

NoiseKen

INSTRUCTION MANUAL

COUPLING DECOUPLING NETWORK

MODEL IJ-AT450

NOISE LABORATORY CO., LTD.

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1. IMPORTANT SAFETY PRECAUTIONS

This manual contains important information pertaining to the operation and maintenance of your Coupling Decoupling Network Model: IJ-AT450 (hereinafter "this CDN"). In order to obtain the highest performance from this CDN, it is recommended that the contents of this manual be thoroughly understood and used as ready reference for operation and maintenance.

The "Important Safety Precautions" explain rules that must be followed to prevent any risk of harm or injury to the user of the instrument or to other people.

- **The instrument may only be used by trained EMC technicians (electrical technicians)**

There is a risk of death or serious injury, and of the emission of electromagnetic noise that exceeds the stipulated limits. Please use the instrument in conjunction with appropriate measures for dealing with electromagnetic noise such as a Faraday cage or shielded room.

- **Do not use the instrument for any purposes other than the EMC testing purposes described in this instruction manual**

Failure to follow this rule risks death or serious injury.

- **A person who has a pacemaker on should not operate this CDN and also should not enter the area where it is operating.**

It may result in a fatal or serious accident.

- **The supplied AC power cable of the instrument is intended only for Japan and North America.**

In case of using the instrument in other countries than the above, use an AC power cable that is certified for use under the safety rules of the country in which the instrument is being used.

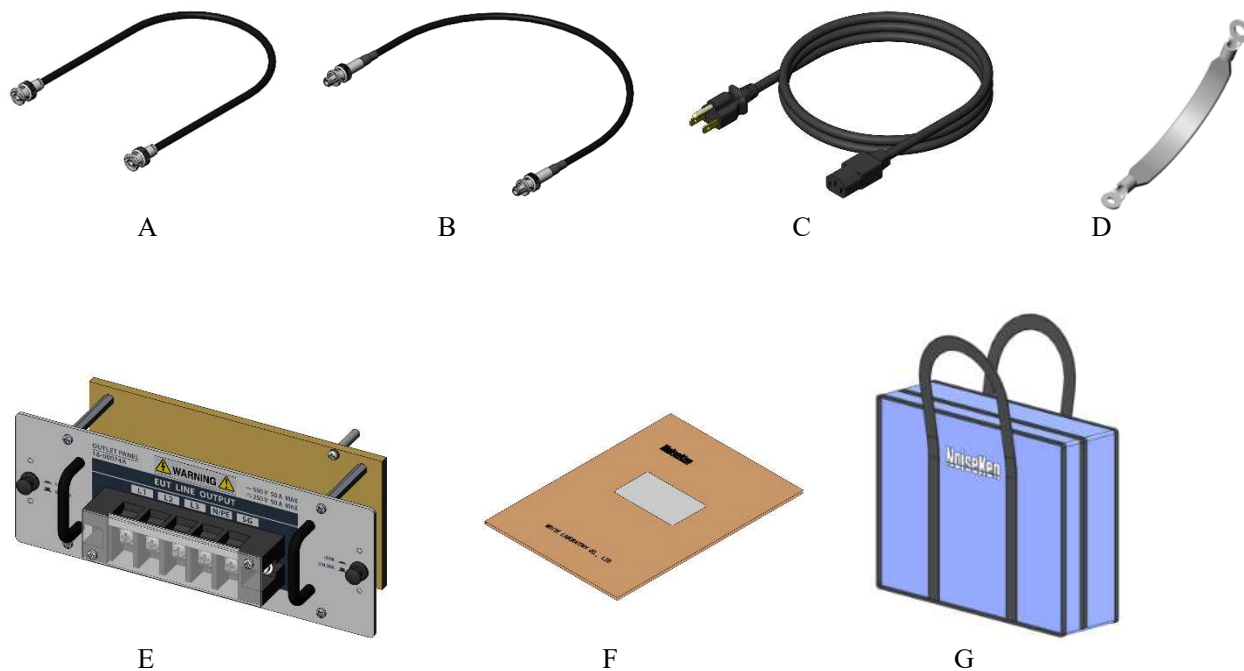
- **This CDN cannot be used in an explosive area, fire prohibited area, etc.**

Use of this CDN in such an area is liable to cause combustion or ignition.

A number of safety recommendations are listed in the later chapter "BASIC SAFETY PRECAUTIONS". Be sure to read them before test

2. INCLUDED ACCESSORIES

The following items are enclosed in the package. Check them when opening the package.



内容	型式	個数	備考
A BNC coaxial cable	02-00159A	1	For sync signal, 0.3m
B High-voltage coaxial cable	02-00160A	1	For pulse injection, 0.4 m
C AC cable	-	1	AC100-115V 3-p, 2.5m
D SG cable	05-00172A	1	0.12 m
E Outlet panel (3-phase terminal block type)	18-00074A	1	
F Instruction manual	-	1	
G Bag	-	1	

3. APPLICATION FORM FOR INSTRUCTION MANUAL

To: Noise Laboratory Co., Ltd. via sales agent

We place an order for an instruction manual.

Model Name

IJ-AT450

Serial No.

Applicant Address

Company Name

Department

Contact Person

Phone No.

FAX No.

Cut off this page "**PURCHASE ORDER 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 your nearest sales agent of Noise Laboratory or Noise Laboratory.

To: Noise Laboratory Co., Ltd.

1-4-4 Chiyoda Chuo-ku Sagami-hara City,
Kanagawa Pref., 252-0237 Japan

Tel: +81-(0)42-712-2051 Fax: +81-(0)42-712-2050

4. PREFACE

We thank you very much for your purchase of our Coupling Decoupling Network IJ-AT450 (“this CDN”). This instruction manual (“the Manual”) contains how to use this CDN and other important information. In order to obtain the highest performance from this CDN, thoroughly understand the contents of the Manual and use as ready reference for operation

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- **The Manual will help operators handle and utilize this CDN in safety.**
 - **Keep the Manual in a place where it is readily available.**
-

4–1. Features

- When combined with NoiseKen’s Impulse Noise Simulator “INS-S420,” it can perform noise superposition testing of 3-phase, 4-wire (L1, L2, L3, and N) lines up to AC500V 50A and DC250V 50A.
- The superimposed line can be changed by operating the switches on the front panel.
- The pulse voltage, pulse width, pulse repetition, phase angle, and test time can be tested automatically by remotely controlling this CDN and the Impulse Noise Simulator “INS-S420” from a PC. (Requires an optional optical interface unit.)
- The provided emergency stop button enables the simultaneous shutoff of the EUT line and pulse injection in case of emergency.
- When this CDN is used with the Impulse Noise Simulator “INS-S220” or an existing product such as “INS-4020” or “INS-4040,” it still allows you to change the superimposed part and turn the EUT line on and off by operating the switches on its panel.
- The line output section uses an outlet panel system to support various receptacles and it can be replaced with an optional outlet panel.
- When combined with the Impulse Noise Simulator, it can synchronize the pulse repetition cycle with the AC line (50 Hz / 60 Hz) of the EUT power supply. Any synchronization angle can be specified between 0° and 360°.

5. TABLE OF CONTENTS

1. IMPORTANT SAFETY PRECAUTIONS.....	1
2. INCLUDED ACCESSORIES	2
3. APPLICATION FORM FOR INSTRUCTION MANUAL.....	3
4. PREFACE.....	5
4-1.Features.....	5
5. TABLE OF CONTENTS.....	6
6. BASIC SAFETY PRECAUTIONS	8
6-1.Symbols of Hazard.....	8
6-2.Symbols of Instruction, Warning and Caution.....	8
6-3.Danger.....	10
6-4.Warning.....	10
6-5.Caution.....	12
7. COAXIAL CONNECTORS USED FOR THIS PRODUCT	14
8. CAUTION ABOUT EXPENDABLE SUPPLIES	15
9. INTRODUCTORY NOTES.....	16
9-1.Introductory Notes.....	16
9-2.Terms and Definitions.....	16
9-3.Block Diagram of IJ-AT450.....	17
10.APPEARANCE AND FUNCTION OF EACH PART	18
10-1.Front Panel.....	18
10-2.Rear Panel.....	20
11.TEST SET UPS AND ENVIRONMENT	22
12.CONNECTION.....	23
12-1.Installation.....	23
12-2.Connecting Power Cable.....	24
12-3.Attaching and Removing Outlet Panel.....	24
12-4.Connecting to Ground Plane (SG Terminal).....	25
12-5.Connecting Pulse Injection Cable.....	26
12-6.Connecting Synchronization Signal Cable.....	26
12-7.Connecting EUT Line Input.....	27

12—8.Connecting EUT	27
13. OPERATION	28
13—1.Operating Emergency Stop Button.....	28
13—2.How to Cancel Emergency Stop Button.....	28
13—3.Turning Power Supply of this CDN On and Off.....	29
13—4.Initializing this CDN	29
13—5.Setting High-voltage Pulse Injection Line.....	30
13—6.Setting Impulse Noise	31
13—7.Starting Tests.....	31
13—8.Stopping and Completing Tests	31
14. TYPES OF ERROR DISPLAY AND ACTIONS	32
How to Cancel Errors.....	32
15.SPECIFICATIONS	33
16.OPTIONAL PRODUCTS	35
17.WARRANTY	36
18.MAINTENANCE	38
19.NOISE LABORATORY SUPPORT NETWORK	39

6. BASIC SAFETY PRECAUTIONS

- The following items are very important instructions which users must follow to take precautions against possible injury and harm.
- The indications are provided as an explanation of potential danger involved if the safety precautions are not observed correctly.

6—1. Symbols of Hazard

- ◆ The following display classifications describe degree, to which injury or harm might occur when the contents of the display are not followed or this CDN or related equipment is operated incorrectly.

DANGER

The contents of this display indicate “the assumption that imminent danger might occur resulting in death or serious injury” if this CDN or related equipment is handled incorrectly.

WARNING









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

CAUTION









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 this CDN or related equipment is handled incorrectly.

6—2. Symbols of Instruction, Warning and Caution



- ◆ The following display classifications describe details that should be followed.

