

NoiseKen®

INSTRUCTION MANUAL
IMPULSE NOISE SIMULATOR
FILTER & INJECTION UNIT
MODEL IJ-02/IJ-03

Noise Laboratory Co., Ltd.

INS-IJ (3.05 EDITION)

[AEB000322-00E-2F](#)

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1 IMPORTANT SAFETY PRECAUTIONS

Thoroughly understand the following precautions before use, as they are important matters for handling this unit in safety.

1. This unit cannot be used in an explosive area, fire prohibited area, etc. Use of this unit in such an area is liable to cause combustion or ignition.
2. A person who has a pacemaker on should not operate this unit and also should not enter the area where it is operating.
3. When connecting cables and carry out settings, place the unit in the STOP conditions and interrupt the EUT supply beforehand, otherwise, an electric shock due to high voltage may be caused. Even in the STOP conditions, allow 5 seconds to elapse, as residual voltages may exist.
4. Before connecting the equipment under test (called EUT hereafter), check to see that the unit is in the STOP conditions and that the EUT supply is interrupted (EUT LINE INPUT), otherwise supply power voltage or the generated pulse voltage may cause an electric shock hazard.
5. An isolation transformer is indispensable for power supply input to the EUT. Power supply connection to the EUT LINE INPUT shall be always done through an isolation transformer.
6. Fully put in each coaxial connector and make sure connection by rotating it clockwise until a "click" is heard.
7. Be extremely careful of an electric shock due to the generated pulses and power supply to EUT.
8. Be sure to go through Section 4 BASIC SAFETY PRECAUTIONS before use listing safety precautions for test set-up, connection and execution of test.

2 APPLICATION FORM FOR INSTRUCTION MANUAL

We place an order for an instruction manual.

Model: _____

Serial No.: _____

Applicant:

Company name: _____

Address: _____

Department: _____

Person in charge: _____

Tel No.: _____

Fax No. _____

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

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

To: Noise Laboratory Co., Ltd.

1-4-4 Chiyoda Sagamihara City,

Kanagawa Pref., 229-0037 Japan

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

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

Cut
line

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4.1 Warning signs and their meanings



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.

4.2 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 equipment under test (called EUT hereafter), check to see that the unit is in the STOP conditions and that the EUT supply is interrupted, otherwise supply power voltage or the generated pulse voltage may cause an electric shock hazard. [Precautions for human body and connections]
5. When connecting cables and carrying out settings, place the unit in the STOP conditions and interrupt the EUT supply beforehand, otherwise, an electric shock due to high voltage may be caused or the unit may be damaged. Even in the STOP conditions, allow 5 seconds to elapse, 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. When conducting coupling tests to the EUT LINE, the signal ground of the HV pulse generator circuit and one line (phase) of the EUT LINE may be connected, causing a shock hazard if the users touch the outer conductor of the HV coaxial connectors. In addition, if the outer conductor of the HV coaxial connectors is connected to any grounded subject, leak current will flow, tripping the ground fault interrupter embedded in the facilities. To avoid these two types of events, use of an isolation transformer is indispensable. Be sure to connect the EUT LINE INPUT to the isolation transformer secondary. [Precautions for human body and connection]

WARNING 警告

9. The AC INPUT (AC inlet) terminal on the rear panel has a conductor for safety grounding connection. This unit shall be connected to a properly grounded service outlet through the AC INPUT. When this unit is not grounded through the AC INPUT, PE terminal positioned next to it shall be used. [Precautions for connection]
10. High voltages exist inside the unit. Never open the covers. [Precautions for human body]
11. 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

