



INSTRUCTION MANUAL

**AC LINE CDN
for Impulse Noise Simulator
MODEL IJ-5100**

NOISE LABORATORY CO., LTD.

Edition1.03
AEB00317-00E-0D

NOTICE

- The contents of this instruction manual (the “Manual”) are subject to change without prior notice.
- No part of the Manual may be reproduced or transferred, in any form and for any purpose, without the permission of Noise Laboratory Co., Ltd.(the “Company”)
- The contents of the Manual have been thoroughly examined. However, if you find any problems, misprints, or missing information, please contact the dealer where you purchased your product (the “Dealer”).
- The Company or the Dealer will not accept any responsibility for any loss or damage resulting from improper usage, failure to follow the Manual, or any repair or modifications of this product (the “Unit”) undertaken by a third party other than the Company or parties authorized by the Company.
- The Company will not accept responsibility for any loss or damage resulting from remodeling or conversion solely undertaken by the user.
- In addition, please note that the Company cannot be held responsible for any consequences arising from the use of this product.

1. IMPORTANT SAFETY PRECAUTIONS

The following is very important matters in order to safely handle this product (called unit hereafter). Read carefully them and strictly observe them.

1. **Use of this unit in an explosive area such as "No fire" area etc. is prohibited. If used in such an area, it is liable to cause combustion or ignition due to discharge.**
2. **Any person who has an implanted pacemaker in the body should not operate this unit. Furthermore, such a person should not enter the test area while this unit is operating.**
3. **Before connecting the equipment under test (called EUT hereafter), check to see that the EUT LINE breaker is off, otherwise an electric shock due to supply power voltage may be caused.**
4. **Fully put in each coaxial connector and make sure connection by rotating it clockwise until a "click" is heard.**
5. **Be extremely careful of an electric shock due to the generated pulses and power supply to EUT.**
6. **Be sure to go through "Basic Safety Precautions" before use listing safety precautions for test set-up, connection and execution of test.**
7. **In normal mode test, the outside conductors of high voltage coaxial connectors of this unit and impulse noise simulator are connected to a line of EUT lines. Be extremely careful of an electric shock while EUT lines are electrified.**

2. APPLICATION FORM FOR INSTRUCTION MANUAL

We place an order for an instruction manual.

Model: IJ-5100

Serial No.: _____

Applicant:

Company name: _____

Address: _____

Department: _____

Person in charge: _____

Tel No.: _____

Fax No.: _____

Cut
line

Cut off this page "application form for instruction manual" from this volume and keep it for future use with care.

When an INSTRUCTION MANUAL is required, fill in the above Application Form and mail or fax it to your nearest sales agent of Noise Laboratory or Noise Laboratory.

Your sales agent:

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4. PREFACE

4-1. Preface

We thank you very much for your purchasing coupling / decoupling network for Impulse Noise Simulator (hereinafter INS) MODEL: IJ-5100 (hereinafter “the Unit”). In order to obtain the highest performance from the Unit, it is recommended that the contents of this instruction manual (hereinafter “the Manual”) be thoroughly understood and used as ready reference for operation and maintenance.

- The Manual is written for well-trained EMC technicians who can follow the instruction for operation of the Unit to handle it safely and to utilize it fully.
- Keep the Manual in a place where readily available when you use the Unit.
- The Manual is not including detailed explanation about INS. For how to use INS, refer to the instruction manual of it. The instruction manual of INS is also including matters that require attention for safety handling. Carefully read it with the counterpart of the Manual.
- As for the connection to INS, explanation in the Manual is based on the case using with INS-4020 or INS-4040.

4-2. Features

- The Unit is 3 phase 5 line (L1, L2, L3, N, PE) type Coupling / Decoupling Network (=CDN) used with INS for EUT test in case that EUT’s power capacity is up to AC480V/100A.
- The Unit with INS enables EUT test that is synchronized with EUT line.

5. BASIC SAFETY PRECAUTIONS

5-1. Symbols of Hazard



Means a warning.

If such a danger is not avoided, a potential danger which may result in a death or serious injury will be caused.



