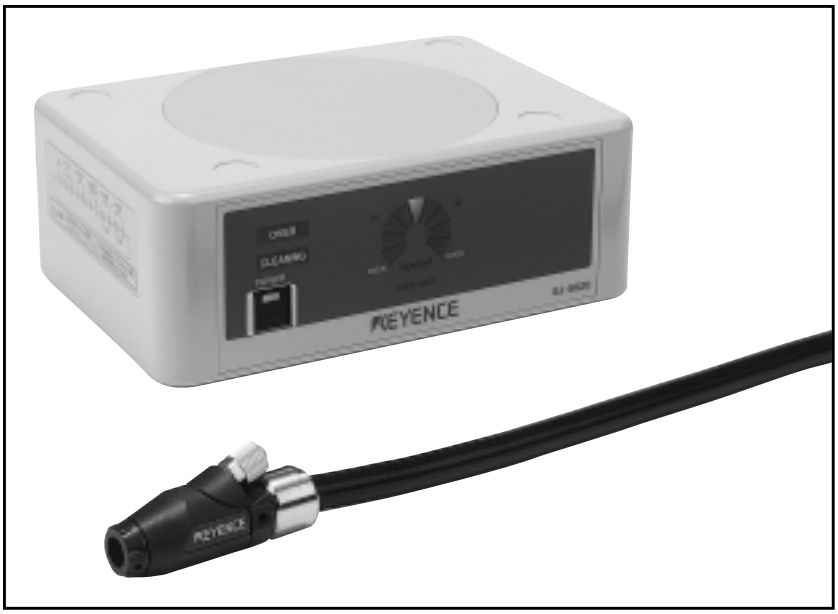
KEYENCE

B35-003

Instruction Manual

Spot-type Static Eliminator

SJ-S020 Series



Safety Precautions

This instruction manual describes the operation and function of the SJ-S020. Read this manual carefully to ensure safe use and maximum performance from your SJ-S020.

Symbols

The following symbols alert you to important messages. Be sure to read these messages carefully.

⚠ WARNING	Failure to follow instruction may lead to injury. (electric shock, burn, etc.)
⚠ CAUTION	Failure to follow instructions may lead to product damage.
Note:	Provides additional information on proper operation.

General precautions

- At startup and during operation, be sure to monitor the functions and performance of the SJ-S020.
- We recommend that you take substantial safety measures to avoid any damage in the event a problem occurs.
- Do not open or modify the SJ-S020 or use it in any way other than described in the specifications.
- When the SJ-S020 is used in combination with other instruments, functions and performance may be degraded, depending on operating conditions and the surrounding environment.
- Do not use the SJ-S020 for the purpose of protecting the human body.

Warnings and cautions specific to the SJ-S020

⚠ CAUTION

The SJ-S020 is a high-voltage device that is not designed to be explosion proof. Before using the SJ-S020, be sure to read the following warnings and precautions carefully.

- To avoid electric shock and to ensure proper static elimination, be sure to completely ground the SJ-S020's ground terminal.
- Do not use the SJ-S020 in a location in which it might catch fire or explode due to flammable solvent or particles.
- Prevent water, oil, or flammable solvent from splashing onto the SJ-S020. Otherwise, excessive voltage is applied to the SJ-S020, resulting in electrical breakdown, electric shock, or product breakdown.
- Keep fingers and metallic objects such as tools or wires away from the SJ-S020. Otherwise, electric shock or product breakdown may occur.
- When the SJ-S020 is used in an enclosed space, the generated ozone may become harmful. Ensure there is adequate ventilation if the SJ-S020 is used in such a location.
- Do not use the SJ-S020 in a location in which the temperature changes suddenly, or where condensation occurs. This may lead to an accident or product breakdown.
- Do not operate the SJ-S020 with wet hands, as this may cause an electric shock.
- Be sure to turn the power off while maintaining or inspecting the SJ-S020. Otherwise, electric shock or product breakdown may occur.
- Do not touch the electrode probes directly with your hands or fingers during maintenance, as this may cause injury.
- When using the air purge function, do not supply air that is at an extremely low temperature compared to the ambient air. Condensation may occur on the inside of the static elimination head, resulting in an electric shock or product malfunction.
- If any abnormality is observed in the SJ-S020, immediately turn off the power and contact the nearest KEYENCE office. Do not try to repair the SJ-S020 by yourself. This may cause electric shock or product breakdown.

⚠ WARNING

- Do not touch the SJ-S020's electrode probes with hard objects such as tools. If the electrode probes are damaged, the SJ-S020 does not operate properly, resulting in an accident or product breakdown.
- When the SJ-S020 is used over a long period, dust accumulates on the electrode probes. When the CLEANING or OVER indicator illuminates, clean the electrode probes. If you continue to use the SJ-S020 with dust accumulating on the electrode probes, the SJ-S020 will not operate properly, resulting in an accident or product breakdown. Regular cleaning (about every 2 weeks) is recommended.
- Do not drop the SJ-S020 or subject it to a strong impact. This may cause an accident or product breakdown.
- Do not use the SJ-F020 for any purpose other than eliminating static electricity.

Precautions for power supply

⚠ CAUTION

- ***To supply power to the SJ-S020, use the SJ-U1 optional AC adapter or the DC power supply. (90 to 125 VAC only)***
- ***Noise conveyed through the power supply line may cause the SJ-S020 to malfunction. Be sure to use a stabilized DC power supply with an insulated transformer.***
- ***When using a commercially available switching regulator, ensure that the frame ground terminal is completely grounded.***

Precautions for grounding

The ground cable is connected to the SJ-S020's ground terminal.

⚠ CAUTION

- ***For safe and proper static elimination, be sure to completely ground the SJ-S020's grounding cable.***
- ***Be sure to completely ground the grounding terminal.***

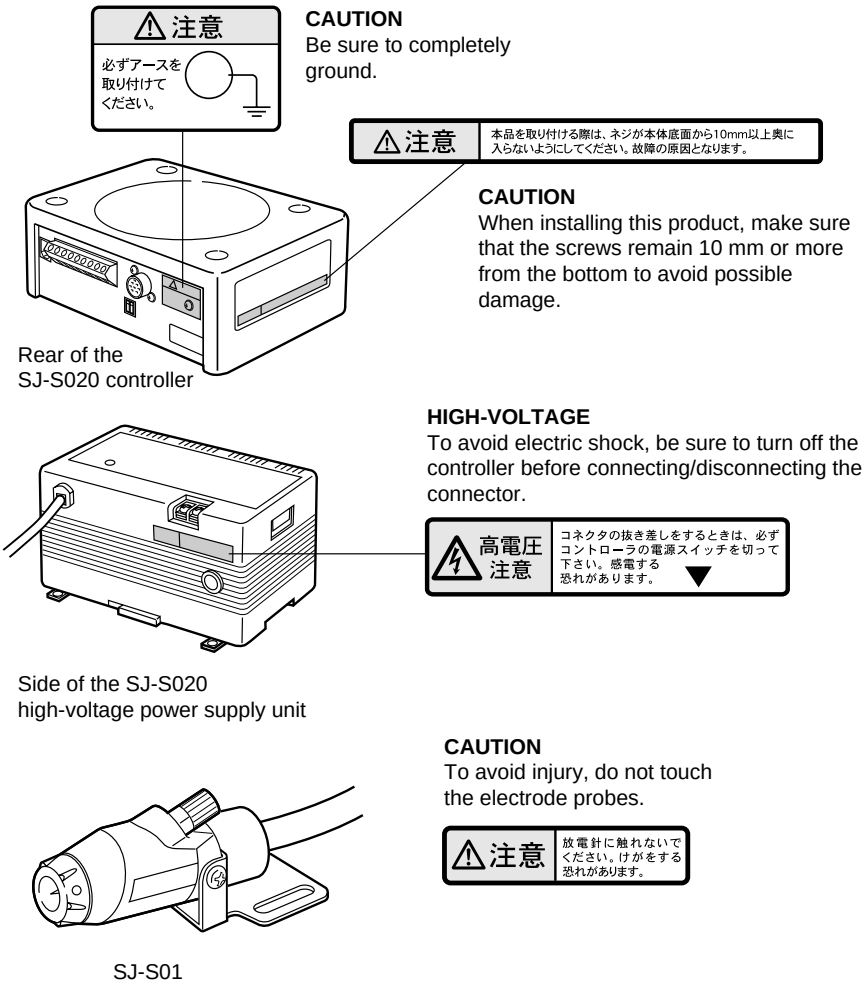
Precautions for air purge function

⚠ CAUTION

- ***Be sure to supply air at a pressure below 0.7 MPa. Otherwise, an accident or product breakdown may occur.***
- ***Be sure to supply clean and dry air to the static eliminator head. If the air contains water or oil, it may cause an electric discharge inside the static eliminator head, resulting in an accident or product breakdown.***

Warning labels

For safety reasons, the following labels are attached to the SJ-S020.
Read each label carefully and follow the instructions on the labels.



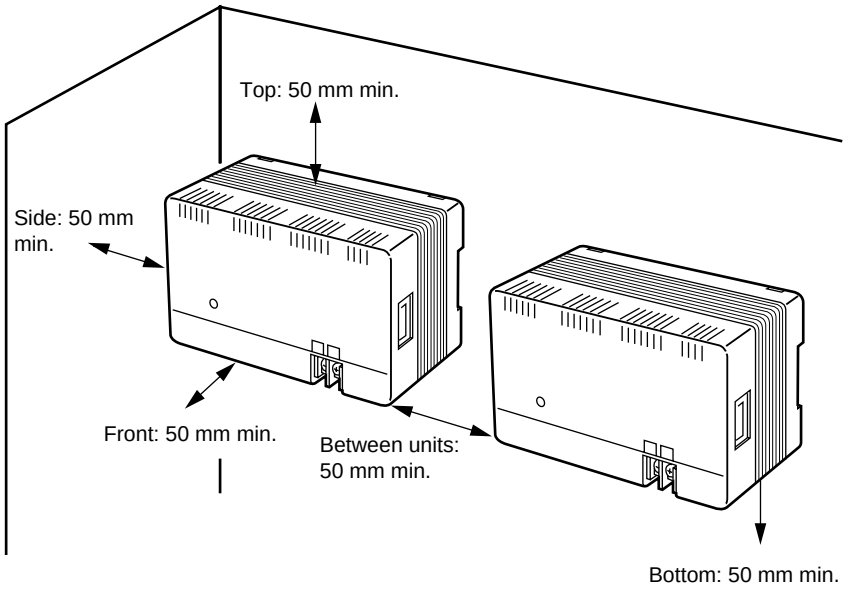
Locations

⚠ CAUTION

To prevent product breakdown, avoid installing the SJ-S020 in the following locations.

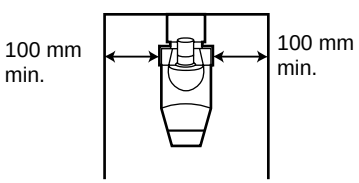
- Locations in which the SJ-S020 may be directly subjected to vibration or impact.
- Locations in which the ambient temperature drops below 0°C (32°F) or exceeds +50°C (122°F).
- Locations in which the relative humidity drops below 35% or exceeds 65%, or where condensation occurs.
- Locations in which the temperature changes suddenly.
- Locations in which the SJ-S020 is exposed to a direct breeze from an air conditioner.
- Locations in which there are volatile, flammable substances or corrosive gas.
- Locations exposed to dust, salt, metal particles, or greasy fumes.
- Locations in which water, oil, or chemicals may splash onto the SJ-S020.
- Locations in which a strong magnetic or electric field is generated.

