

**ION JET NOZZLE  
NIH-55  
INSTRUCTION MANUAL**



- Read this instruction manual and make sure you thoroughly understand its contents before attempting to operate, inspect or service this product.
- The users and supervisors of this product must not let anyone to operate this product if unfamiliar with it.

**Kasuga Denki, Inc.**

## INTRODUCTION

This instruction manual is a guidebook to allow safely and effectively using this product. Always be sure to read this instruction manual and thoroughly understand its contents before attempting to operate, inspect or service this product.

Failure to comply with this instruction might lead to serious accidents. Caution items are listed at various points throughout this instruction manual. These displays are points where special caution is needed to maintain safety so proceed with the task after making sure you fully understand the necessary information.



- Using this product without adequate preparation may lead to serious injuries or major accidents.
- The operator and maintenance personnel shall read this manual carefully before attempting to operate or service this product.
- Do not operate or service this product until you fully understand the contents of this service manual.
- Store this manual near the product so it can be easily referred to when needed. If this manual is lost or is damaged then promptly order another copy from our company or dealer.
- Before granting this product to another party, always makes sure to send this instruction manual along with it, to the new owner of the product.
- Please acknowledge beforehand that our company bears absolutely no responsibility for the operation or results of operation of this product.

# Contents

## Introduction

1. Safety Information .....	1
2. Overview.....	1
3. Features.....	2
4. Package Contents .....	2
5. Main Components and Functions .....	3
6. Installation.....	5
7. Maintenance .....	9
8. Warranty.....	10
9. Specifications.....	11
10. External View .....	12

## 1. Safety Information

### 1-1 Meaning of displays and messages

The safety displays and messages are organized as follows to make sure you fully understand this instruction manual and the product safety labels.



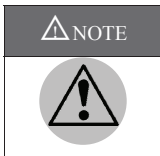
This term is used in safety messages and on safety labels in locations where there is a high possibility that serious injury or even death might occur from failure to avoid a particular hazard.

These safety messages include prevention measures that must be implemented to avoid a particular hazard.



This term is used in safety messages and on safety labels in locations where there is a high possibility that serious injury or a major accident might occur from failure to avoid a particular hazard.

These safety messages include prevention measures that must be implemented to avoid a particular hazard.



This term is used in safety messages and on safety labels in locations where there is a high possibility that minor injury or material damage might occur from failure to avoid a particular hazard.

These safety messages include prevention measures that must be implemented to avoid a particular hazard.

## 2. Overview

This electrostatic charge remover (hereafter “ionizer”) is a device for non-contact neutralization of static electricity. An ion emitter electrode installed at the nozzle spray outlet removes static charges by generating ions from a corona discharge that then combine with air from a compressor and are blown away.

In manufacturing processes using insulating materials such as semiconductors and molded parts, electrostatic charges occur due to peeling or machining processes. These electrostatic charges hurt productivity because of damage from static discharge or from dust adhering to the material and therefore require ESD protective measures.

This ion jet nozzle device is an electrostatic charge remover that eliminates these problems.

