



# **operating instructions**

**damped oscillatory wave tester**

**MODEL SWCS-900-1M**

**Noise Laboratory Co., Ltd.**

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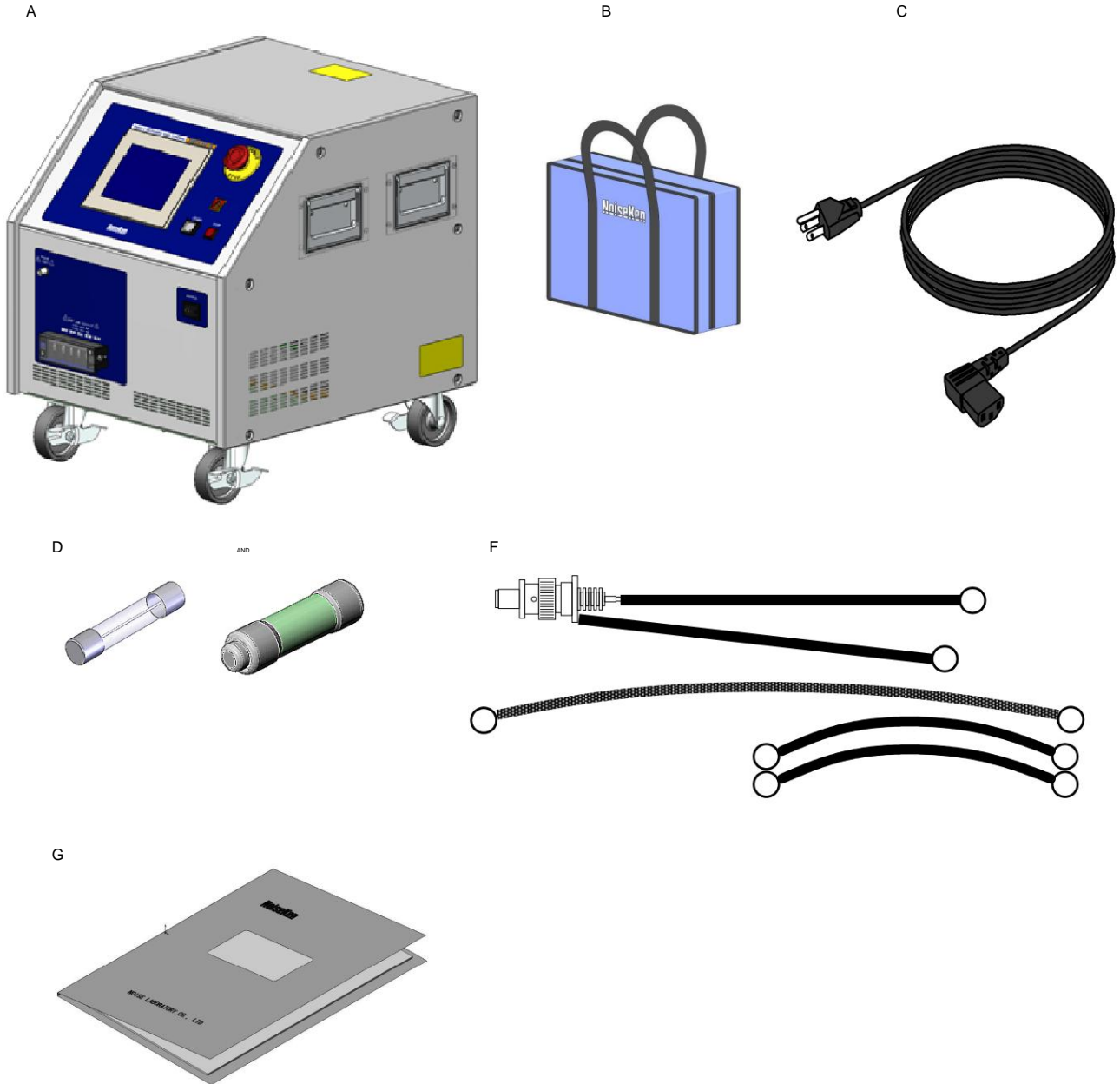
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# 1. Please confirm

Before using this tester, please check the included accessories.



content quantity

- A: Body** ..... 1
- B: Bag for accessories** ..... 1
- C: AC code** ..... 1
- D: Spare fuse for equipment power supply** 2
- E: EUT line spare fuse** ..... Four
- F: Jig set for waveform confirmation (with M5 crimp terminals)** 1  
 (For PULSE OUT: 1 with coaxial conversion connector NMHV-PR + UL1015 AWG14 20cm)  
 (For CDN: 2 copies of UL1015 AWG14 20cm)  
 (For PE terminal: 1 book of braided wire 40cm)
- G: Instruction manual** ..... 1

## 2. Important Safety Issues

**"Important Safety Instructions" describes items that must be strictly observed in order to prevent injury or damage to the person using this tester or other people.**

**Use of this tester by trained EMC engineers (electrical engineers) may result in**

**death or serious injury, and may result in radiation of electromagnetic noise that exceeds regulatory limits.**

**DEATH OR SERIOUS INJURY MAY RESULT IN DEATH OR SERIOUS INJURY.**

**Persons with electronic medical devices such as cardiac pacemakers should not use them and should not enter the test area while they are in operation. Death or serious injury may result.**

**Do not use in areas where fire is prohibited or explosive areas .  
There is a possibility of ignition due to electrical discharge, etc.**

**Install this tester for the AC input cord . . The attached AC input cord is for Japan and North America. When installing in a country other than the one on the left, please use the product certified by the safety standard of the installation country.**

**Safety recommendations are listed in "Basic safety precautions for using this tester safely" described later, so be sure to read them before setting up the test environment, making connections, and starting the test.**

3. Instruction manual Purchase application form

Via purchase source Noise Laboratory Co., Ltd.

Apply to purchase the instruction manual.

model name is

SWCS-900-1M

and,

The serial number is

[Serial number input field]

is.

Applicant: Address;

[Address input lines]

Company Name;

[Company Name input line]

Department name;

[Department name input line]

Name of person in charge;

[Name of person in charge input line]

telephone number;

[Telephone number input line]

fax number;

[Fax number input line]

Keep this instruction manual and the purchase application form in case they are lost.  
**Cut it off and store it separately.**

If you need the instruction manual, send this instruction manual purchase application form to the place of purchase.  
Please send it by mail or fax .

Personal information such as the customer's address, company name, and name (hereinafter referred to as personal information) will only be used to send instruction manuals, unless there is a valid reason.  
We will not disclose or present personal information to third parties other than our company.  
We will properly manage your personal information.

memo

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## 5. Preface

Thank you for purchasing the damped oscillatory wave tester (SWCS-900-1M).

Before using the SWCS-900-1M, please read this manual carefully and make full use of it.

This instruction manual is written so that those who can observe the operation method and precautions can handle the Damped Oscillatory Wave Tester (SWCS-900-1M) safely and make full use of it. Keep this instruction manual in a place where you can take it out anytime when handling the SWCS-900-1M.

SWCS-900-1M is a damped oscillatory wave generator for performing damped oscillatory wave immunity test conforming to electric power standard B-402 (2007) and IEC 61000-4-18 (ed1.0) (1MHz only) standard. .

### Note The

screens used for explanations in this manual may differ from the actual screens in font or shape, or may be partially omitted. In addition, there are some screens that are different from the actual screen display in consideration of the visibility as printed




## 6. Basic precautions for using this tester safely

The "Basic Precautions" are intended to prevent injury to the person using this tester and other people, and damage to property. In order to prevent this, the items to be observed are described.











The degree of danger and damage that may occur if you ignore the contents and use the product incorrectly are explained as follows. Please understand the meaning before reading the text.

### 6-1. Explanation of Pictograms







The classifications of the following indications explain the degree of danger and damage that may occur if the indications are not observed and the product is used incorrectly.

 <p><b>DANGER 危険</b></p> <p>This indication indicates that mishandling may result in imminent danger of death or serious injury.</p>
 <p><b>WARNING 警告</b></p> <p>This indication indicates that improper handling may result in death or serious injury.</p>
 <p><b>CAUTION 注意</b></p> <p>This indication indicates that if the product is mishandled, it is assumed that there is a possibility of suffering damage and that only property damage is assumed.</p>

The following display categories explain the items to be observed.

 <p>Indicates a caution (something to pay attention to).</p>	 
 <p>Indicates prohibited actions (things that must not be done).</p>	  <p>Prohibition of decomposition prohibition</p>
 <p>Indicates compulsory (must be performed).</p>	 <p>mandatory</p>  <p>Be sure to connect the ground wire</p>  <p>Unplug the power plug from the outlet</p>

The following display categories explain warnings and cautions when using this tester.