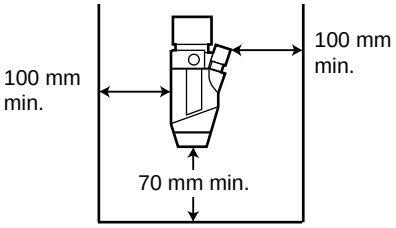
When several high-voltage power supply units are installed side-by-side, provide space of 50 mm or more between the units. Also, provide space of 50 mm or more between the high-voltage power supply unit and surrounding walls.



Note: Consider the following precautions when installing the SJ-S020 static eliminator head.

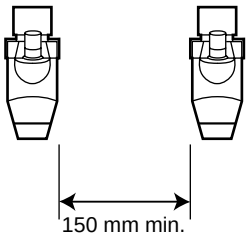
- Provide enough space between the static eliminator head and surrounding walls as shown in the figures below.



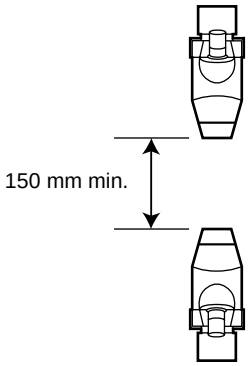


- When using two static eliminator heads, provide enough space between the static eliminator heads as shown in the figures below.

Side-to-side installation



Face-to-face installation



WARRANTIES AND DISCLAIMERS

See page 37.

Notice

- No part of this manual may be reprinted or reproduced in any form or by any means without the prior written permission of KEYENCE.
- The content of this manual is subject to change without notice.
- KEYENCE has thoroughly checked and reviewed this manual. Please contact a sales representative if you have any questions or comments regarding this manual or if you find an error.
- KEYENCE assumes no responsibility for any errors or omissions in this manual. No liability is assumed for damages resulting from the use of the information in this manual, item 3 above notwithstanding.
- KEYENCE will replace any incomplete or incorrectly collated manual.

How this manual is organized

Chapter 1 **Introduction of SJ-S020**

Describes the features, part names, and functions of the SJ-S020.

Chapter 2 **Connection and Installation**

Describes the connection and installation of the SJ-S020.

Chapter 3 **Setting and Functions**

Describes the setting method and functions of the SJ-S020.

Chapter 4 **Maintenance**

Describes the maintenance of the SJ-S020 and electrode probes.

Chapter 5 **Specifications**

Describes the specifications and dimensions of the SJ-S020.

Contents

Chapter 1

Introduction of SJ-S020

This chapter describes the features, part names, and functions of the SJ-S020.

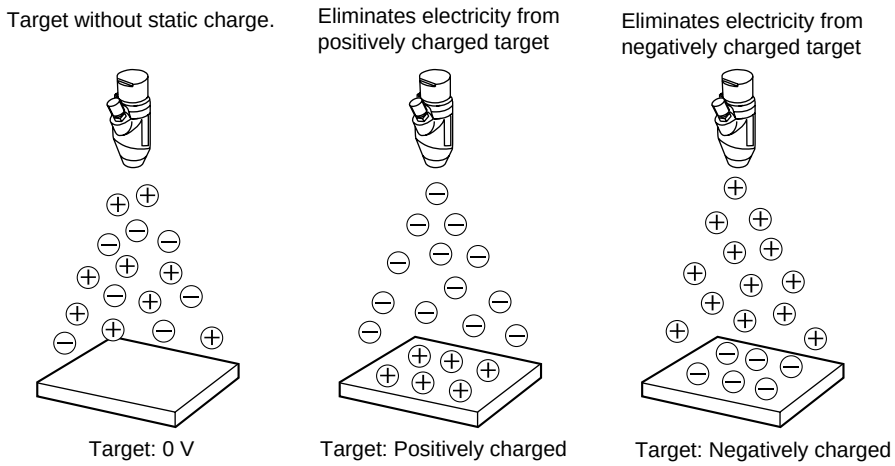
1.1 Features of SJ-S020

This section briefly describes the features of the SJ-S020.

1.1.1 Overview

■ Pulse AC + I.C.C. (Ion Current Control) method

The SJ-S020 uses the pulse AC method which generates positive and negative air ions alternately from a single electrode probe.
The SJ-S020 detects the ion current that is generated by the potential difference between a target and the grounding electrode of the static eliminator head. It then determines the electrical charge of the target. To supply the opposite polarity ions according to the strength of the electric charge of the target, it controls the time period (pulse width) during which high voltage is applied to the electrode probes. This series of operations is called the I.C.C. method.
The I.C.C. method enables optimal static elimination according to the electric charge of the target, as well as accurate control of ion balance.



■ Static elimination frequency setting

The operating distance and line speed can be set as desired by switching the static elimination frequencies. Static elimination is ensured even on a high-speed line.
➪ *See "Static elimination frequency setting function" on page 23.*

■ Manual ion balance control function

This function allows the unit to generate positive and negative ions with a desired pulse width. Use this function to shorten the operating time according to the location.
➪ *See " Manual ion balance control function" on page 23.*

■ Electric charge indicator

The SJ-S020 features an electric charge indicator that displays the polarity and strength of the electric charge of the target. It also displays the process of static elimination.

Target is not charged. Target is positively charged.

■ CLEANING indicator

Illuminates to indicate when the static elimination performance has degraded due to dirty or worn-out electrode probes. Maintenance is required.

➪ *See "Indicators" on page 22.*

■ Air purge function

Connecting the tube to the air duct in the static eliminator head and supplying clean, dry air through it can prevent accumulation of dust on the electrode probes. The air purge also widens the static elimination area.

➪ *See "Air purge function" on page 24.*

■ SK (electrostatic sensor) feedback function

When the SK-030/200 is connected to provide feedback on the measured value to the SJ-S020, more accurate, high-speed static elimination can be achieved.

➪ *See "Sensor feedback function" on page 27.*

■ Synchronization function

When two SJ-S020 units are used and controlled simultaneously, static elimination can be performed quickly.

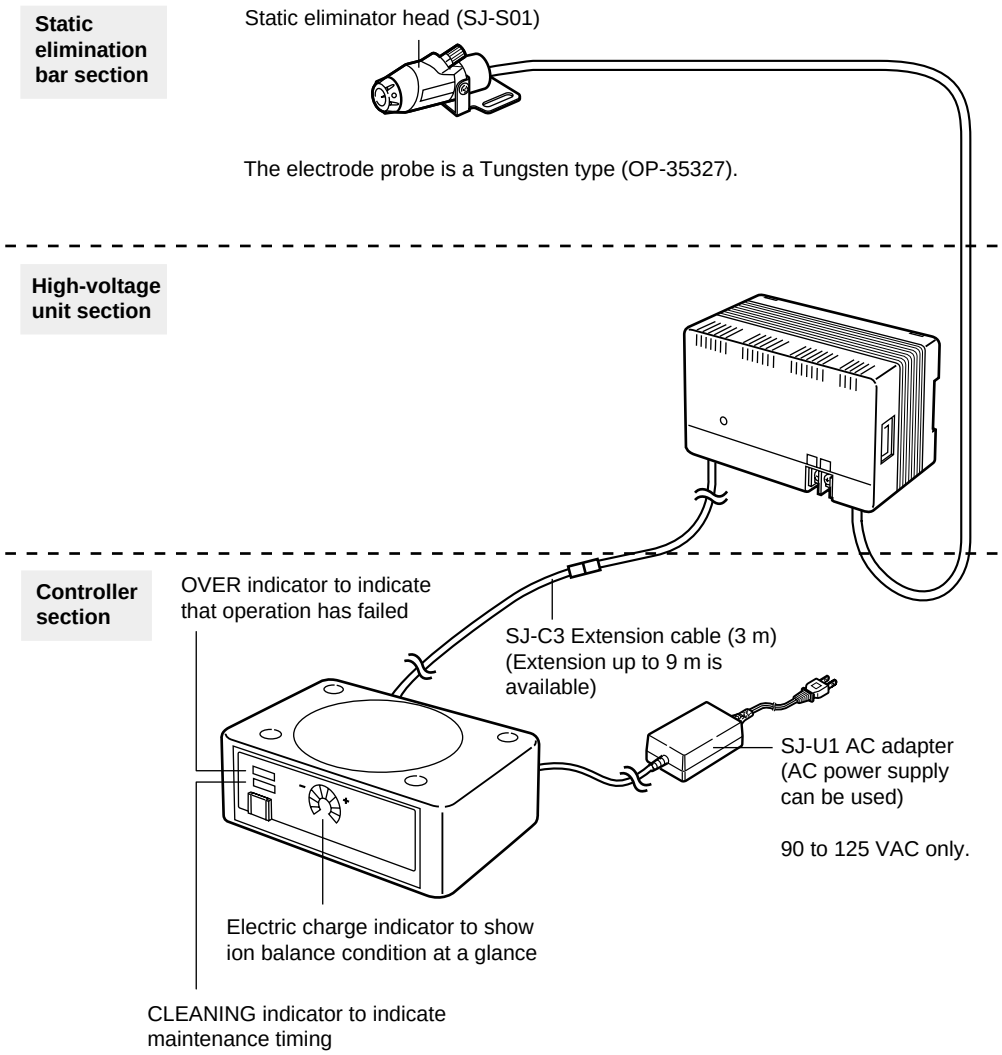
➪ *See "Synchronization function" on page 28.*

1.2 System Configuration

This section describes the system configuration of the SJ-S020.

1.2.1 System configuration

The controller and static eliminator head of the SJ-S020 consist of the following parts and devices.

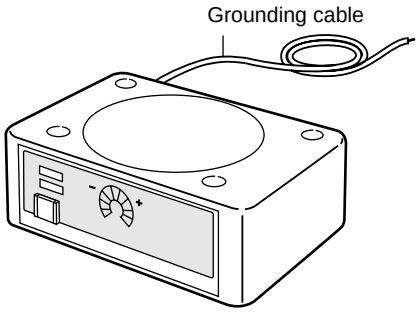


1.3 Checking Package Contents

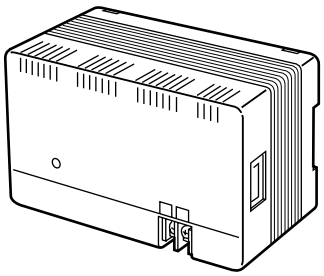
The spot type high-speed static eliminator package includes the following parts and equipment. Ensure that these items are included in your package before using the unit.
The extension cable, AC adapter, and replacement electrode probe for maintenance are available as options.

