



Ultra High-speed Sheath Sensing Ionizer SJ-HA Series

SJ-H036A/060A/084A/108A/132A/156A/180A/204A/228A/252A/300A

Instruction Manual

Read this instruction manual before using the product in order to achieve maximum performance Keep this instruction manual in a safe place after reading it so that it can be used at any time



■ Symbols

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

⚠ Danger

Failure to follow instructions may lead to death or serious injury



Failure to follow instructions may lead to injury.



Failure to follow instructions may lead to product damage (product malfunctions, etc.).

Provides important precautions and restrictions on proper operation

Provides additional information on proper operation



Reference Provides useful information on proper operation

M Provides reference pages

Safety Precautions

■ General precautions



- You must verify that the SJ-HA Series are operating correctly in terms of functionality and performance before the start and the operation of the SJ-HA series
- We recommend that you take substantial safety measures to avoid are event of a problem occurring.
- . KEYENCE never warrant the function or performance of the SJ-HA Series if it is used in a manner that differs from the SJ-HA Series specifications contained in this instruction man ual or if the SJ-HA Series are modified by yourself.
- Do not use the SJ-HA Series for the purpose of protecting the human body.

■ Warnings and cautions specific to the SJ-HA Series

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



- · Filling a closed space with nitrogen will reduce the oxygen levels in the air to dangerous
- Make sure that there is adequate ventilation when using the SJ-HA Series in an enclosed
- Do not use the SJ-HA Series in the presence of flammable or explosive gases or ele ments



- To avoid the risk of electric shock and ensure proper static elimination, be sure to com pletely ground the SJ-HA Series' 10-pin I/O cable
- To avoid the risk of electric shock or product malfunctions, prevent water, oil, or flammable solvent from splashing onto the SJ-HA Series.
- To avoid the risk of electric shock or product malfunctions, keep fingers and metallic objects such as tools or wires away from the SJ-HA Series during operation
- When the SJ-HA Series is used in an enclosed space, the generated ozone may become
- Make sure that there is adequate ventilation when using the SJ-HA Series in an enclosed
- Do not use the SJ-HA Series in a location in which the temperature changes sudde where condensation occurs. This may lead to an accident or product breakdown.
- . To avoid the risk of electric shock, do not operate the SJ-HA Series with wet hands
- To avoid the risk of electric shock or product malfunctions, be sure to turn the power off during maintenance of the SJ-HA Series.
- To avoid the risk of injury, do not touch the electrode probes directly with your hands or fingers during maintenance.

 • If any abnormality is observed in the SJ-HA Series, immediately turn off the power and
- contact the nearest KEYENCE office. Do not try to repair the SJ-HA Series by yourself. This may cause electric shock or product malfunctions.



- . Do not touch the SJ-HA Series' electrode probes with hard objects such as tools. If the electrode probes are damaged, the SJ-HA Series does not operate properly, resulting in
- Operate the control panel of the SJ-HA Series with the flat-blade screwdriver provided with the product.
- . When mounting the SJ-HA Series, use the provided End units (L/R) and Auxiliary Support Part, otherwise product malfunctions may result.
- . When the SJ-HA Series is used over a long time, dust accumulates on the electrode probes. Clean the electrode probes when the alarm indicator flashes. If you continue to use the SJ-HA Series with dust accumulating on the electrode probes, the SJ-HA Series will not operate properly, resulting in product malfunctions. Regular cleaning (about every
- Do not drop the SJ-HA Series or subject it to a strong impact. This may cause product mal-
- Do not use the SJ-HA Series for any purpose other than eliminating static electricity.
- When the SJ-HA Series is used in combination with other instruments, functions and performance maybe degraded, depending on operating conditions and the surrounding

■ Precautions for power supply



- Use a DC power supply at a rated supply voltage of 24 to 36 V.
- Noise conveyed through the power supply line may cause the SJ-HA Series to malfunction. Be sure to use a stabilized DC power supply with an insulated transformer
- When using a commercially available switching regulator, be sure to completely ground switching regulator's frame ground terminal.
- Do not connect a number of power supplies to a single SJ-HA unit or more than one SJ-HA unit connected together, otherwise the power supplies will be short-circuited and product malfunctions may result.

■ Precautions for grounding

The 10-pin I/O cable for the SJ-HA Series is provided with a ground wire.



- For proper static elimination, be sure to completely ground the SJ-HA Series' grounding
- The grounding cable must be grounded at a resistance not exceeding 100 Ω .

■ Warning labels on SJ-HA Series

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

■ Locations



- To prevent product malfunctions, avoid installing the SJ-HA Series in the following locations. Locations in which the SJ-HA Series may be directly subjected to vibration or impact.
- Locations in which the ambient temperature drops below 0°C or exceeds + 40°C.
- . Locations in which the relative humidity drops below 35% or exceeds 85%, or where condensation occurs.
- . Locations in which the temperature changes suddenly.
- Locations in which the SJ-HA Series 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 fume
- · Locations in which water, oil or chemicals may splash onto the SJ-HA Series.
- Locations in which a strong magnetic or electric field is generated
- . Locations where the altitude exceeds 2000 m.
- Outdoors

■ Other precautions



- . Follow the warning instructions and cautions specified in this instruction manual
- If the unit is turned off while setting, the settings may be damaged.

Before using the unit, wait approx, 20 minutes after the unit is turned on. Otherwise, the ion

Precautions for CSA Certificate

The SJ-HA Series complies with the following CSA and UL standards, and has been certified by CSA

CAN/CSA-C22.2 No.61010-1

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use

UI 61010-1

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use

<Pre><Pre>cautions>

- When selecting a power supply for use with the SJ-HA Series, always use a CSA/UL-listed power supply that either provides Class 2 output as defined in the Canadian Electrical Code/National Electrical Code, or that has been evaluated as a Limited Power Source as defined in CAN/ CSA-C22 2 No. 60950-1/UI 60950-1
- Always establish a proper ground connections when installing the SJ-HA Series.