12. The G terminal provided on the front panel of this unit functions as the signal reference ground for testing. The PE terminal (EUT) is for the protective earth conductor for the EUT. The protective earth terminals for this unit itself are the AC inlet earth pin (AC INPUT) and PE positioned in close proximity. These SG, EUT PE, simulator PE are independent each other. When conducting tests, make connections according to Section 8 OPERATION. [Precautions for operation and connection]
13. The test rig used in conjunction with this unit should be insulated against a minimum voltage of 8kV (when the built-in 50 Ω terminator disconnected from the test circuit). [Precautions for environments]
14. 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 cage, shielded room, shielded cable and so on. [Precaution for environments]
15. Be sure to connect the ground plane to the safety ground. [Precautions for operation and safety]
16. To ensure safety in operation, use the accessories (use power cord and LINE input cable with relevant safety agency approval) and optional equipment supplied by our company. Use of others may degrade the safety and performance of this unit. [Precaution for handling and safety]
17. 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]
18. 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]
19. Do not drop the unit or do not give strong shock to the unit. [Precaution for handling]
20. When installing the unit, do not block the vent. [Precaution for environments]
21. Do not supply voltage exceeding the rated voltage range. [Precautions for installation and connection]



22. Only a service engineer authorized by our company should perform repair, maintenance work and internal adjustment. [Precaution for handling and safety]
23. 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]
24. 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]

4.3 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.

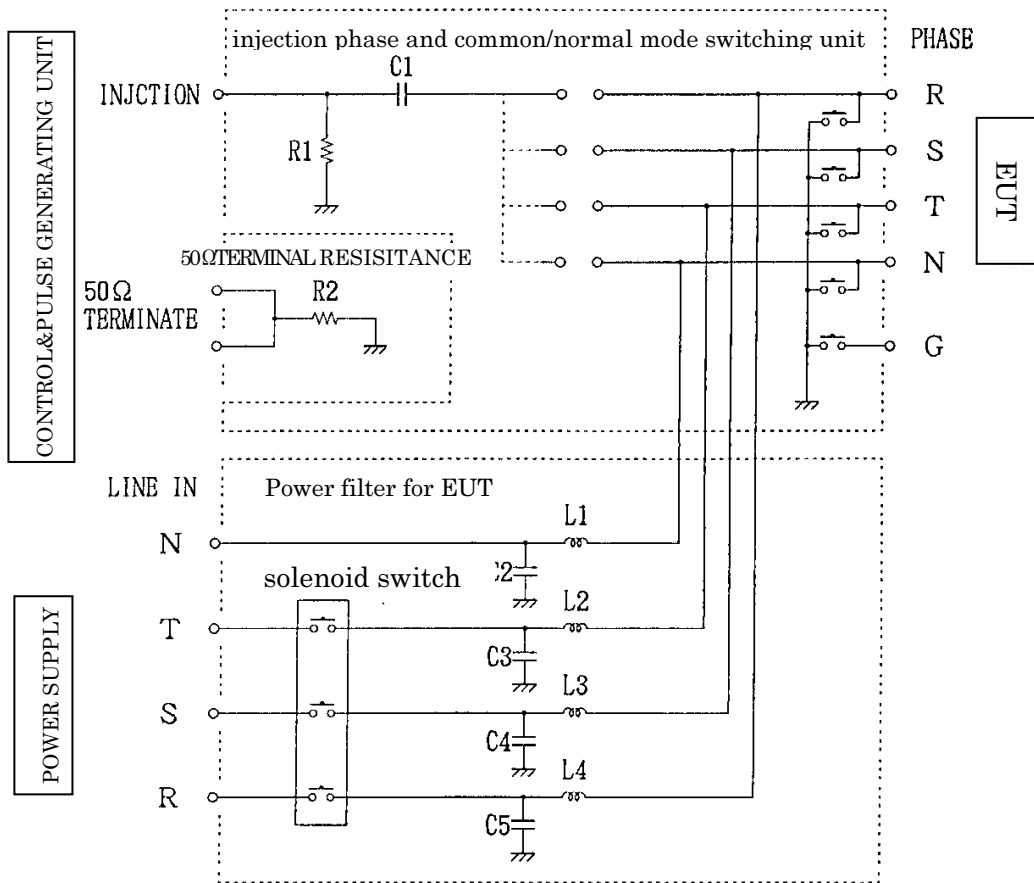
5 FEATURES: CAPABILITIES OF THIS UNIT

By using this unit in combination with the control & pulse generating Unit (INS-200AX, INS-300AX and INS-400AX), you can conduct a noise test for EUT with power capacity of up to AC 240V (single/3-phase)/DC 65V, 30A. Switching of injection phase and common/normal mode is automatic.