1.3.1 Package contents

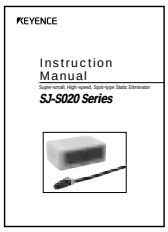
■ **SJ-S020 controller**



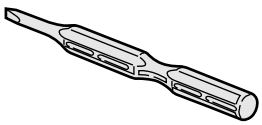
Controller



High-voltage power supply unit

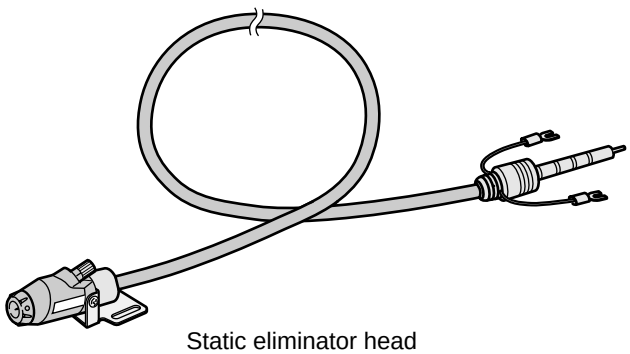


Instruction manual (This manual)



Flat-blade screwdriver

■ **Static eliminator head (SJ-S01)**

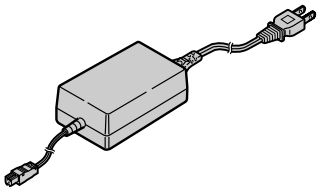


Static eliminator head

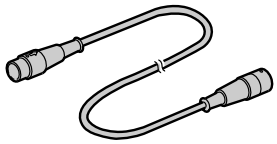
1.3.2 Optional parts

The following parts are available as options. Contact the KEYENCE office for details.

■ **Optional parts**

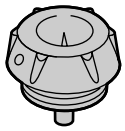


SJ-U1 AC adapter
90 to 125 VAC only.



SJ-C3 extension cable (3 m)
(between controller and high-voltage power supply unit)

■ **Maintenance parts**



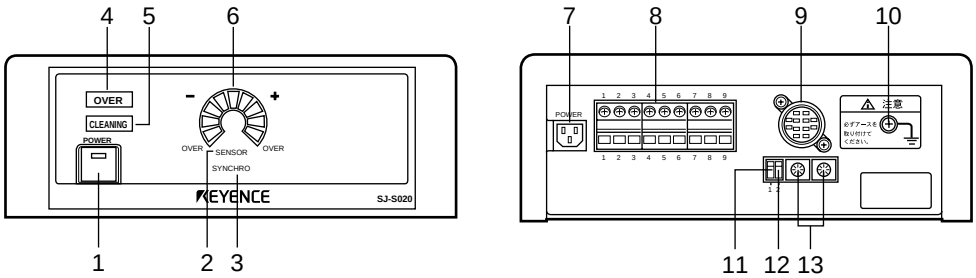
The electrode probe is a Tungsten type (OP-35327).

1.4 Part Names and Functions

This section lists the part names and functions of the SJ-S020.

1.4.1 Part names and functions of controller

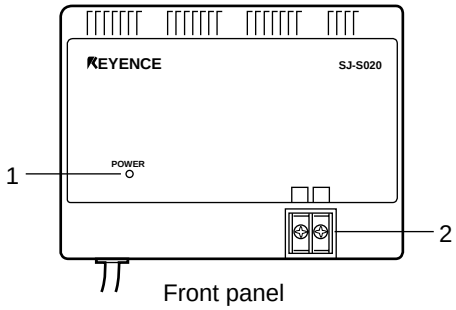
■ **Controller**



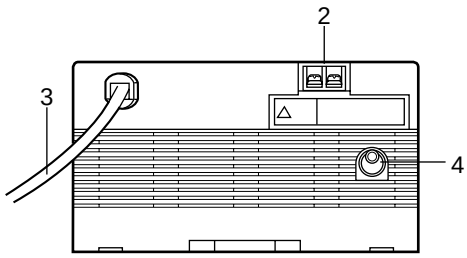
Front panel Rear panel

1. **Power switch**
   Turns on/off the power supply of the SJ-S020.
2. **SENSOR indicator**
   Illuminates when the sensor feedback function is used.
3. **SYNCHRO indicator**
   Illuminates when the synchronization function is used.
4. **OVER indicator**
   Illuminates when the SJ-S020 cannot completely eliminate the target's static electricity.
5. **CLEANING indicator**
   Illuminates when maintenance is required.
6. **Electric charge indicator**
   Displays the static elimination process.
7. **Power supply connector**
   Connects the AC adapter (SJ-U1) and supplies power. (90 to 125 VAC only.)
8. **Terminal block**
   Contains the I/O terminals.
   ➪ *See "I/O terminals" on page 9.*
9. **High-voltage power supply unit connector**
   Connects the controller connecting cable of the high-voltage power supply unit.
10. **Ground terminal**
    For safe and proper static elimination, be sure to completely ground this terminal.
11. **DIP switch 1**
    Switches between MAIN and SUB when the synchronization function is used.
    ➪ *See "Synchronization function" on page 28.*
12. **DIP switch 2**
    Used for the static elimination frequency setting.
    ➪ *See "Static elimination frequency setting function" on page 23.*
13. **Manual ion balance control switch**
    Used to manually adjust the ratio of positive to negative ions.
    ➪ *See "Manual ion balance control function" on page 23.*

■ **High-voltage power supply unit**



Front panel

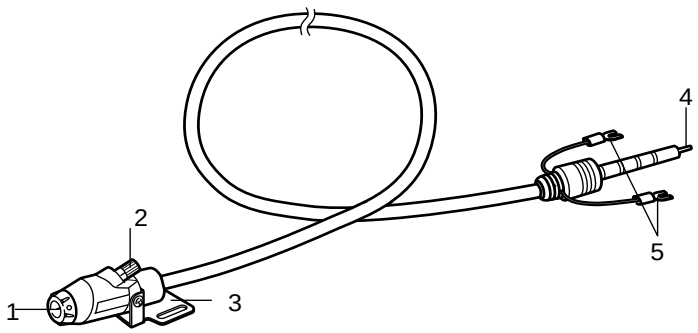


Side panel

1. **Power indicator**
   Illuminates when power is supplied.
2. **Static eliminator head terminal block**
   Connects to the high-voltage power supply terminal of the static eliminator head.
3. **Controller connecting cable**
   Connected to the high-voltage power supply unit connector of the controller.
4. **Static eliminator head connector**
   Connects to the high-voltage power supply probe of the static eliminator head.

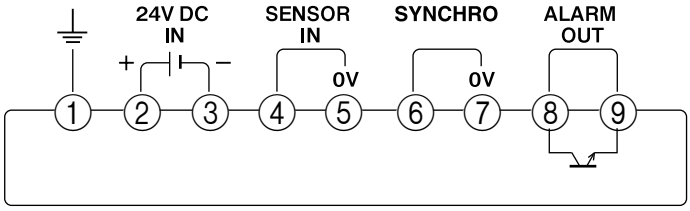
1.4.2 Part names and functions of static elimination head

■ **Static eliminator head**



1. **Mounting bracket**
   Used to mount the static eliminator head.
2. **Air duct**
   Used to supply clean air from an external device.
3. **Electrode probe**
   Generates ions.
4. **High-voltage power supply connecting probe**
   Connected to the static eliminator head connector of the high-voltage power supply unit.
5. **High-voltage power supply connecting terminal**
   Connected to the static eliminator head connecting terminal block of the high-voltage power supply unit.

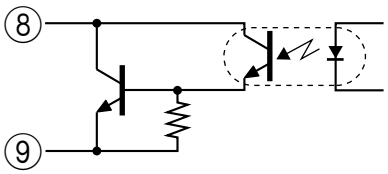
1.4.3 I/O terminals



Terminal No.	Signal name	Description
①	Ground	Be sure to completely ground this terminal.
②③	Power supply	Connect this terminal to a 24 VDC±10% power supply.
④⑤	Sensor input	Connect this terminal to KEYENCE's SK-030/200 high-precision electrostatic sensor.
⑥⑦	Synchronization input	Connect this terminal to another SJ-S020 when using the synchronization function.
⑧⑨	Alarm output	NPN open-collector output: 100 mA max. (40 V max.) N.C. Alarm signal is output due to the following conditions: • When static charge of target cannot be completely eliminated. • When maintenance is required. • When cable breaks.

CAUTION ***Terminals ①, ③, ⑤, ⑦, and ⑨ are not common. Connect each terminal separately.***

■ **Alarm output circuit**
Open-collector output



100 mA max. (40 V max.) N.C.

Chapter 2

Connection and Installation

This chapter describes the connection and installation of the SJ-S020.

2.1 Before Installation

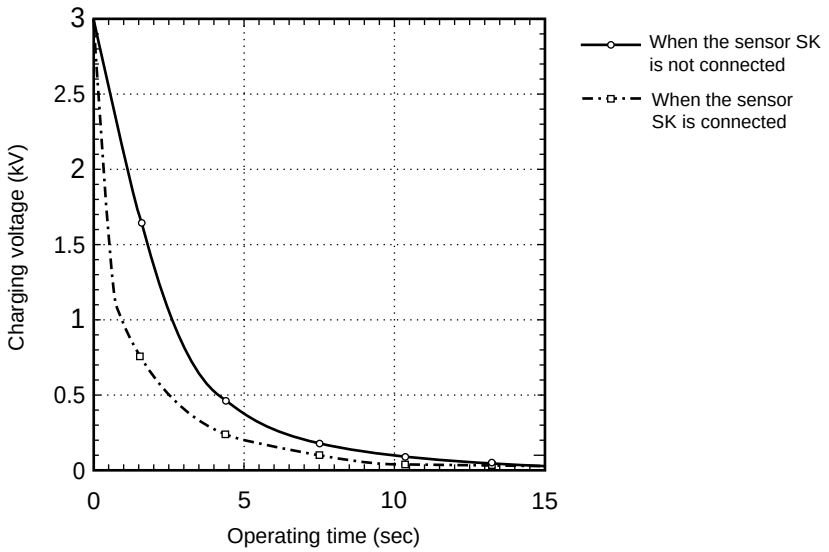
This section describes the static elimination ability of the SJ-S020.
Before installation, carefully consider the operating conditions such as the distance between the static eliminator head and the target, or the time required for the elimination of the target's static charge.

2.1.1 Static elimination ability

After carefully considering the elimination area, target size, operating distance, and operating time required for static elimination, select the elimination frequency.
➪ *See "Static elimination frequency setting function" on page 23.*

■ Operating time

The following graph shows a typical example of the relationship between the operating time and the charging voltage.
This graph also shows the above relationship when a high-precision static electricity sensor SK-030/200 is connected to the unit and the sensor feedback function is used for static elimination.