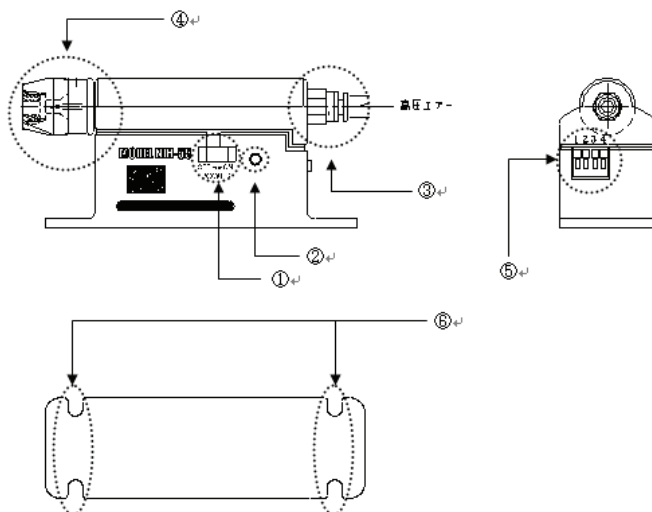
### **3. Features**

- (1) Installation is simple and safe since no high-voltage cables are needed because the ionizer electrode section has its own internal high-voltage power supply.
- (2) Static charges are efficiently removed regardless of the charge polarity or voltage potential because of the excellent ion polarity balance. There is virtually no charge inversion due to ion emission.
- (3) Internal circuit generates safe ions.
- (4) Compact design allows easily installing this device in all types of equipment.
- (5) When charge removal (ionizing) stops, the Operation-Warning lamp appears as a “RED” warning lamp turns on during an electrode needle emission error when the electrode is dirty. The high-voltage can be switched on and off or the warning output, by making (switch) connections to the terminal block.

### **4. Package Contents**

1. Ionizer unit (NIH-55)
2. Instruction manual (this text)
3. Warranty
4. Dedicated AC adapter (option)

## 5. Main Components and Functions



- (1) Power switch                      (2) Operation-Warning lamp    (3) Air IN  
 (4) Ion generator (metal cap)    (5) Terminal block                (6) Mounting hole

### (1) Power switch

This is an ON-OFF switch for operating the ionizer.

### (2) Operation-Warning lamp

This lights up in “Green” after turning on the power when operation is normal. This lamp lights up in “Red” when there is a problem with ionizing (charge removal) performance.

See “7. Maintenance” for information on what to do when the “Red” lamp lights up.

### (3) Air IN

Connect an outer diameter (O.D.) dia. 6 air tube to this port.

### (4) Ion generator (metal cap)

Generates and emits ions.

Remove this metal cap when performing maintenance. (See “7. Maintenance”)

(5) Terminal block

No.	Name	Remarks
1	Power IN	24 volts DC $\pm$ 10% Connect to a switching power supply or AC adapter (white).
2	IONIZER ON/OFF	Shorting terminals (2) and (3) together stops the ionizing (static charge removal).
3	Ground terminal	Always supply a ground connection. Use the AC adapter (black) if an AC adapter is to be used.
4	Warning output	Photocoupler open-collector Photocoupler maximum rating 100mA, 24 volts (10mA, 24V recommended) This warning is output when ionizing stops, if the electrode needle is dirty or when discharge from the electrode needle is abnormal.



- This device is designed to use +24 volts DC. If the supplied voltage is not within the rated voltage then not only will performance deteriorate but fires or accidents might occur.
- Connecting a wire to the wrong terminal No. on the block might not only cause equipment breakdown but may also damage other equipment. This might also cause fires or accidents to occur.
- Always connect the ground terminal to ground.

(6) Mounting hole

Install securely using a machine screw. Use flat washers or a spring washers to prevent the hardware from coming loose.

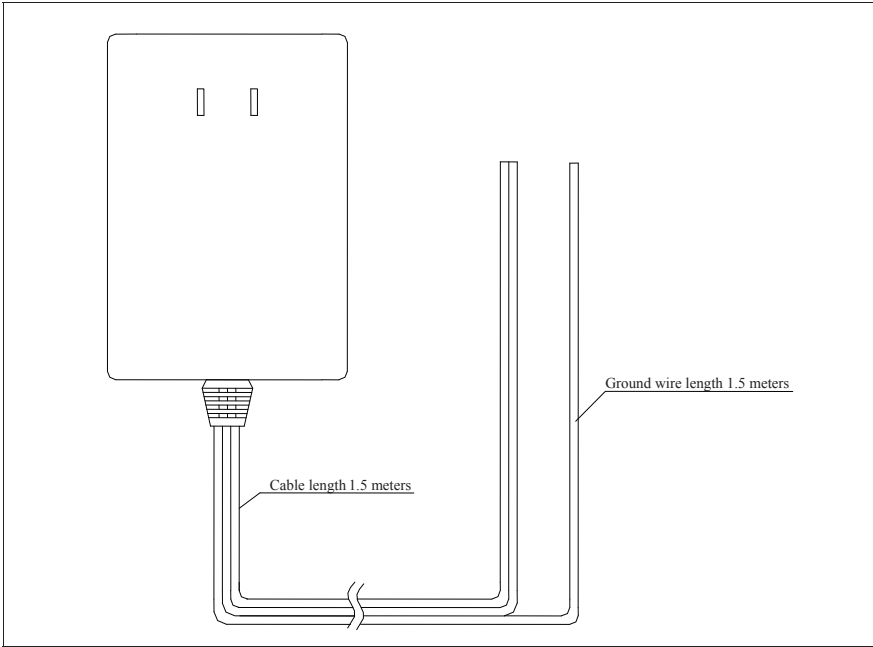
Over-tightening might cause damage.