■ Components of Filter & Injection Unit

This unit consists of injection phase and common/normal mode switching unit, 50Ω terminal resistance and power filter for EUT. (Refer to Fig. 5-1.)

Fig. 5-1 Filter & injection unit block diagram



C1: Coupling condenser R1: Injection resistance
 R2: Terminal resistance
 C2~5, L1~4: Filter condenser

6 STANDARD ACCESSORIES

This unit is supplied with the following standard accessories.

- Coaxial cable (1m x 1 pc.)..... Fig.6-1-A

It is used to connect to Control & Pulse Generating Unit.

- Coaxial cable for terminal resistance.. (18cm x 1 pc.)..... Fig.6-1-B

It is used to connect terminal resistance with injection IN.

- Output terminal (Red x 4 pcs.)..... Fig.6-1-C

It is connected to output connector on front panel of the unit so as to inject high voltage pulses to EUT.

- GND terminal (Black x 1 pc.)..... Fig.6-1-D

GND terminal for common mode testing

- Line input cable (2m x 1 pc.).....

Fig.6-1-E

It connects to terminal base for line input on rear side of the unit.

- Power cable (1 pc.)..... Fig.6-1-F

Power supply cable for operating solenoid switch.

- Fuse (2 pcs.).....

Fig.6-1-G

Spare fuse (250V, 2A) provided on the rear panel of the unit

- Carrying bag.....

Fig.6-1-H

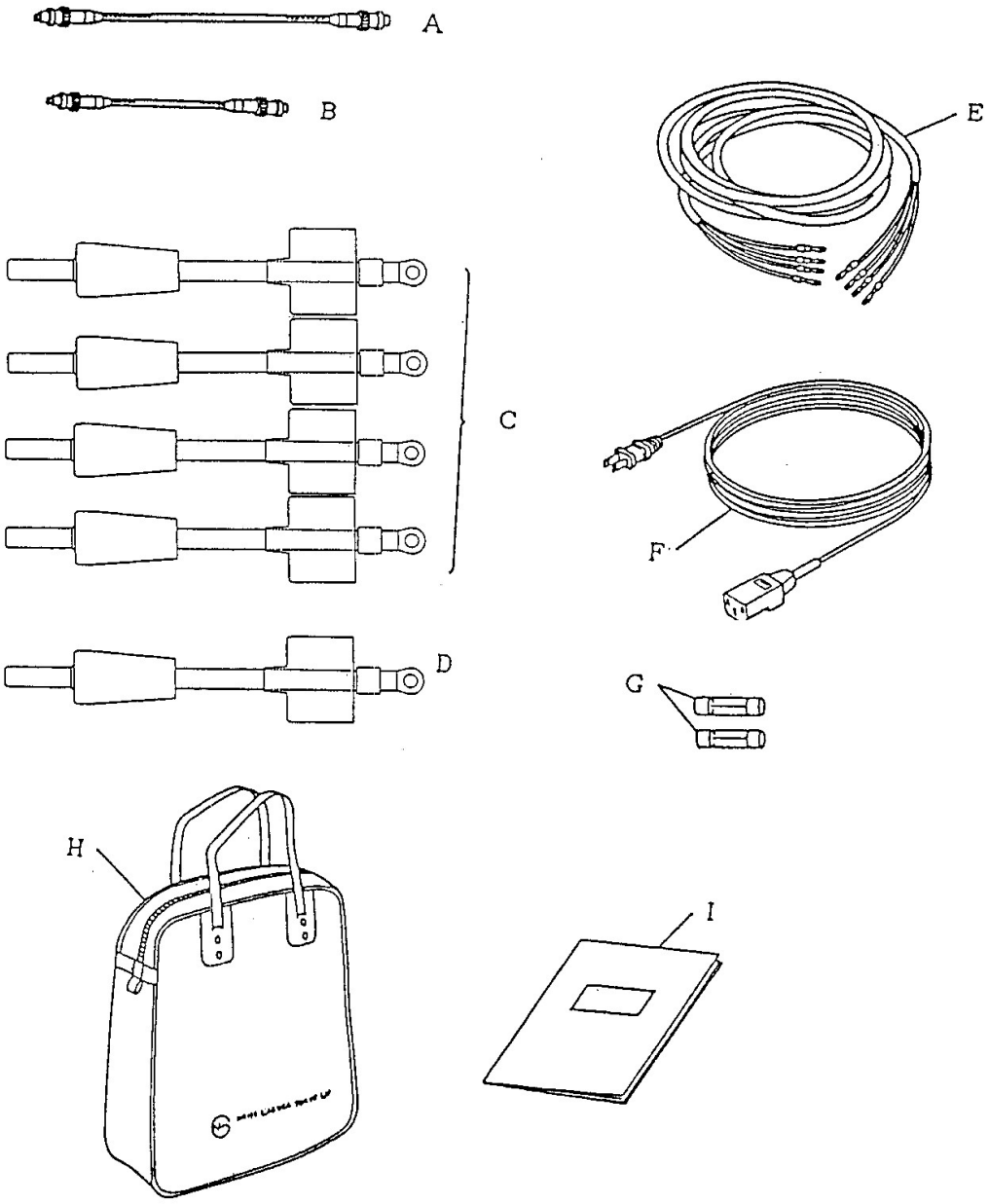
It is used to carry standard accessories.