	Indicates attention (a matter that must be paid attention fully)		
	Indicates prohibition (an action that must not be taken)		 Do not disassemble
	Indicates a compulsory action (an action that must be taken)		Compulsory


◆ The contents of following signs indicate warnings and cautions when using this CDN.


	<p>Noticing possibility of an electric shock It indicates that there is possibility of an electric shock.</p>
	<p>Noticing caution, warning and danger It indicates that there is a possibility of harm or physical damage if this CDN is or related equipment is handled incorrectly and that the Manual should be referred.</p>
	<p>It indicates warnings for electric shock etc. and the Manual should be referred.</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. 誤った取扱いによる損害に対しては、一切責任を負いません。</p>	<p>Notifying danger of electric shock and the Manual should be referred.</p> <p><u>Caution in handling</u> 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.</p>
 <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>Notifying danger of electric shock and the Manual should be referred.</p> <p><u>Warning</u> To reduce the risk of electric shock, do not remove cover.</p>
 <p>EUT LINE INPUT</p> <p>USE INSULATION TRANSFORMER BETWEEN AC POWER INPUT TERMINAL AND AC POWER SUPPLY FOR AC INJECTION TO PREVENT LEAKAGE TO GROUND.</p> <p>AC入力時、LINEに絶縁トランスを挿入すること。</p>	<p>Notifying danger of electric shock and the Manual should be referred.</p> <p><u>Warning</u> Use insulation transformer between AC power input terminal and AC power supply for AC injection to prevent leakage to ground.</p>
 <p>WARNING/ 警告</p> <p>Heavy Object 重量物</p> <p>Lifting may damage back. 持ち上げ・移動時ケガの危険性有</p>	<p>Notifying danger and the Manual should be referred.</p> <p><u>Caution in handling</u> Lifting may damage back.</p>
 <p>DANGER HIGH VOLTAGE !! 高電圧危険 !! NEVER TOUCH ANY CONNECTOR AND SG TERMINAL DURING OUT THE PULSE !! パルス発生中はコネクタやSG端子に絶対に触れないこと !!</p>	
<p>Notifying danger of electric shock and the Manual should be referred.</p> <p><u>Warning</u> Danger high voltage !! Never touch any connector and SG terminal during out the pulse!!</p>	


6—3. Danger


 <p>Do not disassemble</p>	<p>Do not take this CDN apart or do not remodel. Do not open the cover.</p> <p>Imminent danger might occur resulting in death or serious injury. Repair, internal adjustment, and inspection of this CDN should be performed by a qualified service engineer. Ask the Company or its sales agent.</p>
 <p>Prohibited</p>	<p>Do not use this CDN in an explosive are or fire-prohibited area etc.</p> <p>Use of this CDN in such an area is liable to cause combustion or ignition.</p> <hr/> <p>A person who has a pacemaker on should not operate this CDN and also should not enter the area where it is operating.</p> <p>It may result in a fatal or serious accident.</p>

6—4. Warning


 <p>Compulsory</p>	<p>Stop operation if following unusual phenomena should occur.</p> <ul style="list-style-type: none"> ○ Emitting fumes, or smelling. ○ Water or an unusual substance being stuck ○ Being dropped or being damaged ○ AC cable being damaged (e.g. core lines being exposed etc.) <p>Continuing to operate in the above status may result in a fire, electric shock, or injury. If an unusual phenomenon occurs, turn off power supply immediately, pull AC plug out of an outlet, and ask the Company or sales agent repair. As there is potential danger, any user must not repair the product.</p> <hr/> <p>Insulate and protect the test facility against 8000V* (Max. output voltage of this CDN).</p> <p>If the test facility is not so insulated and protected, there is the dangerous possibility of an electric shock, leak or fire</p> <p>* When the 50Ω terminator is not connected: The maximum output at 50Ω termination is 4000V.</p> <hr/> <p>Turn off power supply of this CDN when setting or changing connection of related equipment.</p> <p>The misuse may cause electric shock, injury, or malfunction.</p> <hr/> <p>Be sure to turn off power supply for EUT when connecting EUT to this CDN.</p> <p>The misuse may cause electric shock, injury, or malfunction.</p> <hr/> <p>Use a proper EUT power supply equipped with protection network enough for EUT's current capacity.</p> <p>EUT line of this CDN does not have any protection network against over current. Connect an appropriate EUT power supply which has protection network (circuit breaker, fuse, etc.) to the input terminal of EUT line. If you fail to follow this precaution, the equipment or test facilities may be broken or be in danger.</p>
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 Compulsory	<p>Do not supply over-rating power to EUT Line input terminal.</p> <p>Do not supply over-rating power to EUT line. The misuse may cause a damage of equipment or a fire. The rating of input is;Maximum voltage: AC500 V, DC250 V, Maximum current 50 A;</p>
	<p>Use this CDN after understanding instructions in the Manual fully.</p> <p>There may be danger causing a fatal or serious wound or emitting over-ristriected-value electromagnetic noise in using this CDN. NOISE LABORATORY and its sales agents shall have no liability against any accident resulting in injury or death, any damage to equipment or any resultant damage thereof, which is caused by abuse or careless handling of this CDN.</p>
	<p>Watch equipment while this CDN is operating.</p> <p>If this instruction should not be followed, a third person or equipment related to the test may be exposed to a danger.</p>
	<p>Supply power within the indicated range (AC100 V to 240 V).</p> <p>The misuse may cause an electric shock or a fire. The supplied AC cord in the accessory is for AC100~120 V. Prepare a proper 3-line AC cord with a protective earth pin conforming to the local safety standard in using with AC220~240 V power supply.</p>
	<p>Use proper connectors and cables and connect them securely.</p> <p>Avoid using a damaged connector or cable. The misuse may cause an electric shock or damage of equipment.</p>
	<p>Insert AC plug securely to the end.</p> <p>Insecure inserting generates heat and gathers dust. It may result in a fire or an electric shock. Avoid using a multiple outlet extension plug for the same reason.</p>
	<p>Install this CDN on a stable place.</p> <p>If this CDN is installed on an unstable place, human body may be in danger due to drop or overturn of this CDN.</p>
	<p>Connect the protective earth of AC cord.</p> <p>Using this CDN without connecting it may cause an electric shock.</p>


 Prohibited	<p>Do not use this CDN for any other purpose than Impulse noise test.</p> <p>The misuse may result in an electric shock, an injury, or damage of equipment.</p>
	<p>Do not put any substance into this CDN or its connectors.</p> <p>If some metal or flammable things are put into this CDN through a connector or a vent, it may result in a fire or an electric shock.</p>
	<p>Do not install this CDN on the spot where quick operation of power key or STOP key is difficult.</p> <p>If this CDN is set up on such a spot, difficulty in taking action in emergency may result in a fire or an electric shock.</p>

 Prohibited	<p>Do not use the supplied AC cord for any other purpose.</p> <p>The misuse may result in a fire or an electric shock.</p>
	<p>Do not damage AC cord.</p> <p>A damaged AC cord may cause a fire or an electric shock. For HV cable, be sure to take notice following points.</p> <ul style="list-style-type: none"> ○ Do not modify it. ○ Do not bend it forcibly. ○ Do not twist it. ○ Do not pull it. ○ Do not move it close to heat. ○ Do not put heavy things on it.
	<p>Do not touch the HV coaxial connectors and SG terminal when this CDN is producing pulses or EUT power is being supplied to the EUT LINE INPUT.</p> <p>The misuse may result in a fire or an electric shock.</p>

6-5. Caution

 Compulsory	<p>Take actions against emission of electromagnetic waves.</p> <p>When a test is performed using this CDN, a great amount of electromagnetic waves are emitted according to the type of EUT, sometimes adversely affecting the neighboring electronic equipment and radio communication apparatus. The user is required to provide a Faraday cage, shield room, shielding cable, etc. as necessary.</p>
	<p>Connect EUT power supply only to EUT LINE input terminal.</p> <p>If EUT power supply is connected directly to PULSE OUT connector, EUT FAIL input terminal, or other parts of this CDN.</p>
	<p>If dewing occurs, fully dry up this CDN before using it.</p> <p>Dews may cause an electric shock, a trouble, a fire.</p>
	<p>Use this CDN in proper environment.</p> <p>Operating temperature range is 15~35°C. Operating humidity range is 25~75%. If these precautions are not followed, this CDN may be broken or the prescribed performance may not be warranted.</p>
	<p>Clean up the AC plug periodically.</p> <p>If dust gets damp between the AC plug and outlet, insulation capability deteriorates. It may result in a fire. Pull the AC plug out from an outlet periodically and wipe it with a dry cloth.</p>

 Compulsory	<p>Clean up PULSE OUT connector periodically.</p> <p>If dust gets damp in PULSE OUT connector, insulation capability deteriorates. It may result in a fire. Clean up PULSE OUT connector periodically. Be sure to pull the AC cord out from the outlet to make this CDN turning off before cleaning and blow dehumidified air to PULSE OUT connector to blow off dust.</p>
	<p>When the body is dirty, wipe the body with a dry cloth.</p> <p>Do not wipe this CDN and Probe with thinner, alcohol or other solvent. When the body is very dirty, soak a cloth into neutral detergent, squeeze out the detergent from the cloth and wipe the body with the cloth.</p>
	<p>Make hazardous labels always noticeable.</p> <p>When the caution or warning label is peeled off, missing or dirty, attach a new one for securing safety. When the caution or warning label is missing, ask the sales department or maintenance section of our company to send a new label.</p>