Means a caution.

If such a danger is not avoided, a potential danger which may result in a minor or medium degree of injury will be caused.

5-2. Basic Safety Precautions



1. Use of this unit in an explosive area such as "No fire" area etc. is prohibited. If used in such an area, it is liable to cause combustion or ignition due to discharge. [Precautions for human body and environments]
2. Mishandling and careless operation of this unit will result in a deadly injury. [Precautions for human body, operation, environment and connection]
3. Any person who has an implanted pacemaker in the body should not operate this unit. Furthermore, such a person should not enter the test area while this unit is operating. [Precautions for human body and operation]
4. Before connecting the EUT, check to see that the EUT LINE breaker is off, otherwise an electric shock due to supply power voltage may be caused. [Precautions for human body and connections]
5. When connecting cables and carrying out settings, place the unit in the STOP conditions beforehand, otherwise, an electric shock due to high voltage may be caused. Even in the STOP conditions, keep a 5 seconds lapse as residual voltages may exist. [Precautions for human body and connection]
6. Fully put in each coaxial connector and make sure connection by rotating it clockwise until a "click" is heard. Insufficient connection leads to unwanted discharges inside the coaxial connectors. [Precautions for human body and connection]
7. Be extremely careful of an electric shock due to the generated pulses and power supply to EUT. [Precautions for human body and connection]
8. To avoid an electric shock even when EUT does not have proper function or is broken, never apply any pulse voltage to any metallic object which is not grounded. [Precautions for human body, environment and connection]
9. 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 unit. [Precautions for human body, operation, environments and connection]

 **CAUTION 注意**

10. The SG terminal provided on the front panel of this unit functions as the signal reference ground for testing. In common mode test, connect SG terminal to a ground plane securely. [Precautions for connection]
11. The test rig used in conjunction with this unit should be insulated against a minimum voltage of 8kV (when the built-in 50Ω terminator disconnected from the test circuit). [Precautions for environments]
12. During test, high level of electromagnetic radiation may be generated depending on the type or nature of the EUT and thus causing interference with nearby electronic equipment and radio communication equipment. In such case, the user may have to take measures such as a faraday case, shielded room, shielded cable and so on. [Precaution for environments]
13. Keep a cable from an output terminal further enough away from other equipment. Malfunction may occur if the distance is not enough. [Precautions for operation]
14. To ensure safety in operation, use the accessories and optional equipment supplied by our company. Use of others may degrade the safety and performance of this unit. [Precaution for handling and safety]
15. Do not use nor keep the unit in a hot or cold environment (Operating temperature: 15°C~35°C/Operating humidity range: 25~75%) otherwise, the unit may be damaged or only exhibit limited performance. [Precaution for environments]
16. If condensation is found, fully dry the unit before operating it, otherwise, the unit may be damaged or only exhibit limited performance. [Precautions for environments]
17. Do not drop the unit or do not give strong shock to the unit. [Precaution for handling]
18. When installing the unit, do not block the vent. [Precaution for environments]
19. Do not apply voltage exceeding the rated voltage range. [Precautions for installation and connection]
20. The coaxial connectors used for this unit is of NoiseKen original design. Use of other type of connectors may cause electric shock hazards or malfunctions of the unit. [Precautions for handling and safety]
21. There flows big leakage current between line-input terminals because of existence of a decoupling capacitor. Put an isolation transformer if necessary. (In case of AC480V/60Hz, max 145mA leakage current will flow.)
22. For power supply to the unit, use a power supply cable conforming to voltage/current. [Precaution for environments and connection]
23. When conducting powered EUT testing, be sure to turn ON this unit and check to see that the power lamp is on. Testing in OFF status may cause damage or deteriorate some components in this unit due to the temperature rise since the cooling fan does not work. [Precautions for handling and safety]