- Instruction manual.....

Fig.6-1-I

It is this booklet.

Fig. 6-1 Standard accessories



7 NAME AND FUNCTION OF EACH PART

“Pulse injection connector”, “50 Ω terminal resistance”, “output indicating LED” and “output connector” are arranged on the front side of this unit. “Control connector”, “operating power connector and fuse”, “terminal base for EUT” and “breaker” are arranged on the rear side of the unit.

■ Front side (Fig. 3-1)

① Injection (Injection connector).....It is used to input pulses. It connects to 50 Ω terminate with the supplied coaxial cable for terminal resistance.

② 50 Ω terminator.....50 Ω terminal resistance. It connects to PULSE OUT of control & pulse generating unit with the supplied coaxial cable for injection.

③ R (R phase indicating LED)

④ S (S phase indicating LED)

⑤ T (T phase indicating LED)

⑥ N (N phase indicating LED)

It is used to indicate the phase to which pulses are injected. LED of the phase to which pulses are injected is on.

⑦ R (R phase output connector)

⑧ S (S phase output connector)

⑨ T (T phase output connector)

⑩ N (N phase output connector)

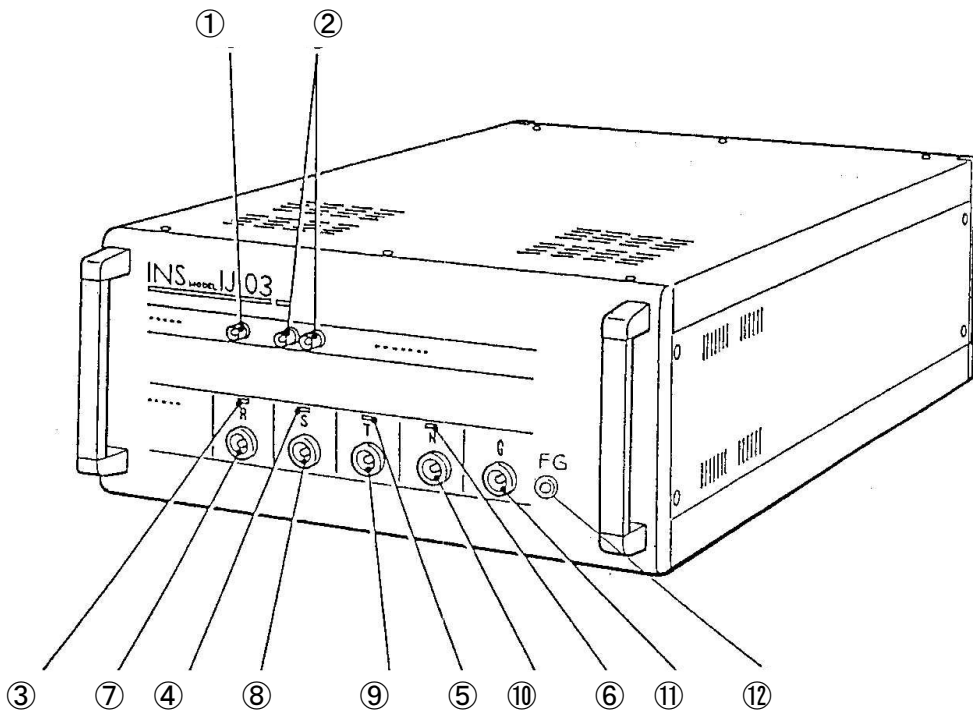
It is used to inject pulses to EUT. Pulses injected from INJECTION are injected to EUT. It connects to the supplied output terminal.