	<p>Indicates a risk of electric shock.</p>
	<p>Indicates a caution and refer to the instruction manual.</p>
 <b>WARNING</b> 	<p>Indicates <b>WARNING, SHOCK HAZARD, CAUTION</b>, and refer to instruction manual.</p>
 <b>WARNING</b>  <p>WARNING TO REDUCE THE RISK OF ELECTRIC SHOCK. DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL. 感電の危険あり。カバーを外さないこと。</p>	<p><b>WARNINGS, SHOCK HAZARD, CAUTIONS, AND READ INSTRUCTIONS</b></p> <p><b>WARNING</b> <b>ELECTRIC SHOCK HAZARD, DO NOT REMOVE COVER.</b></p>
<p>NOISE LABORATORY CO.,LTD. IS EXCLUDED ALL THE LIABILITY OF ANY FORMS OF DAMAGE, OF EQUIPMENT OR HUMANS, CAUSED BY USER'S MISHANDLING DURING OPERATION. 誤った操作による損害に対しては、一切責任を負いません。</p>	<p><b>Handling Precautions</b></p> <p><b>We are not responsible for any damage caused by incorrect operation.</b></p>

## 6. Basic precautions for using this tester safely

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### 6-2. DANGER Hazards

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 **DANGER 危険**



Decomposition prohibited

**Do not disassemble or modify. Do not remove the cover. Failure to do so may result in death or serious injury, as well as fire or electric shock. For internal inspections and repairs, contact the place of purchase or our customer service center.**

### 6-3. WARNING warnings

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 **WARNING 警告**



prohibit

**Do not insert any objects into the tester or connector . Metal objects or flammable objects entering the tester or connectors may cause fire or electric shock.**

**Do not touch the electrodes on the terminal block during the test . It may cause an electric shock or injury.**

**Do not touch the inside or outside of the PULSE OUT terminal during the test . It may cause an electric shock or injury.**

**During the test, do not touch the external conductor of the coaxial conversion connector for PULSE OUT of the jig set for waveform confirmation. Otherwise, it may cause electric shock or injury.**

**Do not install the product in a location that interferes with the operation of the power switch or STOP switch. Failure to do so may result in fire or electric shock, as it will not be possible to respond quickly in the event of an abnormality.**

**Do not divert the AC cord. The attached AC cord is intended to be used only with this tester. Do not use anything other than the one attached to this tester. Using it with other electrical products may cause fire or electric shock due to heat generation. In addition, if the AC cord of other electrical products is used with this tester, the tester's original performance may not be obtained, or heat generation due to insufficient current capacity may result in fire or electric shock.**

**Do not damage the AC cord** Damage to the AC cord may result in fire or electric shock. In particular:

- Do not process AC code
- Do not forcibly bend the AC cord
- Do not twist the AC cord
- Do not pull the AC cord
- Keep the AC cord away from heat appliances
- Do not place heavy objects on the AC cord



#### **Unplug the power plug from the outlet**

In the unlikely event that any of the following abnormalities occur, stop using the product immediately.

- When there is smoke or an unusual odor
- When water or foreign objects have entered the product
- When it is dropped or damaged
- When the AC cord is damaged (exposed core wire, broken wire, etc.)

Continuing to use the product with an abnormality occurring may result in fire or electric shock. Immediately turn off the power and be sure to unplug the AC plug from the outlet.

After confirming that smoke is no longer coming out, ask the place of purchase or our customer service center for repair.

Do not attempt repairs by yourself as it is dangerous.



Turn off the power of this tester when setting or changing the connection of each cord. Otherwise, it may cause an electric shock, injury or malfunction.

Use within the indicated power supply voltage range and frequency (AC 100V to 240V, 50Hz/60Hz). A power supply voltage range

and frequency other than the indicated power supply voltage range and frequency may result in fire or electric shock.

Firmly insert the AC cord plug all the way to the base. If the plug is not completely inserted, it may cause an electric shock, heat generation, or dust accumulation, resulting in a fire or electric shock. The octopus wiring also causes the cord to heat up and cause a fire or electric shock.

## 6. Basic precautions for using this tester safely

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### Be sure to

connect the ground wire . Connect the AC cord to a power outlet equipped with a protective earth terminal . , is connected through an AC cord to the metal part of the tester. For protection against electric shock, plug the power cable into an outlet with a protective grounding terminal that is properly grounded.

Protective Earth Using without connecting may cause an electric shock.

## 6-4. Cautions

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 **CAUTION 注意**



mandatory

Move the product from a cold place to a warm place, and if dew has formed on the product, allow it to dry naturally before use .

Clean the AC plug regularly. Dirt and dust accumulated between the AC plug and the power outlet may absorb moisture, resulting in insulation deterioration and a fire hazard. Periodically unplug the AC plug from the outlet and remove dirt and dust with a dry cloth.

If it gets dirty, wipe it with a dry cloth. Using solvents such as benzene or thinner will degrade the exterior and printing. Never use it. If the

exterior or panel operation surface becomes dirty, wipe it with a soft dry cloth. For stubborn stains, dampen a cloth with water or wipe it with a small amount of neutral detergent, and then wipe it with a dry

Keep the hazard notice label visible at all times. If the hazard notice label becomes dirty or comes off, please re-apply it for safety. If it is lost, please contact the place of purchase or the customer service center.



prohibit

**Do not install in the following locations** Installing the product in the following locations may result in fire or electric shock.

Places subject to high humidity or dust

Places exposed to direct sunlight or places subject to high temperatures, such as near heating

appliances Places where water droplets are likely to form, such as near windows

**Do not block the ventilation holes or use the tester in a poorly ventilated place. Do not block the ventilation holes of this tester. If the ventilation holes are blocked, heat will accumulate inside the product and may cause a fire. In particular:**

**Do not lay it on its back, lay it on its side, or turn it upside down. Do not push it into a narrow, poorly ventilated place.**

**Do not insert or remove the AC plug, high voltage input connector, or operate equipment with wet hands.**

**Doing so may cause electric shock or malfunction .**

**Do not place a container containing water on the tester. Spilling or entering water may result in fire or electric shock.**

**Do not drop it or subject it to strong impact. Doing so may cause malfunction.**

**Do not hit or rub against hard objects as this may damage the paint or the LCD panel.**

**\* If this tester breaks down under normal use conditions, we will repair it according to the conditions stipulated in the warranty. However, we and our distributors will not be liable for damages caused by failure of this test, deterioration of consumables, or other external factors, or damage to EUT (Equipment Under Test) or peripheral equipment. Please note that we do not take any responsibility.**

## 7. Precautions regarding consumables

### Rechargeable battery for memory backup

This product contains a secondary battery to retain memory contents when the power is turned off.

Secondary batteries are consumables. Secondary batteries deteriorate as they are repeatedly charged and discharged.

Even with normal use, the charge will gradually decrease.

The life of the lithium battery is 10 years or more at an ambient temperature of 40°C or less, 4.1 years or more at 50°C or less, and 60°C or more.

1.5 years below.

The backup period is approximately 100 days with an initial charge (fully charged) and approximately 6 days at the end of battery life.

\* This tester does not use the memory backup function.



## About fuses

This product has a built-in fuse.

### Equipment power fuse

There is a fuse holder in the AC inlet on the back (Chapter 8-2), which can be replaced by the customer.

When replacing the fuse, use the following.

**Rated voltage AC250V / Rated current 3.15A slow blow fuse**

**Recommended Fuse: Littelfuse 215 3.15**

**Quantity: 2**

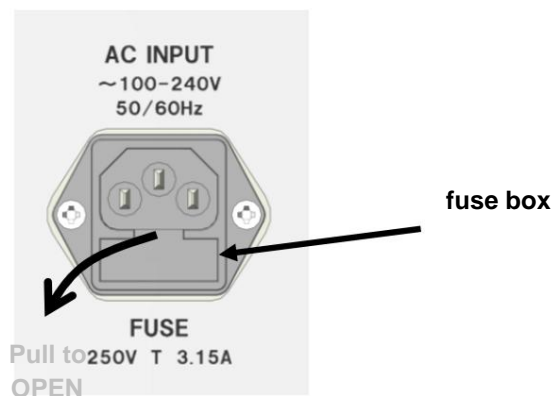


Figure 7-1 Fuse box Fuse box

### Fuse for EUT line

There is a fuse holder on the back, which can be replaced by the customer.

When replacing the fuse, use the following.

**Rated voltage AC/DC250V/ Rated current 20A Slow blow fuse**

**Recommended fuse: Littelfuse CCMR 020.**

**Number: 4 ( 1 for each phase)**

If it is difficult to obtain the applicable fuse, please contact the place of purchase or our customer service center.  
please.