Option: Dedicated AC adapter (AC adapter for NIH-55)



This dedicated adapter is designed to supply 100 to 240 volts AC at 50/60 Hertz. Failure to use a voltage within the rated specifications might not only lower performance, but also cause fires or accidents to occur.

**Always connect a ground line.**



## 6. Installation



- This product is an electrostatic charge removal device and is not made to explosive proof specifications. So do not use it in environments where explosions might occur due to dust or inflammable solvents, etc.

### [How To Install]

- (1) Ionizer unit installation position  
Installing the ionizer unit at a position where the ionized air will blow directly on the statically charged work piece.
  
- (2) Install the ionizer  
Install securely using machine screws. Use flat washers or a spring washers to prevent the



hardware from coming loose. Over-tightening the screws might cause damage. Tighten only to the specified tightening torque.

The recommended tightening torque is  $5.2\text{N} \cdot \text{m}$  (Usually this is the torque required to flatten the spring washer.)

Install the ionizer while being careful not to directly apply vibration or impacts.

See “10. External View” for further details on this installation method.

(3) Install the air tube

Connect a dia. 6 air tube to the port.

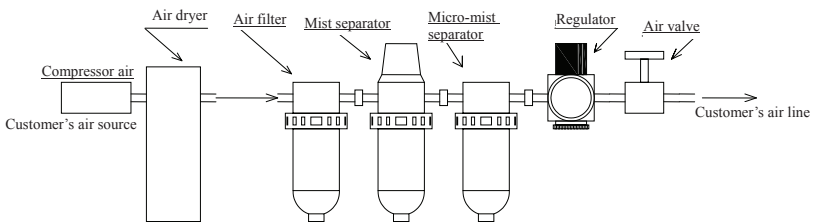
(4) Set the air pressure

Set a correct air pressure within a range from 0.1 to 0.4 MPa using a regulator, etc.

(5) Cautions during installation

- Make sure there are no obstructions between the ionizer and the statically charged work piece.
- If clamping the unit, then make sure the foundation is sufficiently strong.
- If the air for use becomes contaminated with oil or moisture then equipment breakdowns might occur. So completely remove all contaminant material from in front of the ionizer unit to ensure that only clean air is used.

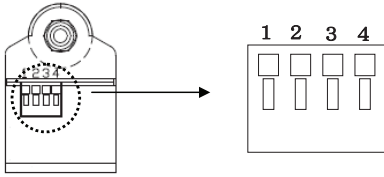
Typical recommended air-tube layout



(6) Terminal block connection

Connect a switching power supply or a +24 volt DC line from the dedicated AC adapter to the No. 1 terminal. Ground the No. 3 terminal.

Always connect terminal No. 2 (ionizer ON/OFF) and No. 4 (Warning output) if needed.

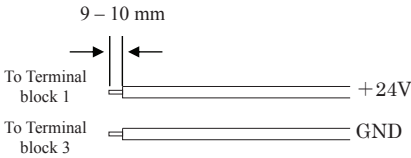


While holding down the terminal block button, insert a sheathed wire with the last 10 millimeters stripped away. Once the wire is inserted, tug gently on the wire to ensure that it will not come loose. If the wire comes loose, then reinsert it so it will not come loose.