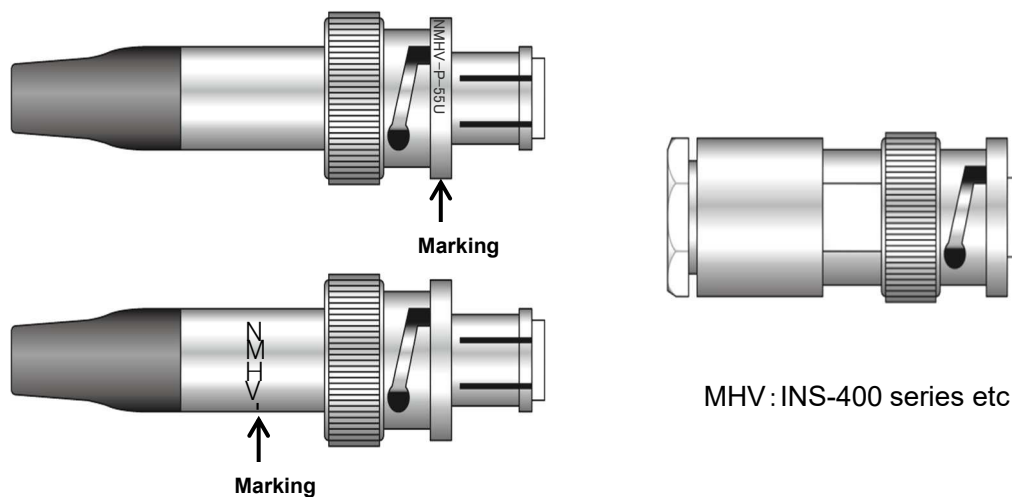
 Prohibited	<p>Do not install this CDN on following places.</p> <p>Setting up this CDN on wrong places as follows may result in a fire, an electric shock, or an injury.</p> <ul style="list-style-type: none"> ○ A very humid or dusty place ○ A hot place, e.g. a place exposed to direct rays of the sun, a place close to a heater. ○ A place easy to bedew, e.g. a place close to a window.
	<p>Do not block a vent or do not use this CDN in a place poorly ventilated.</p> <p>If a vent is blocked, the internal heat is close. It may cause a fire. For ventilation, be sure to take notice following points.</p> <ul style="list-style-type: none"> ○ Do not lay this CDN on its back, sideways, or upside down. ○ Do not put this CDN into a small, poorly ventilated place. ○ Keep this CDN at least 10cm away from a wall or some substance.
	<p>Do not handle the AC plug with your hand wet.</p> <p>The misuse may result in an electric shock or trouble.</p>
	<p>Do not put any container containing water on this CDN.</p> <p>If water is spilled or gets into this CDN, it may result in a fire or an electric shock.</p>
	<p>Do not drop or shock this CDN excessively.</p> <p>The misuse may cause trouble or damage.</p>
	<p>Do not bump or rub this CDN against something hard.</p> <p>The misuse may damage a surface of this CDN.</p>

7. Coaxial connectors used for this product

The coaxial connectors used for this CDN is of NoiseKen original design. Use of other type of connectors may cause electric shock hazards or malfunctions of this CDN. Be sure to use accessories and options supplied by our company.

We have updated coaxial connector specifications to match the output pulse voltage from the NoiseKen INS. This product (INS-S220) uses a custom design connector called NMHV which our company designed for 3kV or higher voltage application. In the market, there are some other types of coaxial connectors similar to the NMHV. Even when they have similar appearances, they are different from the NMVH in terms of the inner conductor projection and length of the insulator. Misconnection of a different type of connector to the NMHV may cause internal discharges, leading to an unexpected shock hazard or a failure of this product. For avoiding this kind of misuse, a marking of "NMHV-P-55U" is given Connector body or on the fringe of the leading edge of a connector lock. If NMHV connectors have been mixed up with other types of connectors, discriminate NMHV connectors and use them only. Before adoption of the NMHV, our company used the other type connector called MHV for INS-400 series (2kV pulse output) such as model INS-410, INS-420 etc. and their options. The MHV connector cannot be used for this product (INS-S220) for the above mentioned reason. The NMHV and MHV connectors are quite different in appearance and thus they can be easily identified.

When using an external coupling unit such as IJ-4050 or other optional products, check the connector type and use accessory and cables supplied by our company.



NMHV: INS-S220/S420
INS-4020/4040
INS-AX2 series etc

8. CAUTION ABOUT EXPENDABLE SUPPLIES

- Coaxial cable and high-voltage coaxial connector
 - The high-voltage coaxial cable (incorporated in this CDN) and high-voltage coaxial connector (external) are consumable supplies
 - Check the high-voltage coaxial cable and high-voltage coaxial connector with an insulation-resistance tester every half-year or when they are used for about 200 hours. When the performance drops below DC1000V/100MΩ, change them for new ones.
 - If it is necessary to change, please ask Noise Laboratory or its distributor/agent closest to you for replacement.

- Fuse
 - The instrument contains fuses.
 - A fuse holder is located in the AC inlet on the rear panel and the fuse can be replaced by the user.
Please replace with a fuse of the following type.
Rated voltage 250V/Rated current 2A Time-Lag Fuse
Recommended fuse: Littelfuse 0215002.*XP
* : Quantity code H, M, T etc.
Quantity: 2
 - If unable to obtain the correct fuse, please contact your sales agent or the Noise Laboratory repair and calibration center.

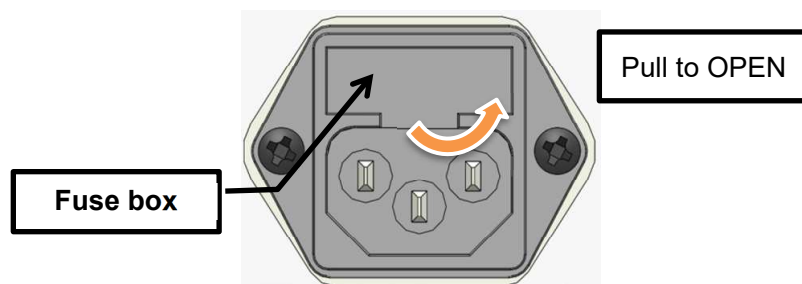






Fig 8-1. Fuse Box

In the event of failure in normal usage, repair shall be performed under the condition of the warranty rule. However, NOISE LABORATORY and its sales agents shall not be liable for any accident resulting in damage of DUT or peripheral equipment caused by deterioration of performance of expendable parts or any other external factors.

9. INTRODUCTORY NOTES

9—1. Introductory Notes

The meaning of following symbols is as follows.

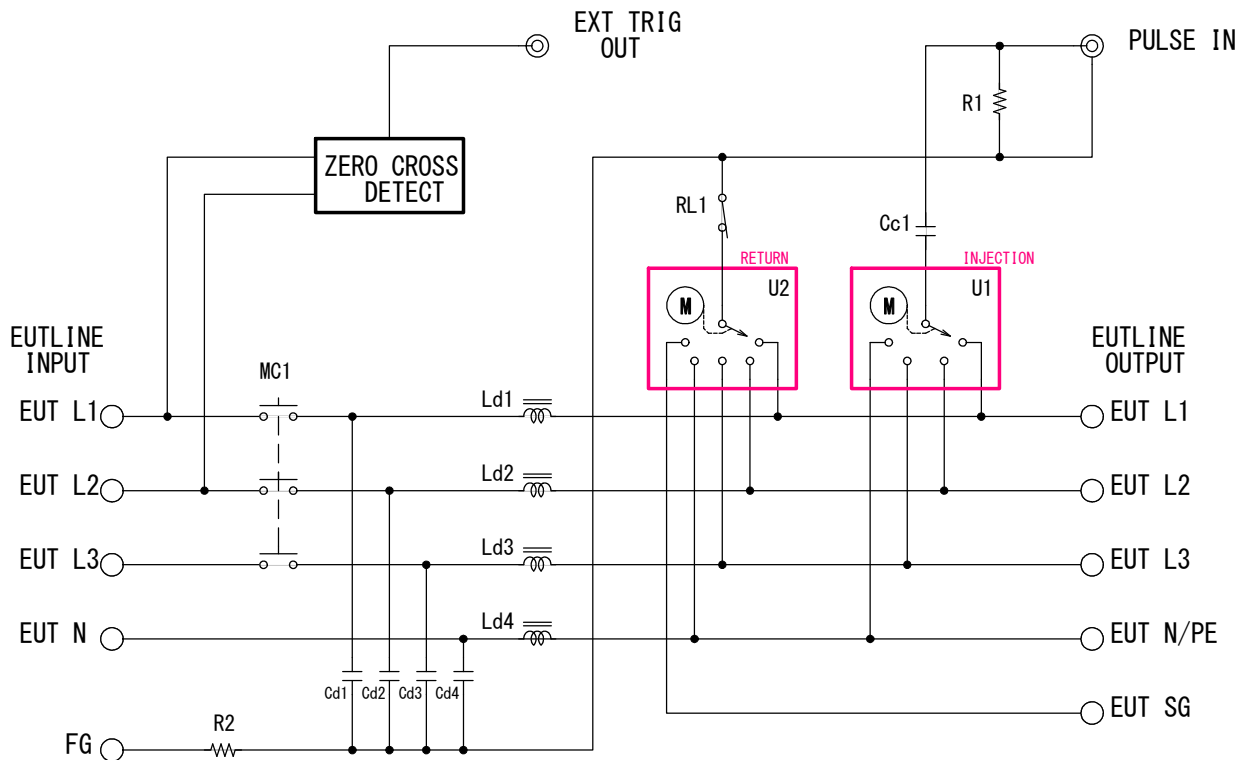
	Additional explanation.
	Indicating other parts to be referred in the Manual.
	Indicating restriction of setting up
	Indicating items to be confirmed before usage.
【 】	Indicating text on the panel of this CDN.

9—2. Terms and Definitions

The terms and their definitions are shown as follows.

Term	Difinition
Impaluse Noise	Fast rising square wave noise waveform
Immunity	Ability of a device, equipment, or system to perform without degradation in the presence of electromagnetic disturbance.
Ground Plane	Reference Ground Plane Flat conductive surface whose potential is used as a common reference.
SG	Signal Ground Output pulse signal ground. Connect SG terminal 【SG】 to ground plane with the supplied SG cable. For details, see <u>P25 “Connecting Ground Plane(SG terminal)”</u> .
FG	Frame Ground Do not connect to Ground Plane. Connect to the protective earth terminal of test room. For details, see <u>P20 “FG terminal”</u> .
EUT	Equipment Under Test
Test for Power Line	Way of testing coupling high voltage pulses to AC/DC power supply port and/or protective earth of EUT. The test is conducted with using CDN.
CDN	Coupling/Decoupling Network Electric circuit to prevent the applied pulse voltage from affecting the device or equipment not under test or system.