## 8. EQUIPMENT APPEARANCE AND DESCRIPTION

### 8-1. Appearance of main unit (front panel)

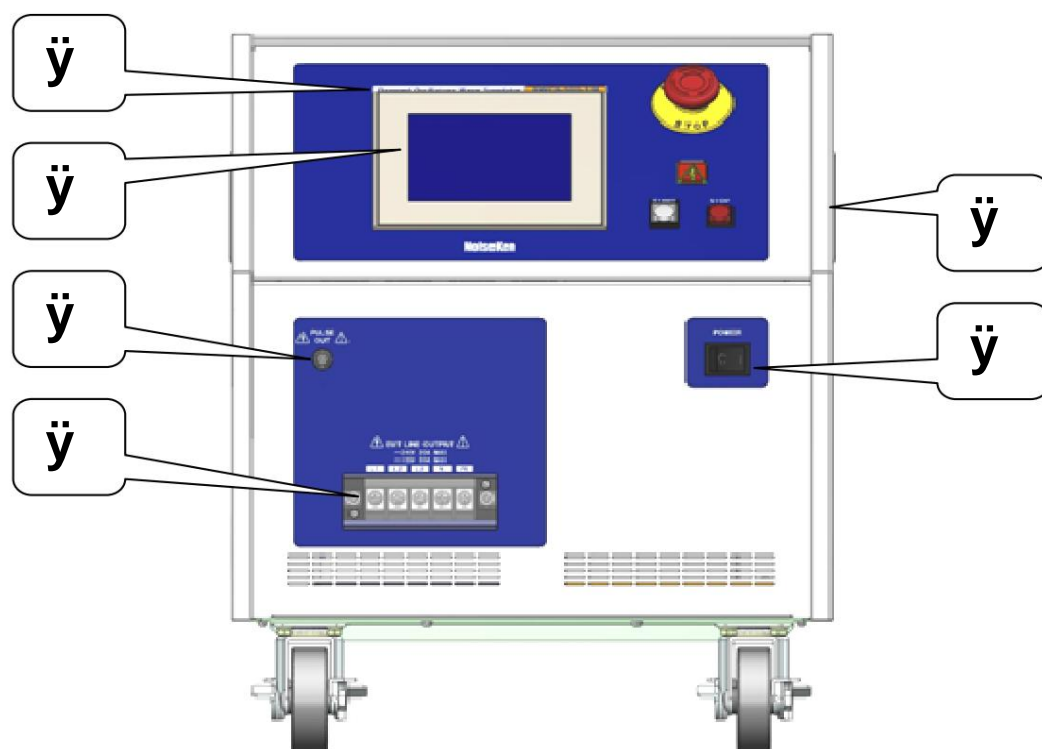


Figure 8-1 Appearance of main unit (front)

**ÿ MODEL name** This is

the product name and model name of this tester.

**ÿ Operation panel**

It has a liquid crystal display and operation switches. See Chapter 8-3 for details.

**ÿ PULSE OUT terminal**

Used for waveform check and external CDN connection.

It becomes possible to output after setting PULSE OUT by switching the output on the setting mode screen.

If not set to PULSE OUT, this terminal is open. Note: The

PULSE OUT terminal is a floating output. Be careful not to get an electric shock as potential appears on the outer conductor of the PULSE OUT terminal.

**ÿ EUT line terminal**

This is the EUT side terminal block for the EUT line. A pulse is superimposed on the EUT line and output.

**ÿ Power switch** Used

to turn the power on or off.

**ÿ Handle (side)**

Used for transportation and movement.

## 8-2. Body appearance (rear panel)

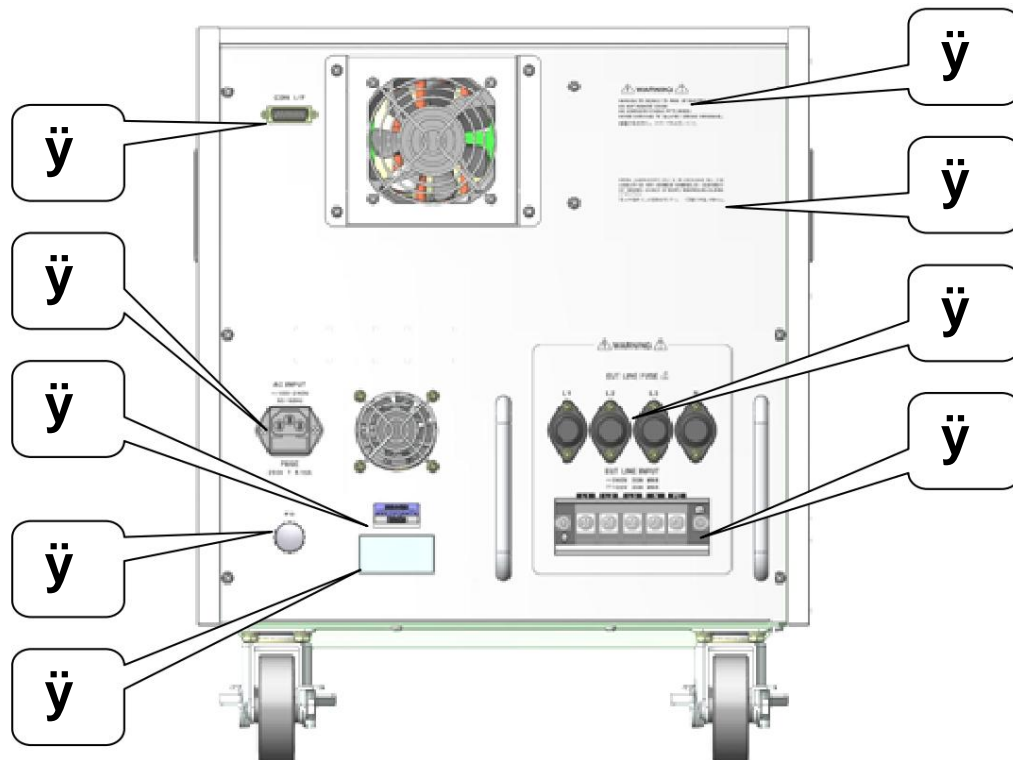


Figure 8-2 Appearance of main unit (rear side)

### External CDN control connector

This is a D-SUB 15 pin connector. Used to connect with an external CDN.

### AC inlet (Built-in fuse box)

This is an inlet for connecting the attached AC cord, and has a built-in fuse.

When replacing the fuse, use the following.

Rated voltage 250V/Rated current 3.15A Slow blow fuse

Recommended Fuse: Littelfuse 215 3.15

### Fuse holder for EUT line

A fuse connected to the EUT line is inserted.

When replacing the fuse, use the following.

Rated voltage AC/DC250V/Rated current 20A slow blow fuse

Recommended fuse: Littelfuse CCMR 020.

### EUT line terminal This is the

terminal block on the power supply side of the EUT line.

Connect the EUT power supply.

• **FG terminal**

**Frame ground terminal.**

Use a round terminal with a diameter of 6 mm or more for connection.

• **Warning text**

**WARNING, SHOCK HAZARD, CAUTION, READ INSTRUCTIONS, AND "SHOCK HAZARD, REMOVE COVERS".**  
don't. ] is warned.

• **Serial number label**

**MODEL** This is a label with the model name, serial number, etc.

• **Inspection certificate**

This label certifies that the product has passed our shipping inspection.

• **Notes on handling**

"We are not responsible for any damage caused by incorrect operation. •

### 8-3. Operation panel

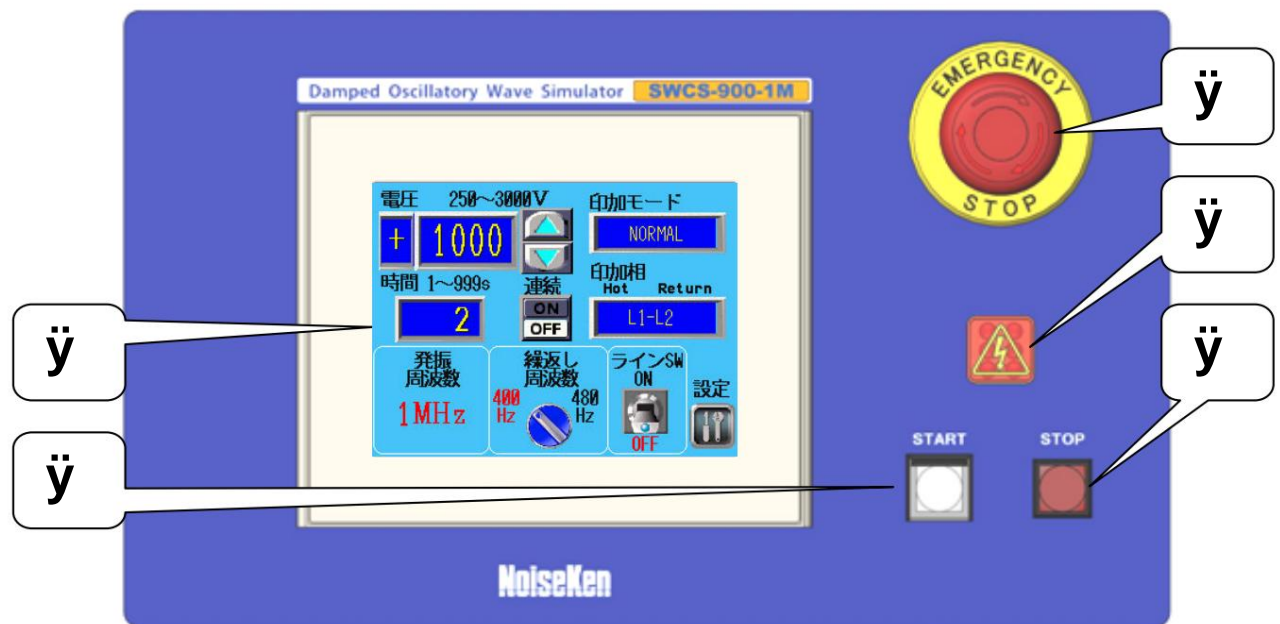


Figure 8-3 Operation panel

#### ÿ Liquid crystal display

Displays various states. In addition, various settings can be made by touching each part on the screen.

increase.

