

## INSTRUCTION MANUAL

Micro-gap discharge tip for TC-815S

12-00010A

NOISE LABORATORY CO., LTD

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### NOTICE

- The contents of this instruction manual (the "Manual") are subject to change without prior notice.
- No part of the Manual may be reproduced or distributed, in any form or by any means, without the authorization of Noise Laboratory Co., Ltd. (the "Company").
- The contents of the Manual have been thoroughly examined. However, if you find any problems, misprints, or missing information, please feel free to contact our sales agent who you purchased our product from.
- The Company assumes no responsibility for any loss or damage resulting from improper usage, failure to follow the Manual, or any repair or modifications of this product undertaken by a third party other than the Company or the agent authorized by the Company.
- The Company assumes no responsibility for any loss or damage resulting from remodeling or conversion solely undertaken by the user.
- Please note that the Company cannot be held responsible for any consequences arising from the use of this product.

### 1. IMPORTANT SAFETY PRECAUTIONS

Important points for the safe use of this unit are provided below. Be sure to carefully read this information before use.

- Do not use this unit in areas where open flames are prohibited or areas having an explosive atmosphere. Electrical discharges can occur during use, which can cause these atmospheres to ignite.
- Do not allow people with pacemakers or other electronic medical devices to operate this unit or to enter the testing area while this unit is operating.
- The section "Basic Safety Precautions" contains important safety recommendations, and so be sure to read the section carefully before making the testing environment settings, connections, and starting testing.

### 2. INTRODUCTION

Thank you very much for your purchase of Micro-gap discharge tip for TC-815S.

- This operation manual describes the function, operation and safety precautions of this product.
- Thoroughly read this operation manual before use and keep it as a ready reference.
- This product shall be used with TC-815S discharge gun. For operating instructions of ESD simulator main unit and discharge gun, refer to the relevant operation manuals.
- This product is designed to generate spark discharges through a narrow gap arranged inside a discharge tip. By its nature, this product itself is handled as a consumable and care shall be taken:
  - (1) Periodic inspections for its degradation or exhaustion are recommended because repeated spark discharges degrade and exhaust the tip by carbonization.
  - (2) Air discharges are significantly affected by the

atmospheric temperature and humidity. Depending on the environment, discharges are not always happen and they can be very varying. For this reason, the product does not have waveform specifications.

### 3. BASIC SAFETY PRECAUTIONS

#### 1. Safety Warning Signs and Their Meanings

#### ⚠ WARNING 警告

The contents of this display indicate "the assumption that there is a possibility of death or serious injury" if the Unit or related equipment is handled incorrectly.

#### ⚠ CAUTION 注意

The contents of this display indicate "the assumption that there is a possibility of harm and the assumption that there is a possibility of physical damage" if the Unit or related equipment is handled incorrectly.

#### 2. Basic Safety Precautions

#### ⚠ WARNING 警告

1. Do not use this unit in areas where open flames are prohibited or areas having an explosive atmosphere. Electrical discharges can occur during use, which can cause these atmospheres to ignite. (Precaution regarding personal safety and environment)
2. Do not allow people with pacemakers or other electronic medical devices to operate this unit and to enter the testing area while this unit is operating. Failure to observe this can result in malfunctions in the electronic medical device and endanger personal safety. (Precaution regarding personal safety and operation)
3. Noise Laboratory and our affiliated dealers are not liable for any injuries or equipment damage due to improper operation of this unit or for any resulting incidental damages. (Precaution regarding personal safety, operation, environment, and connection)
4. When operating this unit, do not leave the equipment unmonitored. Before leaving this unit, be sure to turn off test equipment power and terminate testing.  
If you fail to observe this, you could endanger people in the surrounding area and testing equipment. (Precaution regarding personal safety, operation, and environment)