 **CAUTION 注意**

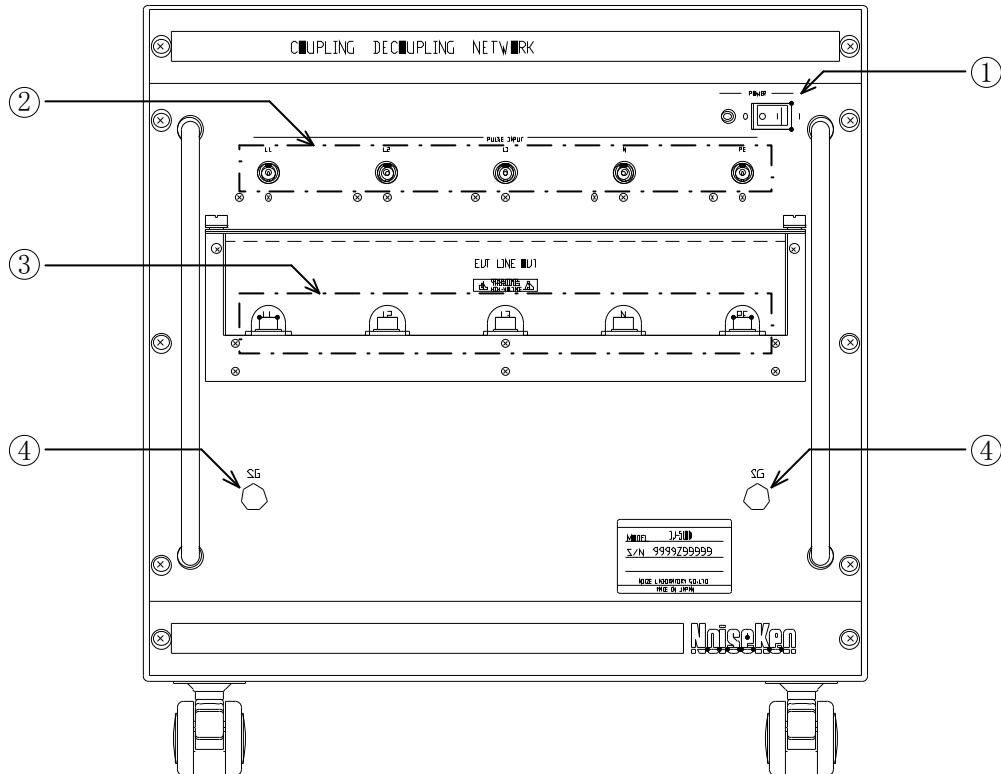
24. Only a service engineer authorized by our company should perform repair, maintenance work and internal adjustment. [Precaution for handling and safety]
25. Do not wipe off the body and peripheral equipment with thinner, alcohol or other solvent. When the unit is dirty, soak a cloth in a detergent, wring it and wipe the unit with this cloth. Using solvents may spoil the appearance. [Precautions for handling]

5-3. When Warning Label is Missing

1. When warning label is lost, or peeled off or dirty, put up a new one for extra safety.
2. When warning label is lost, contact our company's sales dept. or maintenance dept. for issuance.