 Make sure to use only the connection cables provided by KEYENCE to set the SJ-HA Series units.
- by connecting to one another or to connect to their power supplies.

 Install the SJ-HA Series in accordance with the installation and wiring instructions described in this instruction manual. Never operate the SJ-HA Series with the ratings that does not conform to the specifications described in this instruction manual.

Precautions for CE Marking

The SJ-HA Series complies with the following EU Directives and EN standards

- EMC Directives (2004/108/EC)
- Low-voltage Directive (2006/95/EC)

EN Standards

- EN61326-1 Class A
 EN61010-1

- Be sure to completely ground the SJ-HA Series' ground terminal when installing the SJ-HA Series.
- Overvoltage Category (Installation Category): I Pollution Degree: 2
- When selecting a power supply for use with the SJ-HA Series, always use a power supply that has
- been certified by a EU Notified Body (as a Limited Power Source as defined in EN60950).

 Make sure to use only the connection cables provided by KEYENCE to set the SJ-HA Series units by connecting to one another or to connect to their power supplies.
- Install the SJ-HA Series in accordance with the installation and wiring instructions described in this
 instruction manual. Never operate the SJ-HA Series with the ratings that does not conform to the specifications described in this instruction manual.

Checking the Package Contents

The package of SJ-HA Series includes the following items. Ensure that these items are included in your package before using the Unit. Extension cables and electrode probes for replacement are available as options

See "List of Optional Accessories" (page 8)

Contents

SJ-H060A/084A/108A/132A/156A/180A/204A/228A/252A/300A Controller-built-in Static Eliminato



S.I-H036A Static Flimination Bar





Electrode probe



Auxiliary Support Part

SJ-H036A: 0 SJ-H060A : 0 SJ-H084A : 0 SJ-H108A : 0 SJ-H108A: 0 SJ-H132A: 1 SJ-H156A: 1 SJ-H180A: 1

End Units (L/R)

End Unit Securing Screws: 2



Instruction Manua

SJ-H204A : 1 SJ-H228A: 2

SJ-H252A : 2





The CAUTION/WARNING labels in Japanese, Gerrand Chinese*1





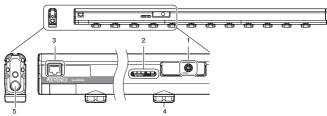
*1 Use these language warning labels and ID number seals as needed

Prepare the 10pin I/O cable (SJ-C□U) to use the SJ-HA Series See "Cables" (page 3).

Part Names

This section lists the part names of the SJ-HA Series. For details about the operation keys and indicators on the controller's front panel, see "Names and functions of operation keys, switches, and indica-

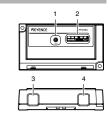
Static elimination bar (Control panel)



- The figure is for the SJ-H084A/108A/132A/156A/180A/204A/228A/252A/300A. The position of Ion monitor of SJ-H060A is different from other models. SJ-H036A does not have 1 and 2.
- 1. Setting block (Not provided on SJ-H036A)
- 2. Indicator block (Not provided on SJ-H036A)
- 3. Cable connector
- 4. Electrode probe
- 5. Air supply opening (Two on SJ-H036A/060A/084A/108A/132A/156A/180A/204A, and three on SJ-H228A/252A/300A)

Control panel (SJ-H036A)

- 1. Setting block
- 2. Indicator block
- 3. I/O Cable connector
- 4. Cable connector



Installation and Connection

This section explains how to set up and install the SJ-HA Series

Before installation, carefully consider the operating conditions such as the distance between the static elimination bar and the target, or the time required for the elimination of the target's static charge

Static elimination ability

■ Static elimination speed and operating distance

The SJ-HA Series offers a variety of frequency settings to enable flexible static elimination according to the location and application

See "Frequency setting" (page 4).

Static elmination speed	Location	Operating distance (mm)	Recommended frequency (Hz)	
High-speed	Production lines of films or sheets (Short distance)	50-300	68, 47, 33, 22	
	Clean bench (Middle distance)	300-1000	10, 8, 5	
Low-speed	On ceiling of clean room (Long distance)	1000-2000	3, 1	

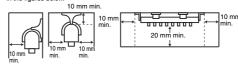
Precautions for installation

■ Installation location



Refer to the following illustration to install the SJ-HA Series.

Provide enough space between the static elimination bar and surrounding walls as shown in the figures below

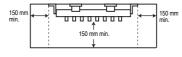


- When mounting the SJ-HA Series, use the provided end unit and auxiliary support part, otherwise an accident or malfunction may result.
- · Be sure that the cable stays more than 10 mm away from the SJ-HA Series, otherwise an accident or malfunction may result.

■ Interference

The SJ-HA Series may not operate properly if there is any conductive object close to the SJ-HA Series or if another SJ-HA unit is installed closely together. Refer to the following illustration and isolate the SJ-HA Series from the conductive object.





If two SJ-HA units are used, refer to the following illustration and separate the static elimination bars





Side-to -side installa

Face-to-face installation

■ Auxiliary support part (SJ-H132A/156A/180A/204A/228A/252A/300A)

Install the SJ-H132A/156A/180A/204A/228A/252A/300A with auxiliary support part. Auxiliary support part prevents the static elimination bar from bending. Do not install the SJ-H132A/156A/180A/204A/ 228A/252A/300A without using auxiliary support part.