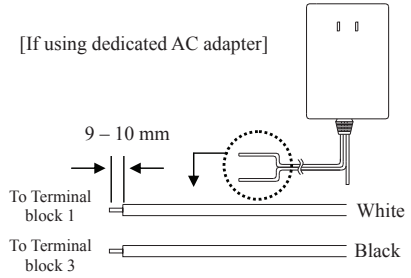
Note: Poor connections might cause faulty operation so use caution when wiring.

1	Power DC+24V
2	Ionizer ON/OFF
3	Ground terminal
4	Warning output

[If using external power supply]



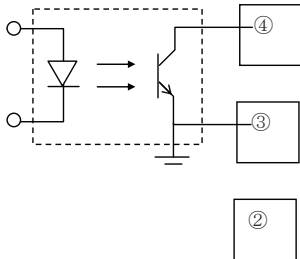
[If using dedicated AC adapter]



- Recommended terminal block connector cable
  - Plastic sheath AWG cable
    - Single line : 0.32mmS to 0.65mmS
    - Twisted line : 0.08mmS to 0.32mmS
    - Bare line : dia. 0.12 or more

[Warning output – Ionizer ON/OFF terminal connection diagram]

(1) Photocoupler



**[Warning output] (Terminal No. 4)**

Operating conditions

-During normal operation : (3) – (4) ON

-During warning output : (3) – (4) OFF

**[Ionizer ON/OFF] (Terminal No. 2)**

Operating conditions

-During normal operation : (2) – (3)

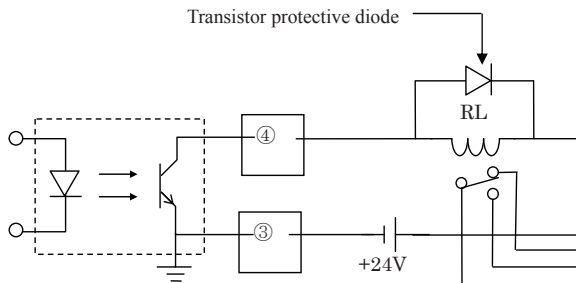
When open: Ionizing ON

-During warning output : (2) – (3)

When shorted: Ionizing OFF

[Terminal block typical wiring]

● Warning output (Terminal No. 4) wiring example (when operating a relay)

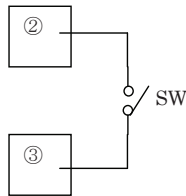


Operating conditions

- During normal operation : ON

- During warning output : OFF

● Ionizing ON/OFF terminal (Terminal No. 2) typical wiring



Operating conditions

- SW ON : Ionizing OFF
- SW OFF : Ionizing ON

## 7. Maintenance

### 7-1 Periodic maintenance

After long term use of this product, dust will adhere around the ionizer electrode and the electrode needle. This dust lowers the charge removal performance and causes the ion balance to deteriorate. If the Operation-Warning lamp lights up (Operation OK:Green Error:Red) then clean the area around ionizer electrode and electrode needle. Cleaning them periodically (for example, once every 1 to 2 weeks) is recommended even if the Warning lamp does not light up.

 DANGER



Always turn off the power supply for this unit before attempting this cleaning task. Serious accidents such as electrical shock might occur if the power is still on during this task.

 WARNING

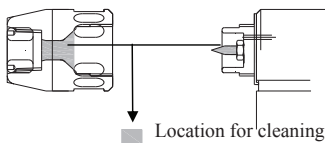


This cleaning task should be performed by the person responsible for this equipment. After finished cleaning, use this equipment after first checking that it has completely dried. If still moist then there is a hazard of sparks occurring.

[Cleaning procedure]

- (1) Remove the metal cap. See “5. Main Components and Functions (4)” for information
- (2) Clean away dirt on the vicinity of the ionizer electrode, electrode needle, and interior of the metal cap with cotton swabs and alcohol.
- (3) Check that the electrode section is dry and re-install the metal cap.