⑪ G (GND terminal)

GND terminal for common mode testing It connects to the supplied GND terminal. It is automatically switched in the unit in case of normal mode testing.

⑫ FG (Frame ground for optional unit).....Frame ground for optional plug socket box

Fig. 7-1 Front view of the unit



■ Rear side (Fig. 7-2)

① TO CONTROL UNIT (Control connector)

It connects to TO INJECTION UNIT of Control & Pulse Generating Unit. Use the control cable (standard accessory) of Control & Pulse Generating Unit for connection.

② AC IN (AC input connector)

Connector for power supply to solenoid switch for line input

③ FUSE

Power fuse is for solenoid switch for line input of this Unit. Two spare fuses are supplied.

④ FG (Frame ground)

Frame ground terminal

⑤ EXT. CLOCK (Auxiliary line input)

Auxiliary line input for line synchronization. Correct line synchronized signal cannot be detected from defective line input in case where the Unit is used in combination with VDS or other similar cases. In this case, apply normal line input to EXT. CLOCK terminal.

*The right terminal is for R phase and the left one is for S phase.
Input voltage range: 100VAC~240VAC

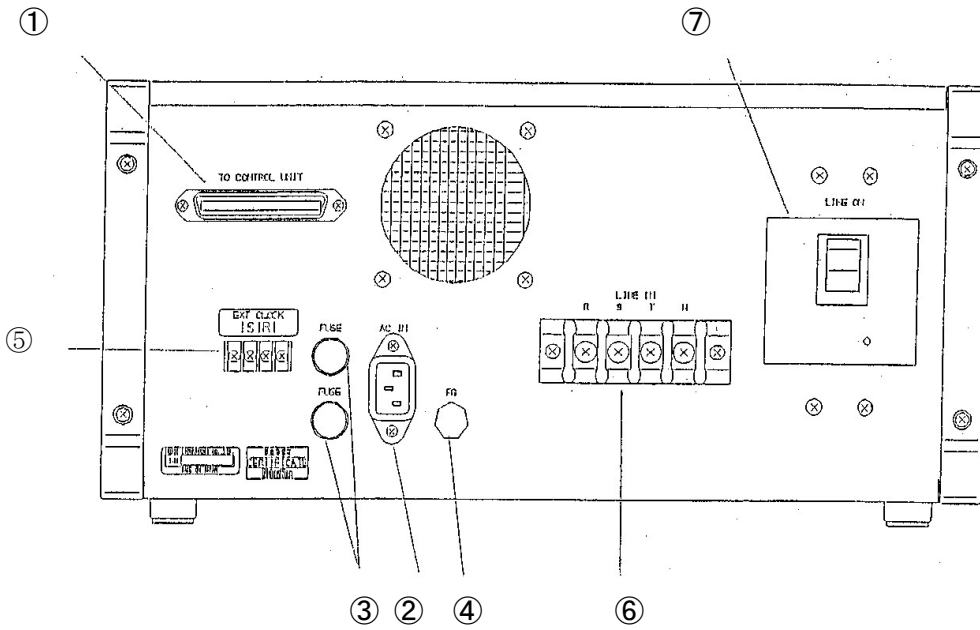
⑥ LINE IN (Line input terminal)

Input connector is for power supply to EUT. It connects with the supplied line input cable.