Туре	No. of auxiliary support parts necessary for installation
SJ-H036A/060A/084A/108A	0
SJ-H132A/156A/180A/204A	1
SJ-H228A/252A/300A	2

■ Cables

The cables, including power cables and connector cables, required for the SJ-HA Series are not included in the package. Confirm the installation location before installing and make sure to buy the proper lengths of cables (10 pin I/O cable, 10-to-10-pin cable and 10-to-10-pin for SJ-H036A cables)

Item	Туре	Appearance	Description
10-pin I/O cable	SJ-C2U (2m) SJ-C5U (5m) SJ-C10U (10m)		Power cable for the SJ-HA Series. Three types (2-, 5-, 10-m cables) are available. (Cable color :Gray)
10-to-10-pin cable	OP-42210 (2m) OP-42211 (5m) OP-42212 (10m)		Cable for connecting the SJ-HA Series units. Three types (2-, 5-, 10-m cables) are available. Use this cable to connect to the coupled Relay Box. (Cable color :Gray)
10-to-10-pin cable for SJ-H036A	SJ-C2H (2m) SJ-C5H (5m) SJ-C10H (10m)		The cable that connects the SJ-H036A controller to the bar. Three types (2-,5-,10-m cables) are available. 10-pin I/O cable is necessary for supplying power. (cable color :Black)
Relay box for SJ-HA	OP-84296		This is required if the cables will extend more than 10 meters. (For use with the 10-to-10-pin cable)

Installing SJ-HA Series

■ Installing SJ-HA Series

Install the SJ-HA Series in places where a static problem occurs or may occur.

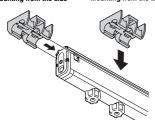


- When installing the SJ-H132A/156A/180A/204A/228A/252A/300A, mount and secure the auxiliary support parts with screws for the prevention of the static elimination bar from bending, otherwise the static elimination bar may be broken. See "Precautions for installation" (page 2).
- eep a space of at least 10 mm around the static elimination bar after installation, other wise the static elimination bar may malfunction or receive damage
- Mount the auxiliary support parts on top of the static elimination bar or along the guide rails. The SJ-H132A/156A/180A/204A requires a single auxiliary support part, the SJ-H228A/252A/300A requires two auxiliary support parts. Mount them at approximately equal intervals.

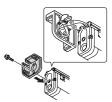


Confirm that the hooks on the auxiliary support part grasp the guide rails on the static elimination bar when installing

. Mounting from the side



Attach the end unit to each end of the static elimination bar.

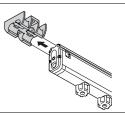


Secure the SJ-HA Series with M4 screws at the desired installation position.

When installing the SJ-H132A/156A/180A/204A/228A/252A/300A, secure the auxiliary support part with M4 screws as well.



When removing the auxiliary support part, be sure to remove it from the side along the guide rails.



Wiring diagram (SJ-C2U/C5U/C10U 10-pin I/O cable)



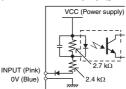
Cord color	Description	
Brown (2 wires)	DC power supply (rated voltage of 24 to 36 V)	
Blue (2 wires)	Power supply GND	
Pink	Static elimination interrupt input	
Orange	Output signal GND	
Black	Ion level alarm output	
White	Condition alarm output	
Gray	Alarm output	
Shield wire (thick black wire)	Ground (Ground at a resistance not exceeding 100Ω)	

- The blue wire and orange wire are insulated from each other. There are two wires each for the brown wire and the blue wire. Be sure to connect both of the two wires. The ends are soldered together before shipping.
- **⚠** Caution

Do not short-circuit the output signal wire and output signal GND wire together without any load, otherwise the internal circuit will be damaged, which may result in product malfunctions, because the SJ-HA Series does not have any overcurrent protection circuit.

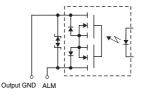
■ Input circuit

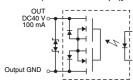
Pink (Static Eliminat on Interrupt Input)]



Apply NPN open collector input to the INPUT and 0 V terminals from non-voltage contacts (such as relays).

■ Output circuit Photo Relay Output [Gray (Alarm Output)]





Connection of power supply

■ Connecting SJ-H060A/084A/108A/132A/156A/180A/204A/228A/252A/300A to power supply

A 10-pin I/O cable (sold separately) is required to connect the SJ-H060A/084A/108A/132A/156A/ 180A/204A/228A/252A/300A to power supply

See "Wiring diagram" (page 3) and connect each wire of the 10-pin I/O cable.

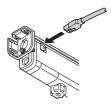


- For proper static elimination, the ground wire must be grounded at a resistance not
- Use a DC power supply with a marginal output (at least 500 mA) at a rated voltage of 24 to
- Do not connect a number of power supplies to a single SJ-HA unit or more than one SJ-HA unit connected together, otherwise the power supplies will be short-circuited an accident or malfunction may result.

Connect the modular connector of the 10-pin I/O cable to the SJ-H060A/084A/108A/132A/156A/180A/204A/228A/ 252A/300A.

SJ-H060A/084A/108A/132A/156A/180A/204A/228A/252A/ 300A have the cable connection part (10-pin)

The connector will snap when it is connected correctly





- Press the tab of the modular connector to disconnect the cable. Do not pull the cable with out pressing the tab, otherwise the cable may be damaged. Keep a space of at least 10 mm around the static elimination bar after installation, other-
- wise the static elimination bar may malfunction or receive damage.

■ Connecting SJ-H036A to power supply

A 10-pin I/O cable and a 10-to-10-pin cable (both sold separately) are required to connect the SJ-H036A to power supply.

See "Wiring diagram" (page 3) and connect each wire of the 10-pin I/O cable.

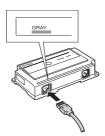


- For proper static elimination, the ground wire must be grounded at a resistance not eding 100 Ω .
- . Use a DC power supply with a marginal output (at least 500 mA) at a rated voltage of 24 to 36 V
- Do not connect a number of power supplies to a single SJ-HA unit or more than one SJ-HA unit connected together, otherwise the power supplies will be short-circuited an accident or malfunction may result.