#### ÿ Start switch

By pressing the switch, a high voltage is output and the test is started. By pressing during the test, You can pause the exam. When restarting the test, press the start switch again.

press the

#### ÿ Stop switch

Stop the exam. The output of the high voltage power supply stops.

#### ÿ Emergency stop switch

Please press in case of emergency. When pressed, the power supply to the internal high voltage power supply is cut off.

Turn the knob to release.

#### ÿ Warning lamp

Flashes when high voltage is output.

## 9. Connection method

### 9-1. AC cord connection

#### **WARNING 警告**

Connect the AC cord to a power outlet with a protective grounding terminal. This tester comes with a 3-pin plug AC cord that connects to the power supply and protective grounding. It is connected to a metal part of the tester. To protect against electric shock, insert the power cable plug into an outlet with a protective earth terminal that is properly connected to earth. Doing so may cause an electric shock.

Firmly insert the AC plug all the way in. Heat or dust may accumulate, resulting in fire or electric shock. Insufficient insertion and multi-legged wiring can cause the cord to heat up and cause fire or electric shock. Do not use the AC cord for anything other than this tester. The attached AC cord is intended to be used only with this tester. Do not use anything other than the one supplied with this tester. Using it with other electrical products may cause fire or electric shock due to heat generation. Also, if the AC cord of another electrical product is used with this tester, the original performance of this tester may not be obtained, or heat generation due to insufficient current capacity may result in fire or electric shock.

#### **CAUTION 注意**

Regularly clean the AC plug. Dirt and dust accumulated between the AC plug and the power outlet may absorb moisture, resulting in insulation deterioration and a fire hazard. Periodically unplug the AC plug from the outlet and remove dirt and dust with a dry cloth. Do not connect or disconnect the AC plug or operate the equipment with wet hands. Doing so may cause electric shock or malfunction.

This tester comes with a 3-pin plug AC cord that connects to the power supply and protective ground.

The protective earth of the 3-pin plug is connected to the metal part of this tester through the AC cord.

For protection against electric shock, plug the power cable into an outlet with a protective grounding terminal that is properly grounded.

Please insert the cable plug.

Using the product without connecting the protective ground may result in electric shock.

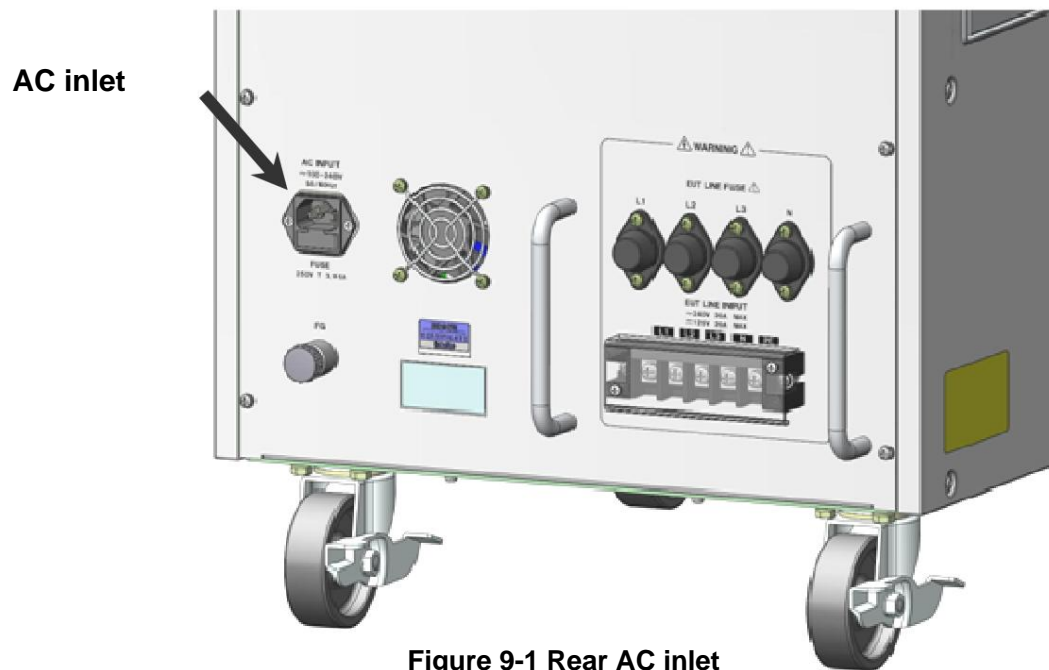


Figure 9-1 Rear AC inlet

## 9-2. Connection of EUT LINE INPUT

Before connecting the EUT power supply to this tester, stop the EUT power supply and turn on the POWER switch of this tester. switch to the OFF state. Electric shock may occur due to the power supply to the EUT or the generated pulse. **may occur.**

Prepare a power cable that conforms to the safety standards of the country in which it is used and that matches the EUT power capacity. **Attach an upper 5 crimp terminal and connect via an isolation transformer. Stay protected once connected**  
**Install the cover.**

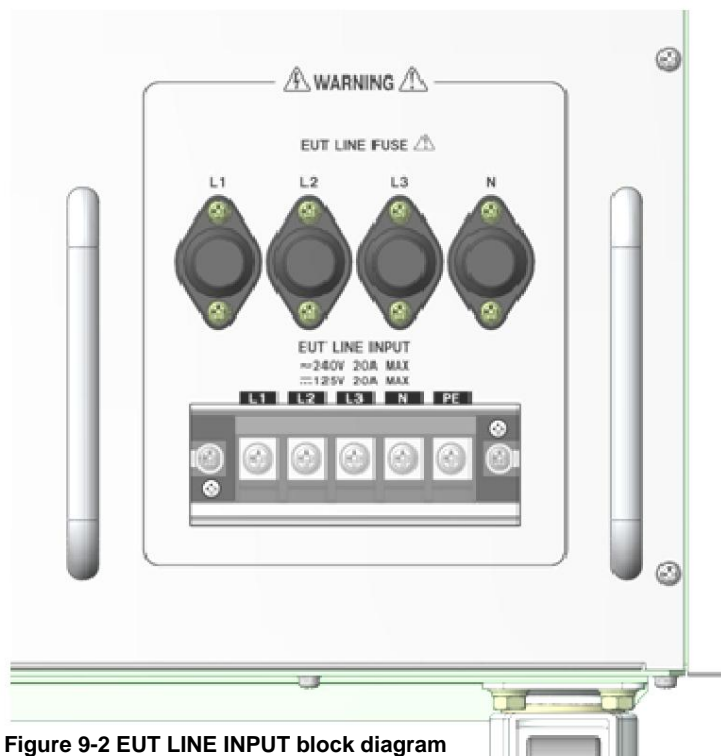
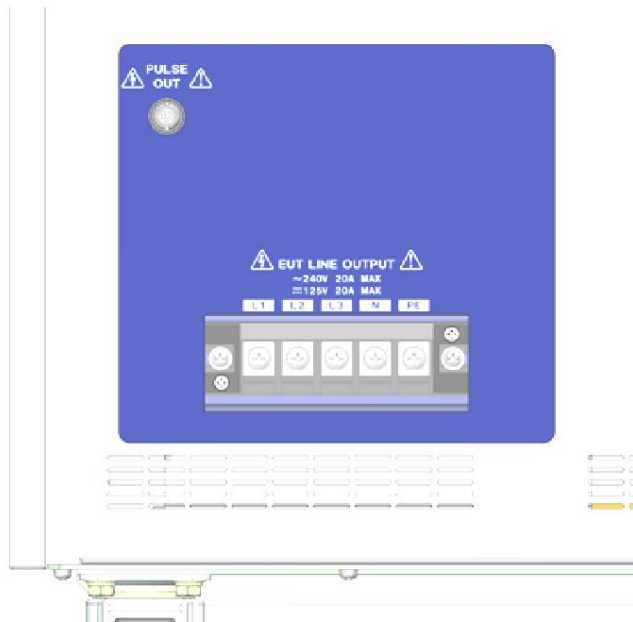


Figure 9-2 EUT LINE INPUT block diagram

### 9-3. Connection of EUT

Turn off the EUT power supply, the tester and the EUT before connecting the tester and the EUT. please. Prepare a cable suitable for the EUT power capacity, attach a 5 crimp terminal and connect. please. Be sure to attach the protective cover after connecting.



