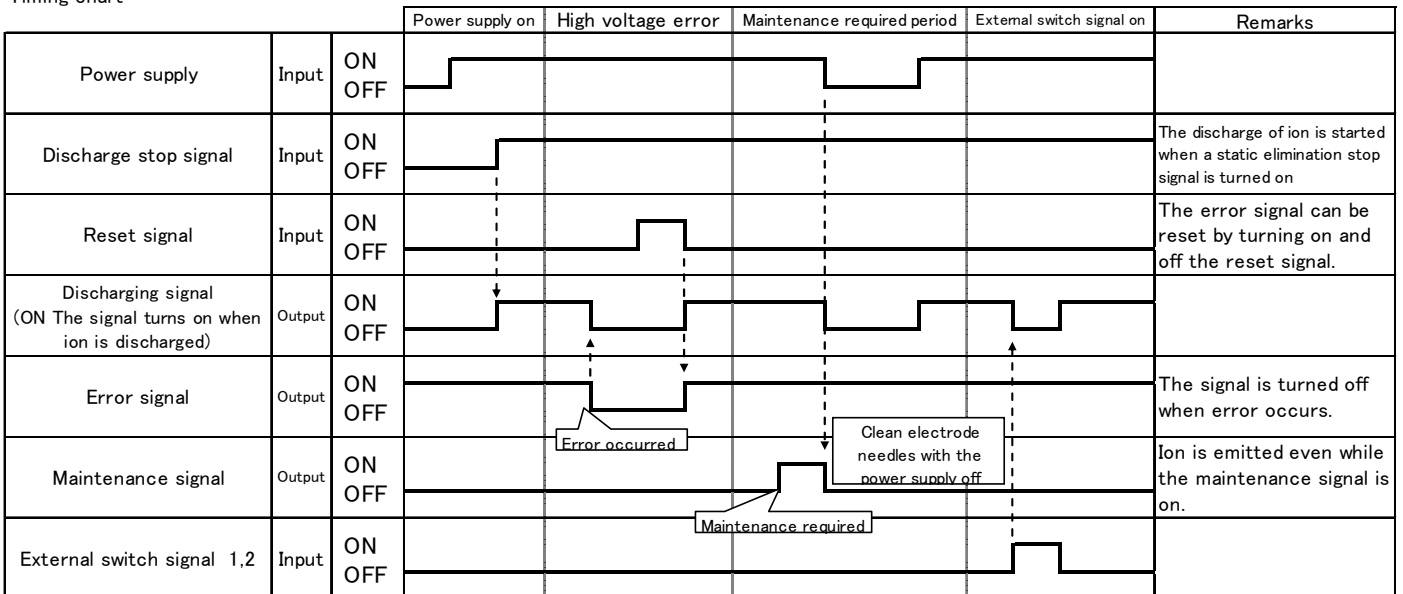
PNP: Signal ON when a output transistor is energized (with the 24 V power supply at the inside of the product) and OFF when de-energized.

## 4-4. Power supply cable wiring diagram



## 4-5. Timing chart

Timing chart





## 5. Functional Explanation

### 1. Detection of dirt on electrode needle

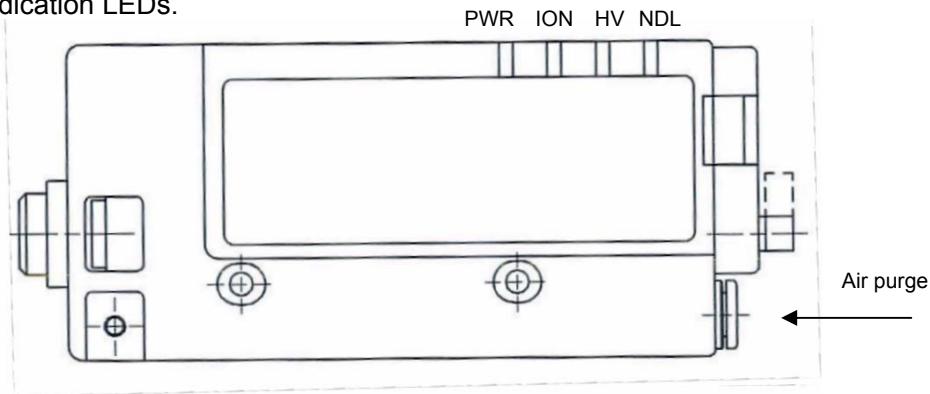
During operation reduced charge elimination capability due to a dirt or wear on electrode needles is monitored continuously. If it becomes necessary to clean the electrode needle, the LED for maintenance lights up on the display of the product and maintenance output signal is generated.