Connect the modular connector of the 10-pin I/O cable to the SJ-H036A controller

Connect the cable to the cable connection part indicated "GRAY" on the controller.

The connector will snap when it is connected correctly



Connect the SJ-H036A controller and the static elimination bar over the 10-to-10-pin cable.

Connect the cable to the connector marked by the word "BLACK." Then connect the cable to the static elimination bar of the SJ-H036A

The connector will snap when it is connected correctly





- . Press the tab of the modular connector to disconnect the cable. Do not pull the cable with out pressing the tab, otherwise the cable may be damaged.
- Keep a space of at least 10 mm around the static elimination bar after installation, otherwise the static elimination bar may malfunction or receive damage.

The SJ-H036A static elimination bar and controller should bear the same serial number. Check that they bear the same serial number when connecting them.

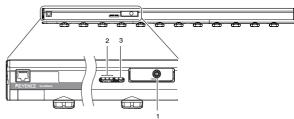
Static Elimination Setting

This section provides the name and functions of operation keys, switches, and indicators on the controller's front panel. It also describes the operation procedure for the static elimination setting

Names and functions of operation keys, switches, and indicators

The control panel of the SJ-H084A/108A/132A/156A/180A/204A/228A/252A/300A has the same lay-

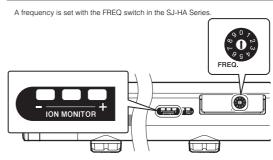
The control panel of the SJ-H060A and SJ-H036A has the setting switch and display part positions swapped.



- Sets the frequency 1. FREQ switch
- 2. ION MONITOR ... Displays the strength of the electric charge of the object.
- This flashes once per second if static elimination power is affected by situations such as an absorption of ions by surrounding metals, which can cause instability of the setting environment (temperature, humidity, surrounding metals). (Condition alarm) This will blink twice per second if the ion generation capability falls below the set value due to wear or dirt on the electrode probe. (Ion level alarm) Flashes if the quantity of ion generation is low due to the deteri-

oration of the electrode probes or the dirt on the electrode probes. Then static elimination will be forcibly turned OFF. (Alarm)

Frequency setting



When the frequency setting is made, the indicator for the present frequency on the ION MONITOR will flash for approximately five seconds. Then the indicator will be turned OFF

Frequency	FREQ. switch	ION MONITOR
68Hz	0	OFF OFF Green
47Hz	1	OFF OFF Yellow
33Hz	2	OFF OFF Red
22Hz	3	OFF Green OFF
10Hz	4	OFF Yellow OFF
8Hz	5	OFF Red OFF
5Hz	6	Green OFF OFF
3Hz	7	Yellow OFF OFF
1Hz	8	Red OFF OFF
Not used	9	

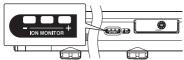
M For frequency settings in detail, see "Static elimination ability" (page 2).

Other Functions

This section describes other functions such as the display function, alarm output function, and air

Indicators

The target's static charge and the quantity of ions generated from the static elimination bar are displayed on the ION MONITOR



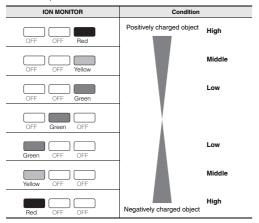
■ Electric charge indicator

The ION MONITOR works as an electric charge indicator that displays the target's static charge,

polarity of the static charge, and condition of static elimination.

The plus and minus side LEDs will illuminate in response to the current charge level.

When static elimination is finished, the indicator in the middle will be illuminated. Therefore, the user will know the process of static elimination.



Alarm output function

■ Alarm function (ALM)

The ION/ALM/COND indicator will flash red three times per second and an alarm signal (N.C. control signal) will be output if the internal circuit is damaged or an abnormal electrical discharge occurs.

Then the SJ-HA Series will stop generating ions. Alarm output will activate regardless of whether or not static elimination is being interrupted manually or forcibly



■ Ion level alarm function (ION)

The ION/ALM/COND indicator will flash twice per second and an alarm

signal (N.O. control signal) will be output if the quantity of ion generation is low due to the deterioration of the electrode probes or the dirt on the electrode probes. Static elimination will not be interrupted in this case.

The ion level warning can be a notice for the maintenance of the electromagnetic probes. Static elimination continues, so make sure to turn off the power when you perform maintenance on the electromagnetic probes

■ Condition alarm function (COND)

The ION/ALM/COND indicator will flash once per second and an alarm signal (N.O. control signal) will be output if the installation environmental conditions (e.g., the temperature, humidity, and ambient metal) are unstable and likely to affect the performance of static elimination adversely (e.g., the absorption of ions) caused by ambient metal objects. Static elimination will not be interrupted in this case

Elimination interruption function

For the purpose of energy saving, by short-circuiting the blue (DC GND wire) and pink (static elimination interruption input signal wire) wire terminals of the 10-pin I/O cable, only the static elimination function will be turned OFF without turning off the SJ-HA Series

Air-purge function

Supplying clean air through the air duct on both ends of the static elimination bar will prevent the dust accumulation on the electrode probes. The air purge widens the static elimination area and increases the speed of static elimination as well.

- The air pressure indicates the pneumatic value at the route of the joint.
- Please contact the nearest KEYENCE office when using the air-purge function with intermittent air supply.



Filling a closed space with nitrogen will reduce the oxygen levels in the air to dangerous

levels.

Make sure that there is adequate ventilation when using the SJ-HA Series in an enclosed



- . Check that the air pressure does not exceed 0.5 MPa, otherwise an accident or malfunc-
- tion may result.

 Please contact the nearest KEYENCE office when opening and closing the air duct.