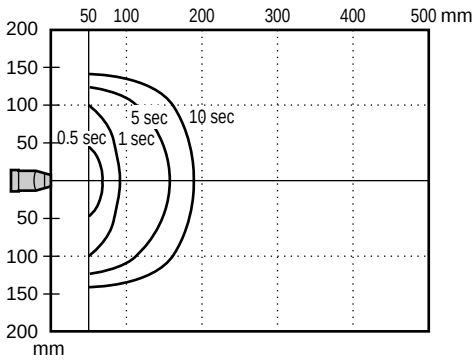
Measurement conditions:
- Applied voltage: +3,000 V,
- A plate monitor of 150 mm x 150 mm (170 pF) is used.
- Static elimination frequency: 33 Hz
- Operating distance: 150 mm
- Air pressure: 0.12 MPa

■ Operating area and operation time

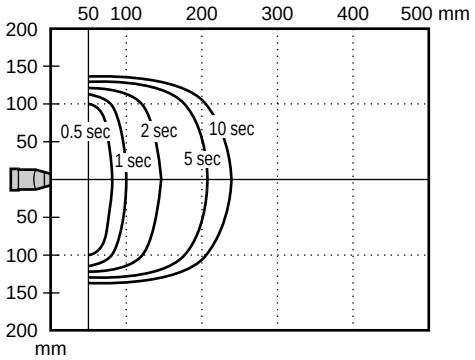
The following graphs show typical examples of the relationship between the time required to eliminate the target's static charge and the operating distance between the target and the static eliminator head with the static elimination frequency settings 100 Hz and 33 Hz.
Use the graphs to select the appropriate static elimination setting.

Measurement conditions:
- The time required to eliminate the static charge of the target from ±3000 V to ±300 V is measured.
- The 150 x 150 mm plate monitor (20 pF) is used.

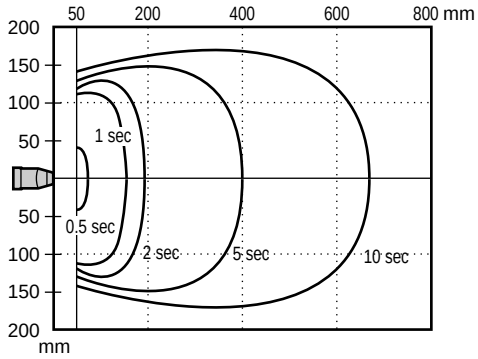
100 Hz (without airflow)



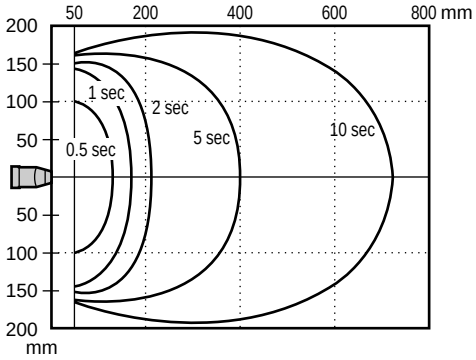
33 Hz (without airflow)



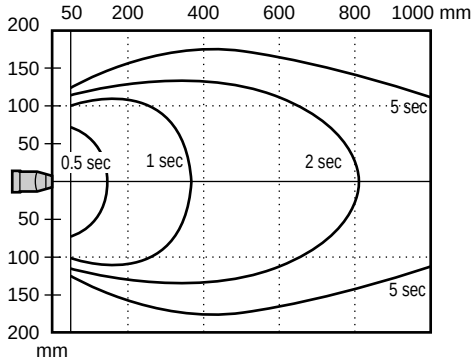
100 Hz Air flow of 20 Nl/min (pressure of 0.08 MPa)



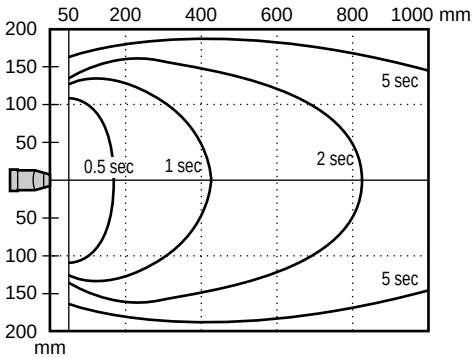
33 Hz Air flow of 20 Nl/min (pressure of 0.08 MPa)

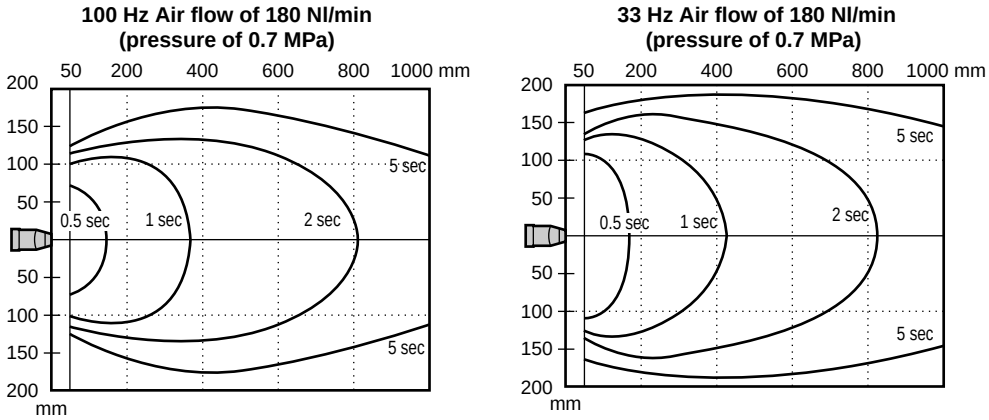


100 Hz Air flow of 60Nl/min (pressure of 0.24 MPa)



33 Hz Air flow of 60Nl/min (pressure of 0.24 MPa)

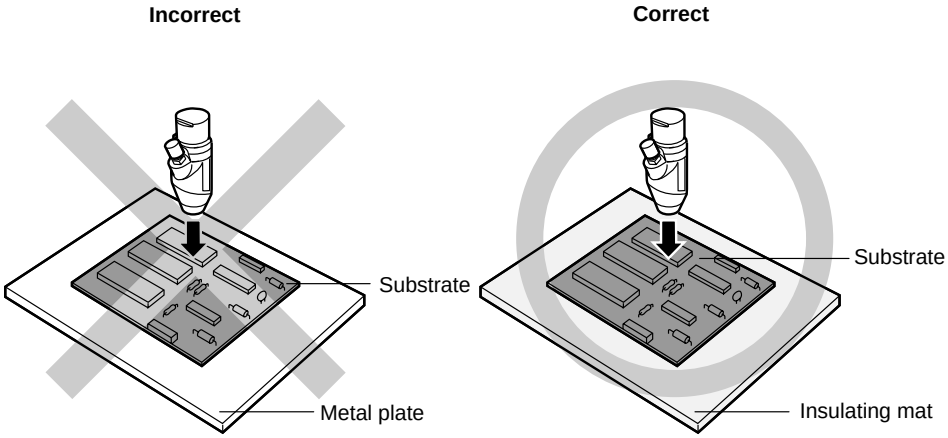




■ Proper static elimination

To ensure proper static elimination, consider the following points.

If the target is in contact with metallic objects (grounding conductor), the static charge of the target is not completely eliminated.
Install the SJ-S020 in a location in which the target is not in contact with any metallic objects (such as a grounding conductor).



For insulators such as a substrate, only the static electricity on the surface exposed to the static eliminator head is eliminated.
To eliminate the static electricity on both surfaces, use another SJ-S020 for the other side.

For a high-speed production line or targets with a high electric charge, the use of the sensor feedback or synchronization functions is recommended.

☞ *See "Sensor feedback function" on page 27.*
☞ *See "Synchronization function" on page 28.*

Note: Install the static eliminator head in a location that allows easy maintenance access to replace or clean parts.

2.2 Connection and Installation of the SJ-S020

This section describes the procedures for connecting and installing the static eliminator head and controller.

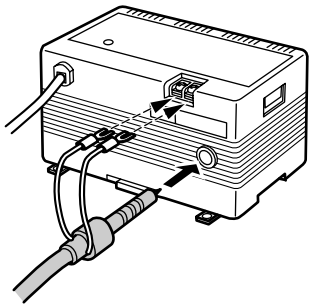
2.2.1 Connecting the controller

⚠ WARNING

- ***Read "Safety precautions" on page i carefully before connecting the devices.***
- ***Be sure to turn the power off before connecting the devices. Otherwise, an electric shock or product breakdown may occur.***

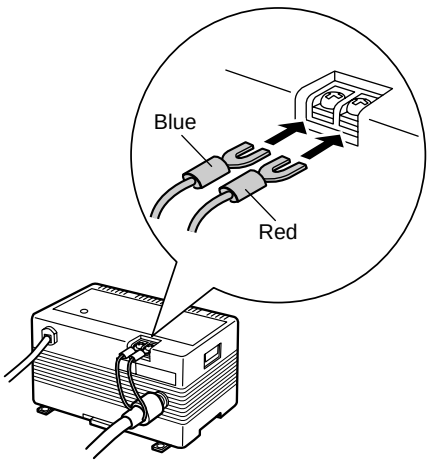
1. Connect the high-voltage power supply unit and static eliminator head.

Connect the high-voltage power supply connecting probe of the static eliminator head to the static eliminator head connector.
Insert the connector as far as it will go.



2. Connect the high-voltage power supply connecting terminals (red and blue) to the static eliminator head connecting terminal block.

Fasten the terminals with screws to prevent them from being disconnected.

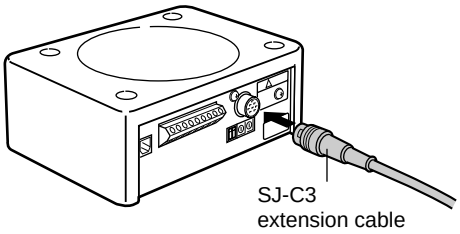


⚠ CAUTION

For safety and proper static elimination, be sure to connect the high-voltage power supply connecting terminals (red and blue) to the static eliminator head connecting terminal block.

3. Connect the controller to the high-voltage power supply unit.

To extend the cable, use the SJ-C3 optional extension cable (3 m).
The cable can be extended up to 9 m.

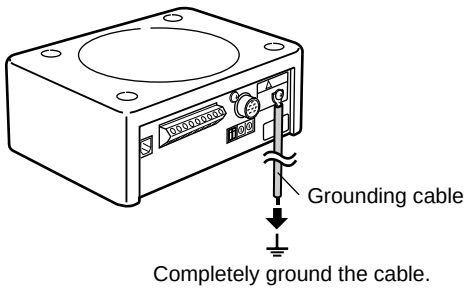


4. Completely ground the grounding cable.

The grounding cable is factory-connected to the controller.
Be sure to completely ground the grounding cable.

⚠ WARNING

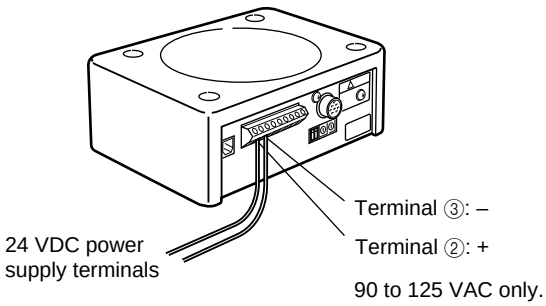
To prevent an electric shock and ensure proper static elimination, be sure to completely ground the SJ-S020's grounding cable.



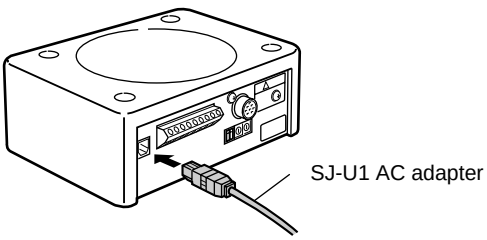
5. Connect the controller to the power supply.