### 2. Input of external switch signal

There are two ports for external switch signal inputs.

If a pressure switch or electrostatic sensor is connected, discharge can be stopped for abnormal pressure or completion of charge elimination.

### 3. Name of indication LEDs.



Name	Indication	Color	Content
Power supply	PWR	Green	Lights up when the power supply is turned on.
Discharge	ION	Green	Lights up when discharge is performed.
High voltage error	HV	Red	Lights up when excessive current flows to the electrode needle.
Maintenance	NDL	Orange	Lights up when a dirt or wear on the electrode needle is detected.

### (b) LED state

Item	PWR	ION	HV	NDL	Remarks
Normal operation (turning on of discharge stop signal)	○	○			Ion emission
Normal operation (turning off of discharge stop signal)	○				Discharge stop
Detection of high voltage error	○		○		Discharge stop due to error detection
External switch signal 1	○				Discharge stop due to signal input
External switch signal 2	○				
Detection of dirt on electrode needle	○	○		○	Ion emitted continuously even dirt on needle is detected

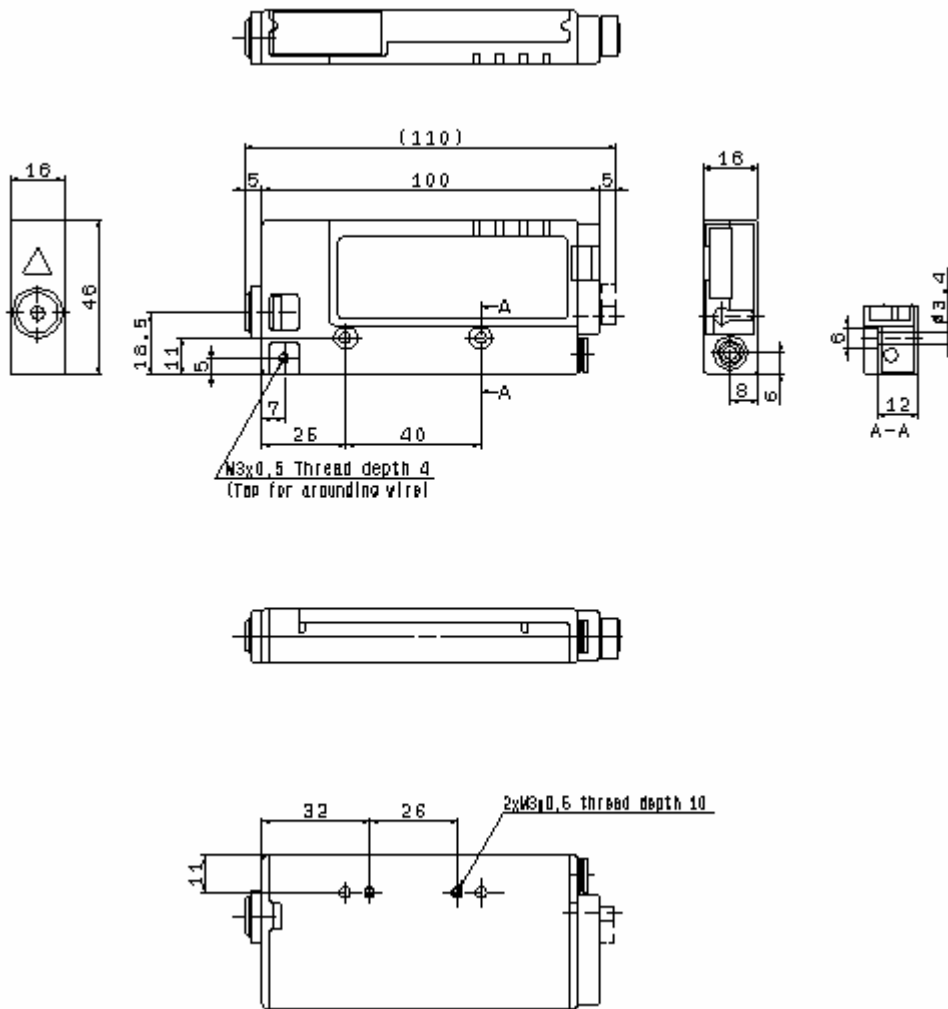
### 4. Content of alarm

Description	Content	How to reset
High voltage error	<p>Notifies that abnormal current such as high voltage leakage has occurred. "HV" LED lights up and ion emission is stopped. The error signal is turned off when error occurs.</p>	<p>Turn off the power supply, solve the error and restart the power supply. If the error is solved correctly, turn the reset signal on and off.</p>
Electrode needle maintenance period	<p>Notifies that maintenance of electrode needles is necessary. "NDL" LED lights up and maintenance signal is outputted.</p>	<p>Turn off the power supply, clean the electrode needle, and then restart the power supply.</p>