9-3. Block Diagram of IJ-AT450

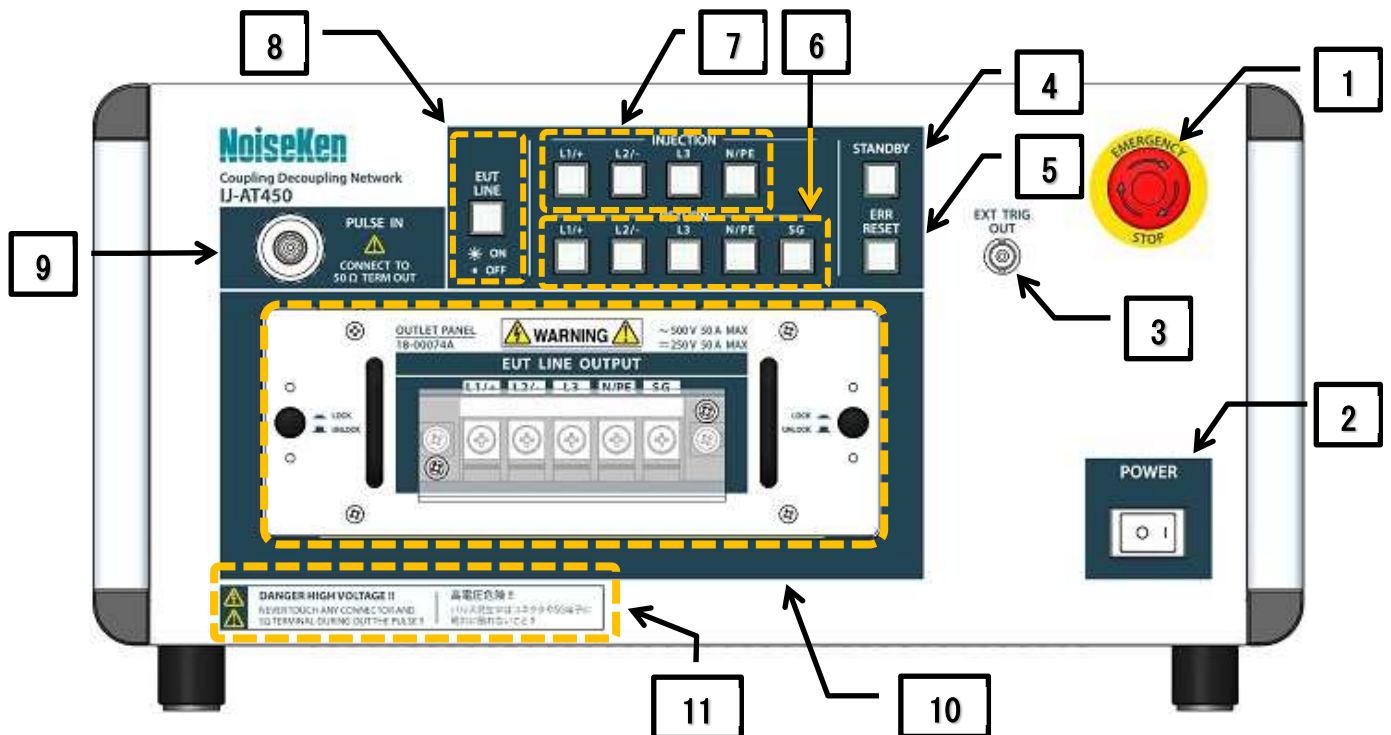


R1	Terminal resistor (500Ω) ^{*1,*2}	R2	Floating resistor (1MΩ)
MC1	Contactors (EUT LINE)	Ld1~Ld4	Decoupling coil (200μH)
Cc1	Coupling capacitor (0.2047μF)	Cd1~Cd4	Decoupling capacitor (0.3μF)
U1	INJECTION switching unit	U2	RETURN switching unit
RL1	Contactors (EUT LINE)		

- ※1. The resistance of the terminal resistor is approximately 50Ω, as it is combined with the terminal resistor inside the Impulse Noise Simulator (INS-S□□ series). To connect it to a generator, use the coaxial cable supplied with IJ-AT450 to achieve the same characteristic impedance.
- ※2. When the INS-40 series, which uses mercury relays, is used as the pulse generator, the resistance is approximately 53.5Ω when combined with the terminal resistor in the equipment.
For how to set the terminal resistor, refer to the instruction manual for the generator.
When connecting it to a generator, use a 53.5Ω coaxial cable to achieve the same characteristic impedance. (For details, contact your NoiseKen supplier or sales representative.)

10. APPEARANCE AND FUNCTION OF EACH PART

10-1. Front Panel



1. Emergency stop button [EMERGENCY STOP]
This button is used to stop the equipment in case of emergency. The emergency stop button is an emergency switch.
Do not use it to stop the equipment while it is in normal operation.
2. Power switch [POWER]
The power switch is used to turn this CDN on and off. Setting the switch to ON (I) turns on the power.
Setting it to OFF (O) turns off the power.
3. External trigger output connector [EXT TRIG OUT]
This output connector is used to output synchronization signals externally. It is connected to the external trigger input connector of the Impulse Noise Simulator. Use the supplied BNC coaxial cable for the connection. This is a BNC type of connector.
4. Standby switch [STANDBY]
This switch is used to initialize the internal automatic selector. The switch always blinks after turning the power on. When the switch is pressed and initialization is completed normally, the switch lights up.



This switch blinks intermittently during remote control.

5. Error reset switch [ERR RESET]

This switch blinks in red when an error is detected. Holding down the switch cancels the error state.



For details, refer to “*Types of Error Display and Actions* on [P. 32](#).”

6. Return switches [RETURN]

These switches are used to select the return phase of the pulse. When a switch is selected it lights up. When the switch for the desired phase is pressed, the switch blinks rapidly. Once the movement is completed, the switch stays lit without blinking.



- The same phase as the injection switch cannot be selected.
- This switch cannot be operated during remote control.

7. Injection switches [INJECTION]

These switches are used to select the injection phase. When a switch is selected, it lights up. When the switch for the desired phase is pressed, its switch blinks rapidly. Once the movement is completed, the switch stays lit without blinking.



- The same phase as the return switch cannot be selected.
- These switches cannot be operated during remote control.



After the initialization using the standby switch is completed, the switch’s light turns off until it is pressed again.

8. EUT line switch [EUT LINE]

This is the ON/OFF switch for the EUT line. The switch lights up when it is set to ON.



This switch cannot be operated during remote control.

9. Pulse input connector [PULSE IN]

This connector is used to inject a pulse into the EUT power supply line. It is connected to [50Ω TERM OUT], the 50Ω terminal pulse output of the Impulse Noise Simulator. Use the supplied high-voltage coaxial cable for the connection.



Do not touch the connector during pulse generation or when power is being supplied to the EUT line input terminal block.
Failure to follow this instruction may result in an electric shock.

10. EUT line output terminal block [EUT LINE OUTPUT]

This terminal block is used for EUT line outputs L1, L2, L3, N (+ / – / PE) and SG on which a pulse is superimposed.

The superimposed pulse is output from the terminal of the phase that is set with an injection switch.



The screw size of the terminal block is M5.



Do not touch the terminal block during pulse generation or when power is being supplied to the EUT line input terminal block.
Failure to follow this instruction may result in an electric shock.

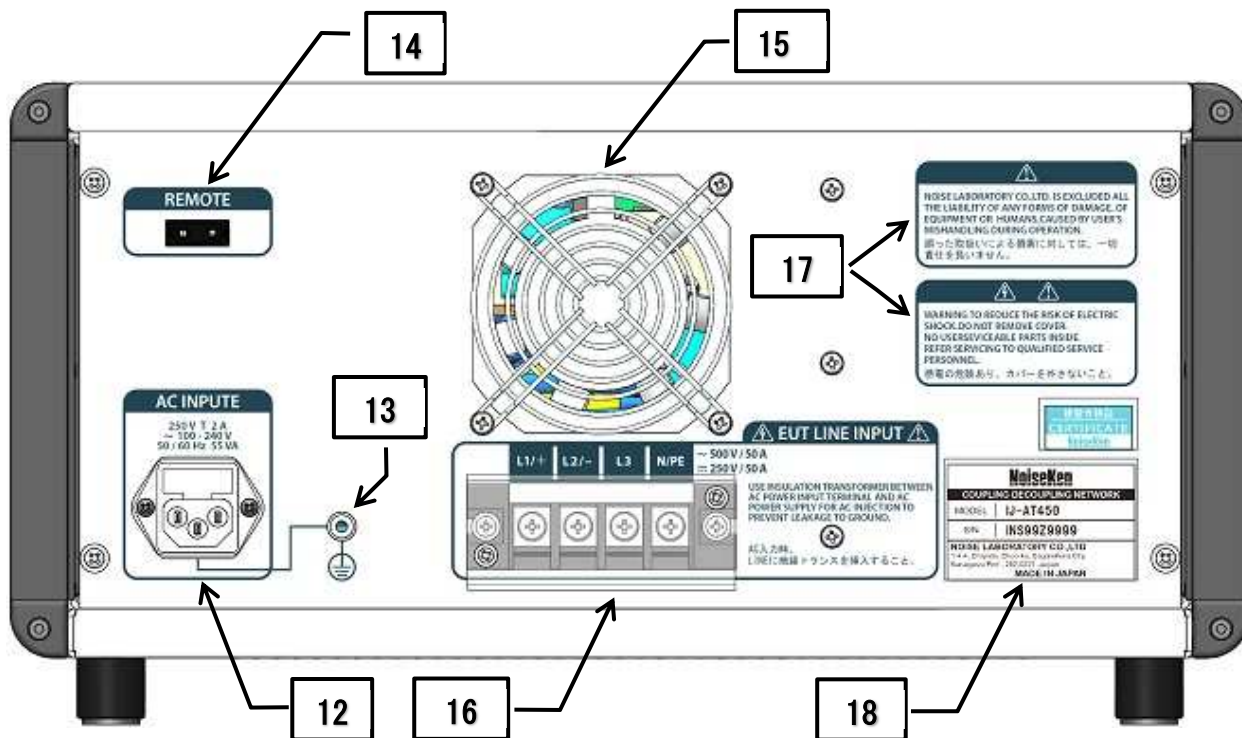
11. Warning on handling

Displays warning messages “DANGER HIGH VOLTAGE” and “NEVER TOUCH ANY CONNECTOR AND SG TERMINAL DURING OUT THE PULSE .”