Connect the power supply using one of the following methods.

- **Using power supply terminals (Terminals ② and ③)**
  Connect a 24 VDC output cable with sufficient capacity (output capacity: 900 mA min.) to the power supply terminals.



- **Using AC adapter (SJ-U1)**
  Connect the AC adapter to the power supply connector at the rear of the controller.



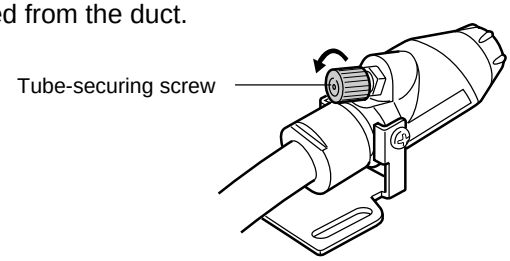
2.2.2 Installing static eliminator head

■ Installing the air supply tube

When using the air purge function, secure the static eliminator head to the desired location after connecting an air supply tube to the air duct.
➪ *See "Air purge function" on page 24.*

1. Release the tube-securing screw.

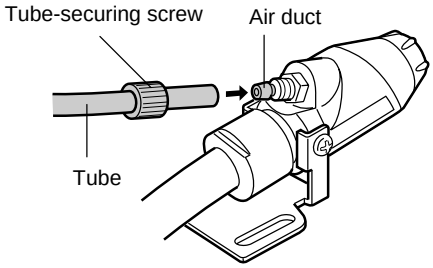
Turn the tube-securing screw fitted on the air duct with your fingers until it is released from the duct.



2. Connect the tube to the air duct.

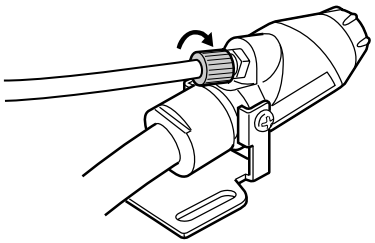
After threading the screw onto the tube, place the tube over the air duct without any gaps.

Note: Use a nylon or polyurethane tube with an outer diameter of 6 mm and an inner diameter of 4 mm.



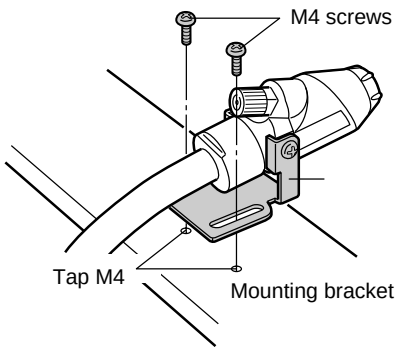
3. Tighten the tube-securing screw on the air duct.

Turn the tube-securing screw with your fingers until the screw secures the tube.



■ Installation of the static eliminator head

Adjust the angle of the mounting bracket until the static eliminator head is properly secured at the desired angle.
Tap M4 screw holes at the appropriate locations and secure the static eliminator head using M4 screws.

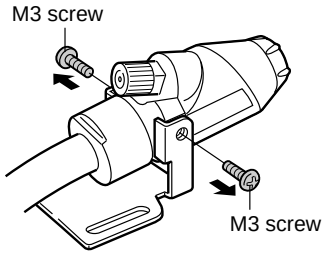


■ Detaching the mounting bracket

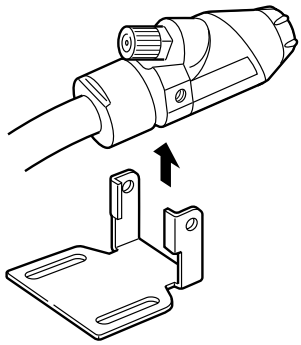
The mounting bracket can be detached from the static eliminator head.

1. Remove the M3 screws from the static eliminator head.

Remove the M3 screws on both sides of the static eliminator head using a Phillips screwdriver.



2. Detach the static eliminator head from the bracket.

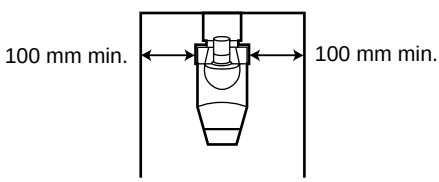


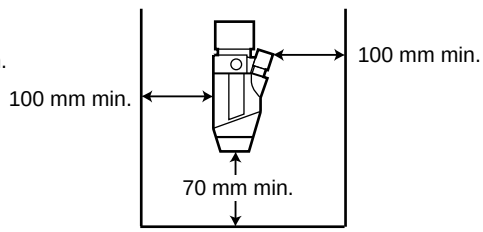
Note: Be sure to keep the removed M3 screws and bracket for future use.

■ Where to install the eliminator head

Install the SJ-S020 in a location where static electricity may or will cause problems.

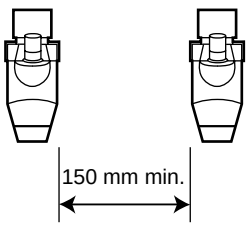
Provide enough space between the unit and the surrounding walls as shown in the figures below.



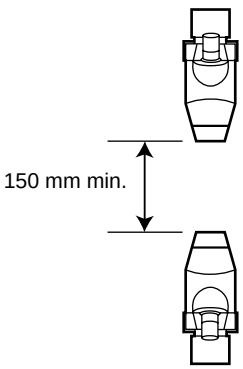


When using two eliminator heads at the same time, provide enough space between the units as shown in the figures below.

Side-to-side installation



Face-to-face installation

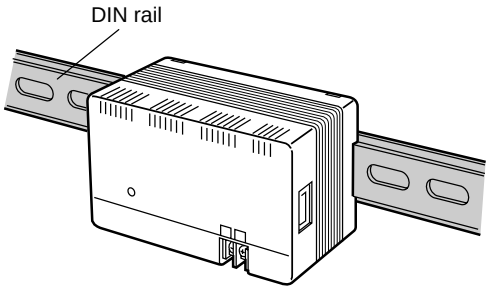


2.2.3 Installing the controller

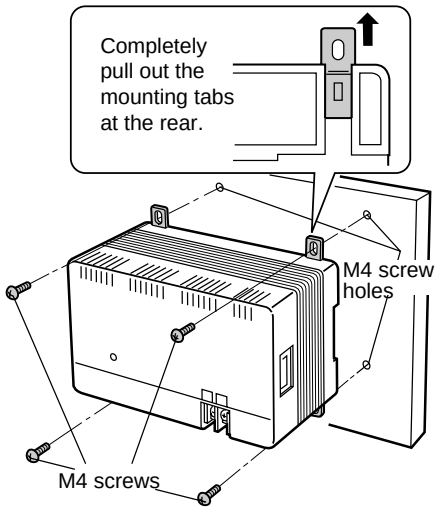
■ Mounting high-voltage power supply unit

Secure the high-voltage power supply unit to the DIN rail or mounting surface using the mounting tabs at the rear.

When mounting to DIN rail

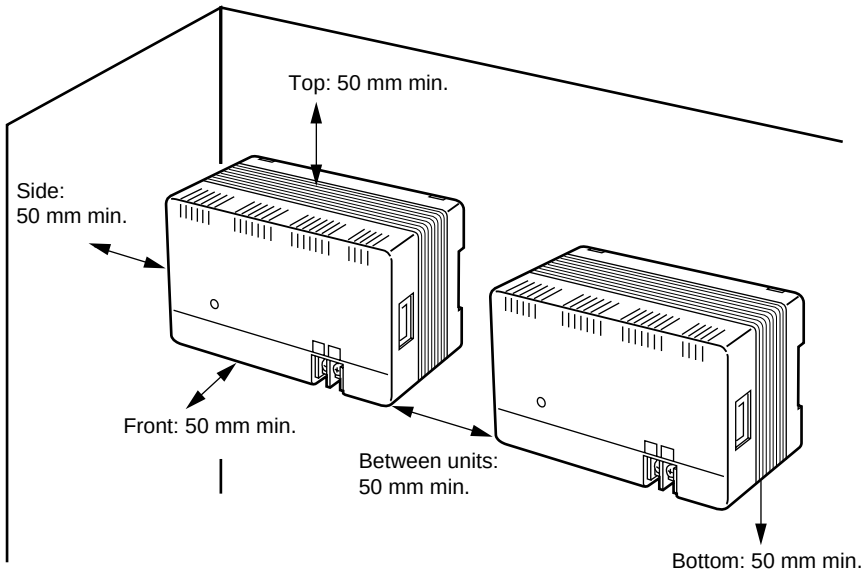


When using mounting tab at rear



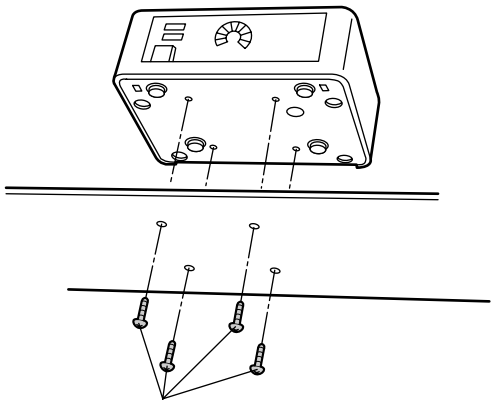
CAUTION

When several high-voltage power supply units are installed side-by-side, provide space of 50 mm or more between the units. Also, provide space of 50 mm or more between the high-voltage power supply unit and surrounding walls.

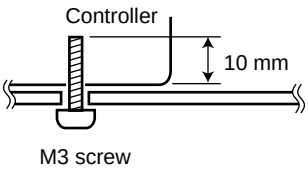


■ Fastening the controller

To fasten the controller in place, insert screws through the mounting holes on the bottom.



CAUTION ***When fastening the controller, avoid sinking screws more than 10 mm from the bottom surface.***



Chapter 3

Setting and Functions

This chapter describes the setting method and functions of the SJ-S020.

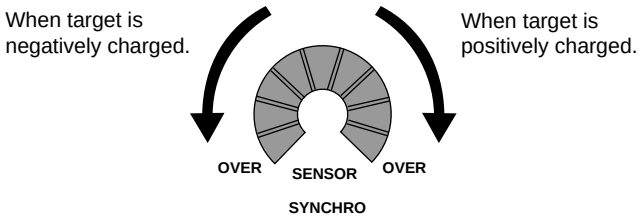
3.1 Indicators

This section describes the functions of the indicators on the controller's front panel.

3.1.1 Indicators

■ Electric charge indicator

Shows the static elimination process.
When the target moves closer to the static eliminator head, the segment on either the positive or negative side illuminates according to the electric charge of the target.
When static elimination is complete, the center segment illuminates. This allows the static elimination process to be monitored at a glance.