#### ⚠ CAUTION 注意

5. Do not use or store in environments with extremely hot or cold temperatures. If you cannot maintain a suitable operating environment (temperature: 15°C to 35°C, humidity: 25% to 75%), the unit can be damaged and result in impaired performance. (Precaution regarding environment)
6. In the event that condensation forms, be sure that the unit is fully dried before starting operation. Failure to observe this can damage the unit and result in impaired performance. (Precaution regarding environment)
7. Avoid using the unit in locations with high humidity or exposed to large amounts of dust. Failure to observe this can damage the unit and result in impaired performance. (Precaution regarding environment)
8. Do not wipe the unit with thinner, alcohol, or other solvents. If the unit is dirty, wipe with a cloth dipped in neutral detergent after it is fully wrung out. Wiping with a solvent can damage the unit surface.

### 4. PRODUCT COMPONENTS

- Micro-gap discharge tip (body) ..... 1 piece
- Thickness gauge..... 1 set
- Adjustment screw driver..... 1 piece
- Storage case..... 1 piece
- Instruction Manual (this document) ..... 1 piece

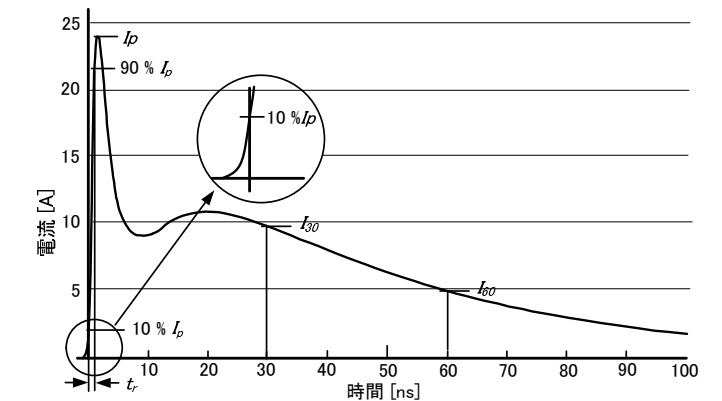
### 5. SPECIFICATIONS

Item	Spec./Performance
Compatible discharge gun	TC-815S, TC-815S-330/2k TC-815R, TC-815-330/2k ※ <u>Not compatible with GT-30R discharge gun</u>
Gap adjustment range	minimum : 0.03 mm maximum : 1.00 mm ※ <u>The included thickness gauges are: 0.10, 0.20, 0.30, 0.40, and 0.50 mm.</u>
Waveform specifications	Refer to the following Section. ※ <u>No waveform specifications provided</u>
Operating temperature range	15~35°C
Operating humidity range	25%RH to 75%RH (no condensation)

### 6. Discharge waveform parameters (Informative)

It is recommended to measure the waveform of the product, with 0.5 mm gap, to the suggested set-up to IEC 61000-4-2 or ISO 10605.

#### 1. Discharge waveform at 5kV (Informative)



#### 2. Discharge waveform parameters (informative)

Setup voltage [kV]	Peak current [A]±20%	Rise time [ns]±25%	30ns Current value [A]±30%	60ns Current value [A]±30%
3	9	1.1	6	3
4	16	0.7	8	4
5	24	0.7	10	5

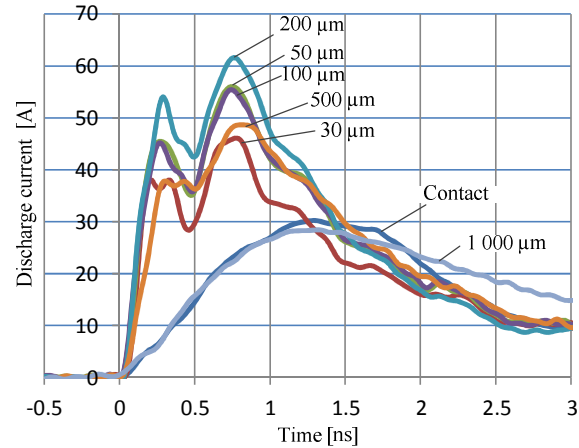
- ※ The values obtained with 0.5 mm gap setting also with 150pF/330 ohm capacitor-resistor unit is merely provided as a reference but not specifications.
- ※ 2GHz or higher bandwidth scope is recommended.
- ※ This product may not exhibit stable discharges because sparks are generated across the gap in the atmosphere. Therefore no waveform specifications are provided.
- ※ When the voltage is set to 3 kV, discharge may not take place every time (Influence of temperature and humidity).