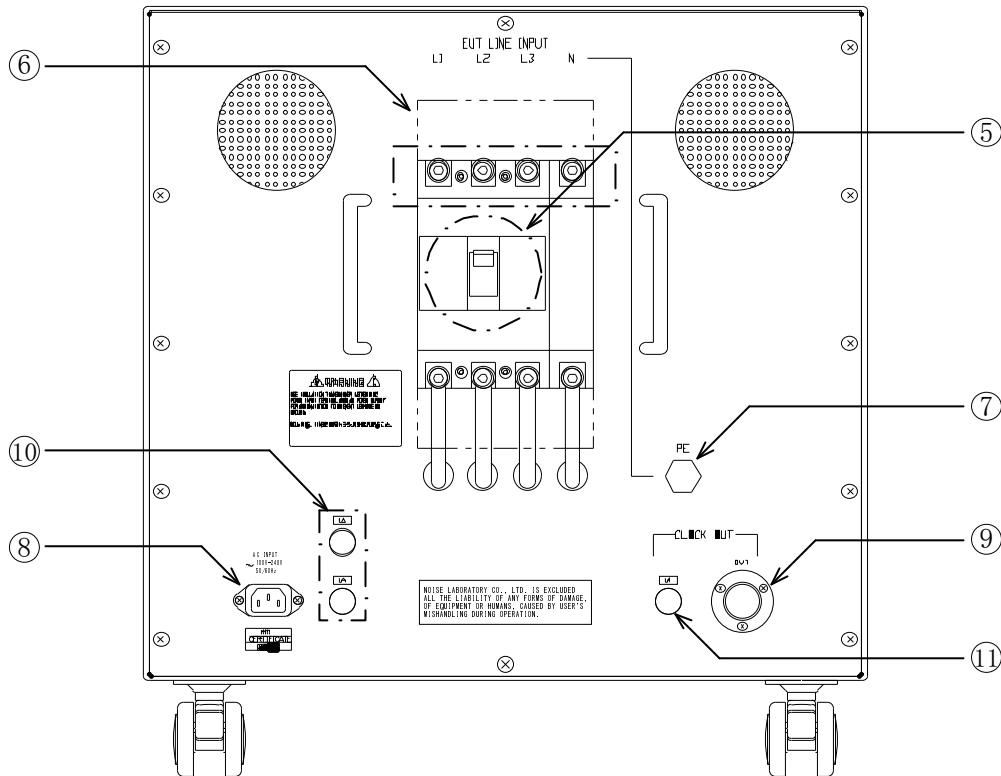
6. NAME AND FUNCTION OF EACH PART

6-1. Front Panel



- ① POWER POWER switch and lamp (green LED)
Lights on when power is supplied.
- ② PULSE INPUT PULSE INPUT connector (L1, L2, L3, N, PE)
High voltage coaxial connector (=NMHV connector) for injecting a high voltage pulse
- ③ EUT LINE OUT EUT LINE OUT terminal (L1, L2, L3, N, PE)
Connected to EUT power supply
Tighten M8 hexagonal bolt with a hexagonal wrench.
- ④ SG Ground terminal for impulse noise signal (high voltage)
The connection way varies depending on test mode (common mode and normal mode).
Connect the attached SG cable.