⑦ LINE INPUT BREAKER (LINE ON)

Circuit breaker is for excessive current and short-circuiting.

Fig. 7-2 Rear view of the unit



8 OPERATION

When conducting a noise test using this Unit, follow the operating precautions. For how to set each test screen, refer to the instruction manual (User's guide).

Operation with this unit used in combination with the control & pulse generating unit is described below:

■ Operating precautions

① Position

As this Unit incorporates a mercury relay, place it horizontally.

② Environment

Operate the Unit at temperature of 15~35°C and humidity of 25~75%.

③ Fully insert the coaxial connector of each part and rotate it clockwise until a click is heard to secure connection.

④ Change the input voltage select terminal of Filter & Injection Unit to the intended voltage.

⑤ Line synchronized signal is detected from R phase and S phase of line input. In case of 3-phase input, line synchronized signal is also detected from R phase and S phase.

9 CONNECTIONS

■ How to connect to FG terminal for INS-AX Series

INS-AX Series has a floating structure equipped with FG terminal and G terminal. The function of these terminals and how to connect to them are explained below:

FG terminal is GND potential for chassis.

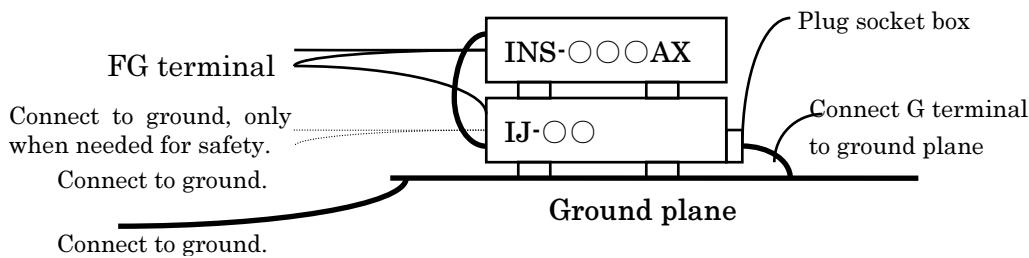
INS-○○○AX has one FG terminal on the rear panel.

IJ-○○ has a total of 2 FG terminals (one on the front panel and one on the rear panel).

- FG terminal on the front panel of IJ-○○ is provided to connect the case of a plug socket to the chassis of IJ-○○ automatically, when a plug socket box is connected.
- FG terminal of the rear panel is provided to connect the chassis of INS-○○○AX to that of IJ-○○. Make connection with the supplied GND cable.

When it is necessary to connect the chassis to the ground for safety, connect FG terminal on the rear panel to the ground directly. It is supposed the ground plane, which serves as a test environment, has been connected to the ground. However, connect FG terminal directly to the ground. Namely, do not connect it to the ground plane.

Example of connection



G terminal is Signal GND for output pulses.

Connect G terminal to the ground plane that serves as a test environment. When a plug socket box is used, connect G terminal of the plug socket box to the ground plane.

A common mode test and a normal mode test are available as test methods.