 Be sure to provide clean, dry air to the static elimination bar. If the air contains water or oil, air leaks or electrical discharges may occur in the static elimination bar, thus resulting in
- accidents or malfunctions.

 Be sure to supply air from both sides (2 locations) of the SJ-H036A/060A/084A/108A/132A/156A/180A/204A.

 Be sure to supply air from both sides (3 locations) of the SJ-H228A/252A/300A.

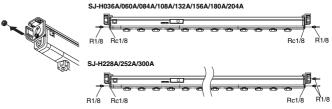
Provide clean, dry air free of organic matter at a condensation point of -25 °C and approximately 0.01 um in mesh size

■ Air supply method

As shown in the illustration below, remove the screw that block the air duct on either end of the static elimination bar, connect a joint to the air duct, and provide air.



- Be sure to limit the tightening torque to 1.2 N•m (12 kg•cm²) 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 malfunctions.
 Be sure to supply air from both sides (2 locations) of the SJ-H036A/060A/084A/108A/132A/156A/180A/204A.
 Be sure to supply air from both sides (3 locations) of the SJ-H228A/252A/300A.



Recommended joint

The recommended joint is the Tube Fitting (tube diameter : ϕ 8 mm) manufactured by Pisco Co.



- Use a joint having a tube diameter of 8 mm on the SJ-HA Series.
 When providing air to more than one SJ-HA unit, check that each static elimination bar is provided with air. If the air supply source is one, each static elimination bar may not be provided with enough air.

Abnormal discharge detection function

The SJ-HA Series detects abnormal electric discharge caused by the condensation on the tips of the electrode probes or conductive objects that may come close to the electrode probes, thus interrupting the generation of ions and prevent the occurrence of trouble.

Settings for SJ-HA Units in Coupled Operation

Using the coupled Relay Box, more than one SJ-HA Series can be used by coupling in parallel

Frequency setting

When using SJ-HA units in coupled operation, set a unique frequency for each SJ-HA unit individu-

Connecting SJ-HA Series units in coupled operation

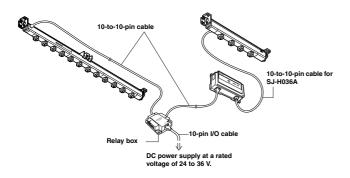


Do not connect a number of power supplies to a single SJ-HA unit or more than one SJ-HA unit connected together, otherwise the power supplies will be short-circuited an accident o malfunction may result.

- A coupled installation of the SJ-HA units is possible under the following restrictive conditions.
 Up to seven SJ-HA units can be connected.
 The total extension length between the power supply and the farthest static elimination bar is within 30 m.

 When smaller as to more than one SI-HA unit check that each static elimination bar is provided with
 - When providing air to more than one SJ-HA unit, check that each static elimination bar is provided with air. If the air supply source is one, each static elimination bar may not be provided with enough air.

Up to seven SJ-HA units can be connected in parallel over the optional 10-to-10-pin serial cable through the optional OP-84296 relay box.



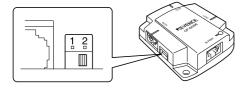
OP-84296 relay box

Using the OP-84296 relay box allows the SJ-HA Series to be connected in paralle

Use the relay box (OP-84296) as well when extending the cable



- Set the terminator switch to "2" if the SJ-HA Series is connected to the OUT port of the relay box
- Set the terminator switch of the OUT port that is not connected to the SJ-HA Series to "1"





Do not connect a number of power supplies to a single SJ-HA unit or more than one SJ-HA unit connected together, otherwise the power supplies will be short-circuited an accident or malfunction may result.

- A coupled installation of the SJ-HA units is possible under the following restrictive conditions
 Up to seven SJ-HA units can be connected.

 A coupled installation of the SJ-HA units is possible under the following restrictive conditions
 Up to seven SJ-HA units can be connected.
 - (Seven units can be connected only when using the power supply of 36 V. When using 24 V, contact your nearest KEYENCE sales office.)

 The total extension length from the power supply to the farthest static elimination bar must be less
 - than 30 m
 - When providing air to more than one SJ-HA unit, check that each static elimination bar is provided with air. If the air supply source is one, each static elimination bar may not be provided with enough air.

Maintenance of Electrode Probes

mulation of dust

If you continue to use the SJ-HA Series 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.

Maintenance of electrode probes

Use the electrode probe cleaning kit (OP-84299) or a cotton swab when performing maintenance for the electrical probes



- Turn off the SJ-HA Series before the maintenance of the electrode probes
- . Do not touch the electrode probes directly with your hand or fingers, as this may cause injury. Be extremely careful when cleaning them

■ Cleaning the electrode probes : Electrode probe cleaning kit (OP-84299)

Soak the filter of the cleaning kit with alcohol, and place the cleaning kit on the electrode probe and rotate it gently two or three times.

The filter on the cleaning kit will remove any dirt from the electrode probes. Replacement filters (OP-42218) are also available



* For information on how to replace the filter, see "Electrode Probe Cleaning Kit Instruction Manual".

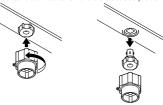
■ Clean the electrode probe : Cotton bud

Clean the electrode probe with a cotton bud moistened with alcohol.



■ Changing the electrode probes

Place the included electrode probe replacement kit over the electrode probe and press it towards the device while rotating it counter-clockwise to remove the electrode probe.

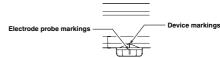


To attach an electrode probe, place the new probe in the electrode probe replacement kit, line it up with the grooves and insert it. Press the kit towards the device and turn clockwise to secure the electrode probe





. When attaching an electrode probe, line up the markings on the device and the markings on the electrode



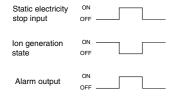
When attaching an electrode probe, check that the O-ring is at the designated position.