### 9-4. Connection to ground plane

Depending on the test item, connect to the ground plane with the attached braided cable.

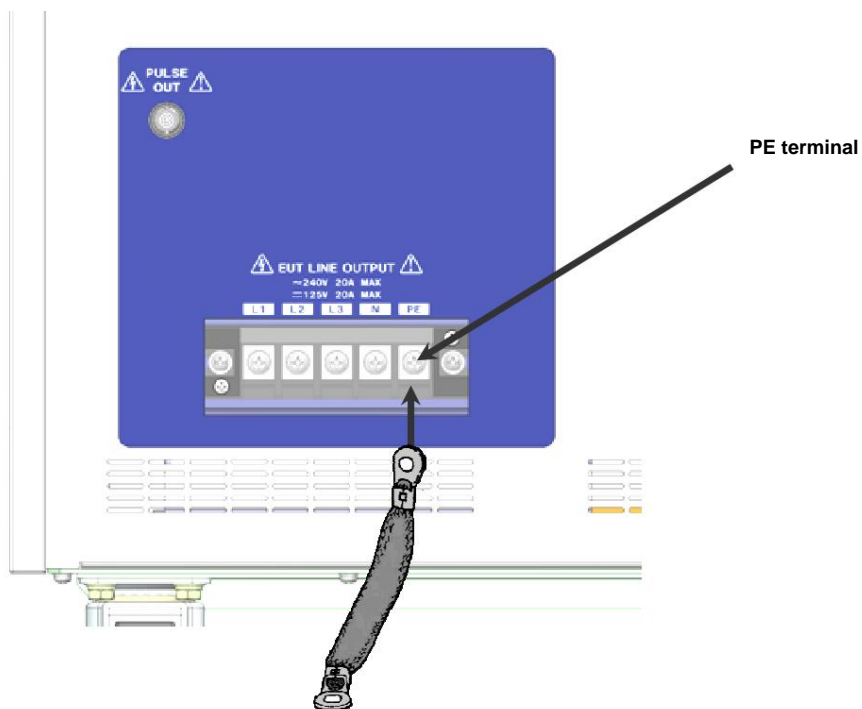


Figure 9-3 Front EUT line terminal area



## 10. Operation method

### 10-1. Power ON/OFF

Push the power switch on the front of the tester to the "I" side to turn on the power of the tester and turn on the operation panel display.

The spray lights up. Pushing it to the "O" side will turn off the power of this tester, and the display on the operation panel will turn off.

type goes off.

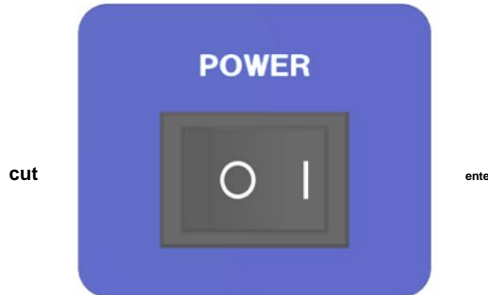


Figure 10-1 Power switch

### 10-2. Operation screen

After 2 seconds from the opening screen, the operation screen will be displayed.

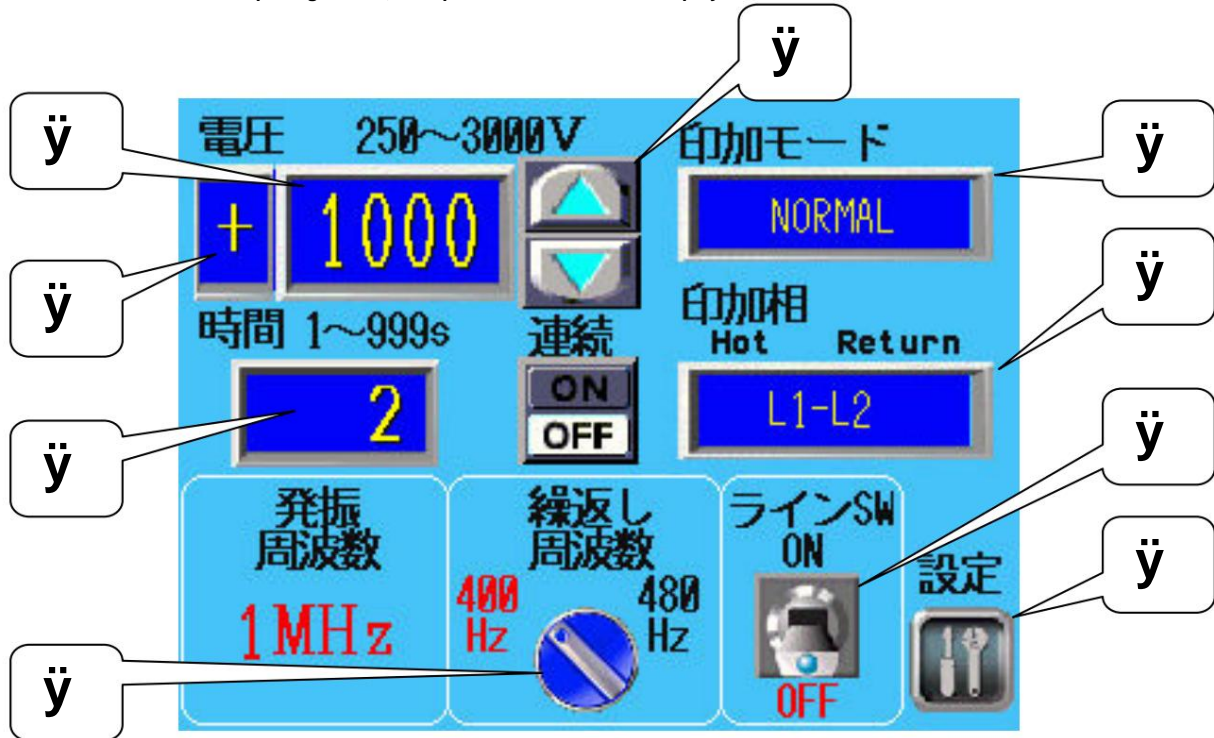


Figure 10-2 Operation screen

#### ÿ Voltage setting

Sets the voltage of the first peak of the damped oscillatory wave. By directly touching the number, you can enter the numeric keypad. 250 to 3000

You can enter a number up to .



Figure 10-3 Voltage setting screen

• Polarity input

You can enter the polarity of the damped oscillatory wave. by touching the symbol +/- will be exchanged.



Figure 10-4 Polarity selector switch

• Voltage step input button

250 V • 500 V • 1000 V • 2000 V • 2500 V by pressing the button • 3000V and the setting of the output voltage are switched.



Figure 10-5 Voltage Step Input Switch

• Test time

Set test time. set here

A pulse is output for the time (seconds)

increase.

Numerical input by touching the numeric value

I can.



Figure 10-6 Test time input screen

Continuous output when the continuous setting button is turned on

mode and press the stop switch

Pulses continue to be output until



• Application mode

Switch between normal mode and common mode

change. Next, select the application phase.

please.

• Applied phase selection

Select the application phase. normal mode and

The combination that can be selected in the common mode has changed.

ends.



(a) Normal mode Normal mode

(b) common mode

Figure 10-7 Application phase selection screen

• Repetition frequency selection

Switch repetition frequency between 400Hz and 480Hz increase.

The IEC61000-4-18(ed.1.0) standard repeats The frequency is "400/s" (400 times per second). 400Hz), so Select 400Hz.

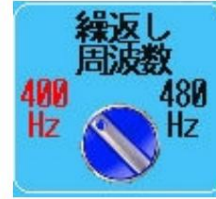


Figure 10-8 Repetition frequency selection switch

According to the B-402 (2007) standard, the repetition frequency is

It is described as "6 to 10 times / 1 cycle of commercial frequency (asynchronous)".

Select 400Hz if the commercial frequency is 50Hz

Select 480Hz if the commercial frequency is 60Hz

8 times/1 cycle of commercial frequency (asynchronous).

The number of applications per wavenumber cycle can be the same.

For settings other than the above, there are fractions in the number of times of application. The list is described below.

Commercial frequency	50Hz	50Hz	60Hz	60Hz
Repetition frequency	400Hz	480Hz	400Hz	480Hz
frequency setting Number of applications per cycle of commercial frequency	8 times	9.6 times	6.7 times	8 times

• Line switch

Switches the EUT line ON/OFF. cut Press and hold the switch (2 seconds) to

stomach.



Figure 10-9 EUT line switch Line switch

• Setting mode switch

Move to setting mode. • See Chapter 10-3.



Figure 10-10 Configuration mode switch

## 1) 3.2 Start the test

**! warn**

•Before execution, make sure that the EUT line is properly connected. •Please be careful that the displayed voltage is generated from the EUT terminal. •Be careful to ensure that there are no people in the vicinity of the test equipment.