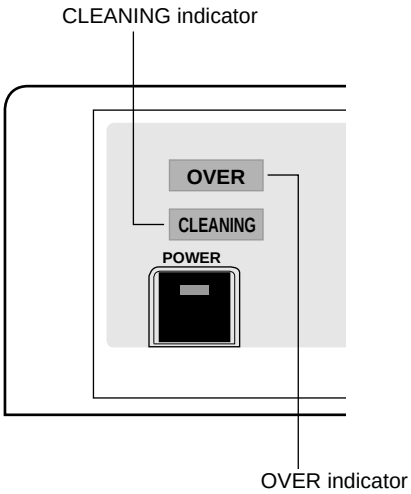


■ CLEANING indicator

Illuminates when the amount of ion generation decreases due to dirty or worn out electrode probes.
If the indicator does not turn off after the electrode probes are cleaned, the probes are worn out and should be replaced.
➪ *See "Maintenance of electrode probes" on page 31.*

■ OVER indicator

Illuminates for approximately 20 seconds when the ion balance is incorrect or when the static electricity of the target is too strong to be eliminated.
The OVER indicator may be canceled by changing the static elimination setting.
➪ *See "Static elimination frequency setting function" on page 23.*

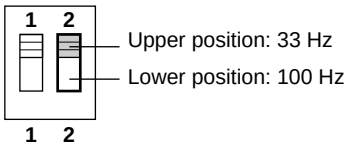


3.2 Other Functions

This section describes other functions, such as static elimination frequency setting, manual ion balance control, air purge, feedback, and synchronization.

3.2.1 Static elimination frequency setting function

To set the static elimination frequency, use DIP switch 2 on the rear of the controller.
The static elimination frequency is determined by the line speed and the operating distance between the unit and the target.
Switching DIP switch 2 between the upper and lower positions will change the static elimination frequency.



CAUTION ***Be sure to turn off the power before setting the static elimination frequency. Otherwise, an electric shock or product breakdown may occur.***

Position of DIP switch 2	Frequency (Hz)	Recommended operating distance (mm)
Upper position	33	150
Lower position	100	

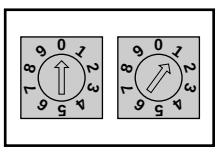
DIP switch 2 is initially set to the upper position (33 Hz).

3.2.2 Manual ion balance control function

Use the manual ion balance control function to manually adjust the ratio of positive to negative ions.
When eliminating the static charge of films or sheets, which are always charged with a large amount of electricity, force the generation of more positive or negative ions as required to increase the operating speed.
Also, when the ratio of positive to negative ions being generated is changed, an ion balance other than 0 V can be obtained according to the location.

■ Initial setting (I. C. C. setting mode)

The manual ion balance control switches on the rear of the controller are initially set to 0-1. In this setting, the unit enters the I. C. C. setting mode, automatically controlling the ion balance.

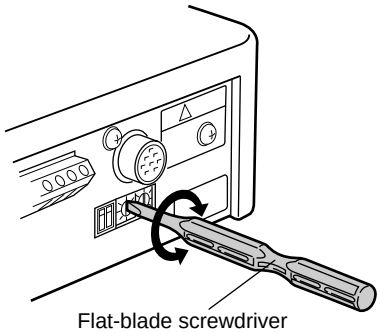


When the switches are set to 0-1, the unit enters the I. C. C. setting mode.

Initial setting

■ **Manual ion balance control**

To specify a desired pulse width, turn the manual ion balance control switches using a flat-blade screwdriver and select the setting.
For the settings, refer to the manual ion balance control quick reference shown below.



Flat-blade screwdriver
(standard accessory)

⚠ WARNING ***Be sure to turn off the power before using the manual ion balance control function. Otherwise, an electric shock or product breakdown may occur.***

Manual ion balance control quick reference

Setting	Description
0-0	Pulse width ratio: generation of 0% positive ions (negative ions only).
0-1	I. C. C. setting mode (initial setting)
0-2 : 1-9	Not used
2-0 : 8-0	Pulse width ratio: generation of 20% positive ions. : Pulse width ratio: generation of 80% positive ions.
8-1 : 9-8	Not used
9-9	Pulse width ratio: generation of 100% positive ions (positive ions only).

3.2.3 Air purge function

Supplying clean, dry air through the air duct in the static eliminator head can prevent the accumulation of dust on the electrode probes. The air purge also widens the static elimination area.

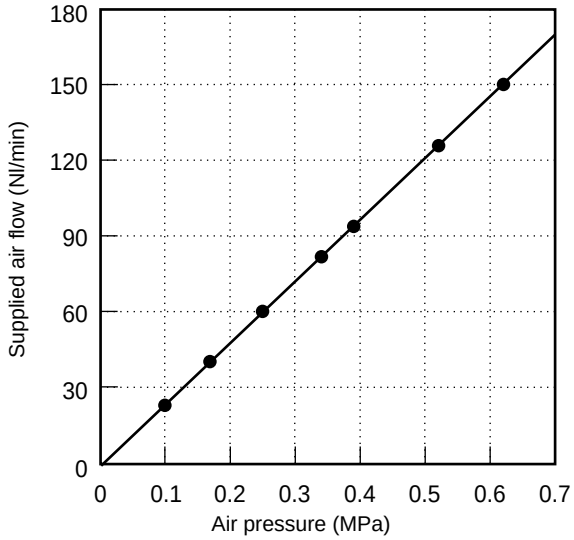
* The air pressure value is measured at the base of the air duct.
Recommended dew points of the supplied air are temperatures below –20°C.

⚠ CAUTION

- ***Be sure to supply air at a pressure below 0.7 MPa. Otherwise, an accident or product breakdown may occur.***
- ***Be sure to supply clean and dry air to the static eliminator head. If the air contains water or oil, it may cause an electric discharge inside the static eliminator head, resulting in an accident or product breakdown.***

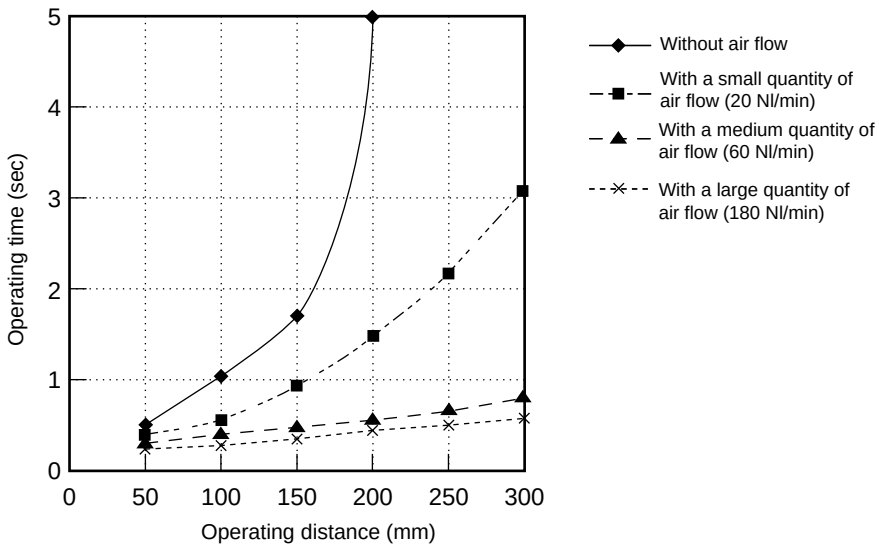
■ Relationship between pressure and air flow

The relationship between air pressure and air flow is shown below.
Refer to the graph on the right to select the appropriate air supply device (compressor) that will supply sufficient air flow.



■ Relationship between operating speed and operating distance with different air flows

The relationship between the operating speed and the operating distance varies with the air flow.
Refer to the typical example on the right to select an appropriate air flow to be supplied.



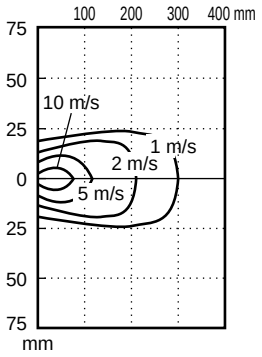
Measurement conditions:

- The time required to eliminate the static charge of a target with a voltage from ±3,000 V to ±300 V is measured.
- A plate monitor of 150 mm x 150 mm (20 pF) is used.
- Static elimination frequency: 33 Hz

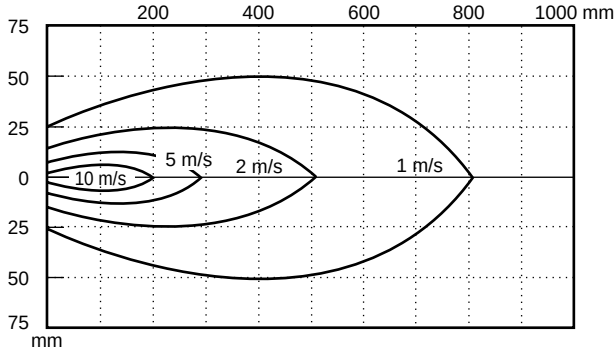
■ Relationship between air velocity and operating distance with different air flows

The relationship between the air velocity and the operating distance varies with the air flow.
Refer to the graphs below to select an appropriate air flow to be supplied.

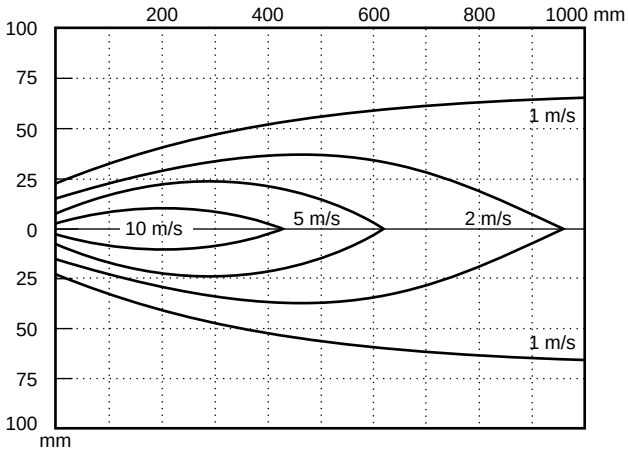
Air velocity 20 Nl/min



Air velocity 60 Nl/min



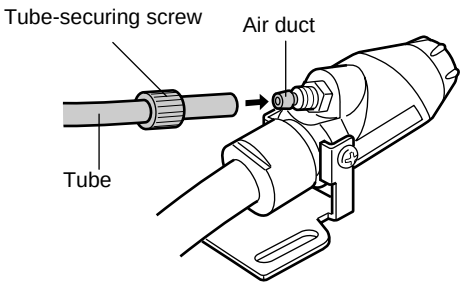
Air velocity 180 Nl/min



■ Air supply method

As shown in the figure below, supply air through the duct in the static eliminator head.