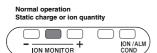
Timing Charts

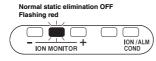
This section explains the timing charts of the SJ-HA Series.

■ Control of Ion generation

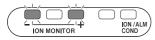


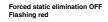
Static elimination ON/OFF Indicator





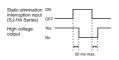
Forced static elimination ON Flashing green



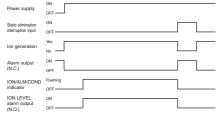


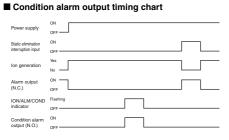


■ Input response

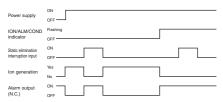


■ Ion level alarm output timing chart





■ Alarm output timing chart



Once the alarm is indicated, the unit returns to the previous state by turning the power on again.

Troubleshooting

Refer to the following list for troubleshooting and remedies before sending out the unit for repairs.

Problem	Inspection	Remedy
No ION MONITOR indicators are	Check that the power supply cable is connected correctly.	Connect the power supply cable correctly.
working.	Check that the power supply is within the rated range.	Use power supply within the rated range.
	Check that the electrode probes are not worn out or dirty.	Carry out maintenance work on the electrode probes or replace them.
No state ellectration to conform at	Check that static elimination is not interrupted.	Cancel the static electricity stop input of the SJ-HA Series (Open the input terminal.).
No static elimination is performed.	Check if the abnormal discharge detection function is working. (Check if the alarm is output)	Eliminate conductive objects within 20 mm of the electrode probe and turn on the SJ-HA Series again.
	Check that the ground is connected.	Confirm that the ground is properly connected.
	Check that the correct frequency setting is selected.	Select the optimal frequency setting according to the operating distance.
Static elimination is not performed properly.	Check that there is no conductive object or another Static Eliminator Unit close to the SJ-HA Series.	Keep the SJ-HA Series away from the conductive object or the Static Eliminator Unit.
	Check that the ground is connected.	Confirm that the ground is properly connected.
Ion level (ION LEVEL) alarm is illuminated and output frequently.	Check that the electrode probes are not worn out or dirty.	Carry out maintenance work on the electrode probes or replace them.
The condition (COND) alarm is illuminated and output frequently.	Check that there is no conductive object or another Static Eliminator Unit close to the SJ-HA Series.	Keep the SJ-HA Series away from the conductive object or the Static Eliminator Unit.
The alarm (ALM) indicator is	Check that there is no conductive object within 10 mm of the SJ-HA Series.	Eliminate the conductive object within 10 mm of the SJ-HA Series and turn the SJ-HA Series OFF and ON. The abnormal discharge detection function may have been turned ON.
illuminated.	Check that the SJ-C*H is connected.	The modular jack may not be inserted properly or the cable may be disconnected. Connect the modular jack correctly and turn the SJ-HA Series OFF and ON.
Control output is not output correctly.	Check that the cable is wired correctly.	Check the output circuit and make sure that the wiring is correct.
Static elimination interrupt input is not input properly.	Check that the cable is wired correctly.	Check the input circuit and make sure that the wiring is correct.
Cannot understand the meaning of the ndicators	-	See "Indicator Specifications" (page 8).
A distance extension of 10 m or more is required.	-	Purchase the Extension Cable and Relay Connector.

Warnings and Remedies

This section explains each type of warning, as well as the most common causes and best remedies for each issue

Warning	Major causes	Remedy	
	Irregular discharge from the end of a probe	Turn the power off and remove any conductive objects from the area around the static elimination bar.	
Alarm	Ground not connected	Confirm that the ground is properly connected.	
	Internal circuit damage	Contact your nearest sales office.	
Ion level warning	Dirt on the electrode probes	Turn the power OFF and clean the electrode probe. If the ion level warning persists after cleaning, confirm the surroundings of the electrode probe.	
	Electrode probe wear	Turn the power OFF and replace the electrode probe	
	Ground not connected	Confirm that the ground is properly connected.	
Condition warning	Influence from a grounding conductor near the static elimination device	The warning may flash when a grounding conductor such as a metal object is close enough to interfere with the static elimination device. Remove any grounding conductors near the static elimination device. See "Interference" (page 3).	
	Ground not connected	Confirm that the ground is properly connected.	

Indicator Specifications

\blacksquare Indicator specifications during setting change, checking, and while in operation

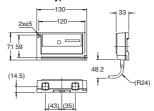
Indicator	Lighting specifications	Description
	One of the "ION MONITOR" lights is illuminated TON MONITOR HON JON JALM TON MONITOR COND	Charge level display Displays the target's static charge. When the leftmost (or rightmost) indicator is illuminated, means that the target's negative (or positive) static charge is very high. The indicator illuminated changes according to the quantity of the target's static charge. See "Indicators" (page 5).
ION MONITOR	One of the "ION MONITOR" lights flashes. ION MONITOR ION MONITOR ONLY ONLY	Frequency setting When the frequency is set, the indicator corresponding to the set frequency will flasher for approximately five seconds. See "Frequency setting" (page 4).
	The ION MONITOR indicator in the middle flashes red. ION MONITOR TO THE MONITOR	Normal static elimination interruption The indicator will flash red when static elimination is interrupted by short-circuiting th blue and pink wires of the 10-pin I/O cable.
ION/ALM/COND	The ION/ALM/COND flashes once per second TON MONITOR + TON 72LM COND	Condition warning The indicator flashes if the ion balance is bad due to the influence of the installation environment. Flashes Green :Sensitivity low When the alarm level is changed to another level, the indicator will flash slowly for approx. five seconds. When the condition warning and the ion level warning occur at the same time, the "ION/ALM COND" indicator flashes first for the ion level warning.
ION/ALM/COND	The ION/ALM/COND indicator flashes twice per second. Toly ALM TON MONITOR TON ALM COND	Ion level warning The indicator flashes when the quantity of ion generation drops below the set value. Flashes Green: Sensitivity low When the alarm level is changed to another level, the indicator will flash slowly for approx. five seconds. When the condition warning and the ion level warning occur at the same time, the "ION/ALM COND" indicator flashes first for the ion level warning.
ION/ALM/COND, ION MONITOR	The ION/ALM/COND indicator and the all ION MONITOR indicator flash red.	Alarm When an abnormal electric discharge occurs the internal circuit is damaged, the ION/ALM/ COND indicator will flash three times per second and the ION MONITOR indicators will flash red slowly.