Pulses are output from the main unit by pressing the start switch (start switch and warning lamp lit). About 3 seconds after pressing the switch, the buzzer sounds and pulse output starts.

The touch panel cannot be operated while the pulse is being applied.

Also, if the start switch is pressed during pulse application, the pulse will be temporarily stopped. (START switch blinks)

Pressing the start switch again restarts the test.

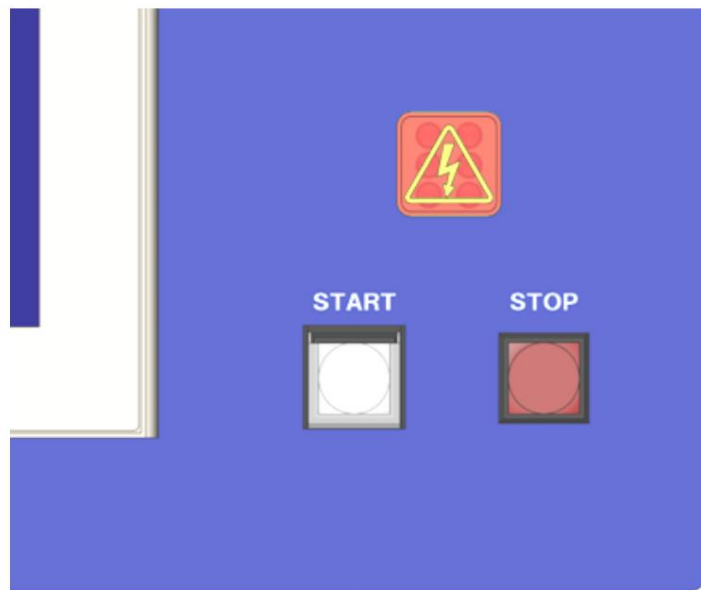


Figure 10-11 Start and stop switches

## 2) End of test

Pressing the stop switch stops the test, turns off the internal high voltage power supply, and turns off the warning lamp lights out.

### 10-3. Setting mode



Figure 10-12 Configuration mode screen

#### Output

switching Select LINE OUT output or PULSE OUT output. The pulse is output from the selected output terminal.

The default setting at AC power on is LINE OUT.

After selecting PULSE OUT, turn on the AC power again to return to the LINE OUT selection state.

#### (2) Switch display

language Switch the display language between Japanese and English.

## 11. Error display

Table 11-1 Error display list Error

display list Emergency stop button pressed	
error contents	The emergency stop button is pressed.
Error release method	Release the emergency stop button (turn the knob clockwise).
Contactor failure Contactor failure	
error contents	The built-in contactor has failed (contact welding, etc.).
Error cancellation method	Turn off the power once and turn it on again. If the error occurs again, repair is required. Please contact the place of purchase or the customer service center.

## 12. Special operations

This section explains how to adjust the brightness of the LCD.

- (1) Touch the upper left corner of the panel, then the upper right corner (within 40 dots vertically and horizontally) within 0.5 seconds.

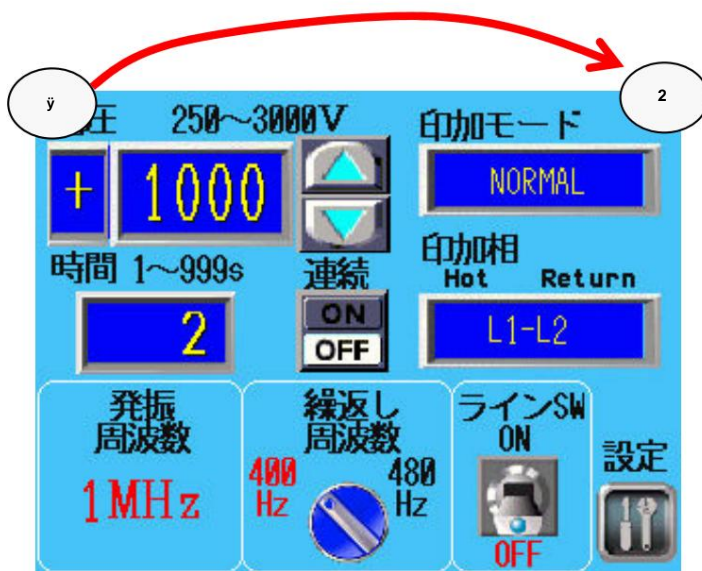


Figure 12-1 Brightness adjustment method

- Since the adjustment bar is displayed at the bottom of the screen, press the + button and - button to adjust it to an easy-to-see state, please.

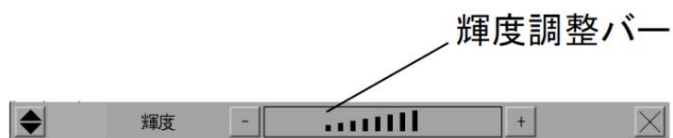
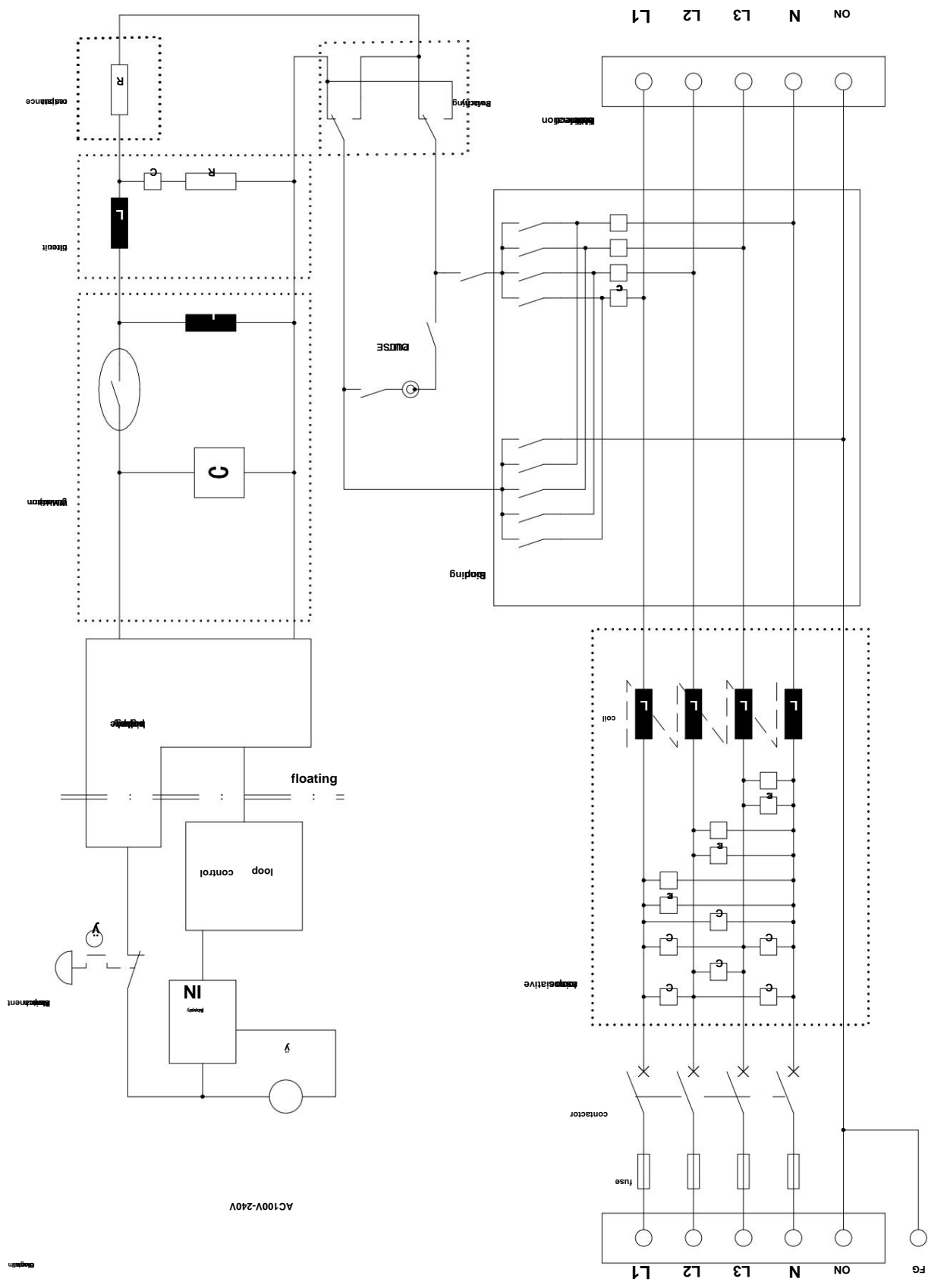


Figure 12-2 Brightness adjustment bar

- After completing the adjustment, press the x button.