6-2. Rear Panel

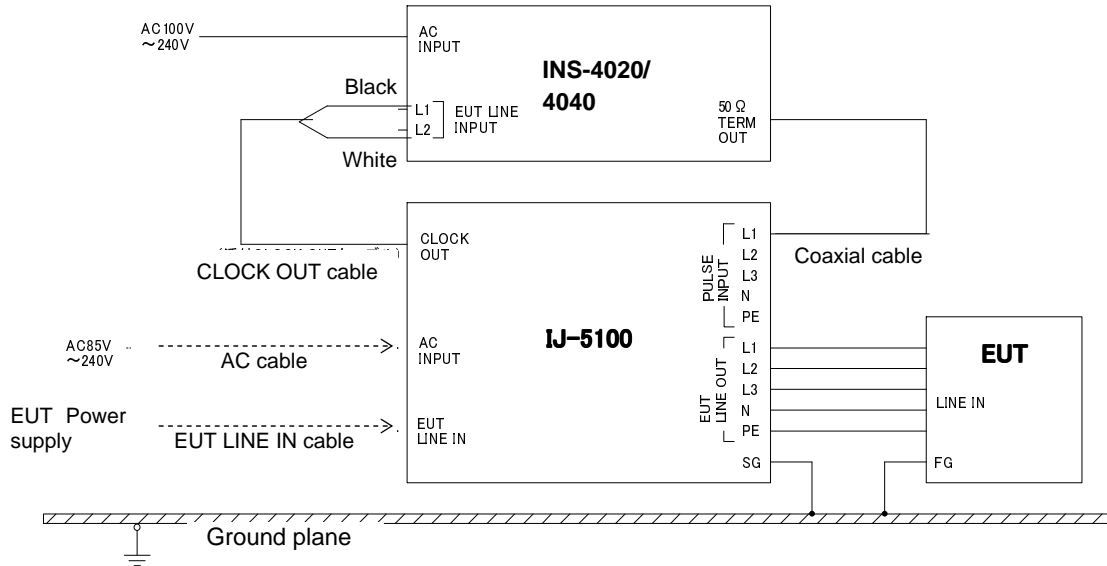


- ⑤ Breaker..... For supplying power to EUT
Turn ON when starting test.
※ Be sure to turn OFF except testing time.
- ⑥ EUT LINE IN..... EUT LINE IN terminal (L1, L2, L3, N)
Terminal connecting to power supply for EUT
Use the attached line-in cable.
- ⑦ PE EUT LINE PE input terminal
Use the attached PE cable.
- ⑧ AC INPUT Power supply inlet (100-240V 2A)
Use a proper AC cable according to voltage/current.
- ⑨ CLOCK OUT..... Connector for outputting LINE synchronization signal (pin#1: L1, pin#2:L2)
Outputs signal detected from L1-L2.
A half of the input voltage will be output to L1-L2.
Connect it to LINE INPUT (L1, L2) of INS injection part with the attached CLOCK OUT cable.
- ⑩⑪ Fuse Holder..... ⑩ : Fuse holder for the fan (2A)
⑪ : Fuse holder for outputting synchronization signal (1A)
Three pieces of fuse (2Ax2, 1Ax1) are attached in the standard accessory as spares.

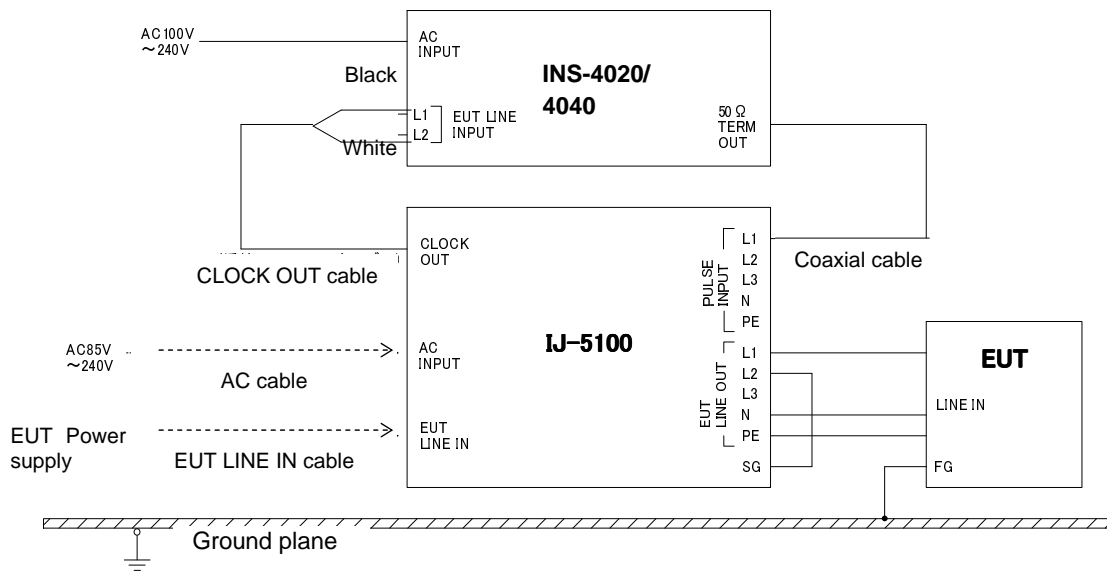
7. CONNECTION

■ How to connect to INS-4020/4040

Example of common mode test (L1-GND)



Normal mode test (L1-L2)



※ When connecting, never fail to confirm that the power supply for EUT and the breaker on rear panel of the unit are turned OFF.

8. HOW TO USE

8-1. Connecting EUT

- ① Put ground plane on floor and set this unit, INS, and EUT on the ground plane.
- ② Check that both power supply for EUT and a breaker on rear panel are turned OFF.
- ③ Connect EUT L1, L2, L3, N and PE on rear panel to power supply for EUT.

※As all of L1, L2, L3 are power lines and equivalent each other, L1-L2 is detected for line synchronization. For N, connect midpoint of 3 phases (L1, L2, L3). For PE, connect PE of EUT line. If there is no applicable line, each terminal does not have to be connected.