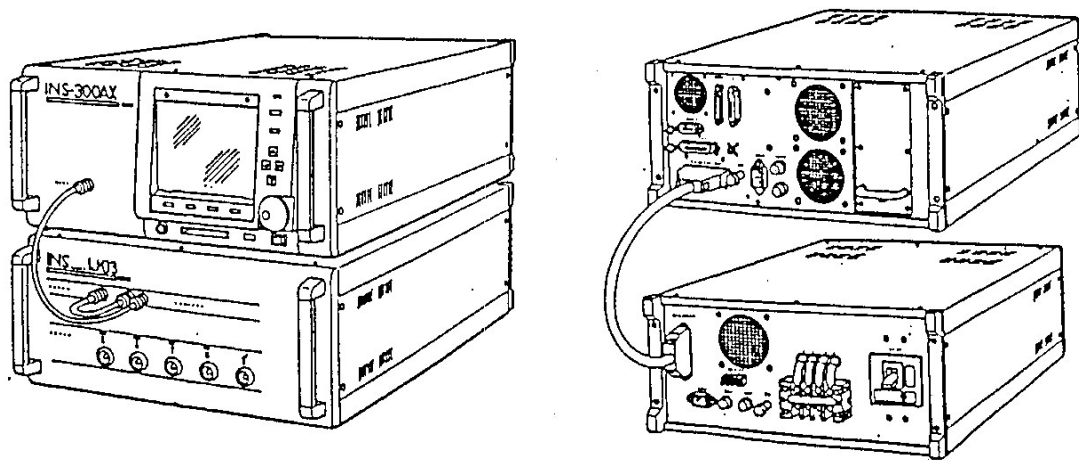
In case of a common mode test, G terminal becomes Signal Ground, which is connected to the ground plane by connecting G terminal to the ground plane.

In case of a normal mode (interphase injection) test, Signal GND is separated from G terminal and connected to one of power phases (R, S, T, N) in IJ-○○, while G terminal is left connected to the ground plane.

(It is not necessary to disconnect G terminal from the ground plane in a normal mode test. For INS-400 Series, on the other hand, it is necessary to disconnect G terminal.)

■ Connecting Control & Pulse Generating Unit and Filter & Injection Unit (Fig. 8-2)

- ① Connect “TERMINATION” (terminal resistance) and “INJECTION” of Filter & Injection Unit with the coaxial cable for terminal resistance (standard accessory).
- ② Connect “PULSE OUT” of Control & Pulse Generating Unit and “TERMINATION” of Filter & Injection Unit with the coaxial cable for injection (standard accessory) of Filter & Injection Unit.
- ③ Connect “TO INJECTION UNIT” of Control & Pulse Generating Unit and “TO CONTROL UNIT” of Filter & Injection Unit with the control cable (standard accessory) of Control & Pulse Generating Unit.



This illustration shows a model with an optional unit.

Fig. 8-2 Connection of this unit and Filter & Injection Unit

10 PERFORMANCE AND SPECIFICATIONS

This unit is designed to inject noise to AC line of EUT by using in combination with Control & Pulse Generating Unit.

Table 1 shows the performance and specifications of this unit.

Table 9-1 Performance and specifications of this unit

Item	IJ-02	IJ-03	Remarks
Power capacity of EUT	AC240V DC65V Single/3-phase, 30A (With solenoid switch)	AC240V DC65V Single/3-phase, 50A (With solenoid switch)	
Injection phase switching	Automatic		
Normal/common mode switching	Automatic		
50 Ω terminal resistance	Built-in		
Power supply	AC90~250V 50Hz/60Hz		
Operating temperature range	15~35°C		
Dimensions	420 W x 200 H x 600 D mm		Projection not included
Weight	Approx. 26kg		

11 HOW TO CHECK THE WAVEFORM

The output waveform shall be verified with the units placed in the same set-up as the actual test run and with the supplied output terminals connected to either Phase Output Connector, by using an oscilloscope and high voltage probe.

Equipment to be required

- Oscilloscope with 100MHz or higher bandwidth
- HV probe with 10KV or higher withstand voltage

The hot lead of the HV probe shall be connected to the Phase Output Connector and the ground lead shall be connected to the selected phase as the pulse ground (internally connected with the ground of the pulse generator circuitry)

CAUTION 注意

Insertion of an isolation transformer between the unit LINE IN and AC supply is indispensable, as the scope chassis may be connected to the Phase (active or hot) of the AC supply depending on setting.

12 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.

13 MAINTENANCE

1. When repair, maintenance or internal adjustment of the unit 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 the unit.
3. When checking or replacing the fuse, turn off the switch of the unit and disconnect the plug socket beforehand.
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.