Do not touch the high-voltage coaxial connector or SG terminal during pulse generation or when power is being supplied to the EUT line input terminal block. Failure to follow this instruction may result in an electric shock.

10-2. Rear Panel



12. AC inlet (with fuse) [AC INPUT]

This input connector is used for the power supply and has a built-in fuse.
When replacing the fuse, be sure to use the rated fuse (250 V T 2 A).



When replacing the fuse, refer to "CAUTION ABOUT EXPENDABLE SUPPLIES" on P. 15.

13. FG terminal

This is the protective grounding terminal for this CDN.
It is electrically shared with the center pin (terminal) of the AC inlet. If grounding via the power supply is difficult, connect this terminal using an appropriate wire to a protective grounding terminal in the laboratory.



Do not connect this terminal directly to the ground plane in the test environment.

14. Optical communication connector [REMOTE]

The optical cable supplied with the optical interface unit (optional) is connected to use remote control.
Place the cap on the connector when it is not used.

15. Fan

This fan is used to release internal heat. Do not obstruct the ventilation.

16. EUT line input terminal block [EUT LINE INPUT]

This terminal block is used to input the EUT power supply (AC 500 V / DC 250 V, 50 A max).

Connect it with a line input cable that complies with the specifications of this CDN and the safety standard of the country in which this CDN is installed.

The phase angle for pulse injection that is set when testing in PHASE (LINE synchronization) mode is controlled based on the power supply connected between L1 (+) and L2 (-) of this input terminal block.



The screw size of the terminal block is M5.



- When connecting the AC power supply for the EUT, input it via an isolation transformer. Input without an isolation transformer may result in an electric shock.
 - This CDN does not have a built-in device to protect against overcurrent or overvoltage on the EUT LINE. Provide a separate protection circuit.
-

17. Warning on handling

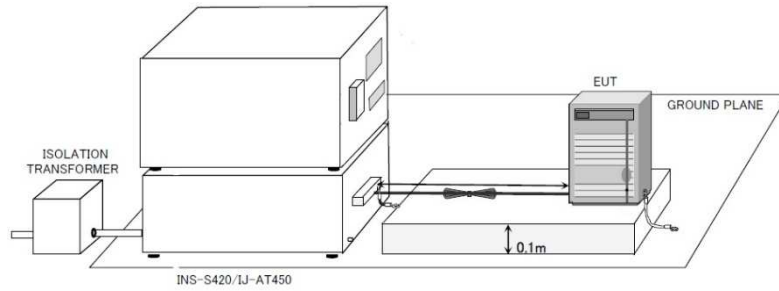
Displays warning messages “NOISE LABORATORY CO.,LTD. IS EXCLUDED ALL THE LIABILITY OF ANY FORMS OF DAMAGE OF EQUIPMENT OR HUMANS CAUSED BY USER'S MISHANDLING DURING OPERATION.” and “WARNING TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE COVER. NO USERSERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.”

18. Serial number label

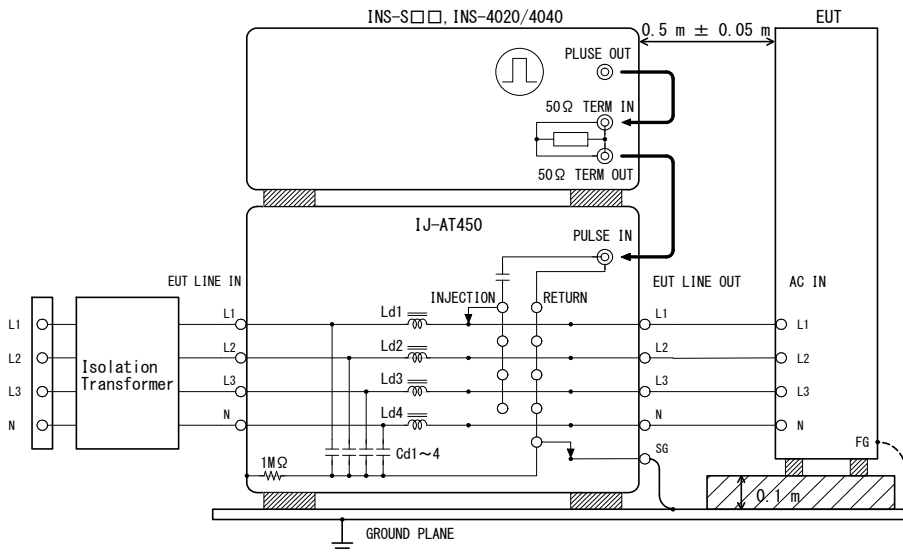
This label indicates the serial number of this CDN.

11. TEST SET UPS AND ENVIRONMENT

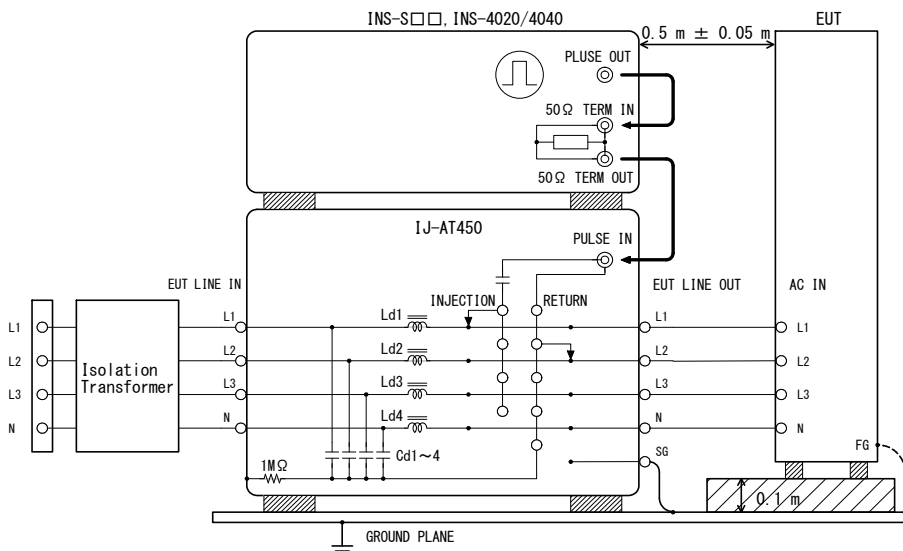
For the test environment and test items, refer to the instruction manual for the Impulse Noise Simulator. An example of a desktop EUT (equipment under test) is shown in the following figure.



※The test table and power supplies are omitted.



Line to ground mode (common mode) for AC operated equipment



Line to line mode (normal mode) for AC operated equipment



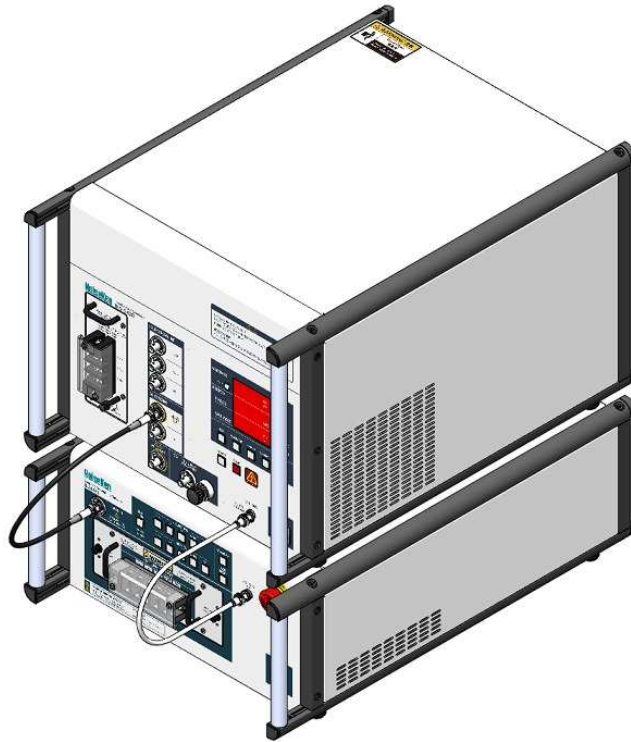
- The INS-S□□ series and INS-4020/4040 series are supplied with the “SG short plug” as standard. However, when combined with this CDN, both the INS-S□□ series and INS-4020/4040 series are used without connecting the “SG short plug” to the main unit of the Impulse Noise Simulator.

12. Connection

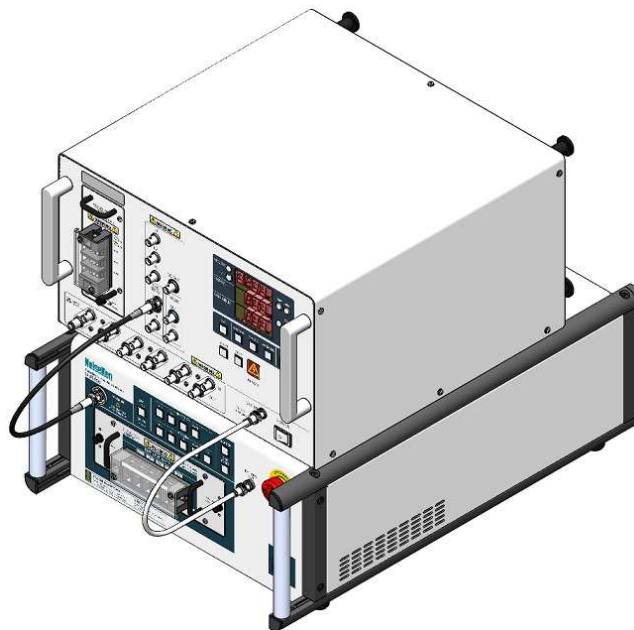
12-1. Installation

Install the Impulse Noise Simulator on top of this CDN.