※※The purpose of the attached PE cable is mainly for protective earth. If a big current flows into PE of EUT, prepare another PE cable suitable for bigger current.

8-2. Test Method

A) Common mode test (Line-Ground)

- ① Connect the terminator output of INS to PULSE INPUT CONNECTOR (high voltage coaxial connector) of the phase to be injected.
- ② Connect SG terminal securely to the ground plane with a low RF impedance cable (3.5mm² or more braided wire recommended) of the shortest possible length.
- ③ Connect the earth terminal of EUT, if it has, to the ground plane, if necessary.
- ④ Turn on AC INPUT on the rear panel and check Power lamp turns on and the fan of this unit is working at the bottom part of this unit.
- ⑤ Turn on EUT power supply and the breaker on rear panel to turn on the electricity to EUT lines.
- ⑥ Operate INS according to the instruction manual of it.

B) Normal mode test (Line-Line)

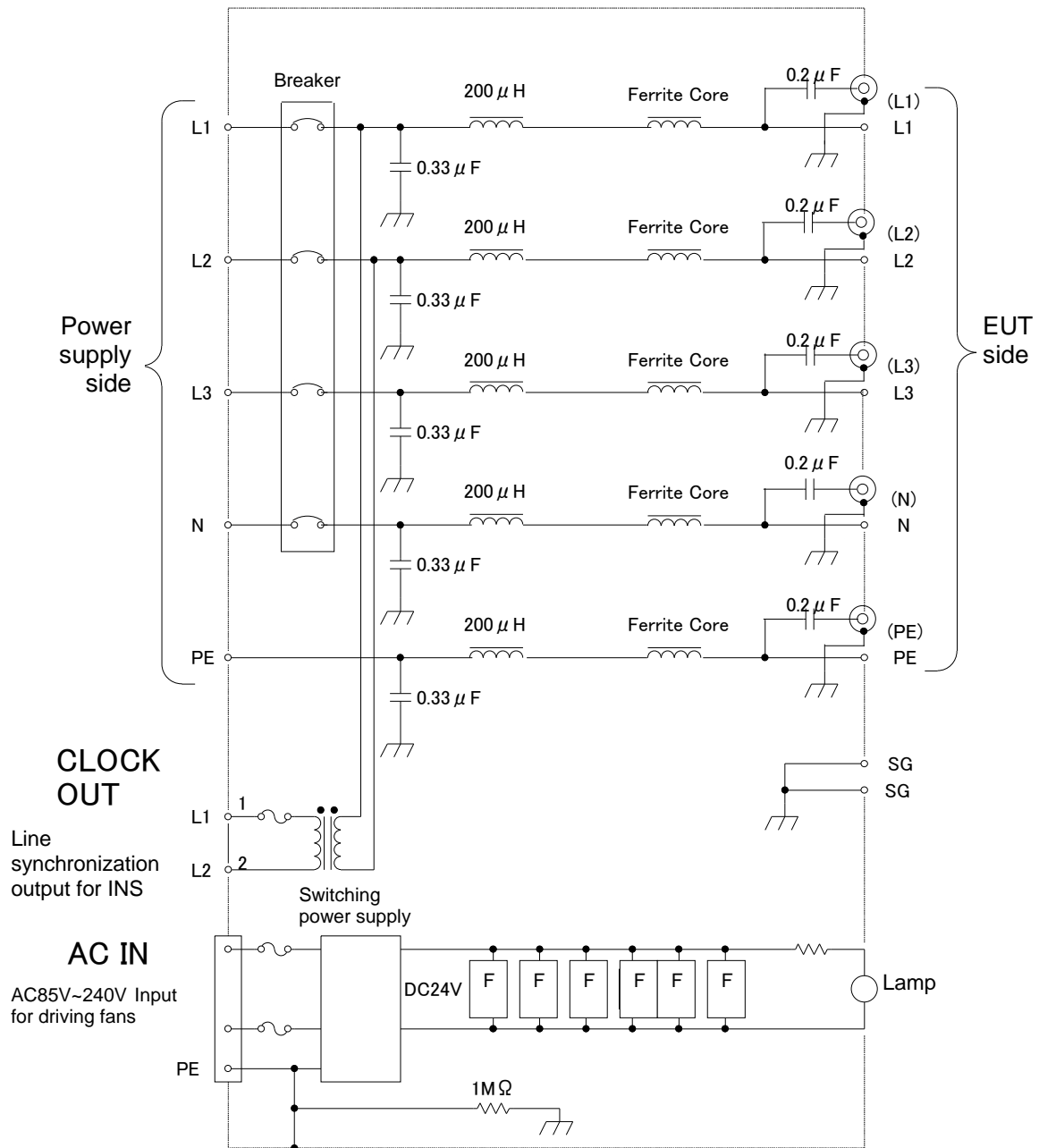
- ① Connect the terminator output of INS to PULSE INPUT CONNECTOR (high voltage coaxial connector) of one of the phase to be injected.
- ② Connect EUT LINE OUT terminal of the other phase to SG terminal of this unit with a low RF impedance cable (3.5mm² or more braided wire recommended) of the shortest possible length. Do not connect SG terminal of this unit to the ground plane.
- ③ Turn on AC INPUT on the rear panel and check Power lamp turns on and the fan of this unit is working at the bottom part of this unit.
- ④ Turn on EUT power supply and the breaker on rear panel to turn on the electricity to EUT lines.
- ⑤ Operate INS according to the instruction manual of it.