# 13. Block diagram



## 14. Specifications

### MODEL SWCS-900-1M Item

	able
Output waveform	nature Slow Damped Oscillatory Wave floating output
Output voltage	250V to 3000V $\pm 10\%$ 1V step
Short-circuit	1.25A $\dot{y}$ 15A $\pm 20\%$
current Oscillation frequency	1MHz $\pm 10\%$
repetition frequency	400 / 480 Hz $\pm 1\%$ 400Hz = 8 times / 1 cycle of commercial frequency 50Hz (asynchronous) 480 Hz = 9.6 times / 1 cycle of commercial frequency 50 Hz (asynchronous) 400Hz = 6.7 times / 1 cycle of commercial frequency 60Hz (asynchronous) 480 Hz = 8 times / 1 cycle of commercial frequency 60 Hz (asynchronous)
voltage waveform attenuation	5th peak $> 50\%$ of 1st peak, 10th peak $> 1st$ peak less than 50% of peak (50% of peak value between period 3.5 and 5.5)
Rise time	75ns $\pm 20\%$ (between 10% and 90%)
Output impedance 200 $\dot{y}$ $\pm 20\%$ Output polarity	
Positive or negative	
Application time 1s to 999s $\pm 0.05s$ (1s step) and continuous	
Coupling Capacitor 0.5 $\mu F \pm 20\%$ Single Phase/	
CDN power capacity	Three Phase AC240V20A or DC125V20A Normal Mode
Inca phase	Between L1 / L2 / L3 / N Phase Common mode L1 / L2 / L3 / Between phase N and PE  When L1, L2, and L3 are the same, between Inca and PE When L1, L2, L3, and N are the same, between Inca and PE
Decoupling coil Drive	Below 1.5mH
power supply	AC100V $\dot{y}$ 240V $\pm 10\%$ 50/60Hz
Power	Below 150VA
consumption Operating temperature range 5 $\dot{y}$ 35 $\dot{y}$	
External dimensions	(W) 430 mm x (H) 515 mm x (D) 500 mm (excluding protrusions)
quality	Approx. 53
accessories	kg Bag for accessories 1 piece 1 AC cord 2 spare fuses for instrument power 4 spare fuses for EUT line Jig set for waveform confirmation (with M5 crimp terminals) 1 set (For PULSE OUT: coaxial conversion connector NMHV-PR+ 1 piece with UL1015 AWG14 20cm) (For CDN: UL1015 AWG14 20cm 2 copies) (For PE terminal: braided wire 40cm 1 book) 1 instruction manual



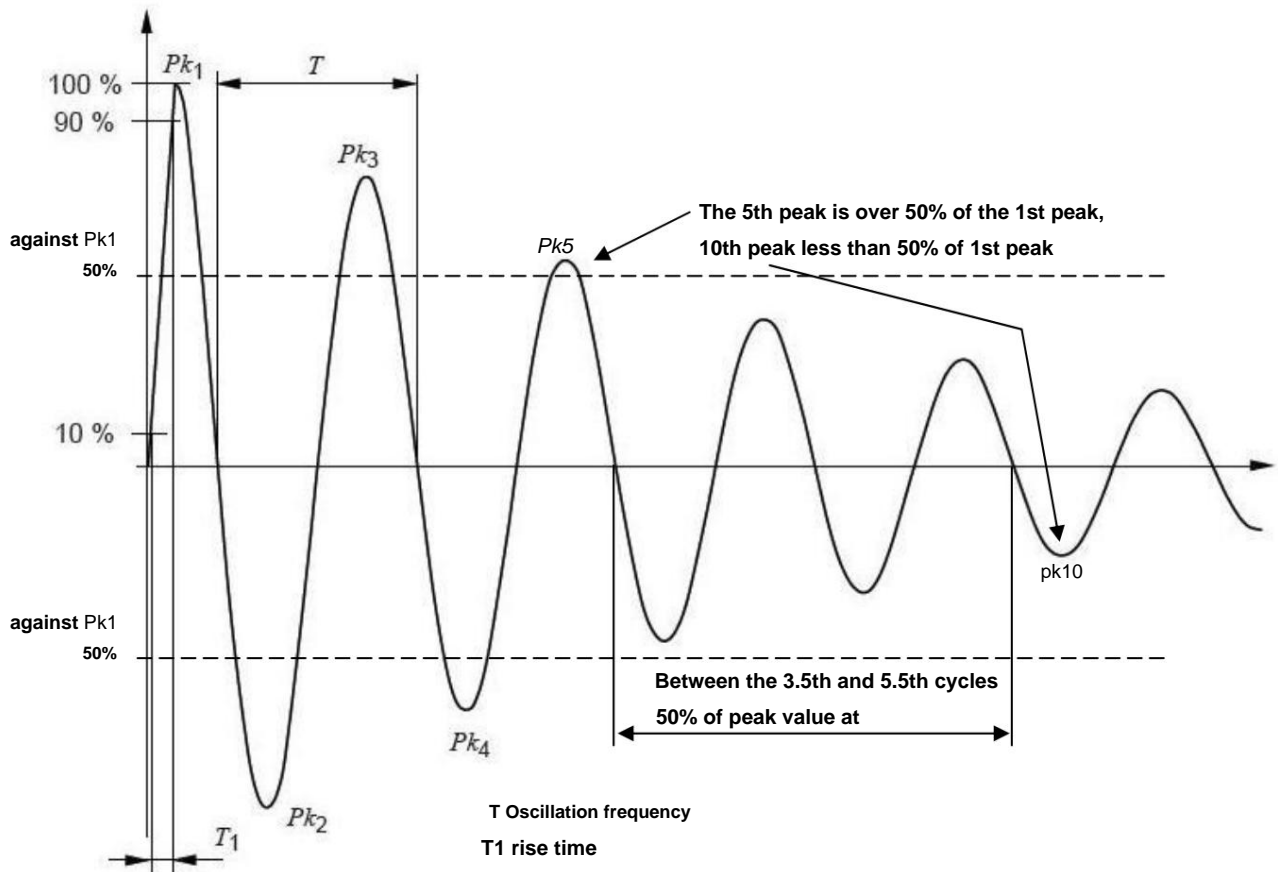


Fig. 1 Damped oscillatory wave (voltage waveform when output terminal is open)

## 15. Waveform confirmation method

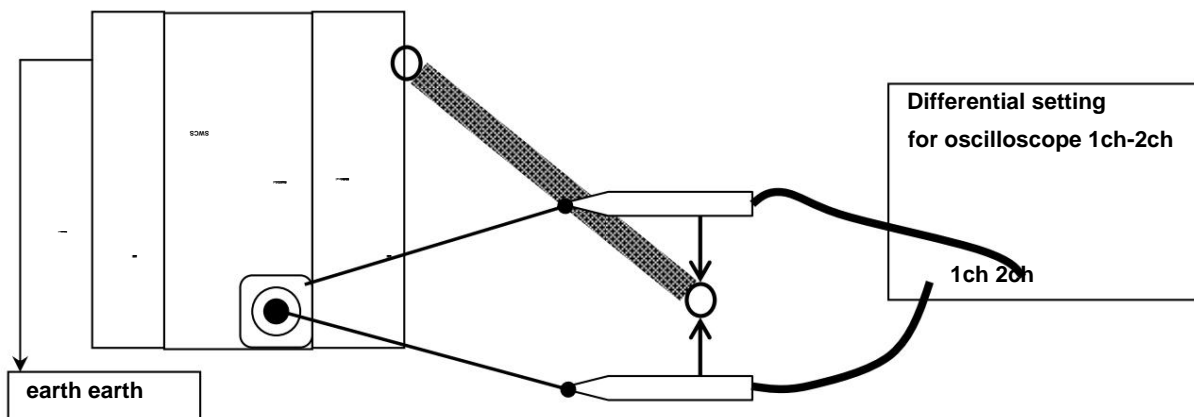
The following outlines how to check whether the SWCS waveform conforms to the standard. The recommended probe is a 1000:1 probe, but please select according to the voltage to be measured. Stray capacitance around the probe may affect the measured waveform, so it is recommended to use an insulating material to keep the probe about 10 cm away from the floor, and to leave a gap of about 10 cm between the probes when measuring. increase.

### Caution:

During the test, do not touch the external conductor of the coaxial conversion connector for PULSE OUT, the crimp terminals at the ends of each cable, the electrodes on the terminal block, and the crimp terminals at the ends of each cable, as there is a risk of electric shock.

### 15-1. For PULSE OUT

Set to PULSE OUT by switching the output on the setting mode screen. Connect the jig for waveform confirmation PULSE OUT to the PULSE OUT terminal. Connect the jig for waveform confirmation PE terminal to the PE terminal. Connect the HOT side of the 1ch probe to the HOT side for PULSE OUT. Connect the HOT side of the 2ch probe to the GND side for PULSE OUT. Connect the GND side of the probe to the PE terminal of the jig for waveform confirmation.