For the test method and test environment, refer to the instruction manual for the Impulse Noise Simulator.



INS-S□□ series + IJ-AT450



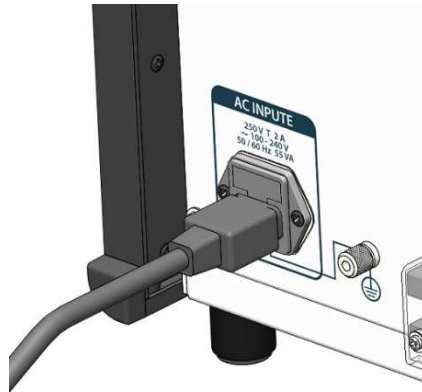
INS-4020/4040 series + IJ-AT450



This CDN is heavy. Take due care when lifting or moving it.

12–2. Connecting Power Cable

Insert the supplied power cable into the AC inlet [AC INPUT] on the rear panel.

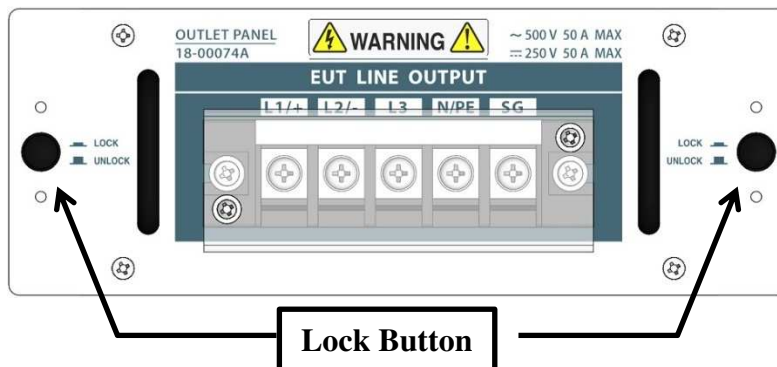
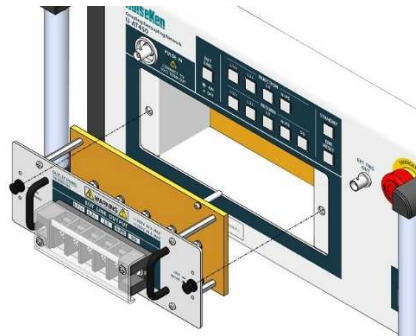


The supplied power cable is designed for AC 100 to 120 V. To use the CDN at AC 220 to 240 V, provide a 3-wire power cable with built-in protective grounding terminal that complies with the safety standard of the country where the CDN is used.

12–3. Attaching and Removing Outlet Panel

To attach the outlet panel, insert it slowly and straight to the back. Make sure that the outlet panel is in contact with the main unit of this CDN, and then press the lock buttons (at two locations) to lock it.

To remove the outlet panel, pull out the lock buttons to unlock it. Hold the top and bottom handles of the output panel in that state and pull it out straight.



Before attaching or removing the output panel, set the Impulse Noise Simulator to the STOP state, wait for at least five seconds, and make sure that the power source supplying the power to the EUT is off. Failure to follow these instructions may result in an electric shock or damage to the CDN due to the generated high-voltage pulse or the EUT power supply.

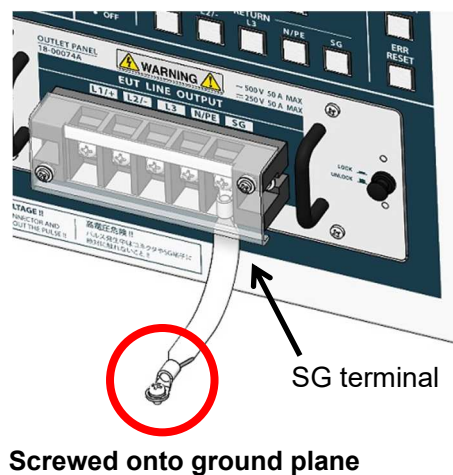
12-4. Connecting to Ground Plane (SG Terminal)

Connect the SG terminal [SG] of this CDN to the ground plane, using the supplied SG cable.

If the EUT has a grounding terminal, connect the EUT to the ground plane according to the manufacturer's installation standard.

Important

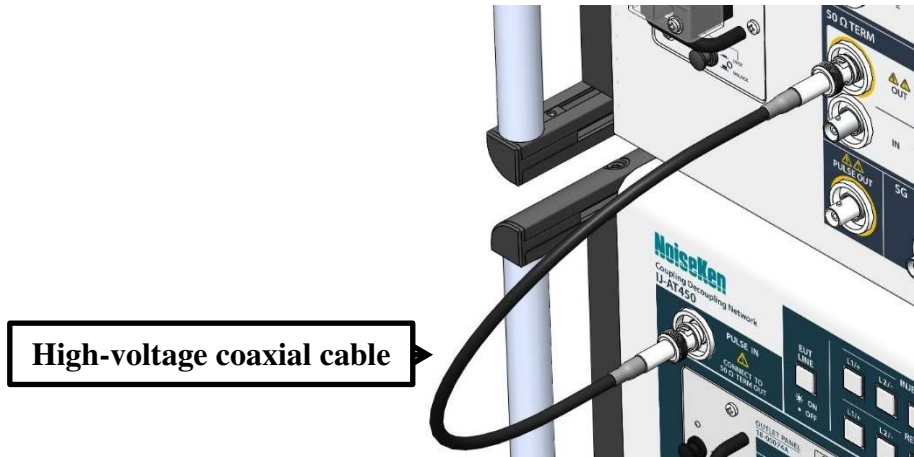
Conventional impulse noise simulators require this connection line to be removed when performing a line-to-line test (normal mode). As, however, this CDN can switch the pulse signal ground (standard ground) setting with its internal automatic selector, you can perform the test in both common and normal modes while the connection line is still attached.



If the supplied SG cable cannot be used for the connection, use the thickest, shortest-possible wire (a braided wire of 3.5 mm² or more is recommended) to connect to the ground plane.

12—5. Connecting Pulse Injection Cable

Connect the 50Ω terminal pulse output [50Ω TERM OUT] of the Impulse Noise Simulator and the pulse input connector [PULSE IN] of this CDN, using the supplied high-voltage coaxial cable.



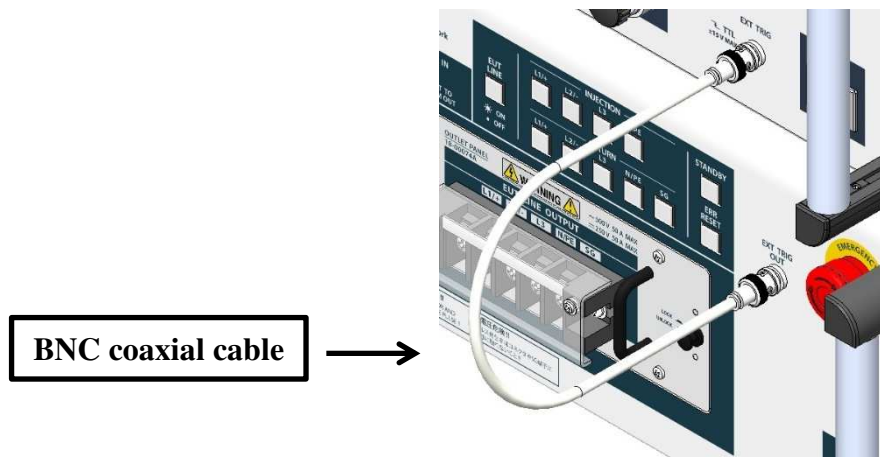
Do not connect anything to the EUT line output terminal of the Impulse Noise Simulator when using it in combination with this CDN. Also, do not connect the SG short plug supplied with the Impulse Noise Simulator to anything.



When the INS-40□□ series is used, the resistance is approximately 53.5Ω as it is combined with the terminal resistor inside the equipment. When connecting it with a generator, use a 53.5Ω coaxial cable to achieve the same characteristic impedance. (For details, contact your NoiseKen supplier or sales representative.)

12—6. Connecting Synchronization Signal Cable

When performing a pulse superimposition test using the PHASE (LINE synchronization) mode, connect the external trigger output connector [EXT TRIG OUT] of this CDN and the external trigger input connector [EXT TRIG] of the Impulse Noise Simulator using the BNC coaxial cable. For the operation method, refer to the instruction manual for the Impulse Noise Simulator.



12–7. Connecting EUT Line Input

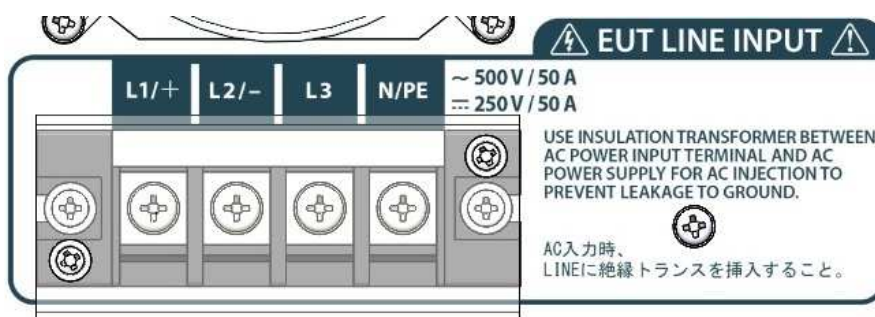
Connect the EUT power supply and this CDN.

Connect the EUT power supply to the EUT line input terminal block [EUT LINE INPUT] on the rear panel. Connect it according to the panel display of this CDN.

When connecting it, make sure that the power supply to the EUT is turned off and that the EUT power supply, Impulse Noise Simulator, and this CDN stop (Power OFF).