## 6. Outline Dimensions

IZN10-01 / IZN10-02

Energy-saving nozzle / Large-flow nozzle



## 7. Maintenance

### 7-1. Precautions for maintenance

#### Maintenance

## WARNING

1. Keep electrode needle clean with regular maintenance.  
Make sure that the product is operating without any failure with regular maintenance. Only those with proper knowledge and experience should perform maintenance on the equipment.  
Dust attached on the electrode needles due to long operating lowers the ability to eliminate static electricity. If electrode needle does not recover its ability to eliminate static electricity after cleaning, replace it with the new one. In order to maintain stable performance, regular maintenance and cleaning of electrode needles are recommended.
2. The tube and fitting must be handled as a consumable part.  
The tube and fitting that are connected to the female threads of piping of the product can deteriorate due to ozone and need to be replaced regularly.
3. Stop supplying power to the body without fail when cleaning the electrode needles or exchanging the electrode cartridge. Do not touch the electrode needles while energizing, or it may cause electric shock or accident.
4. Do not open the case to disassemble or reconstruct the product.  
It may cause electric shock, operation failure and disaster such as fire. In addition, note that if the product is disassembled or reconstructed it may no longer perform according to specifications and will not be covered by guarantee.
5. Do not operate the product with the wet hands.  
It may cause electric shock or accident.