List of Optional Accessories

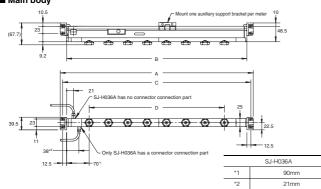
Item	Туре	Appearance	Description
10-pin I/O cable	SJ-C2U (2m) SJ-C5U (5m) SJ-C10U (10m)		Power cable for the SJ-HA Series. Three types (2-, 5-, 10-m cables) are available. (Cable color: Gray)
10 pin-10 pin cable	OP-42210 (2m) OP-42211 (5m) OP-42212 (10m)		Cable for connecting the SJ-HA Series units. Three types (2-, 5-, 10- m cables) are available. Use this cable to connect to the coupled Relay Box. (Cable color: Gray)
10-to-10-pin cable for SJ-H036A	SJ-C2H (2m) SJ-C5H (5m) SJ-C10H (10m)		The cable that connects the SJ-H036A controller to the bar. Three types (2-, 5-, 10-m cables) are available. (Cable color: Black)
Tungsten electrode probes (four) for SJ-HA	OP-84293		Tungsten-made electrode probes (Made for SJ-HA)
Connection relay box	OP-84296		Used for connecting SJ-HA units together.
End unit	OP-84301		Used for installing the SJ-HA Series.
Auxiliary support component	OP-84300		Used to for installing SJ-HA Series.
Electrode probe cleaning kit	OP-84299		Used for maintaining the electrode probes on the SJ-HA Series.
Replacement filters for the electrode cleaning kit (10 pieces)	OP-42218		Cotton filters for the cleaning kit.
Electrode probe cleaning kit 2	OP-84454		Used to perform maintenance on the inside wall of the electrode probe cap.
Replacement filter for the electrode probe cleaning kit 2 (10 pieces)	OP-84455		Replacement filters for the cleaning kit 2.
SJ-GL/G/V/R exchange side supports	OP-84297		Used to match the installation dimensions of the SJ-GL/G/V/R Series. Also used for rotation.
SJ-GL/G/V/R exchange central supports	OP-84298		Used to match the installation dimensions of the SJ-GL/G/V/R Series. Also used for rotation.
Electrode probe replacement kit	OP-84363		Used for changing the electrode probes on the SJ-HA Series.

Dimensions

■ Controller unit (SJ-H036A only)



■ Main body



Type	Electrode probes	A	В	С	D
SJ-H036A	4	380	340	365	P60×3=180
SJ-H060A	8	600	560	585	P60×7=420
SJ-H084A	12	840	800	825	P60×11=660
SJ-H108A	16	1080	1040	1065	P60×15=900
SJ-H132A	20	1320	1280	1305	P60×19=1140
SJ-H156A	24	1560	1520	1545	P60×23=1380
SJ-H180A	28	1800	1760	1785	P60×27=1620
SJ-H204A	32	2040	2000	2025	P60×31=1860
SJ-H228A	36	2280	2240	2265	P60×35=2100
SJ-H252A	40	2520	2480	2505	P60×39=2340
SJ-H300A	48	3000	2960	2985	P60×47=2820

Common for the left side of the bar



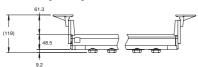
*1 SJ-H036A only has the left socket.
*2 SJ-HA type only has the right socket

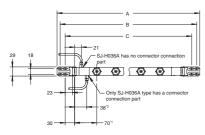
Common for the right side of the bar (SJ-H228A and longer models)



* Not provided for the SJ-H204A or shorter models

When a rotating mounting bracket is attached

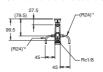




SJ-H036A		
	*1	90mm
	*0	21mm

Туре	Α	В	С
SJ-H036A	451	432	400
SJ-H060A	671	652	620
SJ-H084A	911	892	860
SJ-H108A	1151	1132	1100
SJ-H132A	1391	1372	1340
SJ-H156A	1631	1612	1580
SJ-H180A	1871	1852	1820
SJ-H204A	2111	2092	2060
SJ-H228A	2351	2332	2300
SJ-H252A	2591	2572	2540
SJ-H300A	3071	3052	3020

Common for the left side of the bar



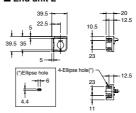
*1 SJ-H036A only has the left socket.
*2 SJ-HA type only has the right socket (Except for the SJ-H036A)

Common for the right side of the bar (SJ-H228A and longer models)

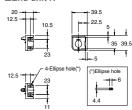


* Not provided for the SJ-H204A or shorter mode

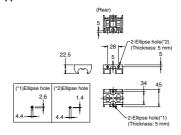
■ End unit L



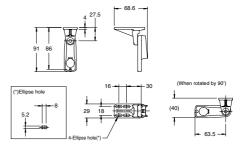
■End unit R



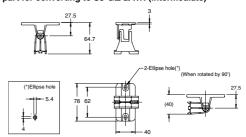
■ Auxiliary support



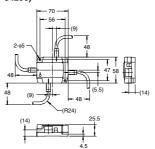
■ Support part for converting to SJ-GL/G/V/R (side)



■ Support part for converting to SJ-GL/G/V/R (intermediate)



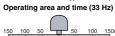
■ Relay box (OP-84296)

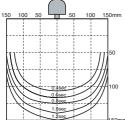


Static Elimination Function List

■ Operating area and operation time

This section shows typical examples of the time necessary for static elimination, and the relationship of the installation distance between the target and the static elimination bar.