### 3. Relationship between gap lengths and voltage settings (informative)

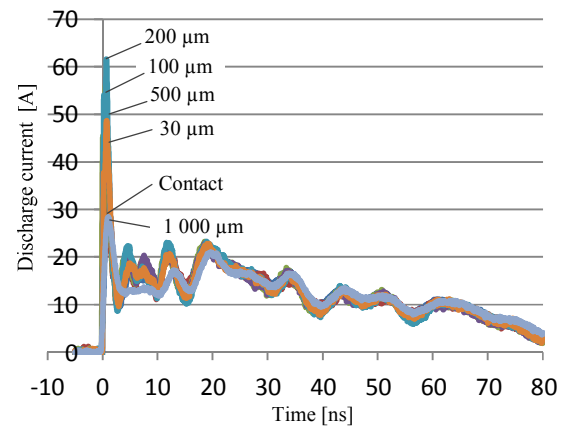
By using different gaps, you can obtain the waveforms shown in the chart below.

#### § Features

- (1) The first peak values become higher.
- (2) Rise times become faster.
- (3) When the gap is 1 mm or larger, the rise time becomes slower.
- (4) Waveforms do not show significant changes except at their first peaks.

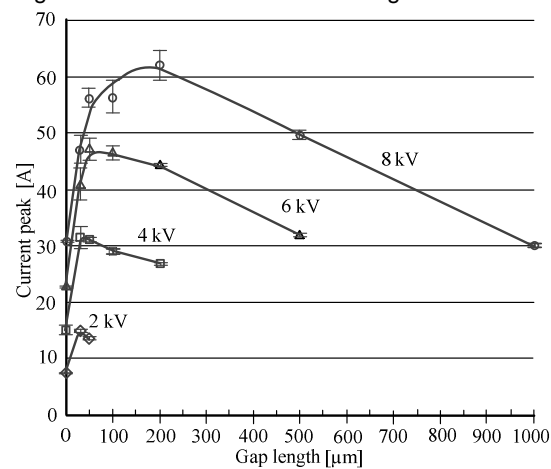


The first peak variations with different gaps at 8kV setting



Entire waveform at 8 kV

The relationship between gap lengths and voltage setting is shown by the graph shown below. Gap length at 0 means contact discharge.