- Screw the metal cap on smoothly. If you feel something hanging up when installing the metal cap then it might have screwed on at an angle. Using too much force when screwing the cap on might destroy the screw threads. If you feel resistance then remove the cap and screw it back on again gently.
- If the Operation-Warning lamp does not light up in Green after cleaning the vicinity of the ionizer electrode, electrode needle, and interior of the metal cap, then the high-voltage circuit might be defective. Promptly contact our company to request repairs. If the Operation-Warning lamp lights up in Red, then the electrode needle might be worn down. Promptly contact our company to request repairs.



## 8. Warranty

If this product suffers a malfunction or breakage for a cause or causes ascribable to the Manufacturer, the Manufacturer will repair it free of charge without delay. This guarantee is effective for a period of one year after the date of delivery. However, this warranty does not apply to:

- 1) A product used in other ways than described in this Manual,
- 2) A product repaired, modified, or disassembled by the customer,
- 3) A product installed under environmental conditions that are significantly deviated from the range described in this Manual,
- 4) Consumable parts such as the discharging electrode needle, or
- 5) Repair without the warranty card furnished.

### Disclaimer

The responsibility of Kasuga Denki in the warranty of this product is limited to repair and replacement of the said product.

Kasuga Denki bears no responsibility for any other damages such as the loss of profit, downtime, customer confidence, damages on facilities and assets, and costs arising from replacement.

## 9. Specifications

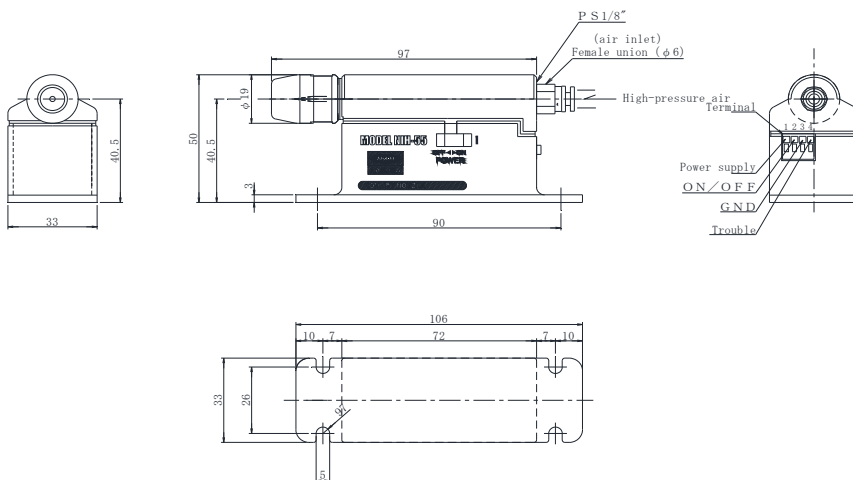
### 9-1 Ion Jet Nozzle (NIH-55)

- Ionizing (charge removal) method RF corona discharge
- High voltage output Approximately 3.5 kilovolts
- Effective ionizing range 100 to 500 millimeters
- Recommended ionizing distance 150 millimeters
- Recommended air pressure 0.1 to 0.4 MPa
- Air consumption quantity 55 to 155 Nliters per minute
- Warning output photocoupler output (open collector)  
photocoupler maximum rating 100mA, 24 volts  
positive logic
- Input +24 volts DC
- Power consumption 2.5 VA
- Environment Installation location non-hazardous area  
Ambient temperature 0 to 40°C  
Ambient humidity 80%RH or less  
(no condensation)
- Mass Approximately 150 grams
- Terminal block ML-700-NH-4 (Sato Parts)  
Recommended cable (cable length within 2 meters)  
Plastic sheath AWG cable  
Single line : 0.32mmS to 0.65mmS  
Twisted line : 0.08mmS to 0.32mmS  
Bare line : dia. 0.12 or more

### 9-2 AC adapter for NIH-55 (option)

- Input voltage 100 volts to 240 volts
- Frequency 50/60 Hertz
- Output voltage +24 volts DC
- Cable length 1.5 meters
- Operating conditions Installation location non-hazardous area  
Ambient temperature 0 to 40°C  
Ambient humidity 80%RH or less  
(no condensation)
- Mass Approximately 160 kilograms

## 10. External View



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