➪ *See "Installing the air supply tube" on page 17.*



⚠ CAUTION

- ***Be sure to limit the tightening torque to 0.7 N•m or less. Otherwise, an accident or product breakdown may occur.***
- ***Be sure to supply only clean, dry air. The use of improper air may cause an accident or product breakdown.***

3.2.4 Sensor feedback function

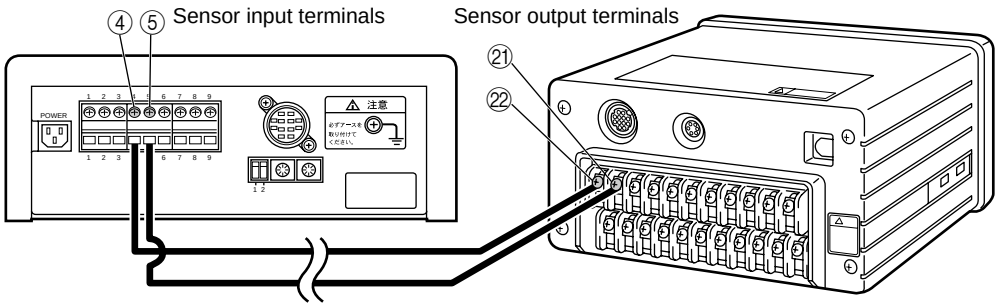
The SJ-S020 alone eliminates the static electricity of the target. However, when KEYENCE's SK-030/200 high-precision electrostatic sensor is connected, it provides feedback on the measured value to the SJ-S020, resulting in more accurate operation.

➪ *See "Static elimination ability" on page 12.*

⚠ WARNING ***Be sure to turn off the power when connecting devices. Otherwise, an electric shock or product breakdown may occur.***

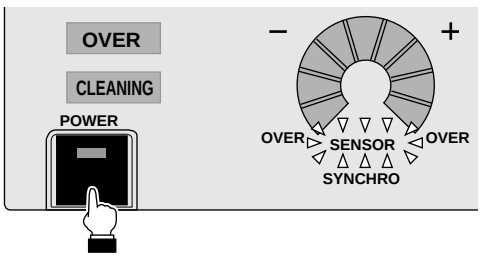
1. Connect the SJ-S020 and the SK-200.

Connect the sensor input terminals (terminals ④ and ⑤) of the SJ-S020 and the sensor output terminals (terminals ㉑ and ㉒) of the SK-200.



2. Turn on the SK-200, and then the SJ-S020.

The SJ-S020's SENSOR indicator illuminates.



Note 1: The SENSOR indicator flashes when there is a break in the cable between devices.

Note 2: If the SJ-S020 is turned on first, the sensor feedback function is not activated.

Note 3: When the SK-030/200 is connected, the static eliminator head of the SJ-S020 is activated based on the input data from the SK-030. Therefore, if the SK-030 and the static eliminator head are aimed at different targets, static elimination fails.

Note 4: To avoid interference, keep a distance of 150 mm or more between the SK-030 sensor head and the static eliminator head.

Note 5: The synchronization function cannot be used together with the sensor feedback function. The sensor feedback function has priority.

3.2.5 Synchronization function

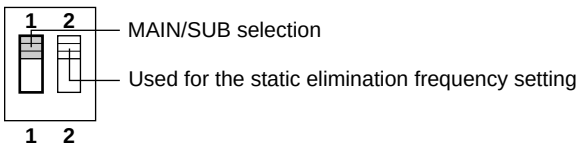
When eliminating the static charge of the target from a close position, 2 SJ-S020 units can be controlled simultaneously (synchronized) to increase the operating speed.
Install two static eliminator heads face to face, sandwiching the target.

⚠ WARNING ***Be sure to turn off the power when connecting devices. Otherwise, an electric shock or product breakdown may occur.***

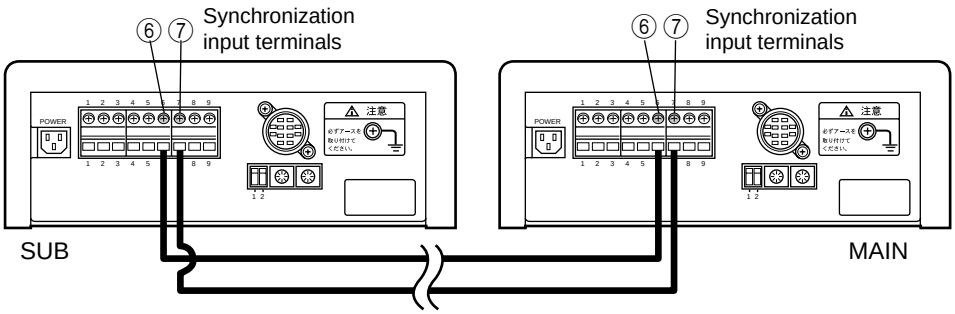
Note: Before using the synchronization function, both SJ-S020 controllers must be set to the same static elimination frequency. If the frequencies are different, the synchronization function will not work properly.

1. **Set MAIN or SUB by changing DIP switch 1 at the rear of the controller.**
   The upper position sets MAIN, and the lower position sets SUB.

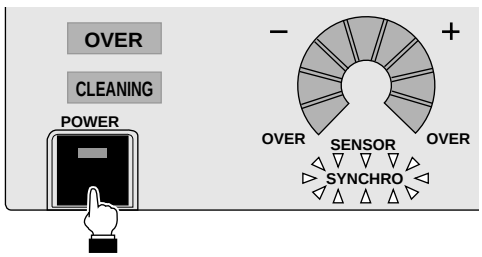
   DIP switch 1 is initially set to the upper position (MAIN).



2. **Connect the synchronization input terminals (terminals ⑥ and ⑦) of the two controllers (MAIN and SUB).**



3. **Turn on the MAIN controller, and then the SUB controller.**
   The SYNCHRO indicator illuminates.



Note 1: The SYNCHRO indicator flashes when there is a break in the cable between the controllers.

Note 2: If the SUB controller is turned on first, the synchronization function is not activated.

Chapter 4

Maintenance

This chapter describes the maintenance of the SJ-S020 and electrode probes.

4.1 Maintenance

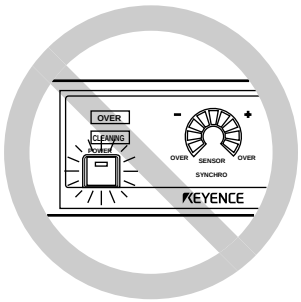
The SJ-S020 requires maintenance. Read the following precautions before performing any maintenance.
The person who performs the maintenance must carefully read and understand “Safety precautions” on page i before starting maintenance.

4.1.1 Maintenance

When the SJ-S020 is used over a long period, the electrode probes become dirty due to the accumulation of dust. When the CLEANING indicator illuminates, clean the electrode probes. If you continue to use the SJ-S020 with dust accumulating on the electrode probes, the static elimination ability may deteriorate, resulting in an accident or product breakdown. Regular cleaning (about every 2 weeks) is recommended.
If the SJ-S020 does not recover its static elimination ability even after cleaning or if the CLEANING indicator illuminates frequently, replace the electrode probes.

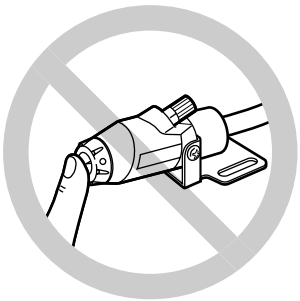
4.1.2 Precautions for maintenance

- Be sure to turn off the power before starting maintenance.



WARNING ***The SJ-S020 uses high voltage. Be sure to turn off the power before touching the static eliminator head. Otherwise, an electric shock or accident may occur.***

- Do not touch the electrode probes directly with your hands or fingers even when the power is turned off, as this may cause injury.



4.2 Maintenance of Electrode Probes

When the SJ-S020 is used for a long period, the electrode probes become dirty due to the accumulation of dust.
If you continue to use the SJ-S020 with dust accumulating on the electrode probes, the static elimination ability may deteriorate, resulting in an accident or product breakdown. Therefore, be sure to clean the electrode probes periodically.

4.2.1 Maintenance of electrode probes

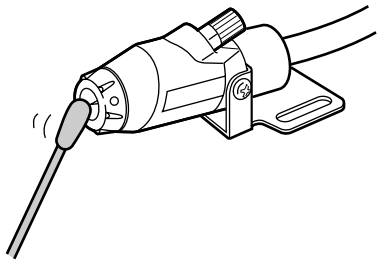
Before starting electrode probe maintenance, be sure to turn off the SJ-S020 controller.

⚠ WARNING

Do not touch the electrode probes directly with your hands or fingers, as this may cause injury. Be extremely careful when cleaning them.

■ **Cleaning the electrode probes**

Clean the electrode probes gently with an alcohol-moistened cotton swab.



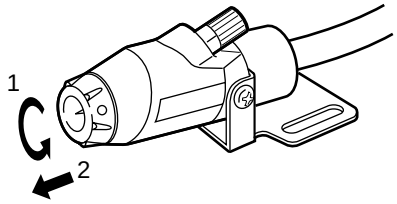
Note: When the electrode probes are hard to reach and clean, remove them from the static eliminator head for cleaning.

■ **Replacing the electrode probes**

If the SJ-S020 does not recover its static elimination ability even after cleaning or if the CLEANING indicator illuminates frequently, replace the electrode probes.
A set of tungsten electrode probes (Black, OP-35327) is available as an option.
When replacing the electrode probes, be sure to replace all probes on the static eliminator head at the same time.

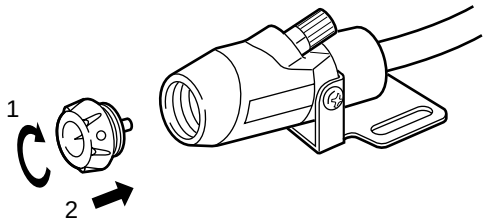
■ Removing the electrode probes

Hold the plastic part of the electrode probe, turn it counterclockwise and pull it upward.



■ Attaching the electrode probes

Hold the plastic part of the electrode probe, insert it by aligning the protrusion of the base with the groove, and turn the probe clockwise.



Chapter 5

Specifications

This chapter describes the specifications and dimensions of the SJ-S020.

5.1 Specifications

This section provides the specifications of the SJ-S020.

■ Static elimination bar

Model		SJ-S01
Ion generating method		Corona discharge
Structure		Shock-less resistance coupled
Operating distance		50 mm min.
Air purge connecting tube		An outer diameter of 6 mm and an inner diameter of 4 mm
Air purge supply pressure		0.7 MPa max. [1.]
Material	Electrode probe	Tungsten or silicon
	Main body	Aluminum and liquid crystal polymer
Ambient temperature		0 to +50°C (32 to 122°F), No freezing
Relative humidity		35 to 65%, No condensation
Weight		Approx. 520 g

1. Be sure to supply clean and dry air. If the air contains water or oil, it may cause an electric discharge inside the static eliminator head, resulting in an accident or product breakdown.

5

■ Controller + High-voltage power supply unit

Model	SJ-S020
Voltage application method/ Applied voltage	Pulse AC method/±7000 V
Ion balance control method	I.C.C.
Ion balance [2.]	±30 V (±50)
Control input	From electrostatic sensor only
Alarm output	NPN open-collector: 100 mA max. (40 V max.) N.C.
Power supply	24 VDC±10%
Current consumption	1 A max.
Major functions	Feedback function from the static electricity sensor (SK-200), alarm output function, static elimination frequency setting function, and synchronization function
Ambient temperature	0 to +50°C (32 to 122°F), No freezing
Relative humidity	35 to 65%, No condensation
Weight	Controller: Approx. 750 g High-voltage power supply unit: Approx. 650 g

2. Measured at an operating distance of 150 mm with the elimination frequency set to 33 Hz. The value inside the parenthesis shows the measured value with the frequency set to 100 Hz.