Use a EUT power supply and a power supply cable that are compatible with the EUT power capacity and attach a $\phi 5$ crimp contact to one end of the power supply cable. Fasten the power supply cable with a terminal screw, and then be sure to attach the protective cover to the terminal block.

The phase angle for pulse injection that is set when testing in PHASE (LINE synchronization) mode is controlled based on the AC power supply connected between L1 (+) and L2 (-) of the EUT line input terminal block.



EUT Line Input Terminal Block



- The screw size of the terminal block is M5.
- Each terminal, L1, L2, L3, and N floats from the enclosure of this CDN.



- When connecting the AC power supply for the EUT, input it via an isolation transformer. Input without an isolation transformer may result in an electric shock.
- This CDN does not have a built-in device to protect against overcurrent or overvoltage of the EUT LINE. Provide a protective device separately.

12–8. Connecting EUT

Before connecting this CDN with the EUT, turn off the EUT power supply and all the power supplies of this CDN and EUT.

Use a power supply cable for supplying power to the EUT that complies with the safety standard of the country where this CDN is installed and with the EUT power capacity. Attach a $\phi 5$ crimp contact to the cable and fasten the cable with a terminal screw, then be sure to attach the protective cover to the terminal block.

Information

In addition to the supplied standard terminal block type, a receptacle type of outlet panel is also available as an option. The receptacle type of output panel allows you to connect the power supply plug of EUT directly.

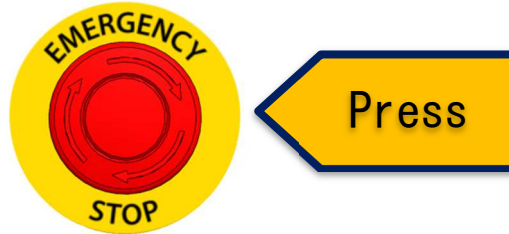


For details about the optional output panel, refer to “OPTIONAL PRODUCTS” on P.35

13. OPERATION

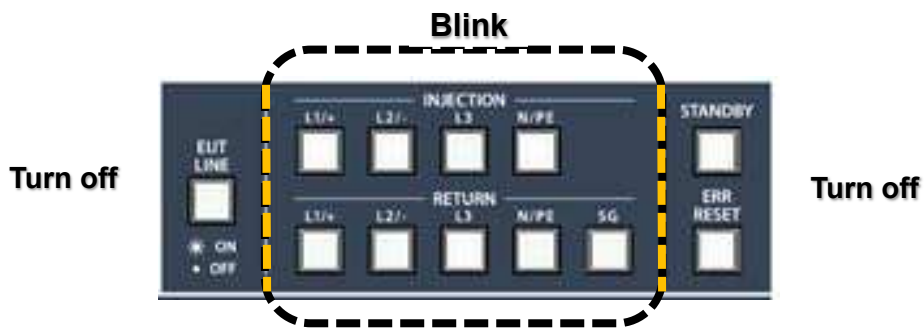
13–1. Operating Emergency Stop Button

Emergency stop button is just for emergency. Do not use it to stop usual operation.



When the emergency stop button is pressed, this CDN is forced into the following state.

- ◆ The EUT power supply to the EUT line output terminal block and the output of the superimposed pulse are turned off forcibly.
- ◆ The standby switch's light turns off and all injection switches and return switches blink.



Pressing the emergency stop button does not stop the output of a high voltage from the Impulse Noise Simulator. (However, output does stop when the optional remote software is used.)

After pressing the emergency stop button of this CDN, be sure to press the STOP switch of the Impulse Noise Simulator to stop the output of high voltage.

13–2. How to Cancel Emergency Stop Button

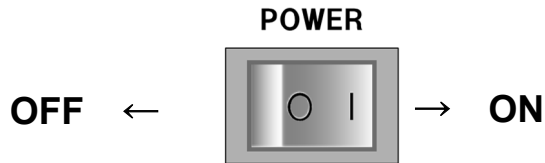
The emergency stop button can be cancelled by pulling it out towards you or turning it clockwise.



When cancelling an emergency stop, eliminate the reason why the emergency stop button was pressed and perform a sufficient safety check.

13—3. Turning Power Supply of this CDN On and Off

1. Press the power supply switch to the ON (|) side to turn on the power supply.
2. The standby switch blinks and the fan in the rear panel section operates.



3. Press the power supply switch to the OFF (○) side to turn off the power supply.

13—4. Initializing this CDN

After the power supply is turned on (and after an emergency stop is cancelled), the standby switch blinks.

Be sure to press the standby switch to initialize the internal automatic selector.

Pressing the switch moves the internal automatic selector to its home position.

The switch blinks rapidly during this movement. If initialization is completed normally, the switch lights up. If it is not completed normally, the emergency stop button is pressed, or an error is detected, the switch's light turns off.



For details, refer to *Types of Error Display and Actions* on [P. 32](#).



- This switch blinks intermittently during remote control.
- When initialization is completed normally, the following states are established:
 - Standby switch: Lit
 - Injection switches: None lit
 - Return switches: SG switch lit

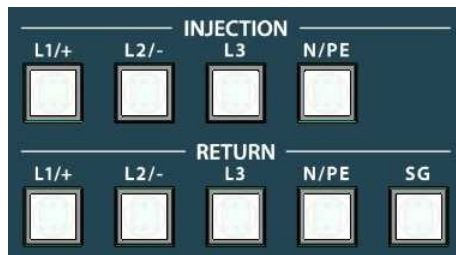
13—5.Setting High-voltage Pulse Injection Line

Set the pulse superimposition with this CDN.

Set the combination you want to test by using the injection switches [INJECTION] to select the phase of the pulse you want to inject and using the return switches [RETURN] to select the phase of the pulse you want to return.

The same pahse cannot be selected for injection phase and return phase. Also, when either an injection switch or return switch is in operation, the other switch cannot be operated.

As the internal automatic selector moves to the selected phase, the switch for the selected phase blinks rapidly. When the movement is completed, the switch lights up.



The following tests are available, depending on each combination.

(INJ refers to the injection phase and RET refers to the return phase.)

Setting					Test contents
L1	L2	L3	N	SG	
INJ				RET	Common mode test of L1 line
	INJ			RET	Common mode test of L2 line
		INJ		RET	Common mode test of L3 line
			INJ	RET	Common mode test of N line
INJ	RET				Normal mode test of L1 line
INJ		RET			
INJ			RET		
RET	INJ				Normal mode test of L2 line
	INJ	RET			
	INJ		RET		
RET		INJ			Normal mode test of L3 line
	RET	INJ			
		INJ	RET		
RET			INJ		Normal mode test of N line
	RET		INJ		
		RET	INJ		



- There is danger of an electric shock if the high-voltage coaxial connector or SG terminal is touched during pulse generation or while power is being supplied to the EUT line input terminal block.
- There is danger of an electric shock if the enclosure, high-voltage coaxial connector shell (external shell), or SG terminal is touched during a test, because one of the phases among the line phases is connected to the enclosure of this CDN. Also, if the high-voltage coaxial connector shell makes contact with any conductive part grounded to a ground in the test environment (e.g., the ground plane, SG terminal connecting line, etc.), the laboratory breaker may get activated and shut off the power source supplying the EUT. To prevent such incidents, be sure to insert an isolation transformer into the input power supply to the EUT line input terminal block at the back of this CDN.

13—6. Setting Impulse Noise

Set the impulse noise from the Impulse Noise Simulator, which serves as its generator.

- Output polarity
- Output voltage setting
- Pulse width setting
- Test time setting
- For using the PHASE (LINE synchronization) mode, refer to “Control Using External Synchronization Signal Input from Superimposition Unit” in the instruction manual for the Impulse Noise Simulator.



For the operation procedure of each setting, refer to the instruction manual for the Impulse Noise Simulator.

13—7. Starting Tests

Start tests from the Impulse Noise Simulator.

Turn on the EUT line switch of this CDN to supply power to the EUT. After checking that power is being supplied, press the START switch of the Impulse Noise Simulator to start pulse injection. The warning lamp of the Impulse Noise Simulator blinks during pulse injection.



※EUT line switch of this CDN



※Control Panel of the Impulse Noise Simulator



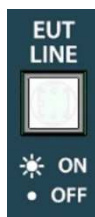
The EUT line switch will not turn on unless the outlet panel is attached normally. If the EUT line switch is turned on when the outlet panel is not attached normally, it is interpreted as an operational error and the EUT line switch blinks rapidly.

13—8. Stopping and Completing Tests

Stop tests from the Impulse Noise Simulator.

Pressing the STOP switch of the Impulse Noise Simulator immediately stops pulse injection and turns off the START switch's light. After that, turn off the EUT line switch of this CDN.

Connection changes should be made after pressing the STOP switch of the Impulse Noise Simulator and waiting for at least five seconds (until the residual voltage is eliminated through the operation of the static elimination circuit) and checking that the EUT power supply is off.



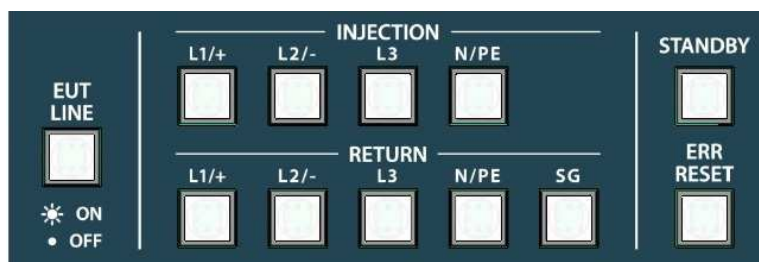
※EUT line switch of this CDN



※Control Panel of the Impulse Noise Simulator

14. Types of Error Display and Actions

The errors displayed on this CDN are as follows.