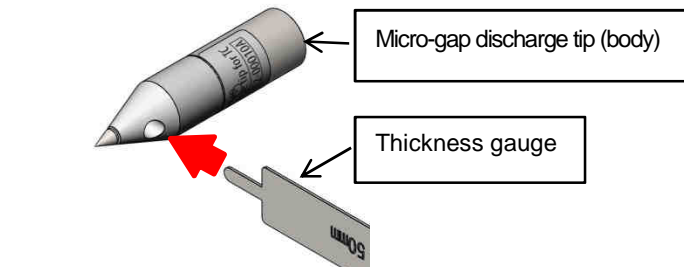


First peak values are dependent on both the gap length and voltage

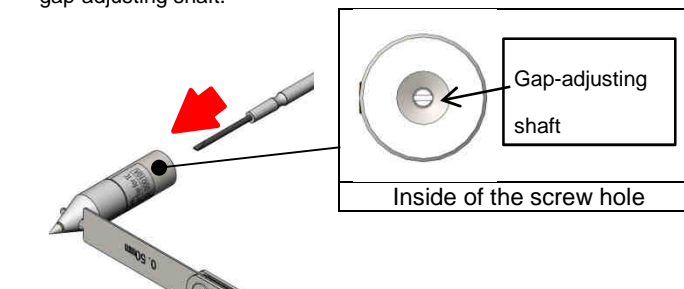
## 7. How to use

### 1. Gap adjustment

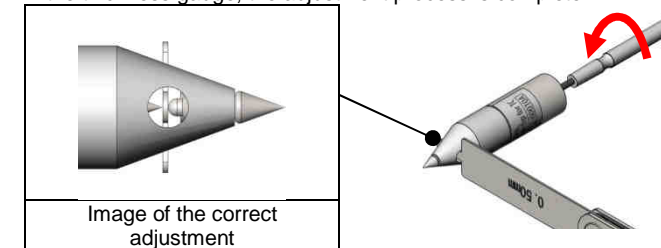
① Insert a thickness gauge into the hole indicated by the arrow in the figure below.



② Insert a screwdriver through the threaded hole (for mounting the tip onto a discharge gun) so that the screwdriver will reach the gap-adjusting shaft.



③ Turn the screwdriver to adjust the gap. Rotating the shaft clockwise a half-turn decreases the gap approximately 0.1 mm or counterclockwise a half-turn increases the gap approximately 0.1 mm. When the end of the gap-adjusting shaft has come into contact with the thickness gauge, the adjustment process is complete.



■ □ CAUTION □ ■  
Do not remove the label signed by arrow below. There is risk that the function may be impaired.



### 2. Mounting onto discharge gun

Like an ordinary discharge tip, mount the dip by rotating it clockwise.

## 8. WARRANTY

### Services

This product is a consumable item and the following warranty terms are applicable.

1. Scope  
The warranty terms herein stated apply to this product.
2. Initial defect  
Product found defective at the time of delivery shall be replaced with a brand new product.
3. Ownership of defective product  
Defective products replaced are deemed property of the Company (Noise Laboratory Co., Ltd.).
4. Maximum Compensation  
In the event the user incurs damage due to the defective product the Company will compensate for the damage. The maximum compensation amount shall be limited to the amount paid by the user at the time of purchase of the product. In no event, shall the company be liable or in any way responsible for incidental or consequential damages such as loss of profit or third party's claims to the user.
5. Wrong Parts, Missing Parts and Damage  
The company shall not be liable for loss of profit, business interruption, other incidental damage, special loss, punitive damage or third party's claims to the user directly or indirectly arising from suspension of testing activities due to wrong parts, missing parts, or damage of the Unit.

## 9. MAINTENACE

1. Maintenance on the user side is restricted to the outside cleaning and functional check of this product.
2. When cleaning this product, turn off the switch of your ESD simulator and the connected equipment and disconnect the plug socket beforehand.
3. Avoid using chemicals for cleaning. Otherwise, the coating of the Unit may peel off or the sight glass may be broken.

## 10. Noise Laboratory Support Network

- If an initial deflection is suspected, contact your supplier (the nearest sales agent of Noise Laboratory) or the Company.
- When the product is returned to Noise Laboratory, write the state of the trouble, contents of your request, model name and serial number in a repair order, and pack the product and repair order sheet in the former package of equivalent suitable for transit and send them back.

NOISE LABORATORY CO., LTD.  
SALES DEPT.

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E-mail: sales@noiseken.com  
http://www.noiseken.com

## 11. Application Form for Instruction Manual

We place an order for an instruction manual.  
Model:

Applicant: \_\_\_\_\_  
Company name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Department: \_\_\_\_\_  
Person in charge: \_\_\_\_\_  
Tel No.: \_\_\_\_\_  
Fax No. \_\_\_\_\_

**Cut off this page "APPLICATION FORM FOR INSTRUCTION MANUAL" from this volume and keep it for future use with care.**

When an INSTRUCTION MANUAL is required, fill in the above Application Form and mail or fax it to the following sales department of our company.

**To: NOISE LABORATORY CO., LTD.**  
**1-4-4 Chiyoda, Chuo-Ku, Sagamiara City,**  
**Kanagawa Pref. 252-0237 Japan**  
**Tel: +81-42-712-2051 Fax: +81-42-712-2050**