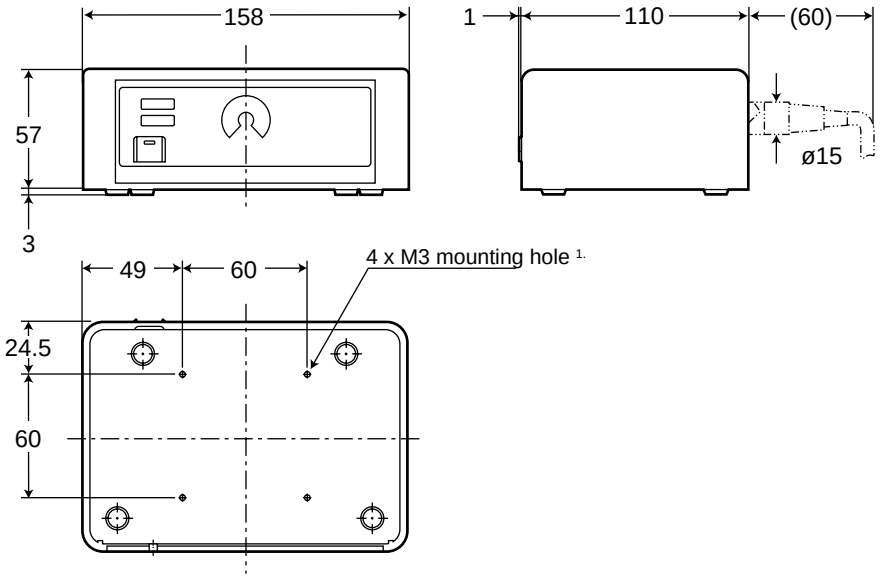
5.2 Dimensions

Unit: mm

This section shows the dimensions of the SJ-S020.

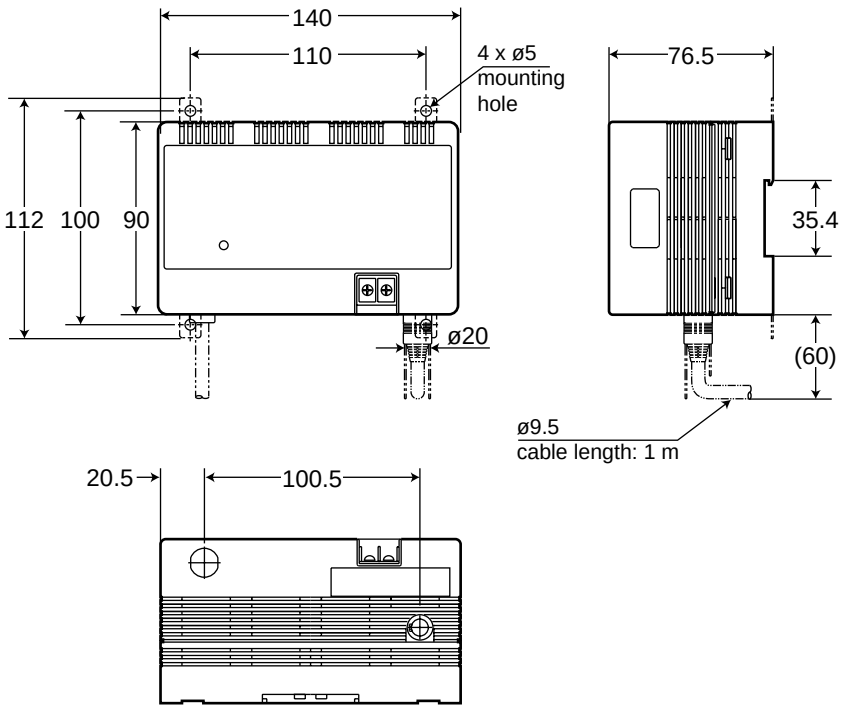
■ Controller

Controller unit

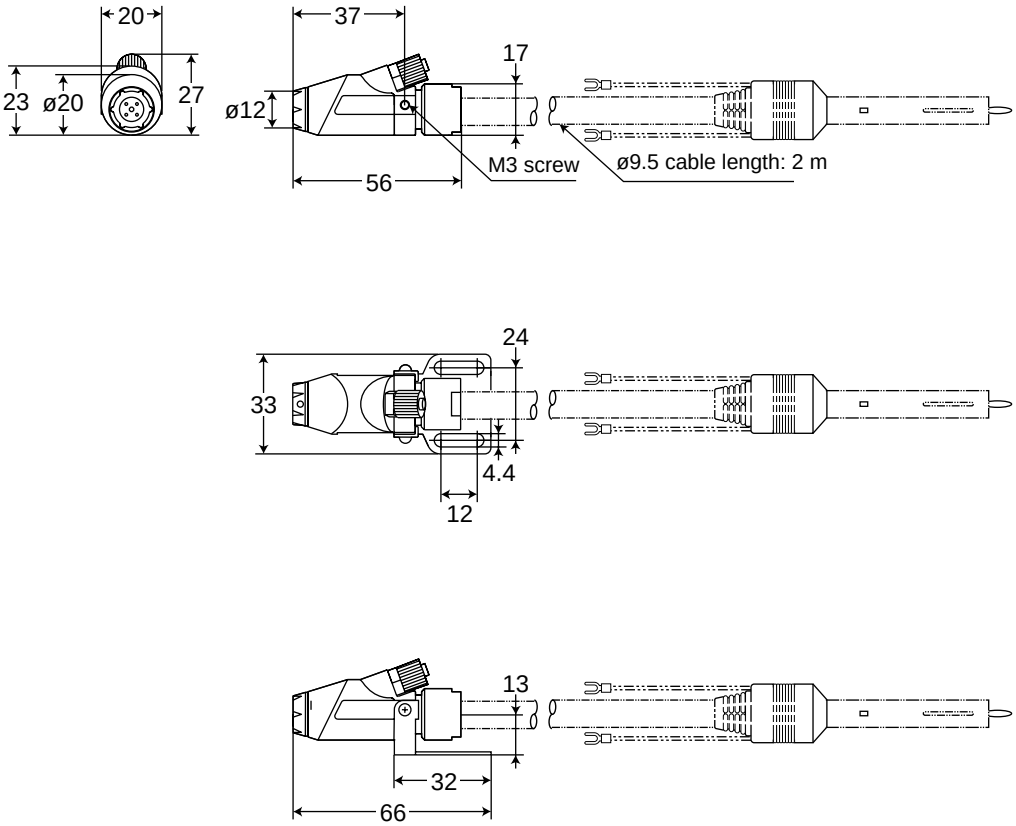


1. When installing the controller, avoid screwing the screws more than 10 mm from the bottom surface.

High-voltage power supply unit



■ **Static eliminator head**



WARRANTIES AND DISCLAIMERS:

(1) KEYENCE warrants the Products to be free of defects in materials and workmanship for a period of one (1) year from the date of shipment. If any models or samples were shown to Buyer, such models or samples were used merely to illustrate the general type and quality of the Products and not to represent that the Products would necessarily conform to said models or samples. Any Products found to be defective must be shipped to KEYENCE with all shipping costs paid by Buyer or offered to KEYENCE for inspection and examination. Upon examination by KEYENCE, KEYENCE, at its sole option, will refund the purchase price of, or repair or replace at no charge any Products found to be defective. This warranty does not apply to any defects resulting from any action of Buyer, including but not limited to improper installation, improper interfacing, improper repair, unauthorized modification, misapplication and mishandling, such as exposure to excessive current, heat, coldness, moisture, vibration or outdoors air. Components which wear are not warranted.

(2) KEYENCE is pleased to offer suggestions on the use of its various Products. They are only suggestions, and it is Buyer's responsibility to ascertain the fitness of the Products for Buyer's intended use. KEYENCE will not be responsible for any damages that may result from the use of the Products.

(3) The Products and any samples ("Products/Samples") supplied to Buyer are not to be used internally in humans, for human transportation, as safety devices or fail-safe systems, unless their written specifications state otherwise. Should any Products/Samples be used in such a manner or misused in any way, KEYENCE assumes no responsibility, and additionally Buyer will indemnify KEYENCE and hold KEYENCE harmless from any liability or damage whatsoever arising out of any misuse of the Products/Samples.

(4) OTHER THAN AS STATED HEREIN, THE PRODUCTS/SAMPLES ARE PROVIDED WITH NO OTHER WARRANTIES WHATSOEVER. ALL EXPRESS, IMPLIED, AND STATUTORY WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF PROPRIETARY RIGHTS, ARE EXPRESSLY DISCLAIMED. IN NO EVENT SHALL KEYENCE AND ITS AFFILIATED ENTITIES BE LIABLE TO ANY PERSON OR ENTITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, ANY DAMAGES RESULTING FROM LOSS OF USE, BUSINESS INTERRUPTION, LOSS OF INFORMATION, LOSS OR INACCURACY OF DATA, LOSS OF PROFITS, LOSS OF SAVINGS, THE COST OF PROCUREMENT OF SUBSTITUTED GOODS, SERVICES OR TECHNOLOGIES, OR FOR ANY MATTER ARISING OUT OF OR IN CONNECTION WITH THE USE OR INABILITY TO USE THE PRODUCTS, EVEN IF KEYENCE OR ONE OF ITS AFFILIATED ENTITIES WAS ADVISED OF A POSSIBLE THIRD PARTY'S CLAIM FOR DAMAGES OR ANY OTHER CLAIM AGAINST BUYER. In some jurisdictions, some of the foregoing warranty disclaimers or damage limitations may not apply.

BUYER'S TRANSFER OBLIGATIONS: If the Products/Samples purchased by Buyer are to be resold or delivered to a third party, Buyer must provide such third party with a copy of this document, all specifications, manuals, catalogs, leaflets and written information provided to Buyer pertaining to the Products/Samples.

Specifications are subject to change without notice.

KEYENCE

KEYENCE CORPORATION
1-3-14, Higashi-Nakajima, Higashi-Yodogawa-ku,
Osaka, 533-8555, Japan
PHONE: 81-6-6379-2211 FAX: 81-6-6379-2131

AFFILIATED COMPANIES

KEYENCE CORPORATION OF AMERICA
PHONE: 201-930-0100 FAX: 201-930-0099

KEYENCE DEUTSCHLAND GmbH
PHONE: 06102-36 89-0 FAX: 06102-36 89-100

KEYENCE (UK) LIMITED
PHONE: 01908-696900 FAX: 01908-696777

KEYENCE FRANCE S.A.
PHONE: 01 47 92 76 76 FAX: 01 47 92 76 77

KEYENCE SINGAPORE PTE LTD
PHONE: 392-1011 FAX: 392-5055

KEYENCE (MALAYSIA) SDN BHD
PHONE: 03-252-2211 FAX: 03-252-2131

KEYENCE (THAILAND) CO., LTD
PHONE: 02-369-2777 FAX: 02-369-2775

KEYENCE TAIWAN CO., LTD
PHONE: 02-2627-3100 FAX: 02-2798-8925

KEYENCE KOREA CORPORATION
PHONE: 02-563-1270 FAX: 02-563-1271