Error type	Description of state	Action
Fan error	Error reset switch: Blinking slowly	Eliminate factors obstructing the fan operation in the rear panel, if any, and then cancel the error.
Panel interlock error	Error reset switch / EUT line switch : Blinking rapidly	Press the STOP switch of the Impulse Noise Simulator and wait for at least five seconds after the pulse stops (until the charge voltage is eliminated through the operation of the static elimination circuit) before checking how securely the outlet panel is attached. After checking it, cancel the error.
Motor error	Error reset switch: Blinking rapidly Depending on the type of error, either the injection switches or the return switches blink together.	Cancel the error and press the standby switch. If the error state does not change, contact the customer service center or your supplier.
Standby error	Error reset switch: Blinking rapidly	
System error	Error reset switch: Lit	If the error state does not change after the power supply switch is turned off and back on, contact the customer service center or your supplier.

How to Cancel Errors

Hold down the error reset switch [ERR RESET] (for at least one second).

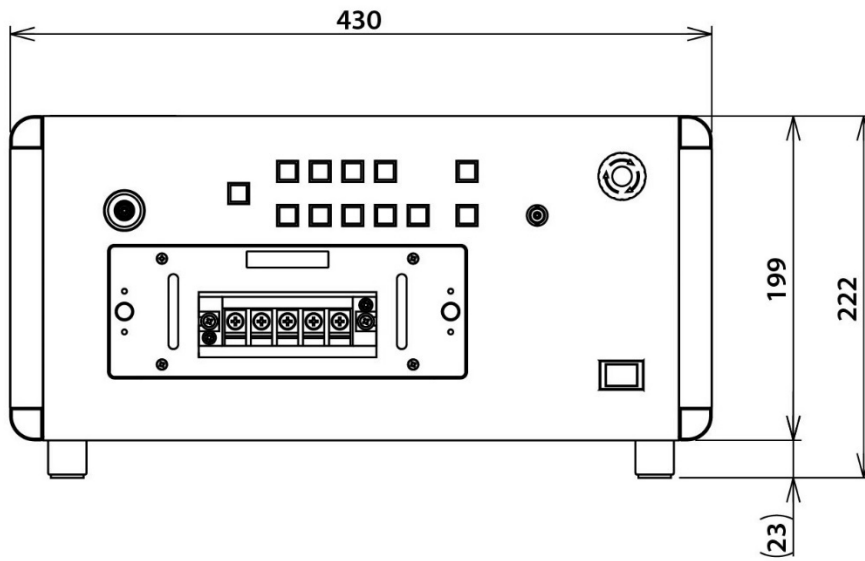


15. SPECIFICATIONS

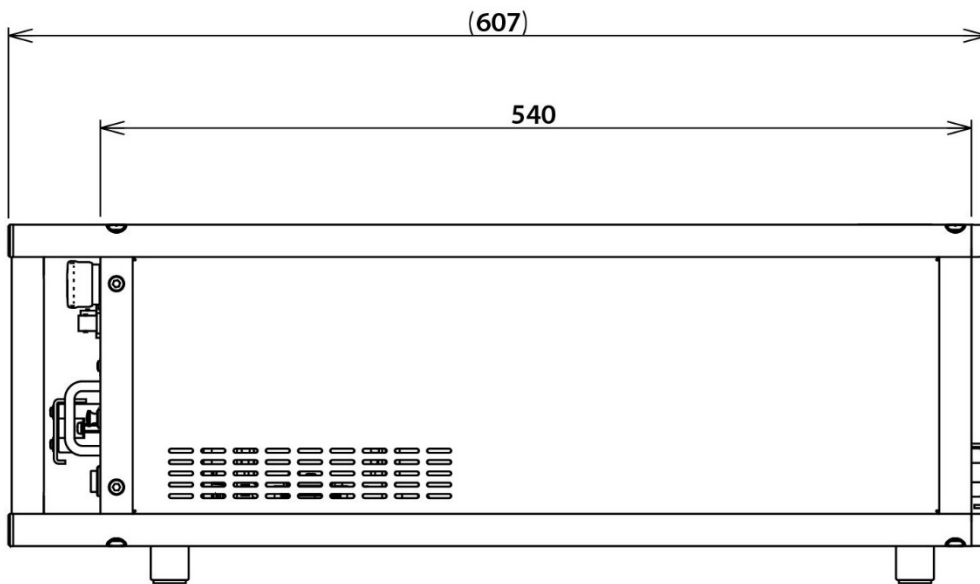
Item	Specification/Performance	Remarks
Input pulse voltage	4 kV MAX (with 50 Ω termination resistance)	
Input pulse terminal	High-voltage coaxial connector (NMHV)	NoiseKen original product
EUT line pulse output voltage	Input pulse voltage ±20% (with 50 Ω termination resistance)	Pulse width of input impulse noise: 1000 ns Regulated at a repetition frequency of 10 ms
EUT power supply capacity	3-phase, 4-line configuration (L1, L2, L3, N) AC 500 V 50 A 50 Hz/60 Hz DC 250 V 50 A	
Superimposed phase switching	Pulse superimposition: L1, L2, L3, N (3-phase, 4-line) RETURN connection: L1, L2, L3, N, SG Automatic switching by operating switch on front panel or remote control	
Superimposition mode	Common/normal	Automatic switching by superimposed phase setting
EUT line input terminal	Terminal block (screw size: M5)	
EUT line output terminal	Terminal block (screw size: M5)	
EUT line protection circuit	Built-in circuit breaker with electromagnetic switch ON/OFF by operating switch on front panel or remote control	Note) This CDN does not have a built-in device to protect against overcurrent or overvoltage of the EUT LINE. Attach a protective device that matches the operating rating, such as a fuse, breaker, or circuit protector, etc., to the EUT power supply.
Line input back-surge voltage	10% or less of set pulse voltage Regulated by releasing EUT line input/output	
Phase angle detection	Detects between L1 and L2, then outputs to EXT TRIG OUT terminal (BNC coaxial connector)	
Emergency stop button	Built-in mushroom-type switch for push-lock and rotation-release	When the emergency stop button is ON, the EUT power supply to the EUT line output terminal block is turned off and the injection of the superimposed pulse is turned off. Note) This is not designed to stop the pulse output on the Impulse Noise Simulator.
External control	Remote control enabled via PC	
Communication function	RS-232-compliant optical communication	The optional Optical Interface Unit is required to connect it to a PC.
Driving power supply	AC 100 V to 240 V ± 10 % 50 Hz/60 Hz ± 10 %	
Power consumption	55 VA	
Operating temperature	15 ~ 35 °C	
Operating humidity	25 ~ 75 % RH	No condensation

SPECIFICATIONS

Item	Specification/Performance	Remarks
Dimensions	Shown in the figure below (mm)	Without projection
Weight	Approx. 24 kg	



Front view



Rear view

16. OPTIONAL PRODUCTS

Major optional products are as follows.

For details, enquire Noise Laboratory or your nearest sales agent of Noise Laboratory.

Item	MODEL No.	Remarks
Remote Control Software	14-00062A	
OPTICAL INTERFACE UNIT	07-00023A	
Outlet panel	18-00069C	JP/USA type AC 125 V / 16 A
Outlet panel	18-00071A	Multiple type AC 250 V / 16A

17. WARRANTY

Servicing terms

The following terms are applicable to servicing by Noise Laboratory Co., Ltd., (hereafter referred to as the Company) provided to maintain the intended performance of its products.

1. Scope

The following terms shall apply only to products made by the Company.

2. Technical servicing fee

In the event of a failure of a product within the warranty period (see warranty section), the Company will repair a product without charge. After the warranty expires, repairs will be billed at a nominal cost.

3. Ownership of defective parts

Any defective part exchanged under the Company's servicing belongs to it.

4. Limited liability

In the event that damages resulting from servicing by the Company are intentional or caused by negligence, the Company will pay the cost but at the purchase value of the relevant product maximum. But, notwithstanding the foregoing, the Company shall not be responsible for any incidental or consequential damages of any nature, including without limitation thereof loss of would-be profit or compensation demanded from a third party

5. Refusal to offer servicing

The company may not accept a repair order in the following cases:

- More than 5 years have passed since the product discontinued
- More than 8 years have passed after delivery
- Required component for servicing already discontinued and no alternative is available.
- Product changed, repaired or remodeled without obtaining a prior permission from the Company.
- Product severely damaged to the extent it has lost its original form

Limited warranty

Noise Laboratory Co., Ltd. (hereafter referred to as the Company) warrants its products to be free from defects in materials and workmanship under normal use and service for a period of one year from date of delivery. In the event of failure of a product covered by this warranty, the Company will repair the product or may, at its option, replace it in lieu of repair without charge.

Notwithstanding the foregoing, the Company shall not be responsible for any incidental or consequential damages of any nature, including without limitation thereof loss of would-be profit or compensation demanded from a third party. This warranty is valid only in Japan.

1. Scope

This warranty shall only apply to products made by the Company.

2. Period

One year from date of delivery. The warranty may be valid in 6 months after servicing if the same failure on the same component has repeated.

3. Exclusions

The followings are exclusions from this warranty:

- Consumable parts (including HV relay)
- Failure caused by misuse, neglect, accident or abnormal conditions of operation
- Failure caused by remodeling on the user side without prior permission from the Company
- Failure caused by servicing by unauthorized personnel by the Company
- Failure due to force majeure including but not limited to, acts of God, fire, war, riot, rebellion and others
- Failure due to shock or drop in or after transit
- Failure due to operation in environment being out of ambient specifications.
- A unit shipped to overseas.

18. MAINTENANCE

1. When repair, maintenance or internal adjustment of this CDN is required, a qualified service engineer takes charge of such work.
2. Maintenance on the user side is restricted to the outside cleaning and functional check of this CDN.
3. When checking or replacing the fuse, turn off the switch of this CDN and disconnect the plug socket beforehand.
4. When cleaning this CDN, turn off the switch of this CDN and the connected equipment and disconnect the plug socket beforehand.
5. Avoid using chemicals for cleaning. Otherwise, the coating of this CDN may peel off or the sight glass may be broken.
6. Do not open the cover of this CDN.

19. NOISE LABORATORY SUPPORT NETWORK

- If a symptom which seems a trouble is found, inform the model name and serial number of the product together with the symptom to Noise Laboratory or your nearest sales agent of Noise Laboratory.
- 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.

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