Measurement conditions Measurement conditions:
The time required to eliminate the static charge of the target from ±1000 V to ±100 V is measured.
The 150×150mm plate monitor (20 pF) is used.
SJ+H108A is used.
No downflow

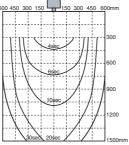


Measurement conditions

Operating area and time (10 Hz)

The time required to eliminate the static charge of the target from ±1000 V to ±100 V is measured. The 150×150 mm plate monitor (20 pF) is used. SJ-H108A is used.

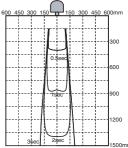
Operating area and time (1 Hz)



Measurement conditions: The time required to eliminate the static charge the target $\pm 1000 \text{ V}$ to $\pm 100 \text{ V}$ is measured. The 150×150 mm plate monitor (20 pF) is used. SJ-H108A is used.

Under the downward air flow of 0.3 m/sec

Operating area and time (at air MAX)

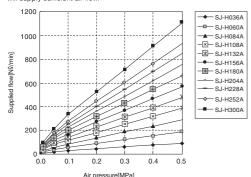


Measurement conditions:
The time required to eliminate the static charge of the target from ±1000 V to ±100 V is measured. The 150×150mm plate monitor (20 pF) is used SJ-H108A is used.

■ Relationship between air pressure and air flow with different bar lengths

The relationship between air pressure and air flow varies depending on the length of the static elimi-

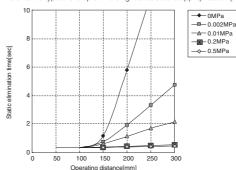
Refer to the typical example on the right to select the appropriate air supply device (compressor) that will supply sufficient air flow



■ Relationship between operating time and operating distance with different air pressure

The relationship between operating time and operating distance varies depending on the air pres-

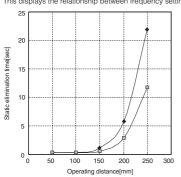
Refer to the typical example on the right to select the appropriate air pressure



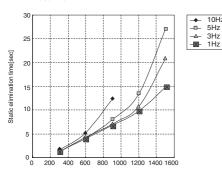
Measurement conditions:
The time required to eliminate the static charge of the target from ±1000 V to ±100 V is measured.
The 150 x 150 mm plate monitor (20 pF) is used. SJ-H108A is used.

■ Relationships between installation speed and static elimination speed due to frequency settings

This displays the relationship between frequency settings and static elimination speed and installation distance



Operating distance[mm] Measurement conditions: The time required to eliminate the static charge of the target from $\pm 1000 \text{ V}$ to $\pm 100 \text{ V}$ is measured. The $150 \times 150 \text{mm}$ plate monitor (20 pF) is used. SJ-H108A is used. No downflow



Operating distance[mm]

Measurement conditions: The time required to eliminate the static charge of the target from ±1000 V to ±100 V is measured. The 150 x 150mm plate monitor (20 pF) is used. SJ-H108A is used. Under the downward air flow of 0.3 m/sec.



Specifications

	Item	Specifications					
Series name		SJ-HA Series					
Ion generating method		Corona discharge					
Structure		Shock-less resistance coupled					
Voltage application method/Applied voltage		Pulse AC method /± 7000 V					
Ion balance control method		Dual I.C.C.					
Ion balance *1		±30 V					
Operating distance		50 to 2000 mm					
Control input		NPN open collector or non-voltage relay signal					
Control output		NPN photo relay with 100 mA max. (at 40 V max.)					
Rating	Power supply	24-36 VDC ± 10 %					
	Current consumption	500 mA (at 24VDC), 350 mA or less (at 36 VDC)					
	Overvoltage category	1					
	Pollution degree	2					
Major functions	·	Condition (COND) warning, ion level (ION LEVEL) warning, alarm (ALM) output					
Air purge connection port		Rc 1/8					
Air purge supply p	pressure	0.5 MPa max. ^{*2}					
Material	Electrode probe	Tungsten					
	Main body	ABS, PC					
Environment	Ambient temperature	0 to +40 °C					
	Relative humidity	35 to 85 % RH, No condensation					

 $^{^{\}star} 1~$ The value is measured under the following condition.

Operating distance	300 mm (22 Hz)	600 mm (10 Hz)	1500 mm (1 Hz)				
Ambient temperature	0 to +40 °C						
Relative humidity	35 to 65 % RH						

^{*} Under the downward air flow of 0.3 m/sec

■ Effective length, total length, weight

Item		Specifications										
Model		SJ-H036A	SJ-H060A	SJ-H084A	SJ-H108A	SJ-H132A	SJ-H156A	SJ-H180A	SJ-H204A	SJ-H228A	SJ-H252A	SJ-H300A
Effective length *3	(unit:mm)	360	600	840	1080	1320	1560	1800	2040	2280	2520	3000
Total length *4	(unit:mm)	380	600	840	1080	1320	1560	1800	2040	2280	2520	3000
Weight	(unit:g)	Static elimination bar :510 (500) Controller :150	780	980	1200	1400	1550	1750	2000	2350	2700	3150

 ^{*3} The effective length represents the operating area at an operating distance of 50 mm.
 *4 The total length represents the length of the model with a end unit attached.

^{*2} Please contact the nearest KEYENCE office when using the air-purge function with intermittent air supply

WARRANTIES AND DISCLAIMERS:

- 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 other-
 - 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 lia-
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