For current waveform measurement, short the crimp terminals on the HOT side and GND side cable ends for the waveform confirmation jig PULSE OUT with a screw and nut before measuring with a current probe.

### 15-2. CDN output: normal mode ( applied between L1 and L2) L1 applied, L2 return

Set to LINE OUT by switching the output on the setting mode

screen. The L1, L2, L3, and N terminals of the SWCS power supply side terminal block are open. Connect the PE

terminal to the earth Connect the waveform confirmation jig for CDN to L1 and L2 of

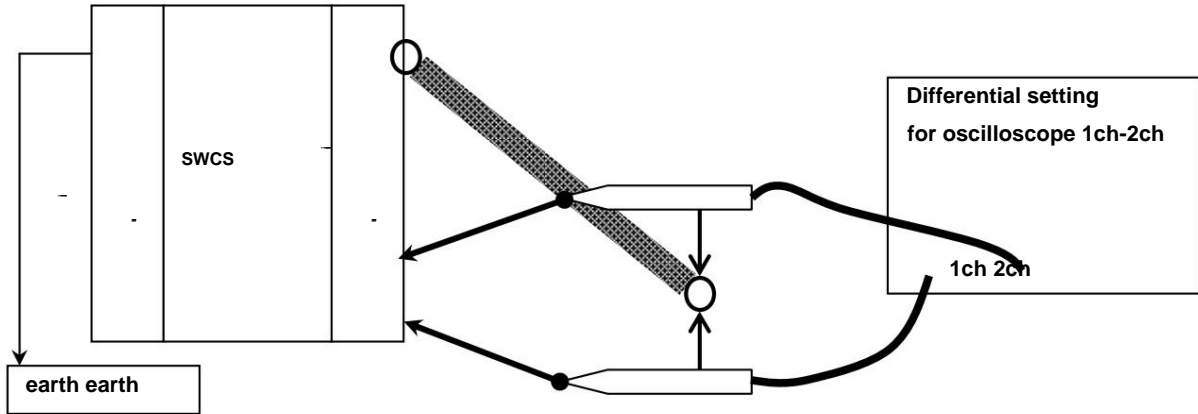
the SWCS power supply side terminal block Connect the

waveform confirmation jig for PE terminal to the PE terminal Waveform confirmation jig

Connect 1ch probe to the L1 terminal for CDN 2ch probe HOT side connection to the L2

terminal side of the waveform confirmation jig for CDN Connect the

GND side of the probe to the waveform confirmation jig PE terminal Differential measurement with an oscilloscope, setting 1ch-2ch (1ch m



When measuring the current waveform, short the crimp terminals on the L1 side and L2 side cable ends for the waveform confirmation jig CDN with a screw and nut, and then measure with a current probe.

### 15-3. CDN output: common mode ( applied between L1 and PE) L1 applied, PE return

Set to LINE OUT by switching the output on the setting mode

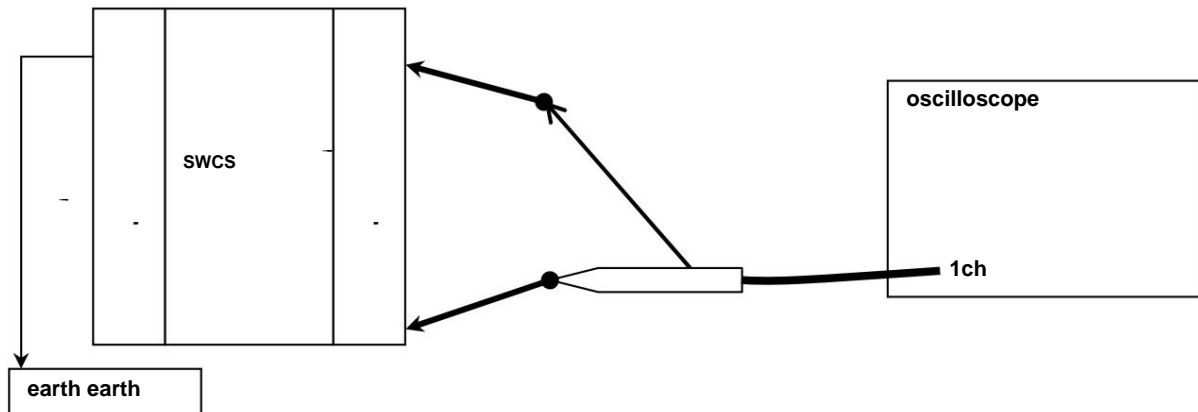
screen. The L1, L2, L3, and N terminals of the SWCS power supply side terminal block are open. Connect the PE

terminal to the earth Connect the waveform confirmation jig for CDN to L1 and PE of the

SWCS power supply side terminal block Connect the HOT side of the 1ch probe to the L1

terminal side of the waveform confirmation jig for CDN Waveform confirmation jig PE

for CDN Connect the GND side of the probe to the terminal side Set the oscilloscope for 1ch and measure



When measuring the current waveform, short the crimp terminals on the L1 side and PE side of the CDN waveform confirmation jig with a screw and nut, and then measure with a current probe.

## 16. Warranty

### Warranty provision

This warranty is a provision for guaranteeing repair services to maintain the specified functions and performance of our products.

#### 1. Scope of warranty

equipment This applies to our products and accessories.

#### 2. Technical and labor

charges In the unlikely event that our product fails, we will repair it free of charge within the gratis warranty period based on the gratis warranty provisions. If the gratis warranty period has expired, you will be asked to bear the actual cost of the technical and labor costs involved in the repair.

#### 3. OWNERSHIP OF

REPLACEMENT PARTS Ownership of all defective parts replaced in connection with performance of repair service shall belong to the Company. Regarding paid repairs, unless otherwise requested, we will take back the replaced defective parts for processing.

#### 4. Liability limit In

the unlikely event that the customer suffers damage due to a failure or repair service of the product purchased by the customer, the customer shall not be liable We will be liable to the customer for damages up to the amount paid for the purchase of the product. However, in any case, out of the damages incurred by the customer due to the failure of the product concerned or the repair service provided by us, loss of profits, third party We will not be held responsible for damages based on liability for damages made to you by or indirect damages.

#### 5. Incorrect/missing/damaged items

Loss of profits, business losses, and other consequential damages incurred by the customer in the event that the product purchased by the customer is incorrect, missing, or damaged, resulting in the inability to use the product. In no event shall we be liable for any damages, including physical, special, indirect or punitive damages, or damages based on liability made to you by any third party.

#### 6. About refusal of repair

Repair may be declined in the following cases. •Products that have been manufactured for 5 years or more •Products that have been delivered for 8 years or more •When parts necessary for repair include discontinued products and there are no substitutes •Changes to devices without our involvement , repaired, or modified products •Products that are significantly damaged, such as those that do not retain their original shape

#### Free warranty provision

**Any failure within the free warranty period will be repaired or replaced free of charge. In that case, let us decide what to repair the equipment. Please note that this free warranty provision applies only in Japan.**

#### 1. Applicable

equipment This applies to our products and accessories.

#### 2. Free warranty

period One year from the date of delivery.

Regarding repaired parts, the gratis warranty period shall be 6 months from the completion of repair in the case of the same part and same defect.

#### 3. Exclusion

Items Notwithstanding the above, if the failure that occurred falls under any of the following, it will not be covered by the free repair service.

Replacement of consumables, including replacement of consumables (for used products) such as mercury relays, high-voltage relays, coaxial cords, coaxial connectors, automatic switches, contactors, etc. Failure or damage caused by careless handling Defects of our products resulting from modifications not involving our company Defects of our products resulting from failures or damage caused by repairs by persons not authorized by our company Directly or indirectly caused by natural disasters, wars, riots, civil strife, or any other majestic force resulting in failure or damage to our products. Defects of our products caused by failure of our products due to failure or damage caused by the usage environment.

## 17. Conservation and preservation

1. Only qualified service engineers should perform repairs, maintenance work, or internal adjustments.  
will implement it.
2. Customer maintenance work should be limited to exterior cleaning and functional checks.
3. For products with replaceable fuses, when inspecting or replacing the fuse, turn the power switch (or power supply) and disconnect the power supply.
4. Before cleaning, turn off the power switch (if any) of the instrument and its connected equipment and unplug the power supply.  
Please remove
5. To remove stains on the exterior, soak a soft cloth in a small amount of water or neutral detergent, wring it out, and wipe it gently.
6. Do not open any covers of the instrument other than those specified.

## 18. Contact information in case of failure

If you experience any symptoms that seem to be a malfunction, check the symptoms, model name, and serial number before purchasing.

**Please contact the original or customer service center.**

When returning the product, please describe the failure status/symptoms and details of the request in detail on the repair request form.

Have the model name, serial number, and package the entire equipment in its original or equivalent packaging suitable for transport.

**Please send it in a package.**

Customer Service Center

TEL (0088)25-3939 (toll-free) / (042)712-2021

FAX (042)712-2020





memo

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**yyyyyy yy yyyy**