9. SPECIFICATIONS

| ITEM | FUNCTION and PERFORMANCE |
|---------------------------------|--|
| Maximum pulse injection voltage | 4000V (50Ω Terminate) |
| EUT Line | 3 phase 5 line (L1, L2, L3, N, PE) |
| EUT Line maximum voltage | AC 480V |
| EUT Line maximum current | 100A |
| Line synchronization output | 1/2 of EUT input voltage |
| Transit characteristics | Within -10 dB at 10 kHz~1 GHz |
| CDN Power supply | AC 100-240V ±10%50/60 Hz |
| Dimensions | Approx. (W)488 mm×(H)520 mm×(D)825 mm (Including projection) |
| Weight | Approx.115 kg |

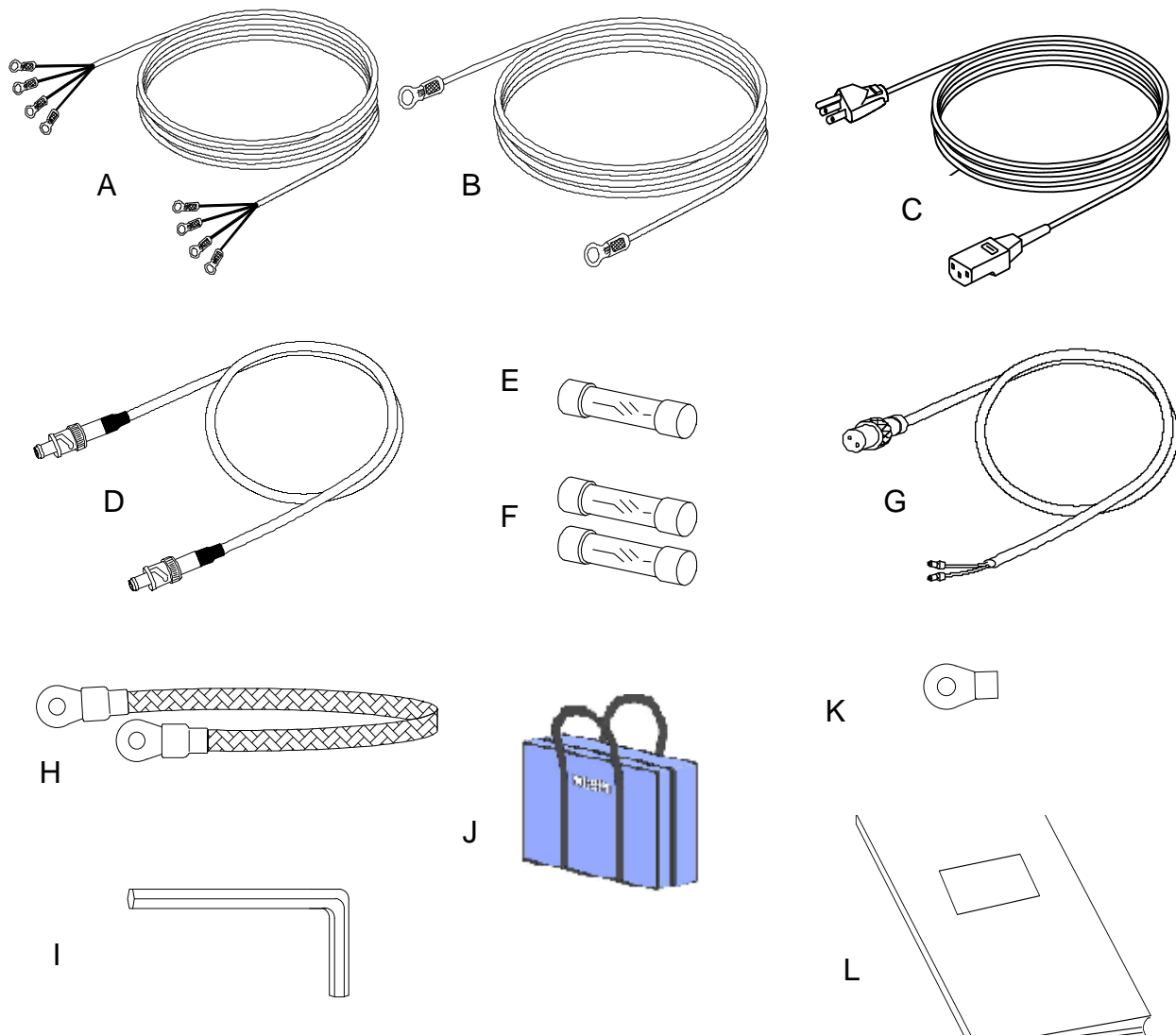
10. BLOCK DIAGRAM

■ Block diagram



※The frame is connected to PE of AC IN. SG terminal (ground of a pulse signal) is floated via a high resistance resistor.

11. ACCESSORIES



| | | |
|---|--|-------|
| A | : Line input cable (38mm ² 4 line with 8 φ terminal Approx. 3m) | 1 pc |
| B | : PE cable (UL1015#14 green/yellow with 8 φ terminal Approx. 3m) | 1 pc |
| C | : AC cable (for driving a fan) | 1 pc |
| D | : Connection coaxial cable (Approx. 50cam) | 1 pc |
| E | : Fuse for line synchronization (1A) | 1 pc |
| F | : Fuse for fan (2A)..... | 2 pcs |
| G | : CLOCK OUT cable | 1 pc |
| H | : SG cable..... | 2 pcs |
| I | : Hexagonal wrench..... | 1 pc |
| J | : Accessory bag | 1 pc |
| K | : Solderless pressure terminal (R38-8) | 4 pcs |
| L | : Instruction Manual (this book) | 1 pc |

12. WARRANTY

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 fore 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.

13. MAINTENANCE

1. The mercury relay is an expendable supplies. If a symptom such as output pulse unstable, etc happens, the mercury relay shall be replaced.
2. When repair, maintenance or internal adjustment of the unit is required, a qualified service engineer takes charge of such work.
3. Maintenance on the user side is restricted to the outside cleaning and functional check of the unit.
4. When cleaning the unit, turn off the switch of this unit and the connected equipment and disconnect the plug socket beforehand.
5. Avoid using chemicals for cleaning. Otherwise, the coating of the unit may peel off or the sight glass may be broken.
6. Do not open the cover of this unit.

14. NOISE LABORATORY SUPPORT NETWORK

- If a symptom that seems a trouble is found, check the symptom against the following check sheet and inform the model name and serial Number of the product together with the symptom to Noise Laboratory or our nearest sales agent in your area.
- 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, pack the product and repair order sheet in the former package or equivalent suitable for transit, and send them back.

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