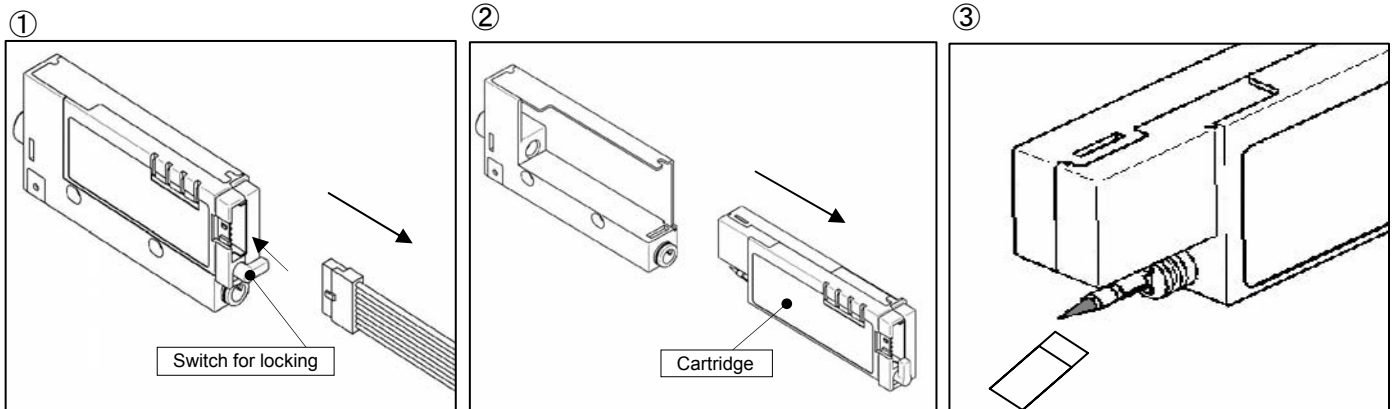
Caution  
for High Voltage

A high voltage generating circuit is installed. Be sure to stop the supply voltage at the maintenance. Do not disassemble / renovate the product as it may deteriorate the functions and cause risks due to electric shock and electric leakage.

## 7-2. How to maintain electrode needles

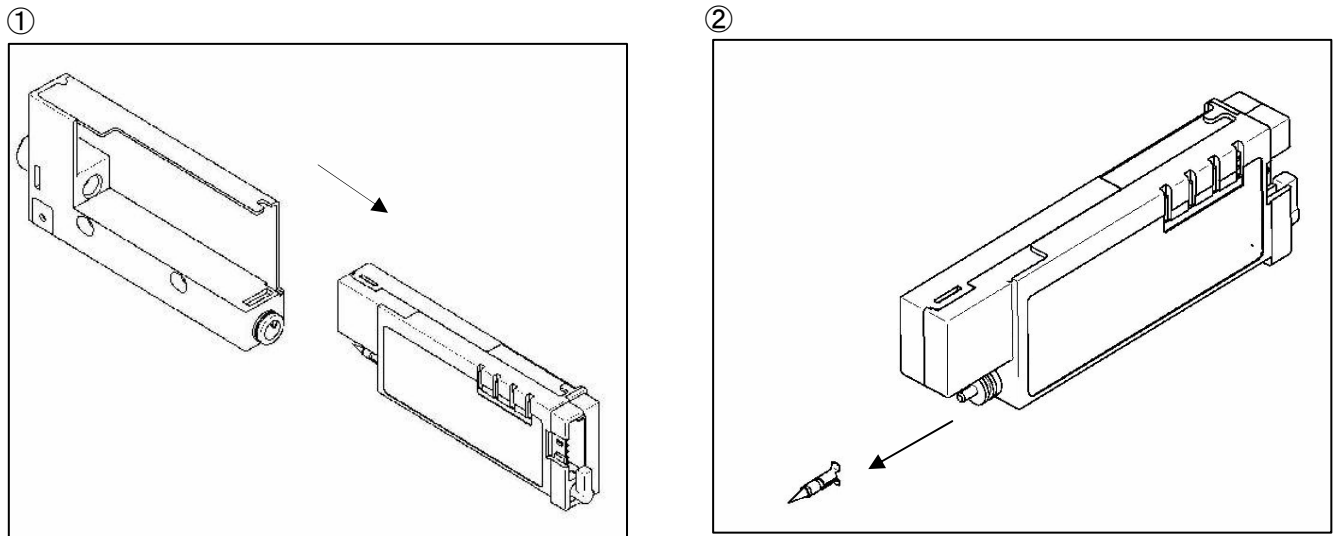
### 7-2-1. Cleaning of electrode needles

- 1) Disconnect the power supply cable.
- 2) Rotate the locked knob and pull down the cartridge.
- 3) Clean electrode needles.
- 4) Mount the cartridge and power supply cable in the reverse order to complete the cleaning.



### 7-2-2 Replacement of electrode needle

- 1) Remove the cartridge in the same manner as 3-1.
- 2) Remove the electrode needle assembly and replace it with a new electrode needle assembly.  
The electrode needle assembly can be removed easily from its cartridge by pulling it forward.  
At that time, pay attention to the sharp end of the needles.



## ⚠ CAUTION

Do not turn the switch for locking without the cartridge. Not only the tooth for locking can be broken, but also the cartridge cannot be mounted due to interference with the tooth for locking.

